
DESCRIPTIVE CATALOGUE OF THE COLLECTIONS OF GEMS
IN THE UNITED STATES NATIONAL MUSEUM.

BY

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I. DEFINITION AND PROPERTIES OF GEM MINERALS.

A gem mineral may be defined as a mineral of any sort distinguished, especially when cut and polished, for its beauty, durability, or rarity.

The essentials, beauty and durability, are dependent upon the color, brilliancy, and hardness of the stone, and these in turn are dependent upon certain chemical and physical properties characteristic of any one kind of mineral as compared with all other kinds of minerals. A detailed description of all these properties is to be found in any textbook of mineralogy, so that a discussion of them here will be limited to those that will afford a more or less ready means of distinguishing one kind of gem from another or upon which their beauty largely depends. These several properties are:

Color.—The character of the color in any one kind of gem is not a constant, and may vary within rather wide limits. The garnet, for example, which popularly is supposed to be a blood or purplish red stone, varies through red of several shades to brown, black, green, yellow, and nearly white. The color depends upon the power of absorbing certain portions of light and reflecting others—that is, absorbing certain rays of the spectrum that pass through or fall upon its surface. Thus a gem appears red because it absorbs all other colors and reflects, or transmits chiefly the reds; a gem appears green because it reflects, or transmits chiefly green rays, absorbing all others. In all cases the color results from the constituents of the light which have not been absorbed. Those which reflect or transmit all the colors in the proportions in which they exist in the spectrum and absorb none are white; those which absorb all and reflect or transmit none are black. Between these two limits there is an infinite variety of hues, according to the greater or less extent to which substances reflect or transmit some colors and absorb others.

Among minerals the many varieties of color are classed, first, as metallic and nonmetallic, and all shades are referred to eight fundamental colors—white, gray, black, blue, green, yellow, red, and brown; second, according to peculiarities in the arrangement of color, as play of color, opalescence, iridescence, and asterism; third, as to difference in color shown for light transmitted in different directions through the stone. This case of color absorption is called pleochroism and is peculiar to certain minerals.

Diaphaneity.—The capacity of transmitting light materially affects the beauty and value of gems. There is a wide difference in the degree of this property possessed by most gems and the amount of light transmitted, or the degree of transparency is classed as transparent when the outline of an object seen through the stone is perfectly distinct; subtransparent when an object may be seen but its outline is indistinct; translucent when light is transmitted but objects are not seen; subtranslucent when merely the edges are translucent; opaque when no light is transmitted.

Luster.—This is that character depending upon the power and manner of reflecting light and is dependent upon the nature of the reflecting surface and the quantity or the intensity of the light reflected. The kinds of luster are described as metallic, the brilliant appearance seen upon the surface of polished metal; adamantine, the luster of the diamond; vitreous, having the luster of flint glass; resinous, having the appearance seen upon the surface of pine resin; waxy, the luster of beeswax; greasy, when resembling that of a freshly oiled surface; pearly, the luster of mother-of-pearl; silky, when having a sheen like that of silk. The degrees of intensity are splendid, shining, glistening, glimmering, and dull. There being no standard of description in regard to luster, these terms are loosely used and intermediate ones may be substituted in describing a particular kind of luster according to the judgment of the observer.

Refraction of light.—The familiar case of the apparent breaking of an oar where it enters the water is an illustration of the bending back or refraction of light. This phenomenon occurs in the majority of cases where a ray of light passes obliquely from one transparent medium to another. Part of the incident ray enters the medium and changes its direction, or is refracted.

For example, if in fig. 1 ao is a ray of light passing from air into water, its path will be changed after passing the surface at o and it will continue in the direction ob . Conversely, if a ray of light, bo , pass from the denser medium, water, at o , it will take the direction oa . Now, if $yo\epsilon$ is a perpendicular to the surface, ww , at o , it will be seen that the angle aoy , called the angle of incidence (i) of the ray, ao , is greater than the angle $bo\epsilon$, called the angle of refraction (r), and what is observed in this case is found to be universally true. Again, how-

ever great or small the angle of incidence may be, there is always a constant relation between it and the angle of refraction for two given substances. This constant relation is the ratio between the sines of the incident and refracted angle, and is called the *index of refraction*.

When a ray of light passes from one medium into another which is less refracting, as from water into air, the angle of incidence is less than the angle of refraction. Hence when light is propagated in a mass of water there is always a value of the angle of incidence such that the angle of refraction is a right angle, in which case the refracted ray emerges parallel to the surface of the water. This angle is called the *critical angle*, since for any greater angle the incident ray can not emerge, but undergoes an internal reflection, which is called total reflection because the incident light is entirely reflected. From water to air the critical angle is $48^{\circ} 35'$. In the example given, air and water, $r = 48^{\circ} 35'$. Now, supposing the light to go from b to o , the line oe will coincide with the line of (the critical angle). If the value of r is increased, the ray will no longer pass from water into air, but undergoes total reflection at the surface o .

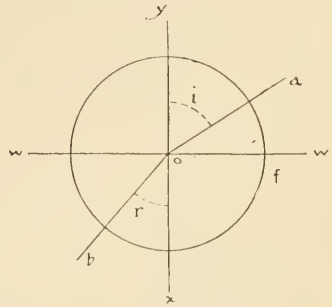


Fig. 1.

DIAGRAM TO ILLUSTRATE REFRACTION.

In total reflection there is no loss of light from absorption or transmission, and accordingly it produces the greatest brilliancy. The luster of transparent bodies bounded by plane surfaces, such as the luster of gems, arises mainly from total reflection. This luster is the more frequent and the more brilliant the smaller the limiting angle. The diamond, having the smallest value for its limiting angle, is the most brilliant of all gems.

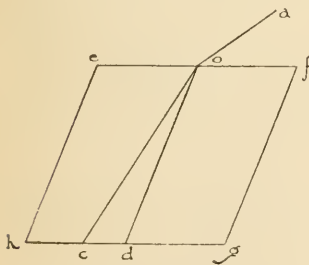


Fig. 2.

DIAGRAM TO ILLUSTRATE DOUBLE REFRACTION.

There are certain transparent substances which possess the power of splitting the refracted ray into two. The most familiar example of this is furnished by the mineral calcite. If $efgh$ (fig. 2) be a cleavage piece of calcite and a ray of light meets it at o , it will in passing through be divided into two rays, oc, od , one of which follows the ordinary law of refraction, the other a more complicated law. Similarly, a line seen through a piece of calcite ordinarily appears double. This phenomenon is called *double refraction*. The diamond, garnet, and all other minerals belonging to the isometric system are singly refracting. The ruby, topaz,

and all minerals belonging to systems of crystallization other than the isometric are doubly refracting.

Dispersion of light.—When a ray of light passing from one medium to another is refracted, it may be decomposed into several kinds of light, separated more or less widely from each other and differently colored. A familiar example of this is seen when a beam of sunlight passes through a flint-glass prism and produces a band of colors in all the hues of the rainbow. This decomposition of light by refraction is called dispersion. Upon it depends that peculiar quality of “fire” or play of prismatic hues in gems, a marked characteristic in the diamond and zircon.

Polarization of light.—The light which passes through a doubly refracting crystal undergoes a peculiar change. A ray of light which has been once split by passing through a doubly refracting substance will not again be divided on passing through another doubly refracting substance, nor can it again be reflected at a certain angle, nor again traverse in a certain direction the substance in which it has suffered this change. Light which has acquired these properties is said to be polarized.

Pleochroism.—This is the variation in color observed in doubly refracting minerals when viewed in different directions. This property is conspicuous in the tourmaline, iolite, chrysoberyl, and epidote. The pleochroism of gems can best be observed with the aid of an instrument called the dichroscope.

This consists of an oblong rhombohedron of Iceland spar, at the extremities of which is cemented a glass prism of 18° . This is contained in a cylindrical metal case having a convex lens at one end and a square opening at the other. On looking through the lens the square opening appears double. When a pleochroic gem is examined in transmitted light with this instrument, the two squares on a revolution will be found to have different colors at certain intervals.

Phosphorescence.—The emission of light or phosphorescence may be produced in different ways; by rise of temperature, by mechanical effect, and by insolation—that is, by exposure to the direct action of sunlight. Phosphorescence is a property possessed by some gems, notably the diamond.

Hardness.—This is the degree of resistance the mineral offers to abrasion. It is usually referred to an arbitrary scale of ten minerals showing a regular gradation in hardness from 1, talc, the softest; 2, gypsum; 3, calcite; 4, fluorite; 5, apatite; 6, orthoclase; 7, quartz; 8, topaz; 9, corundum, to 10, diamond, the hardest. The scale is used as follows: Fragments of the minerals comprising the scale are applied in succession to the stone under examination. Should the test stone neither scratch nor be scratched by a particular unit in the scale, the hardness of the two are the same. Should the test piece scratch one

and be scratched by the next number of the scale above it, its hardness is somewhere between the two units.

The property of hardness is an essential in gem stones, since upon it depend its capabilities of receiving and retaining a high degree of polish and of resisting wear from abrasion. It is also often an available method of identifying a gem. In testing cut stones, however, care must be taken not to disfigure them, and, if possible, the girdle, or the part hid by the mount, should be used as the test surface. Furthermore, the term "hardness" must not be confused with toughness or difficulty of breakage. A very hard stone may be a very brittle or fragile one. Hardness means simply liability or nonliability to scratch.

Specific gravity.—This is the density of a body compared with that of distilled water at a certain temperature (commonly at 60° F.).

The determination of specific gravity is in principle very simple. The substance is at first weighed in air, then in water; divide the weight in air by the loss of weight in water, and the quotient is the specific gravity. Thus if a gem weighs 5 grams in air and only 3 in water, it is evident that it has displaced 2 grams of water, and its specific gravity is 2.5.

In order to get absolute results, very delicate balances have to be used and many precautions taken, but for ordinary work such care is not necessary.

A very convenient specific-gravity apparatus that is sufficiently close for ordinary use is the Nicholson hydrometer (fig. 3). This consists of a float having a descending hook, to which is hung a pan to hold the substance weighed in water. A wire stem supports a cup on which the weights and the substance weighed in air are placed. A mark on the stem shows the point at which the whole apparatus will float in a vessel of water when a certain known weight (called the balance weight) is placed in the weight cup. The specimen under examination must not exceed in weight that of the balance weight, this being the limit of the apparatus. Suppose the limit to be 100 grams. Then to find the specific gravity of a substance, place it on the weight pan and add weights until the instrument sinks to the mark. The difference between the added weight and 100 is the weight of the specimen in air. Then place the specimen in the lower pan; as much more weight on the weight pan will now be required as corresponds to the weight of a bulk of water equal to that of the specimen. The difference of weight

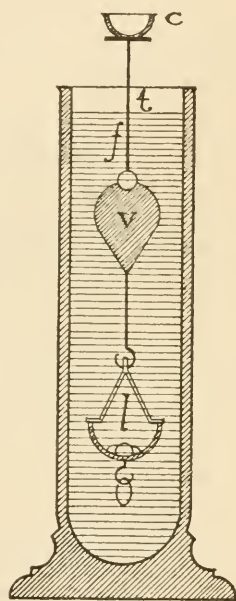


Fig. 3.
NICHOLSON HYDROMETER.

thus found will be the divisor of the weight of the specimen and the quotient will be the specific gravity. Thus:

The substance is placed in the weight cup.	
The limit of the apparatus is.....	100.00
Weight added to sink instrument to mark	22.50
Weight of specimen in air is then	77.50
Specimen placed in lower pan requires, to sink instrument to mark, the weight.....	35.50

Now, $35.50 - 22.50 = 13$, the weight of a like bulk of water. Then $77.50 \div 13 = 5.9615$, the specific gravity sought.

The specific gravity test is one of the most important and reliable means of identifying a gem, since it is practically a constant for all individuals of the same kind, while the difference between individuals of different kinds is often considerable. Thus:

Zircon	4.6	Topaz	3.65
Almandite	4.2	Diamond	3.52
Sapphire.....	4.0	Beryl.....	2.70

Further, if the specific gravities of two substances are known, by taking the specific gravity of their compound the relative weights of the components may be found. Thus, having the weight of a diamond and gold ring we can find the weight of the diamond.

Let A be the weight of the stone, a its specific gravity; B be the weight of the gold, b its specific gravity; C be the weight of the ring, c its specific gravity:

Then $A + B = C$ and

$$\frac{A}{a} + \frac{B}{b} = \frac{C}{c}$$

$$\frac{(c-b)a}{c}$$

From which we obtain $A = C \frac{(c-b)a}{c}$

Electricity.—The electrical properties of minerals are distinguished by the following terms: Frictional electricity, pyroelectricity, and thermoelectricity. Of these we have to do only with frictional electricity, or the power of becoming electrified by friction, and as a result attracting or repelling certain substances. This property is especially noticeable in the topaz, tourmaline, and amber.

Cleavage.—This is that tendency of a mineral to break in the direction of minimum cohesion, and that direction is always parallel to some plane which occurs or may occur in the crystal. The cleavage is characterized, first, according to direction, that is, when parallel to certain faces or planes; second, according to the ease with which it may be obtained, as perfect, imperfect, interrupted, or difficult.

Fracture.—This is that surface obtained by breaking the mineral in a direction other than that of the cleavage. It may be designated as conchoidal, that is, breaking with cavities more or less deep; even, when the fracture approximates a plane surface; uneven, when the surface is irregular; hackly or splintery, when the surface is jagged.

Form.—The external form of a gem mineral may be described as: *A*—crystallized, *B*—crystalline, and *C*—amorphous.

A—Crystallized: When made up of geometrical solids, any individual polyhedral form of which is called a crystal. Crystals are bounded by plain surfaces called planes or faces, symmetrically arranged with reference to one or more imaginary 'diametral lines called axes.

Crystals, though their forms and modifications are of an indefinite number, are classified under six systems according to the number and character of their axes. The systems of crystallization and typical examples occurring under each are:

Isometric.

Examples: Cube, octahedron, and dodecahedron.

Tetragonal.

Examples: Square prism and square octahedron.

Hexagonal.

Examples: Hexagonal prisms, pyramids, and rhombohedrons.

Orthorhombic.

Examples: Right prism on a rhombic base and a rhombic octahedron.

Monoclinic.

Examples: Oblique prisms on a rectangular base and oblique octahedron on a rhombic base.

Triclinic.

Examples: Doubly oblique prism and doubly oblique octahedron or pyramid.

B—Crystalline: When the mass appears to be made up of closely compacted, minute crystals. The individuals composing crystalline masses may be: In columns or fibers, in which case the structure is columnar; in thin laminae, plates, or leaves, giving rise to a lamellar structure; in grains, producing a granular structure. Further, there are numerous irregular and accidental groupings of the individuals composing the mass, giving to it certain shapes, such as globular, botryoidal, reniform, dendritic, etc., which are too numerous to allow of a specification here. These indeterminate forms are grouped under the head of "imitative shapes."

C—Amorphous: Finally, the mass may be entirely destitute of crystalline structure or imitative shape and show neither external nor internal signs of crystallization. Such a mass is said to be amorphous.

II. DESCRIPTION OF MINERALS USED AS GEMS.

ALBITE.

AVENTURINE—MOONSTONE—PERISTERITE.

Albite occurs in opaque to transparent masses and in triclinic crystals having a cleavage in two directions, one of which is highly perfect. The mineral has a hardness of 6; a specific gravity of 2.62, and a vitreous luster, often pearly on a cleavage surface. Color white, also

bluish, grayish, reddish, greenish, and green, occasionally having a bluish chatoyancy or play of color.

The use of this mineral for gem purposes is practically restricted to those kinds showing a bluish opalescence or play of colors, or an aventurine effect, or which give a moonstone effect when cut cabochon. Prominent among the kinds affording gem material are: *Peristerite*, a whitish adularia-like albite presenting a bluish chatoyancy, usually more or less mixed with pale green and yellow, the play of color resembling that on the neck of a pigeon; hence the name, from *περιστερά*, *pigeon*. *Aventurine*, a grayish white to reddish gray albite with internal fire-like reflections proceeding from minute disseminated occluded crystals. *Moonstone*, a transparent albite having a chatoyant reflection resembling that of a cat's eye, or an opaque pearly white albite having a bluish opalescence.

Albite is a constituent of many crystalline rocks and often replaces common feldspar as a constituent of granite, and is frequently a constituent of syenite and greenstone; in other instances it is associated with feldspar and dolomite. Some of the most common occurrences are in veins or cavities in granite or granitoid rocks, such veins being then frequently repositories of fine crystals of other gem minerals, such as beryl, tourmaline, smoky quartz, etc.

One hundred parts of albite contain: Silica, 68.7; alumina, 19.5; soda, 11.8.

AMBER.

SUCCINITE.

A fossil resin occurring in irregular masses without cleavage and having a conchoidal fracture. Color yellow, sometimes reddish, brownish, and whitish, often clouded, and occasionally fluorescent, exhibiting a peculiar blue or green tinge. Hardness 2 to 2.5; brittle. Specific gravity 1.05 to 1.09. Luster resinous to waxy. Transparent to opaque. Negatively electrified by friction. It burns readily with a rich yellow flame and aromatic odor; heated to 150° C. it begins to soften and finally melts at about 250° C., giving off dense white fumes having an irritating aromatic odor. It is soluble in alcohol.

Amber contains in 100 parts: Carbon, 78.96; hydrogen, 10.51; oxygen, 10.52.

ANDALUSITE.

CHIASTOLITE—MACLE.

Andalusite has but a limited use as a gem. It crystallizes in the orthorhombic system commonly in coarse prismatic forms, the prisms often nearly square; occurring also massive, columnar, radiated, and granular. The color varies from a reddish or greenish brown to olive green, flesh red, rose red, violet, and pearl gray; pleochroism strong in some colored varieties, green in one direction and hyacinth to rose-

red in another. Luster, vitreous, often weak. Hardness, 7.5, somewhat greater than that of quartz; brittle. Specific gravity, 3.2; cleavage, prismatic and distinct; often perfect.

The variety chiastolite, or macle, varies in hardness from 5 to 7.5 due to the presence of impurities, which, in part, are arranged symmetrically about the axes of the crystal so as to give a tessellated appearance in cross section.

Andalusite contains: Silica, 37; alumina, 63.

ANHYDRITE.

VULPINITE.

Anhydrite, anhydrous sulphate of lime, has a hardness of 3.5, a specific gravity of 2.9, and a vitreous to pearly luster. Color, white, grayish, bluish, reddish; also brick red and blue. Anhydrite has been variously denominated muriacite, anhydrite, and tripe stone, according to its structure; the first, when crystallized in broad lamellae; the second, when granular, and the third, when composed of contorted plates. Vulpinites is a siliceous variety containing 8 per cent of silica and is the kind most used for ornamental purposes. The use of any of the varieties is limited. Anhydrite contains 41.2 parts of lime and 58.8 parts of sulphuric acid in 100.

APOPHYLLITE.

FISH-EYE STONE.

Apophyllite is occasionally cut for gem purposes.

The hardness of the mineral is below 5; its specific gravity is 2.33; its color varies from white to gray, occasionally tinged with green, pink, or yellow. It crystallizes in the tetragonal system, usually in octahedrons having their solid angles truncated. The faces thus formed have a decided pearly luster, the others vitreous. Apophyllite was so named in allusion to its tendency to exfoliate under the blow-pipe. Its pearly luster, producing an effect like that of a fish's eye, gave rise to the name "fish-eye stone," or ichthyophthalmite.

Apophyllite occurs commonly as a secondary mineral in basalt and related rocks associated with datolite, pectolite, and the several zeolites. One hundred parts contain: Silica, 52.7; lime, 26; potash, 4.4; water, 16.7. There is also a variable proportion of fluorine present which probably bears no relation to the compound.

AXINITE.

Crystals of axinite are occasionally cut for ornamental use. Axinite crystallizes in the triclinic system, commonly in broad, acute-edged, wedge-shaped forms, occurring also massive. The hardness of the mineral is about 7, or near that of quartz, but it is so extremely brittle that it is fashioned only with difficulty. Luster, vitreous.

Transparent to subtranslucent. Specific gravity, 3.27. Color, clove brown, plum blue, violet, pearl gray, and honey yellow to greenish yellow. It is usually strongly pleochroic, pale olive-green specimens giving, with the dichroscope, olive-green and violet-blue images.

The composition of axinite in 100 parts is approximately: Silica, 43; boron trioxide, 5; alumina, 16; ferric oxide, 10; manganese oxide, 3; potash, 1; lime, 20; magnesia, 2.

AZURITE AND MALACHITE.

The use of the two carbonates of copper as gems is limited by their softness and opacity. Their hardness is 4; their specific gravity varies from 3.5 to 4, and they possess a vitreous to adamantine luster, occasionally silky. Malachite is a bright green in color, varying somewhat in tint and usually in veinings or markings. Azurite shows the various shades of azure passing into Berlin blue. Botryoidal masses of these carbonates occur in which the two minerals are in alternate concentric layers, giving rise to a very pleasing effect.

Malachite contains: Copper oxide, 71.9; carbon dioxide, 19.9; water, 8.2. Azurite contains: Copper oxide, 69.2; carbon dioxide, 25.6; water, 5.2. (Plate 1.)

BARITE.

Barite can hardly be regarded as a gem stone, its softness permitting rapid abrasion. Its hardness does not exceed 3.5; its specific gravity is 4.3 to 4.7, depending upon the amount of impurity present. Its color ranges between white, gray, blue, red, or brown; the colors occasionally banded or mottled. Luster vitreous, sometimes pearly.

One hundred parts contain: Baryta, 65.59; sulphuric acid, 34.33.

BERYL.

EMERALD—AQUAMARINE—GOSHENITE.

The beryl crystallizes in six-sided hexagonal prisms, usually long prismatic and often having the prism faces more or less deeply striated vertically. The specific gravity of the transparent flawless beryl is 2.73; usually 2.69 to 2.70. Hardness 7.5 to 8. Brittle. Cleavage indistinct. Fracture uneven to conchoidal. Luster vitreous, occasionally resinous. The colors of the beryl include emerald green passing into pale green, and pale blue, pale yellow, honey, wine, and citrine yellow, white, to a pale rose-red. The pleochroism is more or less distinct; occasionally strong, especially in the emerald which, when viewed across the prism with the dichroscope, shows two different shades of green.

Mineralogically the beryl includes the emerald, aquamarine, goshenite, and davidsonite. The general composition, fundamental crystalline form, hardness, and specific gravity of all the varieties are essentially the same, the difference being primarily one of color. The



BANDED NODULES OF AZURITE AND MALACHITE.

Morenci, Arizona.

Specimen No. 48567, U.S.N.M.

emerald includes the rich green colored kinds only. It is a highly prized gem when of a bright emerald green color, clear, and free from flaws.

The aquamarine includes those beryls showing clear shades of sky blue and sea green. Goshenite is a white or colorless variety from Goshen, Massachusetts. Davidsonite is a greenish yellow beryl from near Aberdeen, Scotland. Other varieties are: Aeroides, pale sky blue; hyacinthozontes, clear sapphire blue; améthiste basaltine, pale



Fig. 4.

EMERALD CRYSTAL.

Stony Point, Alexander County, North Carolina.

Weight, 8½ ounces.

Specimen No. 83730, U.S.N.M.

violet or reddish; chrysolithus, pale yellowish green; golden beryl, clear bright yellow, and chrysoberyllus, greenish yellow to honey or wine yellow. All the varieties are somewhat brittle and contain in 100 parts: Silica, 66.8; alumina, 19.1; glucina, 14.1.

BERYLLONITE.

Beryllonite was first found loose among the disintegrated material of a granite vein at Stoneham, Maine, in 1886, and this is still the only locality known. It occurs in short prismatic to tabular and highly

complex crystals having a hardness of 6 and a specific gravity of 2.84. The transparency and brilliancy of the stone resembles that of topaz.

One hundred parts contain: Phosphoric acid, 55.86; glucina, 19.84; soda, 23.72.

BROOKITE.

ARKANSITE.

Brookite does not readily admit of polish, and in consequence has little use as a gem. Its hardness is 5.5 to 6; specific gravity, 4.12 for brookite and 4.08 for arkansite. Brookite includes the hair brown, yellowish, reddish, or ruby red, transparent to translucent kinds having a metallic adamantine luster. Arkansite includes the brilliant, iron-black, opaque kinds.

Composition: Titanium, 60.98; oxygen, 39.02.

CARBONATE OF LIME.

PEARL—CORAL—MARBLE—CALCITE—ARAGONITE.

Carbonate of lime is most widely distributed in a variety of forms, the varieties depending upon differences in origin, crystallization and structural condition, presence of impurities, etc. With the exception of pearl and coral, the many forms find a use more for decorative purposes than for personal adornment.

Pearls are concretions, consisting essentially of carbonate of lime, found in the shells of certain mollusks. They are the result of an abnormal secretory process caused by an irritation of the mantle of the mollusk, resulting from the introduction into the shell of some foreign body, such as a grain of sand.

Pearls possess a luster peculiar to themselves, which is called pearly or nacreous. This luster may exist on the exterior surface only of the concretion, or the outer surface may be dull and dead in luster while an inner surface may be clear and lustrous. Their specific gravity is 2.5 to 2.7; their hardness 2.5 to 3.5. They may be of any shape, and in some instances of considerable size. In color they range from an opaque white, through pink, yellow, salmon, fawn, purple, red, green, brown, blue, black, passing through the several shades of these colors, or of almost any color; in addition they may be iridescent. In general, their color and luster will be that of the interior shell surface adjacent to which they are formed.

The beauty and value of pearls is dependent upon their color, texture or "skin," transparency or "water," luster, and form, the most valuable being those which are round or pear-shaped, slightly transparent, free from specks or blemishes, and possessing to the highest degree the characteristic luster.

Pearls are liable to deteriorate with age, contact with acids, gases, and vapors, and though various methods are in use for restoring them

to their original beauty, they are by no means to be relied upon, so that care should be taken to preserve fine pearls by carefully wiping them after use with a clean, soft cloth and keeping them wrapped in a clean cloth in a closed box.

Although nearly all bivalves with nacreous shells occasionally yield pearls, practically all of the pearls of commerce are obtained from a few families only of mollusks, prominent among which are the Aviculidae, Unionidae, and Mytilidae. The pearl oyster of the Pacific and Indian oceans, which has yielded the bulk of the pearls of the world, belongs to the first of these groups. The unio, or fresh-water mussel, so abundant in the rivers and lakes of North America, belongs to the second.

Coral is essentially carbonate of lime produced by gelatinous marine animals called polyps. The coral-forming animals are very often, though wrongly, called coral insects, and the coral is not built up as bees build a comb, but grows, as do the bones of other animals, being produced or secreted by a peculiar layer of the skin. The small star-like pits on a branch of coral represent the places where the various members of the colony once grew.

Although coral is found abundantly in the seas of many parts of the globe, that adapted to purposes of ornament comes almost entirely from the African coast of the Mediterranean. The beds lie at a depth of 500 to 800 feet below the surface of the sea, and the coral is won by means of iron drags and nets. The coral varies in color from deep red through pink to green, brown, yellow, white, and black. The red coral, once the most valuable, is now worth far less than the rose-pink, while the white, yellow, and black corals are of very little value.

Coral is frequently imitated in horn, bone, and ivory; also by a composition made up of plaster of paris, gum, and coloring matter.

Marbles consist essentially of carbonate of lime, with more or less carbonate of magnesia. They are fine to coarse granular in structure, and exhibit various colors, as white, yellow, red, green, blue, etc., often clouded and giving a handsome effect when polished. *Statuary marble* is pure white and fine grained; the best is from Paros and Carrara, Italy. *Architectural marble* is both white and colored. The *Cipolin* is white, tinged with green. The *Sienna* is yellow, veined or clouded with brownish red. The *Mandelato* is light red with white spots. The *Bardiglio* is gray with dark cloudings. *Verde-Antique* is clouded yellowish to bluish green. The *Portor* or *Egyptian marble* is black, veined with yellow. *Lumachelle* or *fire marble* is a dark brown shell marble with brilliant fire-like or chatoyant internal reflections. *Madreporic marble* contains corals. *Ruin marble* is a kind showing, when polished, figures bearing a resemblance to cities, castles, etc., in ruins. *Oolite* is a concretionary massive limestone made up of minute spherical grains resembling the roe of a fish, the name coming from

ώόν, egg; *pisolite* differs from oolite in the larger size of its particles. *Stalactites* are pendent masses of limestone formed in caverns by the percolation of water, holding lime in solution, which on evaporation leaves the carbonate of lime. *Stalagmites* are of the same material, covering the floors of the cavern. *Stalactites* and *stalagmites* vary in diaphaneity from nearly transparent to opaque, and are frequently made up of layers of different colors, giving rise when polished to agate-like bandings. *Stalagmites* when fine grained and pure white are sometimes called *alabaster*. *Oriental onyx*, *Gibraltar stone*, *onyx marble*, and *Mexican onyx* have beautifully banded, mottled, or clouded structures, often showing wide ranges of color.

Calcite and *aragonite* consist essentially of carbonate of lime (lime 56, carbonic acid 44). They occur crystallized and massive, and vary in color from white through various shades of gray, red, green, yellow, brown, blue, and black. *Calcite* has a hardness of 3 and a specific gravity of 2.72 when pure. *Aragonite* has a hardness of 3.5 and a specific gravity of 2.93. Their use as gems is limited to fibrous kinds, called *satin spar*, and those specimens showing rich colors.

CANCRINITE.

Cancrinite is occasionally fine enough to be used as a gem. It crystallizes in six and twelve sided hexagonal prisms, also occurring massive. Luster, weak vitreous, inclining to greasy. Transparent to subtransparent. Color, yellow of several shades, also white, gray, greenish, bluish, or reddish. Hardness 5.5 to 6; specific gravity 2.44.

Cancrinite is found at Miask in the Urals; also in the Turkinisk Mountains in a coarse granite with zircon, calcite, and magnetite; and in crystals and massive at Litchfield, Maine, with sodalite and zircon. This locality affords bright orange yellow and pale yellow specimens; occasionally the yellow cancrinite is found penetrating the blue sodalite, forming, when polished, a very attractive stone.

One hundred parts of cancrinite contain: Silica, 38.7; carbon dioxide, 6.3; alumina, 29.3; lime, 4; soda, 17.8; water, 3.9.

CASSITERITE.

WOOD TIN—TOAD'S-EYE TIN.

Cassiterite, or tin stone, is used to a very limited extent for ornamental purposes. Its hardness is between 6 and 7; specific gravity 6.69; luster adamantine. Color, brown or black, occasionally gray, white, or yellow. The mineral occurs in tetragonal crystals and massive; often in reniform shapes having a fibrous structure. The variety known as wood tin occurs in reniform or botryoidal shapes made up of concentric layers or bandings having a fibrous structure and resembling dark wood. Toad's-eye tin is the same on a smaller scale. Cassiterite contains in 100 parts: Tin, 78.28; oxygen, 21.62.

CATLINITE.

PIPE STONE.

Catlinite, or pipe stone, is a compact clay slate of an ash gray to deep red color, or red with white and gray spots. It occurs in beds in Pipestone, especially at Coteau de Prairies, and in Cottonwood, Watonwan, Nicollet counties, Minnesota; at Flandeau and Sioux Falls, South Dakota; Sac County, Iowa; Barron County, Wisconsin, and elsewhere in the Upper Mississippi and Missouri country. Catlinite is worked into ornamental pipes, paper weights, ash trays, match boxes, and other trinkets.

CAT'S-EYE.

The term cat's-eye is applied to a number of minerals which, when cut cabochon, exhibit a peculiar opalescence characterized by a line, or ray, of light across the stone and resembling the contracted pupil of the eye of a cat. Among the minerals which, when fibrous or cut across the cleavage, will show the cat's-eye ray are: Beryl; chrysoberyl, especially the cymophane; corundum; crocidolite; dumortierite; quartz filled with acicular crystals or fibrous minerals, such as actinolite, byssolite, hornblende, etc.; hypersthene; enstatite; bronzite; aragonite; gypsum; labradorite; limonite; hematite, etc. Such gems may be opaque, translucent, or transparent, and may be of any color or colors.

CHONDRODITE.

The hardness, translucency, and range of color of this mineral render it suitable for use as one of the minor gems. It occurs in monoclinic crystals of a varied habit; also massive, compact, and in embedded grains. Its hardness is 6.5; brittle. Cleavage indistinct. Fracture conchoidal. Luster, vitreous. Specific gravity, 3.1 to 3.2. Color, light to dark yellow, honey yellow, garnet, hyacinth, and brownish red. Pleochroism occasionally distinct, especially in brownish-red crystals.

Chondrodite, from *χονδροειδης*, a grain, in allusion to its granular structure, occurs usually in embedded grains or granular masses in limestone. It is found abundantly at the Tilly Foster mine, Brewster, New York, in deep garnet-red crystals of great beauty.

One hundred parts contain approximately: Silica, 33.06; magnesia, 55.46; iron, 3.65; fluorine, 7.60.

CHRYSOBERYL.

ALEXANDRITE—CAT'S-EYE—CYMOPHANE.

The gems known as alexandrite, oriental chrysolite, and cymophane, or true cat's-eye, are varieties of chrysoberyl. The mineral crystallizes in the orthorhombic system, generally in tabular crystals, often

twinning and frequently repeated, forming pseudo-hexagonal crystals with or without reentrant angles. The cleavage of the mineral is quite distinct in one direction. Fracture uneven. Its hardness is 8.5. Specific gravity 3.5 to 3.84. Luster, vitreous. The color ranges from asparagus green, grass green, emerald green, greenish white, yellowish green, golden yellow, to brown and intermediate hues; sometimes a raspberry or columbine red by transmitted light, and occasionally having a bluish opalescence internally.

Alexandrite is the emerald-green variety which by artificial light appears a columbine or raspberry red. The crystals have a specific gravity of 3.644.

Cymophanê, or true cat's-eye, is of a greenish yellow color and exhibits a fine chatoyant effect, due to minute internal striations resulting from twinning, either of the crystal itself or of minute composite crystals of which the whole is made up.

The name *chrysoberyl* is from χρύσεος, golden, and βήρυλλος, beryl. *Cymophane*, from κύμα, wave, and φαίνω, to appear, alludes to its peculiar opalescence. *Alexandrite* is named after Alexander I of Russia.

Chrysoberyl of gem value has not as yet been found in the United States. The chief source of the supply is Minas Geraes, Brazil, and Ceylon. Alexandrite occurs chiefly in the Orenburg district, the Urals, Siberia.

CHRYSOCOLLA.

This mineral, when coated with or contained in quartz or chalcedony, is occasionally cut as a gem. Chrysocolla is a hydrated copper silicate having a mountain green, bluish green, passing into a sky blue, color.

COAL.

JET—CANNEL—ANTHRACITE—BROWN.

The most important of the mineral coals used for ornamental purposes is jet, a compact, soft, light coal of a lustrous velvet black color, susceptible of a high polish. It is the *Gagates* of Dioscorides and Pliny, a name derived from the river Gagas, in Syria, near the mouth of which it was early found. The finest specimens are now found in detached pieces in a clay near Whitby, Yorkshire, England.

Cannel coal has a dark grayish-black or brownish-black color; a fine, compact texture; a large conchoidal fracture, and receives a good polish. It burns readily, without melting, with a clear yellow flame, and has been used as a substitute for candles, whence its name. It is occasionally worked into inkstands, snuff boxes, breast pins, bracelets, and other similar articles.

Anthracite is harder than either jet or cannel coal; it is iron black in color; occasionally iridescent, and has a bright, often submetallic, luster, and a conchoidal fracture. Anthracite is sometimes made into

beads and other round ornaments, trinkets, and charms. It is also made into candlesticks, paper weights, etc.

Brown coal is more recent in its origin than the Carboniferous period of geologists. It sometimes closely resembles ordinary bituminous, or soft coal. Other varieties have a brownish-black color, with more or less of the texture of wood remaining. Often the form and fiber of the original tree is retained. This variety is then called *lignite*. Brown coal in some of its varieties is occasionally made into paper weights, charms, and trinkets.

COBALTITE.

Cobaltite, when in groups or crusts of small, brilliant crystals, is occasionally cut into ovals or other shapes and used as ring stones, mountings for scarf pins, and other ornaments. Its color is pale steel gray, tarnishing to copper or flesh red. Its hardness is about 5.

One hundred parts contain: Cobalt, 35.5; arsenic, 45.2; sulphur, 19.3.

CORUNDUM.

RUBY—SAPPHIRE.

Corundum crystallizes in the hexagonal system in six-sided prisms and pyramids, the crystals often rough and rounded. Hardness 9. Brittle. Specific gravity about 4, the range being from 3.916 to 4.16. Luster, adamantine to vitreous; sometimes pearly on the basal plane and occasionally exhibiting a bright, opalescent, six-rayed star in the direction of the vertical axis. The color range includes nearly all the prismatic hues to colorless. Pleochroic in the strongly colored varieties. Occasionally phosphorescent, with a rich red color.

The transparent corundums rank among the most valuable of gem stones, and include two recognized varieties, the ruby and the sapphire. The red-colored corundums are called rubies. They vary in hue from a rose to a deep carmine, the same crystal occasionally exhibiting different colors, the most approved tint being a "pigeon's blood" red. The sapphire, in general, includes corundums of any color except the red. Specifically, the name is limited in its use to the blue-colored specimens, the approved tints being royal blue, velvet blue, and cornflower blue. The sapphire occasionally exhibits a different color effect by natural light from that seen by artificial light, and as a rule is less brilliant by the latter.

Corundums of other colors are named according to their hues: Oriental emerald, the green-colored kinds, varying in tint from a lively green, exceeding that of the emerald, to a sea or bluish green.

Oriental amethyst, purple or amethystine. Oriental topaz, yellow, rivaling the yellow diamond in brilliancy. Oriental hyacinth is hyacinthine in tint and is rare. Adamantine spar includes the hair-brown varieties.

The six-rayed star seen in many clouded corundums, especially when

cut cabochon with the summits cutting the vertical axis of the prism, is due to numerous minute crystals or layers within the stone which reflect the incident light so as to produce the stellar effect. These rays are invariably white, though the specimen may be of any color, and may be best seen by artificial light. This chatoyancy, when marked, gives the asteria, or star stone, also known as the star ruby or

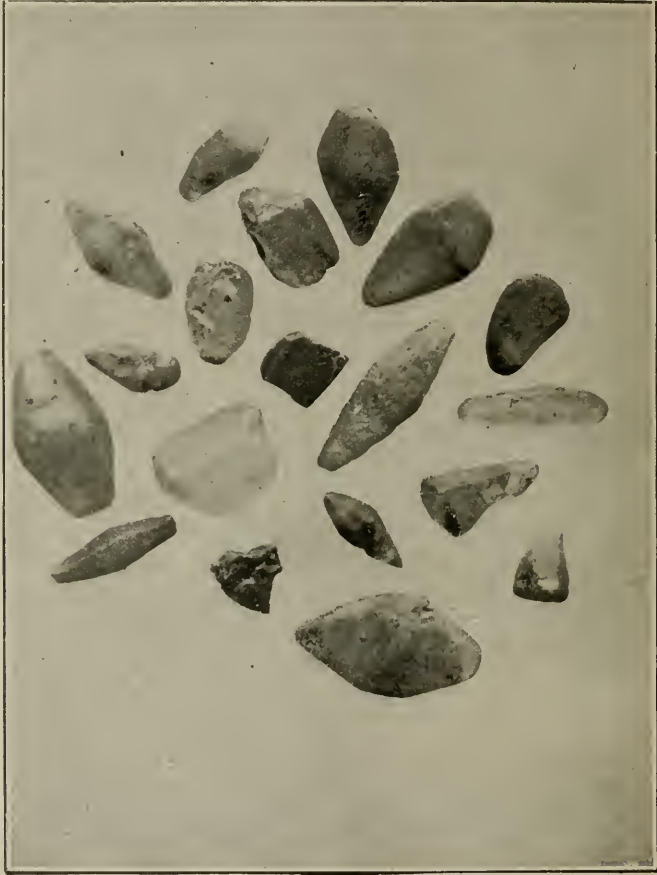


Fig. 5.

CORUNDUM CRYSTALS.

Ceylon.

Specimen No. 81441, U.S.N.M.

star sapphire, as the case may be. Should the gem assume a fibrous texture, the chatoyancy affords the "cat's-eye" ray.

Corundum is associated with crystalline rocks as granular limestone or dolomite, gneiss, granite, mica slate, and chlorite slate. The finest sapphires are usually obtained from the beds of rivers, either in modified hexagonal prisms or in rolled masses, accompanied by grains of magnetic iron ore, and several species of gems.

The best rubies come from the mines of Upper Burma, in an area about 30 miles square of which Mogok is the center. The rubies are found in place in crystalline limestone; occurring also in gem-bearing gravel and in the soil of the hillsides. A similar locality exists in the marble hills of Sagyin, 16 miles north of Mandalay. Ruby mines have also been worked at Jagdalak, near Kabul, Afghanistan. Individuals occur near Bilin in Bohemia and in the sands of the Expailly River in Auvergne. Blue sapphires are brought from Ceylon. Corundum occurs in the Carnatic, on the Malabar coast, in the territories of Ava, and elsewhere in the East; also near Canton, China. At St. Gotthard, it occurs of a red or blue tinge in dolomite, and near Mozzo in the Piedmont in white compact feldspar. Adamantine spar is met with in large, coarse, hexagonal pyramids on the Malabar coast and in Gellivara, Sweden.

The great corundum region of the United States extends from the Virginia line through North and South Carolina, across Georgia and into Alabama. Numerous localities are known in the crystalline rocks of the region, especially in Madison, Buncombe, Haywood, Jackson, Macon, and Clay counties, North Carolina. Quite recently rubies, rivaling those from Burma in color, have been found in the Cowee district of North Carolina. In variety of color the North Carolina corundum excels; it is gray, green, rose, ruby, emerald, sapphire to dark blue, violet, amethystine, brown, yellow of all shades, and colorless. Fine gem sapphires are found on bars in the Upper Missouri River near Helena, Montana. They are most abundant at Eldorado Bar, Frenchman's Bar, and Yogo Gulch, where they occur as pebbles more or less rolled. Corundum has been found in place in granite and trachyte rock in Fergus County, Montana. The Montana specimens rarely exceed one-fourth to one-half inch in length and range in color from light green, light blue, steel blue, bluish red, light red, and intermediate shades; frequently the colors mentioned will appear red or assume a reddish tinge by artificial light. They are usually dichroic and often blue in one direction and red in another.

CROCIDOLITE.

CAT'S-EYE—TIGER'S-EYE.

Crocidolite, from *κροκίς*, wool, in allusion to its fibrous structure, is a fibrous, asbestos-like mineral, having a hardness of 4 and a specific gravity of 3.26. Its color varies from gold yellow to yellowish brown, indigo to greenish blue, leek green, and dull red. Crocidolite often contains a siliceous base, usually a ferruginous quartz, and when cut cabochon with a high summit and the longer diameter of the oval at right angles to the direction of the fibers of which the mineral is made up, will give the "cat's-eye" ray. The gem is also called "tiger's-

eye." Crocidolite contains in 100 parts: Silica, 51; iron oxides, 34; soda, 7; magnesia, 2; water, 3.

The best specimens occur in Griqualand and the Orange River country, South Africa. These are essentially quartz, pseudomorphous after crocidolite, and have a hardness of about 7 and a specific gravity of 3.2. (Plate 2.)

DAMOURITE.

This mineral is one of the micas and usually results from the alteration of some other mineral. It is of little use as a gem. Practically, the only locality at which the mineral is so used is Stoneham, Maine, where a green and red damourite, altered from topaz, has been cut into trinkets.

DATOLITE.

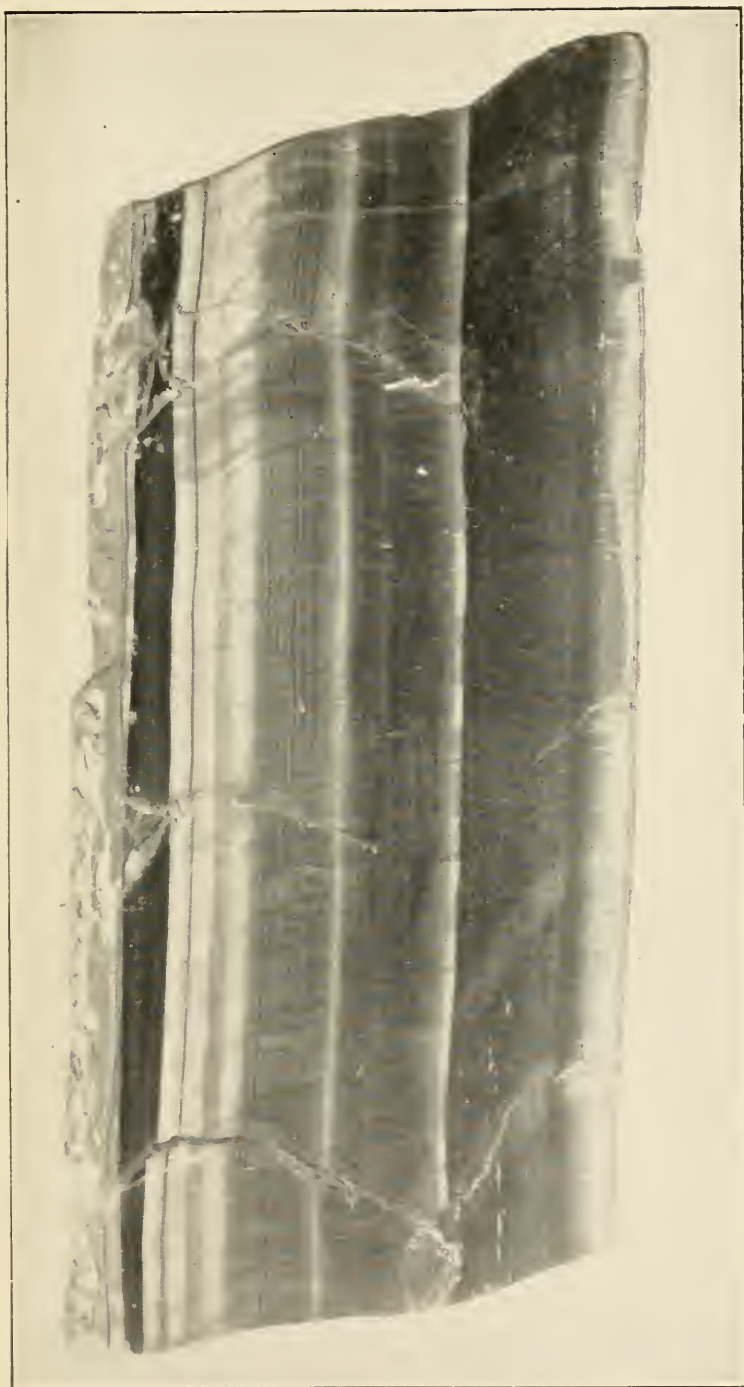
Datolite is another of the mineralogical gems. Its hardness is 5; specific gravity, 2.98; color, white, creamy, grayish, pale green, yellowish, reddish, or amethystine. It occurs in small, glassy crystals and massive, often having a radiating structure.

One hundred parts contain: Silica, 37.7; boric acid, 21.8; lime, 34.9; water, 5.6.

DIAMOND.

The diamond is the hardest of gems; is the only one that is combustible; is the most highly refractive, and surpasses all others in the property of dispersing light—that is, dividing light into colored rays, causing that peculiar flash of prismatic hues called its *fire*. The diamond crystallizes in the isometric system, usually in octahedrons, or combinations of octahedron, cube, dodecahedron, and tetrahedron, the crystals having their faces commonly curved. The cleavage of the diamond is highly perfect and parallel to the octahedral faces. The luster, especially of artificial faces, is peculiarly brilliant and is superior to that of any other gem. The remarkable brilliancy of the diamond results in part from the total reflection of light from its internal faces when the incident ray strikes it at an angle of a little more than 24 degrees. The stone also refracts light strongly. To the refractive and dispersive power of the diamond are due the flash of colors or fire, characteristic of the stone, the colorless specimens exhibiting it to the greatest degree, the colored to the least, or not at all.

The range of color of the diamond is extensive, including nearly all the prismatic hues. The whites, yellows, and browns, perhaps, afford the greatest number of shades and are the most numerous. Next to these, for colored specimens, the greens, including all shades, are most plentiful; the pure grass-green and emerald-colored stones are, however, very rare, as, indeed, are all the strongly colored specimens. Red stones of strong, rich, deep tints are extremely rare; so, too, are the garnet, hyacinth, rose-red, peach-blossom, and lilac colored speci-



CROCIDOLITE IN QUARTZ.
Griqualand West, South Africa.
Specimen No. 47105, U.S.N.M.



mens. Practically all of the blue stones known have been found in India, and their occurrence is as rare as the red. Cinnamon, brown, black, milky, and opalescent stones are occasionally met with. Pure colorless diamonds without a flaw or tint of any kind are more rare than is generally supposed.

The specific gravity of the diamond is 3.52; hardness, 10; crystallization, isometric; cleavage, octahedral and perfect; refraction simple, with an index of 2.439; a high dispersive power; luster, brilliant adamantine; is combustible though infusible; positively electric by friction; a nonconductor of electricity; is phosphorescent; does not polarize light, and consists essentially of carbon.

Three forms of the diamond are recognized: First, crystallized, the one employed in jewelry; second, crystalline, or imperfectly crystallized, having a hardness greater than that of the crystals and known as bort; this term is applied also to chips, diamond waste, and stones unsuited for cutting; third, an impure kind called carbonado; this is an opaque, steel gray to black, amorphous variety, without cleavage.

Diamonds and all other gems are rated by the carat. The term carat is derived from the name of certain small leguminous seeds which, when dry, are quite constant in weight. The brilliant, glossy, scarlet and black seed of *Abrus precatorius* weighs about 2 grains, and was early used in India for weighing gems. An English carat is equal to 3.1683+ grains, commonly reckoned as 3.17 grains troy, hence there are 151½ carats in an English troy ounce. Reckoning the value in the metric system, the weight of a standard carat will be 0.205 grams. The carat is subdivided into halves, quarters, eighths, sixteenths, thirty-seconds, and sixty-fourths. A quarter carat is called a grain. This is a "diamond" grain, not a troy grain, and is but 0.7925 of a true grain. In diamonds, perfectly white stones or decided tints of red, rose, green, or blue are most highly prized. Fine cinnamon, salmon, brown, black, or yellow stones are also much esteemed. When flawless and without tint of any kind, they are termed "first water." If they possess a steely-blue color they are called "blue white." It is impossible to estimate the value of a diamond by its weight. Color, brilliancy, cut, and general perfection of the stone are all to be considered. Of two stones, both flawless and weighing 10 carats, one may be worth \$600 and the other \$12,000. Off-colored or defective stones may sell at \$40 to \$75 a carat regardless of size, while the value of an ordinary good water stone increases in an increasing ratio with its weight up to about 20 carats, beyond which no rule holds good. Exceptionally perfect stones have no fixed value, the price depending upon the purity and brilliance of the stone.

Some diamonds are celebrated for their size, others for the interesting legends connected with them. Among the more interesting of these celebrated diamonds are the "Regent" or "Pitt" diamond,

weighing $136\frac{1}{6}$ carats, the finest large diamond in the world. It was discovered in India in 1701, and weighed 410 carats in the rough. The finest blue diamond is the "Hope," an almost sapphire-blue stone weighing $44\frac{1}{2}$ carats, valued at £18,000. The "Dresden Green" is the finest green diamond, a pear-shaped $48\frac{1}{2}$ carat brilliant. The "Orloff" is a 193-carat stone in the scepter of the Emperor of Russia. The Russian treasury also contains the "Shah," an 86-carat stone. The "Koh-i-Nur" or "mountain of light," which weighed, when first brought to England, $186\frac{1}{6}$ carats, but was reduced by recutting in 1852 to $106\frac{1}{6}$ carats, is among the English crown jewels. The "Victoria," a Cape diamond weighing $457\frac{1}{2}$ carats in the rough and 180 carats cut, is valued at £200,000, and is perhaps the largest brilliant in the world. The largest diamond in America, and the finest yellow diamond in the world, is the "Tiffany" diamond, a flawless double-cut brilliant of a rich orange-yellow color. It was found in South Africa, weighs $125\frac{3}{8}$ carats, and is valued at \$100,000.

For a full discussion and history of the more important stones above 100 carats in weight, as well as of many others, see Streeter's *Great Diamonds of the World*.

The diamond occurs in alluvial deposits of gravel, sand, or clay, associated with quartz, gold, platinum, zircon, rutile hematite, ilmenite, chrysoberyl, topaz, corundum, garnet, etc., the associated minerals being those common in granite rocks or granitic veins. It is found also in quartzose conglomerates, in peridotite veins in gneiss, and in an eruptive pegmatite.

Before the discovery of the Brazilian mines all diamonds were brought from India and Borneo. In India the diamond is met with at three principal localities. The first is in southern India, in the Madras Presidency, and embraces the districts of Kadapah, Bellary, Karnul, Kistna, and Godavari. This region includes the famous "Golconda" district, the name, however, being not that of a mine, but merely the general term for the market where diamonds were bought and sold. The second locality is farther north and includes a large tract between the Mahanadi and Godavari rivers; it embraces Sambalpur and Waigarh, 80 miles southeast of Nagpur as well as portions of the province of Chutia Nagpur. The third region is in Bundelkhand, in central India, the principal working being near the city of Panna. The Indian diamonds were obtained in part from alluvial deposits and in part from a quartzose conglomerate; at Panna this conglomerate appears to be largely made up of fragments of a lower sandstone which it has been suggested may represent the original matrix. The yield of the Indian mines, once so large, is at present very small.

Borneo produces only about 3,000 carats annually. The principal locality is in the basin of the Kapocas River on the west side of the Ratoos Mountain near the town of Pontianak.

The diamond deposits of Brazil were discovered in 1728 and were at one time very productive, although the yield is at present small. Near Diamantina in Minas Geraes the diamonds are obtained in part from river washings and in part from prairie washings. The river deposits consist of rolled quartz pebbles, mixed with or united by a ferruginous clay which rests usually on talcose clays. The more common associated minerals are rutile, hematite, ilmenite, quartz, kyanite, tourmaline, gold, garnet, zircon, etc. In the prairie washings the diamonds occur in a conglomerate consisting of quartz fragments covered with a thin bed of sand or earth. This deposit affords the finest stones. Other Brazilian localities are those of Bagagem, at which place a 247½ carat stone was found, and at Abaethé, Minas Geraes. In Bahia diamonds are found at Lencães; along the river Cacholira, especially at Surua and Sinorca; they occur also on the Salobro and other branches of the Pardo River.

Derby,¹ in a recent paper on the occurrence of diamonds in Brazil, says that for the question of genesis the most significant of the Brazilian localities is that of Sao Joao de Chapada, near Diamantina. The diamonds occur here in thoroughly decomposed material, no fresh rock being found. He regards the various clays as representing a group of phyllites, of varied character, of principally, if not exclusively, clastic origin threaded with dikes of pegmatite, the clastic origin of the schists being indicated by the worn character of the zircons found in the clay derived from them. The diamond streaks appeared to Derby to contain distinct bands composed in part of quartz with plates of hematite, and these bands, he suggests, may be pegmatite dikes. The primary tourmaline and zircon and the secondary hematite and rutile found in the heavy residue after washing the clay are supposed to have originated in the pegmatite, the hematite, octahedrite, and rutile having formed from the original iron and titanium minerals now gone. The staurolite and kyanite, found in the heavy residue, are supposed to have come from the schists where they may have formed as a result of contact metamorphism induced by the intrusive pegmatite. The diamonds have come from the schist, along the borders of the pegmatite dikes and not from the dikes themselves; that is, he regards it possible that the diamond is a product of contact-metamorphism.

By far the greatest portion of diamonds now obtained come from South Africa, their discovery dating from 1867. The diamond workings are of two kinds, river diggings and dry diggings. The river diggings are in the gravel of the Vaal River from Potchefstroom down to its junction with the Orange River, and along the latter as far as Hopetown, the principal workings being along the Vaal between Klip

¹ Brazilian evidence on the genesis of the diamond, *Journal of Geology*, VI, 1898, pp. 121-146.

Drift and its junction with the Hart River. The dry diggings are chiefly in Griqualand-West, south of the Vaal River, on the border of the Orange Free State, about 640 miles northeast of Cape Town. There are here a number of limited areas approximately spherical or oval in form, with an average diameter of some 300 yards, the entire productive area being all within a circle having a radius of about 2 miles. These mines were originally worked as individual claims, but they are now all consolidated in one gigantic monopoly which practically controls the diamond output of the world. Some idea of the enormous output of the region may be gained from the statement that from



Fig. 6.

DIAMOND CRYSTALS.

Kimberly mines, South Africa.

Specimen No. 84799, U.S.N.M.

1867 to 1887 over 33,000,000 carats, or more than $6\frac{1}{2}$ tons of diamonds have been taken out, valued in the rough at \$225,000,000, and after cutting at \$450,000,000.

At the Kimberly mines the diamantiferous area is inclosed in a wall of nearly horizontal black carboniferous shale. The upper portion of the deposit consists of a friable mass of pale yellow color, called the "yellow ground." Below the reach of atmospheric influences the rock is more firm and of a bluish green color; it is called the "blue ground." This consists essentially of a serpentinous breccia inclosing fragments of carbonaceous shale, bronzite, diallage, garnet, magnetite, etc. The

diamonds are rather abundantly distributed through the mass, often to the amount of four to six to the cubic yard. These areas are believed to be volcanic pipes, and the occurrence of the diamonds is obviously connected with the igneous intrusive, either being formed by the action of heat upon the carbonaceous shales, or being brought up from underlying rocks.

In this connection De Launay¹ treats of the occurrence and origin of the Cape diamonds as follows: He describes the serpentine of the Kimberly mines as being derived from a peridotite determined as a picrite-porphry. Mixed with the serpentine are abundant fragments of various rocks, so that many specimens are of the nature of a contact-breccia. The serpentine bodies occur as pipes extending downward in a nearly vertical direction to an unknown depth. In following the volcanic pipes down it has been proved that each one passes through several formations. At the surface the inclosing rocks are carbonaceous shales, and at one time it was believed that the crystallized carbon was primarily derived from these shales. Underlying these shales is a bed of diabase. The serpentine at this horizon still contained diamonds. Below the diabase horizon are quartzites, through which the miners are now engaged in working. According to De Launay, the inclosing terranes have had no influence on either the quantity or quality of the diamonds. He therefore holds that the diamonds have come from below with the peridotite-breccia and that the diamonds did not originate in the Upper Carbonaceous shales. He believes that since the cavities which contain the serpentine pipes are in the nature of volcanic chimneys, water, penetrating to the contact of a molten metallic bath charged with various carburets, caused the sudden formation of carburets of hydrogen, and by their explosion the opening of the volcanic chimneys. The water produced the scori-fication of the molten peridotite magma, and by the compression thus exercised on the carbon, the crystallization of the diamonds. Finally water accompanied the eruption of the peridotite and caused its serpentinization.

Diamonds are mined in the Urals, where they were discovered in 1829. They occur in the gold washings of the detritus along the Adolfskoi Creek, near Bisersk, and elsewhere along the western declivity of the Uralian range. In Australia they are found in the alluvial of the Cudgegong River, near Mudgee, and in the valley of the Horton River, in the Bingera district of New South Wales.

A few crystals have been occasionally met with in the United States in Rutherford, Franklin, Mitchell, and McDowell counties, North Carolina; in Hall County, Georgia; in Kentucky, Ohio, Wisconsin, Colorado, and Idaho, and in the placers of Eldorado, Amador, Nevada,

¹ Les Diamants du Cap, Paris, 1897.

Butte, Trinity, and Del Norte counties, California. In 1856 the Dewey diamond, weighing when cut $11\frac{1}{2}$ carats, was found at Manchester, near Richmond, Virginia.

DIASPORE.

The smallness of the crystals, together with their brittleness, makes this mineral of little use as a gem. Its hardness is 6.5 to 7. Specific gravity, 3.3 to 3.5. Luster, brilliant; pearly on cleavage face. Color, grayish white, greenish gray, hair brown, topaz to fawn yellow, and colorless; occasionally violet blue in one direction, plum blue in another, and pale asparagus green in a third. Diaspore occurs foliated and massive and in orthorhombic prismatic crystals; usually small, thin, and flattened. The mineral is commonly found with corundum or emery in dolomite, chlorite schist, and other crystalline rocks. Perhaps the finest diaspores are those found near Unionville, Chester County, Pennsylvania. At this locality crystals have been found measuring from $\frac{1}{2}$ to $1\frac{1}{2}$ inches in length and $\frac{1}{4}$ inch in thickness.

One hundred parts contain: Alumina, 85.1; water, 14.9.

DIOPSIDE.

Diopside is occasionally cut as a gem. It is a variety of pyroxene occurring in monoclinic crystals of a prismatic habit. Its hardness is about 6. Specific gravity, 3.2 to 3.38. Luster, vitreous. Color, white, of several shades, pale green to dark green and nearly black. A variety containing chromium is often of a fine bright-green color.

Pyroxene is a common mineral in crystalline limestone and dolomite, serpentine, and eruptive rocks; occurs also in granitic rocks and metamorphic schists. The variety diopside occurs commonly in limestones and serpentines. A famous locality is on the Mussa Alp, in the Piedmont, where it occurs in veins, traversing serpentine, associated with garnet. A similar locality is at Traversella, in the Tyrol. Fine gem diopside occurs also at Dekalb, New York.

One hundred parts contain: Silica, 55.6; lime, 25.9; magnesia, 18.5. Iron is usually present in small amounts, and chromium is occasionally observed.

DIOPTASE.

ACHIRITE—CONGO EMERALD.

Dioptase is a silicate of copper crystallizing, commonly in prismatic forms, in the rhombohedral division of the hexagonal system. Its hardness is 5; brittle. Specific gravity, 3.28 to 3.35. Luster, vitreous. Color, rich emerald green. Transparent to subtransparent. Double refraction, strong. Cleavage, rhombohedral and perfect. Pyroelectric.

Dioptase is limited in its use as a gem by its softness and brittleness. It occurs in druses and crystalline aggregates on quartz in seams of a compact limestone near Altyn-Tube, in the Kirghese Steppes, whence

it was first brought by a Bucharian merchant, Achir Mahmed, after whom it was called *Achirite*. Fine crystals are found at Mindouli, near Comba, the French Congo, whence the name *Congo emerald*. Brilliant crystals are found at the copper mines near Clifton, Graham County, Arizona.

One hundred parts contain: Copper oxide, 50.4; silica, 38.2; water, 11.4.

DUMORTIERITE.

Dumortierite occurs commonly in fibrous to columnar aggregates and massive; rarely in distinct orthorhombic crystals. Luster, vitreous. Hardness, 7. Specific gravity, 3.26. Color, strong smalt blue to greenish blue; strongly pleochroic, being colorless, reddish violet, and deep ultramarine in the several directions. The fibrous kinds, when cut cabochon with sufficiently high summits, will often afford the "cat's-eye" ray. In composition the mineral is essentially a basic aluminum silicate, containing in 100 parts: Silica, 30.6; alumina, 69.4.

ENSTATITE.

BRONZITE—HYPERSTHENE.

Enstatite, bronzite, and hypersthene are orthorhombic pyroxenes occurring commonly crystalline, massive, fibrous, lamellar, or foliated. Their hardness does not exceed 6; their specific gravity, 3.5, and their colors include the various shades of green, gray, brown, white, and black. When cut cabochon across the fibers they will all afford the "cat's-eye" ray.

Enstatite is yellowish, grayish, or greenish white; has a vitreous to pearly luster; a specific gravity of 3.10 to 3.13; a hardness of 5.5, and is somewhat brittle. In composition it is essentially a magnesian silicate containing in 100 parts: Silica, 60; magnesia, 40.

Bronzite is grayish to olive green and brown in color; has an adamantine pearly to a metalloidal or bronze-like luster; a specific gravity of 3.1 to 3.3, and a hardness of 5.5. In composition it is an enstatite, having its magnesium in part replaced by iron. Bronzite and enstatite are common constituents of peridotites and the serpentines derived from them; occurring also in the crystalline schists.

Hypersthene is dark brownish green, grayish black, greenish black, and pinchbeck brown, occasionally marked by a play of color resulting from included labradorite. Luster, pearly on cleavage face and frequently exhibiting a peculiar metalloidal effect; hardness, 6; specific gravity, 3.4 to 3.5.

Hypersthene, associated with labradorite, is common in certain granular eruptive rocks, as noryte and gabbro. In composition it is analogous to an enstatite in which the magnesium has in part been replaced by iron, often in the proportion of 1:1.

EPIDOTE.

THULITE.

Epidote occurs in monoclinic crystals, commonly prismatic and in fibrous to granular masses having a hardness of 6 to 7, a specific gravity of 3.2 to 5, and a vitreous luster, inclining to pearly or resinous on certain faces. Ordinarily the color is a peculiar yellowish green, seldom seen in other minerals; from this it may pass into light and dark shades, black on one side and brown on the other; red, yellow, gray, and colorless varieties also occur. Epidote is doubly refracting and strongly pleochroic, showing a green, a brown, and a yellow as viewed in the several directions.

Thulite is a closely related mineral occurring in orthorhombic forms and in columnar to compact masses, having a specific gravity of 3.124 and a hardness of about 6.5. Its color varies from a peach-blossom red to rose red; strongly pleochroic, showing a light rose, a deep rose, and a yellow color in the different directions.

Epidote is common in many crystalline rocks, as syenite, gneiss, schist, and serpentine. It is sometimes found in geodes in trap, and also in sandstone adjoining trap dikes, as a result of contact metamorphism. It occasionally forms with quartz an epidote rock, and is sometimes found in nodules in the different quartz rocks or altered sandstones.

One hundred parts contain, approximately: Silica, 38; alumina, 22; ferric oxide, 15; lime, 23; water, 2.

EUCLASE.

Euclase, named by Haüy from $\epsilon\upsilon$, easily, and $\kappa\lambda\acute{\alpha}\omega$, to break, though susceptible of a high polish, is rarely used as a gem stone because of its brittleness. It varies in color from pale mountain green to indigo blue and white. Its hardness is 7.5, and its specific gravity about 3.1. The mineral crystallizes in the monoclinic system and exhibits trichroism.

One hundred parts contain, approximately: Silica, 41.2; alumina, 35.2; glucina, 17.4; water, 6.2.

Euclase occurs in the mining district of Villa Rica, Minas Geraes, Brazil, associated with topaz in a chloritic schist. It is found also in the auriferous sands of the Orenburg district of the southern Urals, associated with topaz, corundum, kyanite, rutile, etc.

FLUORITE.

CHLOROPHANE.

Fluorite crystallizes in the isometric system, commonly in cubes; occurring also massive and granular, coarse or fine. The mineral has a perfect octahedral cleavage; a conchoidal to splintery fracture; is

brittle; has a hardness of 4, a specific gravity of 3.18, and a highly vitreous luster. The color range is extensive, including white, yellow, green, violet, sky and amethystine blue, brown, wine yellow, rose red, crimson, and pink. It sometimes presents a bluish fluorescence, and is phosphorescent when heated gently. This is especially characteristic of the variety chlorophane, or cobra stone, which emits a bright emerald-green light on a comparatively low rise of temperature.

Fluorite, though too soft for continuous wear, is occasionally cut as a gem, chiefly for collectors' use, and a massive variety occurring in the north of England is not infrequently worked up into trinkets, paper weights, vases, and other ornaments.

Fluorite occurs in veins and beds in gneiss, mica slate, clay slate, limestone, and sandstone.

One hundred parts contain: Calcium, 51.3; fluorine, 48.7.

GADOLINITE.

Gadolinite, a complex silicate of yttrium and other earths, occurs usually massive, rarely in monoclinic crystals. Its hardness is 6.5; specific gravity, 4.35; color, black, of several shades. The mineral affords velvety black, opaque gems and is cut for collectors' use only.

GARNET.

The garnet includes several varieties, which are distinguishable by their differences in composition and in part by their colors. The mineral crystallizes in the isometric system, commonly in dodecahedrons and trisoctahedrons and derived forms. It is singly refracting and monochroic; has a vitreous to resinous luster, and varies in hardness and specific gravity, according to the variety, from 6.5 to 7.5 and 3.15 to 4.3, respectively.

In composition garnet is a silicate of different bases—alumina, lime, magnesia, chrome, iron, manganese, and titanium. There are three prominent groups, with several subdivisions under each, many of these passing into each other. They are:

I. Aluminum garnet:

Grossularite—Lime-aluminum garnet.

Pyrope—Magnesium-aluminum garnet.

Almandite—Iron-aluminum garnet.

Spessartite—Manganese-aluminum garnet.

II. Iron garnet:

Andradite—Lime-iron garnet.

III. Chromium garnet:

Ouvarovite—Lime-chrome garnet.

The lime-aluminum garnet has a hardness of 7, a specific gravity of 3.55 to 3.66, and its color range includes white, pale green, amber, honey, wine, and brownish yellow, cinnamon brown, and pale rose red. The several varieties are: *Essonite*, *cinnamon stone*, or *hyacinth*. The

kind of this variety more commonly used as a gem includes the clear cinnamon brown to a deep gold tinged with brown specimens. Its hardness is 7 and its specific gravity 3.6. *Grossularite*, the pale green, yellow to nearly white, pale pink, reddish orange, and brown kinds. *Romanzovite* is brown. *Wiluite* is yellowish green to greenish white in color. *Topazolite* is topaz to citrine yellow. *Succinite* is an amber-colored kind.

The principal magnesian garnet is the *pyrope*, meaning "fire-like," a deep blood red to nearly black stone, prized as a gem. It is among the hardest of the garnets, ranking 7.5 in the scale. Its specific gravity lies between 3.7 and 3.8. (Fig. 7.)

The *almandite*, or *carbuncle*, and *rhodolite* are iron-aluminum garnets. Almandite varies in color from cherry red, blood red to deep



Fig. 7.

GARNET CRYSTAL AND PEBBLES OF PYROPE.

Specimen No. 82575, U.S.N.M.

red of several tints, occasionally assuming an orange hue by artificial light. The color of the rhodolite lies between a violet purple and a brownish red. These varieties have a hardness of about 7.5, with a specific gravity seldom less than 4, and occasionally as high as 4.3. Both are prized as gems.

Spessartite is a manganese aluminum garnet, varying in specific gravity from 3.7 to 4.3, and has a hardness of about 7. The color varies from a reddish brown, dark hyacinth red, sometimes with a tinge of violet, to orange red. It often affords fine gems.

The calcium-iron garnet varies in specific gravity between 3.6 and 4 and in hardness from 5 to 7. The group includes a number of varieties, varying widely in color and other respects, the more important

of which are: *Andradite*, a yellow or orange-brown variety. *Deman-toid* or *Uralian emerald*, a grass-green, emerald-green, or brownish-green stone having a brilliant luster, and when cut exhibiting considerable fire, especially by artificial light. It is somewhat soft, having a hardness of about 5. *Colophonite* is a brownish-black garnet, characterized by a resinous luster. *Melanite* is a black to yellow-brown kind.

The lime-chrome garnet, *ouvarovite*, is almost invariably a fine emerald green, and is harder than any of the other varieties, ranking nearly 8 in the scale.

In the trade the lighter-colored clear garnets are often called *hyacinth*. The yellowish is the *jacinta*; a yellowish-red, the *guarnaccino* or *vermeille*; the red with a tinge of violet, *rubino-di-rocca* or *grenat syriam*. The deep clear red is the true precious garnet and is often called *carbuncle*.

Garnet is common in mica schist, hornblende and chlorite schist, gneiss, syenitic gneiss, and granite, occurring also in limestone, serpentine, and volcanic rocks. The garnet of granite, gneiss, mica schist, and similar rocks is commonly almandite. Grossularite is common in limestones and crystalline schists. Pyrope belongs especially to peridotites and the serpentines derived from them; occurs also in basalts. Spessartite occurs in granitic rocks, in quartzite, in certain schists, and in some rhyolytes. Iron garnets are common in eruptive rocks, occurring also as a product of contact metamorphism. Demantoid occurs in serpentine. The chrome garnets belong particularly with the chromite in serpentine; found also in granular limestone.

GÖTHITE.

A hydrated oxide of iron, which, when occurring in acicular crystals in limpid quartz, is often cut into gems. The color of the göthite is yellowish, reddish, and blackish brown.

GOLD.

Gold, in crystals, filiform, reticulated, and arborescent shapes, or in nuggets, is frequently worn as a jewel. Gold penetrating white, black, rose, and amethystine quartz is worked into jewelry of all sorts, the designs often being elaborate.

GYPSUM.

ALABASTER—SATIN SPAR—SELENITE.

Gypsum occurs in monoclinic crystals and massive. It has a hardness of 2, a specific gravity of 2.3, and is usually white in color, sometimes gray, flesh red, honey, and ocher yellow, blue, brown, and black. Three varieties are recognized. 1. *Selenite*, occurring either in distinct crystals or broad folia, which are transparent throughout. It is

not used as a gem. 2. *Satin spar*, a fine fibrous variety having the pearly opalescence of moonstone and affording the "cat's-eye" ray when cut cabochon. Though soft, it is frequently worked up into beads, pins, and other ornaments. 3. *Alabaster*, a fine-grained, white or delicately clouded variety. It is worked up into carvings, statuettes, and other ornamental objects.

Gypsum often forms extensive beds in connection with various stratified rocks, especially limestones and marlytes; found also in crystalline rocks, about the fumaroles of volcanoes, and is deposited on the evaporation of sea water and brines, in which it exists in solution.

One hundred parts contain: Sulphuric acid, 46.51; lime, 32.56; water, 20.93.

HEMATITE—CHROMIC IRON—ILMENITE.

The compact, fibrous kinds of hematite are cut into beads, intaglios, charms, and other ornaments. The color is iron black to steel gray; luster metallic and opalescent; hardness 6; specific gravity 4.5 to 5.3. One hundred parts contain: Iron, 70; oxygen, 30.

Chromic iron and ilmenite have a use similar to that of hematite. The hardness, specific gravity, and color of both are also near that of hematite. Chromic iron contains: Iron, 38; chrome, 62. Ilmenite consists essentially of the oxides of iron and titanium in varying proportions.

HORNBLLENDE.

The use of hornblende as a gem is limited to those specimens found penetrating liquid quartz. As such, especially when the hornblende is in delicate acicular crystals, interlaced and penetrating the quartz in every direction, it affords very beautiful gems.

IOLITE.

DICHOIRTE—SAPHIR D'EAU—WATER SAPPHIRE.

Iolite, called also dichroite and saphir d'eau, or water sapphire, is occasionally used as a gem. It occurs in orthorhombic crystals of a prismatic habit, and massive, compact. The hardness is greater than that of quartz; its specific gravity is 2.60 to 2.66, and its luster vitreous. The colors are the various shades of blue, commonly a smoky blue, either light or dark. Its pleochroism is strongly marked, the crystals presenting different shades of blue, bluish white, and yellowish gray, according to the direction in which they are viewed; hence the name dichroite, meaning two colored.

Iolite occurs in granite, gneiss, chloritic and talcose schists, and allied rocks; also in igneous rocks, and as a contact mineral in connection with eruptive dikes, as in slates adjoining granite. The saphir d'eau occurs in small rolled masses of a strong blue color in the alluvial deposits of Ceylon. The mineral alters readily on exposure, so that it

is most commonly found in an altered condition or inclosed in altered iolite.

One hundred parts contain: Silica, 49.6; alumina, 33.8; magnesia, 8.7; oxide of iron, 7.9.

ILVAITE.

Ilvaite has little value as a gem, but is occasionally used for the letter I in sentimental jewelry. It is iron black in color; has a hardness of 6; a specific gravity of 3.99, and a submetallic luster. The mineral crystallizes in the orthorhombic system, commonly in prisms, also occurring columnar or compact massive.

One hundred parts contain: Silica, 29.3; oxides of iron, 54.8; lime, 13.7; water, 2.2.

ISOPYRE.

Occurs in compact masses with cleavage. Its color is grayish or velvet black to dark green, occasionally spotted red like heliotrope and then used as a gem. Its hardness is 6 to 6.5; specific gravity, 2.912; luster, vitreous, and is translucent to opaque. Isopyre occurs in a quartzose granite near Penzance, Cornwall, England, and in a breccia near Edinburgh, Scotland.

The mineral contains in 100 parts: Silica, 47.09; alumina, 13.91; iron, 20.07; lime, 15.43; copper, 1.94.

JADE.

Jade, as commonly used, is a generic term including various mineral substances, as chloro-melanite or jadeite, nephrite, saussurite, pseudo-nephrite, of tough, compact texture, and ranging in color from cream white to dark green and nearly black. The Asiatic jade is usually pale green or bluish white, while that of New Zealand is dark green.

The term jade includes properly two minerals only—*nephrite* and *jadeite*. The one is a tough, compact, fine-grained tremolite, a variety of amphibole, having a hardness of 6 to 6.5 and a specific gravity of 2.96 to 3.1. The other is a tough, fibrous foliated to closely compact mineral grouped with the pyroxenes. Its hardness is 6.5 to 7 and its specific gravity 3.33 to 3.35.

The lack of brilliancy in jade makes it of little value as an article of jewelry, but its great toughness renders it eminently suitable for ornamental vases and other carved work displaying delicacy of workmanship.

KYANITE.

DISTHENE.

Kyanite, when transparent and of a good color, is employed as a gem. The name is from *κυανος*, blue, though the mineral affords examples of other colors, such as white, gray, green, and black. Disthene is

from $\delta\iota\varsigma$, twice, and $\sigma\theta\epsilon\nu\omicron\varsigma$, strong, alluding to its unequal hardness and electrical properties in two different directions.

The mineral occurs commonly in long-bladed triclinic crystals and in bladed to subfibrous masses. Hardness, 5 to 7, depending upon the direction and crystal face upon which the test is made. Specific gravity, 3.56 to 3.67. Luster, vitreous. The color is commonly pale blue, often a deeper hue along the center of the blades, also white, gray, green, and black; pleochroism strong in colored kinds.

Kyanite occurs principally in gneiss and muscovite and paragonite schist.

One hundred parts contain: Silica, 37; alumina, 63.

LABRADORITE.

Labradorite is one of the feldspars occurring in triclinic crystals and cleavable to granular masses. Its hardness is 6; specific gravity, 2.72; luster, vitreous, passing into pearly, translucent to subtranslucent; color, gray, brown, or greenish, sometimes colorless and glassy. Owing chiefly to a peculiarity in its intimate structure, labradorite, especially of the cleavable kinds, often shows a magnificent play of colors, in which blue and green predominate, while yellow, red, pearl gray, orange, puce, amber, and peach blossom hues are apparent, together with a golden and copper schiller. The mineral takes a high polish, and, because of its chatoyant reflections, is often very beautiful.

Labradorite is an essential constituent of various rocks, especially the basic kinds, and is usually associated with some member of the pyroxene or amphibole groups. Labradoritic massive rocks are most common among the Archaean formations. It was brought first from the coast of Labrador, hence the name.

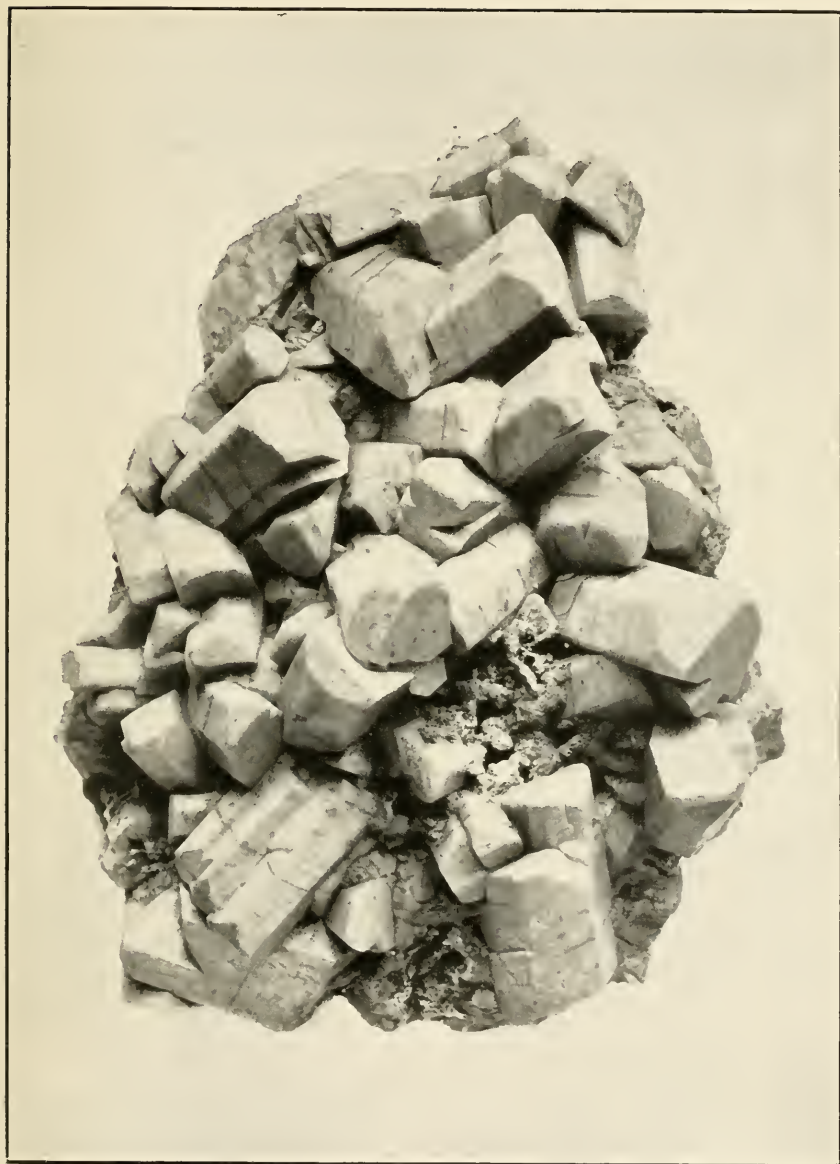
One hundred parts contain: Silica, 53.1; alumina, 30.1; lime, 12.3; soda, 4.5.

LAPIS-LAZULI.

Lapis-lazuli, long thought to be a simple mineral, consists of a mixture of a bluish substance (lazurite) with granular calcite, scapolite, diopside, amphibole mica, pyrite, etc. The richly colored kinds are highly esteemed for costly vases, mosaics, and other ornamental work. Color, rich Berlin or azure blue, violet blue, and greenish blue; occasionally containing a colorless substance and frequently including brass yellow specks of pyrite; these are often so numerous as to produce a spangled appearance. Its hardness is 5.5; specific gravity about 2.4; luster, vitreous; translucent.

Lapis-lazuli occurs commonly massive in limestone and in a granitic rock.

In composition it carries in 100 parts: Silica, 31.7; alumina, 26.9; soda, 27.3; sulphur 16.



AMAZON STONE.

Pikes Peak, Colorado.

Specimen No. 81813, U.S.N.M.

LEPIDOLITE.

Lithia mica is used to some extent for ornaments, such as ash trays, dishes, vases, paper weights, etc. The colors range from rose pink through a variety of shades of violet gray to yellowish and whitish. It occurs in granular masses made up of foliated scales. Hardness about 4; specific gravity, 2.84 to 3.

MAGNETITE.

LODESTONE.

Lodestone, a magnetite that possesses polarity, is worked up into charms and worn solely for the mystic properties it is supposed to possess. Color, iron black; luster, metallic; hardness, 6.4; specific gravity, 5. Brittle, opaque, strongly magnetic, and possessing polarity.

Composition: Iron, 72.4; oxygen, 27.6.

MICROCLINE.

AMAZONSTONE—AVENTURINE.

Microcline, one of the feldspars, occurs massive and in triclinic crystals, resembling those of orthoclase, common feldspar, in habit. Its hardness is 6.5; specific gravity, 2.54; cleavage perfect and in two directions; luster, vitreous; translucent to opaque, and varying in color from white to pale cream yellow, red, and green.

Two recognized varieties are used either as gems or ornamental stones. 1. *Amazonstone*, a green-colored microcline. Its color range includes the several shades of green, from the palest and most delicate to a strong, deep, verdigris green. (Plate 3.) 2. *Aventurine*, consisting of interlaminated albite and microcline, and often including disseminated scales of hematite or goëthite, giving rise to internal yellowish or reddish reflections.

Microcline contains in 100 parts: Silica, 64.7; alumina, 18.4; potash, 16.9.

MICROLITE.

Occasionally crystals of microlite are found that are sufficiently transparent to afford gems ranging in color from cinnamon brown to orange red and spinel yellow. The hardness of the mineral is 5.5; specific gravity, 5.65 to 6.13, greater than that of any other known gem, luster, resinous to vitreous, transparent to translucent and opaque.

In composition it is essentially a tantalate of lime.

NATROLITE.

Natrolite is occasionally used for the letter N in sentimental jewelry and as a collectors' gem. The mineral occurs in groups of slender, prismatic, orthorhombic crystals, in fibrous, radiated, and divergent masses, in amygdules having a fibrous structure, and in compact masses. Its hardness is 5.5; specific gravity, 2.2; luster, vitreous, sometimes inclining to pearly or silky in the fibrous kinds; color, white to grayish, yellowish, reddish, and red.

Natrolite occurs in cavities in amygdaloidal basalt and related igneous rocks, and in seams in granite, gneiss, and syenite.

One hundred parts contain: Silica, 47.4; alumina, 26.8; soda, 16.3; water, 9.5.

OBSIDIAN.

Obsidian is compact volcanic glass. Its specific gravity is 2.25 to 2.8. The hardness is somewhat less than that of ordinary feldspar. The prevalent color of the material is black, but some of it is mottled and streaked with brownish red or various shades of brown; sometimes in reddish-brown spherules in a gray matrix; also green of several shades to light and dark yellow. Certain fibrous specimens will afford the cat's-eye ray.

The kinds used as gems are known as: *Moldavite* or *bottle stone*, a green-colored obsidian; *marekanite* or *mountain mahogany*, a red colored or banded black and brown variety, and *Iceland agate*, *pearlylite*, and *sphaerulite*.

OLIVINE.

CHRY SOLITE—PERIDOT—HYALOSIDERITE.

Olivine crystallizes in the orthorhombic system; also occurring massive; compact or granular; commonly in embedded grains. Its hardness is 6.5 to 7. Specific gravity, 3.33 to 3.44. Cleavage distinct. Fracture, conchoidal. Brittle. Luster, vitreous. Color, commonly olive green, sometimes brownish, grayish red, and occasionally black. Double refraction, strong. Dichroism occasionally marked, the peridot giving a straw-yellow and a green image.

The kinds used as gems are known as: *Chrysolite*, yellowish green; *peridot* or *evening emerald*, having an olive pistachio, or leek-green color, of a quieter hue than that of the emerald, the approved tint being similar to that seen on looking through a delicate green leaf, and *hyalosiderite*, called also *Job's tears*, a highly ferruginous variety having a specific gravity as high as 3.57 and a rich olive-green color.

Olivine is a common constituent of some eruptive rocks; not uncommon in granular limestone and dolomite; occurring also in certain schists and in ore deposits.

The percentage composition of olivine, though the iron oxide may be more or less replaced by magnesia, is, approximately: Silica, 41; magnesia, 50; iron oxide, 9.

OCTAHEDRITE.

ANATASE.

Octahedrite crystallizes in the tetragonal system, commonly on octahedra. Its hardness is nearly 6, its specific gravity 4.86, and its color includes the several shades of brown, passing into deep blue or black; sometimes greenish yellow to pale green. Fine blue crystals of this mineral from Brazil are so remarkably brilliant as to be mistaken for diamonds.

One hundred parts of octahedrite contain: Titanium, 60; oxygen, 40.

ODONTOLITE.

BONE TURQUOISE—FOSSIL TURQUOISE.

Odontolite is a fossil ivory or bone, colored sky blue or green by phosphate of iron. It resembles the turquoise in color, but may readily be identified by its bony structure.

OLIGOCLASE.

HELIOLITE—SUNSTONE.

Oligoclase, one of the feldspars, occurs massive and in triclinic forms crystals somewhat rare. Its cleavage is perfect in one direction, less so in another. Fracture uneven. Hardness, 6. Specific gravity, 2.65 to 2.67. Luster, vitreous to somewhat pearly. Color, grayish, reddish, greenish, and white to colorless, occasionally having a play of color. Aventurine kinds, called either *sunstone* or *heliolite*, are of a grayish white to reddish gray color, with internal yellowish or reddish reflections proceeding from disseminated crystals or flakes of iron oxide.

Fine transparent oligoclase, affording brilliant gems having a moonstone effect, is found near Bakersville, North Carolina. The best sunstone is from Christiana fiord, Norway. The same region also affords specimens having a magnificent play of color, in which grayish blue, orange, and gray, with coppery reflections, are seen.

Oligoclase occurs in granitic, syenitic, and dioritic rocks.

One hundred parts contain, approximately: Silica, 62.3; alumina, 23.5; soda, 14.2.

OPAL.

The opal occurs in amorphous masses; sometimes in reniform, stalactitic, and tuberoso shapes, and encrusting. Its hardness is about 6.5, occasionally as low as 5.5. The specific gravity varies from 1.9 to 2.3, commonly 2.1. Luster, vitreous, frequently subvitreous,

often inclining to resinous, and occasionally to pearly. Color, white, yellow, red, brown, green, gray (the dark color arising from foreign admixtures); sometimes having a brilliant play of colors by reflected and refracted light. This play of colors is not due to the presence of colored substances as constituents of the mineral, but to a physical condition of the specimen resulting from a multitude of fissures, the sides of which are minutely striated, and which cause a diffraction and decomposition of the light which falls upon them. The size of these striations and fissures influence the color and its distribution within the mineral; occasionally the patches of color are of a uniform size; again, they may be irregular. Certain specimens may show a predominance of one set of colors, as red and orange; others may show chiefly green and blue tints.

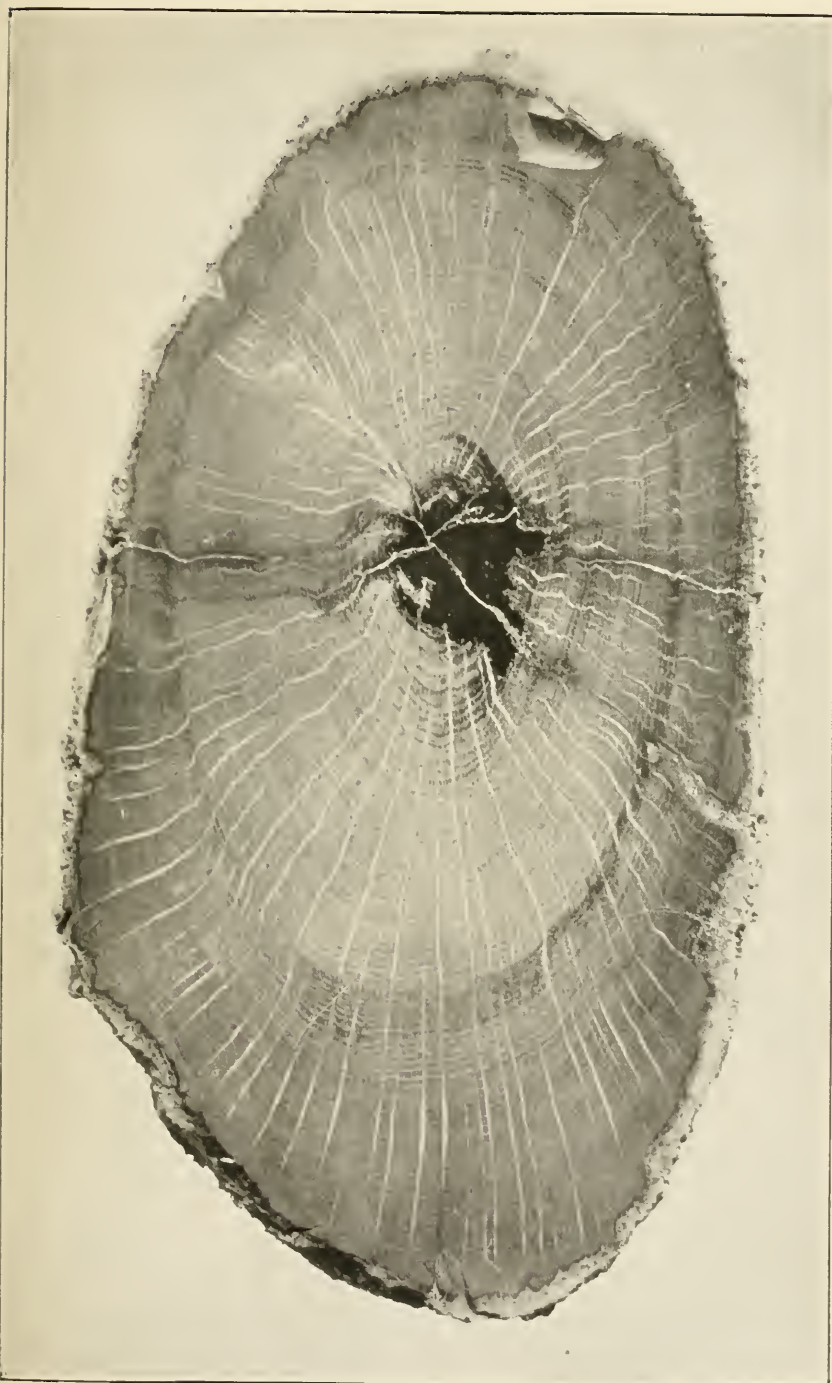
There are many varieties of the opal to which specific names have been given. The *precious opal* exhibits a play of delicate colors, reflecting now one hue and then another. The *harlequin opal* presents a variegated play of colors on a reddish ground and resembles the fire opal. The *fire opal* presents hyacinth red to honey yellow colors, with fire-like reflections, somewhat irised on turning. *Girasol* is a bluish white translucent kind, presenting reddish reflections in a strong light. *Lechosos opal* is a name applied to those kinds showing deep green flashes of color. *Hydrophane* is a whitish or light colored opaque kind which becomes transparent when immersed in water. *Cacholong* is an opaque porcelain, bluish, yellowish, or reddish white variety. *Opal agate* is agate-like in structure. *Jasp opal* contains several per cent of iron, and is the analogue in opal of jasper in quartz. *Wood opal* is wood silicified by opal; sometimes called *lithoxylye* when showing a woody structure. (Plate 4.) *Hyalite*, or *Müller's glass*, is either colorless and pellucid like glass, or a translucent bluish white. *Moss opal* contains moss-like inclusions of manganese oxide and is the analogue in opal of the moss agate in quartz. *Tabasheer* is an amorphous opal-like silica deposited within the joints of bamboo; it absorbs water and becomes transparent like hydrophane.

The opal occurs filling seams, cavities, and fissures in igneous rocks, etc. It occurs also embedded in limestone and argillaceous beds. It consists essentially of silica in the soluble or gelatinizing condition, but often combined with insoluble silica, and is more or less hydrous.

ORTHOCLASE.

ADULARIA—AVENTURINE—MOONSTONE—PERTHITE.

Orthoclase, common feldspar, occurs in monoclinic crystals, often prismatic in habit, and massive, coarsely cleavage to compact, and flint-like or jasper-like. Cleavage perfect in one direction, less so in another. Hardness, 6. Specific gravity, 2.4 to 2.6. Luster, vitreous, sometimes inclining to pearly on the face of a perfect cleavage, and



OPALIZED WOOD.
Clover Creek, Lincoln County, Idaho.
Specimen No. 82581, U.S.N.M.

occasionally having a satin-like effect or schiller. Color, white; often gray, reddish white, flesh red, greenish white, and occasionally green. Transparent to translucent.

The difference in color, luster, and other physical properties has given rise to distinct names for several varieties of this mineral, the more important of which for use as gems are: *Adularia*, a transparent or translucent variety differing from ordinary orthoclase in presenting, when polished, chatoyant or pearly reflections. The kinds exhibiting this chatoyancy to the greatest degree are known as *moonstones*, and have, as a rule, a specific gravity of 2.58. *Aventurine* is less pellucid and has reddish and yellow internal reflections arising from minute scales of occluded minerals. *Sunstone* is a similar variety. *Cassinite* is a bluish-green kind, having a pearly luster and more or less of an aventurine character. *Leelite* has a deep flesh-red color, with a waxy luster. *Perthite* is a flesh-red feldspar, consisting of interlaminated orthoclase and albite, and which often affords bright aventurine reflections. *Variolite* is a dark-green variety containing lighter globular particles; it was so called in allusion to its supposed power in preventing and curing smallpox.

Orthoclase in its several varieties belongs especially to the crystalline rocks, occurring as an essential constituent in granite, gneiss, syenite, porphyry, etc.

One hundred parts contain: Silica, 64.8; alumina, 18.4.

PEGMATITE.

GRAPHIC GRANITE.

Pegmatite consists of feldspar and quartz, in which the quartz, arranged in parallel positions, is so distributed through the feldspar as to appear like oriental characters.

PHENACITE.

Phenacite crystallizes in the hexagonal system; has a hardness of 8; a specific gravity of 2.96; it is colorless, often clouded or milky; also straw and wine yellow and cinnamon colored. The clouded kinds are dichroic. The colorless transparent kinds exhibit considerable "fire," especially by artificial light, and may easily be mistaken for the diamond, hence the name, from *Φένας*, a deceiver.

One hundred parts contain: Silica, 54.3; glucina, 45.7.

PORPHYRY.

The term porphyry, as here used, applies to that class of rocks in which the mass of the rock, or groundmass, is so compact and dense as to appear practically noncrystalline, and in which are embedded large, scattering, more or less perfectly formed crystals, usually of quartz or feldspar. These crystals being of a different color from the

groundmass stand out in marked contrast. The porphyries are, as a rule, hard, tough, and without rift or grain. They may be of several shades of color, as green with splashes of white, or a paler green or red with white specks, etc. Near Charlotte, North Carolina, there occurs a cream-colored quartz porphyry which is penetrated by long parallel streaks of a dead-black color. The stone, when cut across the streaks, has a spotted appearance (hence the name *Leopardite*); cut parallel with the streaks it gives a dendritic or moss-like effect.

Porphyry finds a use more as an ornamental stone than as a stone for personal adornment.

PREHNITE.

CHLORASTROLITE—ZONOCHLORITE.

Prehnite occurs more commonly massive, usually in reniform, botryoidal, globular, and stalactitic shapes. Hardness, 6.5; specific gravity, 2.8 to 2.95; luster, vitreous, occasionally pearly on certain surfaces. Color, light green of several shades, passing into white and gray, the color often fading on exposure. When cut and polished the darker kinds resemble chrysoprase in color and luster.

Chlorastrolite, from chloros (green), aster (star), and lithos (stone), is an impure variety of prehnite, occurring in small rounded pebbles obtained from the trap on the shores of Isle Royale, Lake Superior. It is opaque, of a mottled green color, somewhat chatoyant on the rounded sides, and receives a high polish.

Zonochlorite occurs on a small island off Neepigon Bay, Lake Superior. Its green color and banded appearance has given it its name from zona, a band; chloros, green; and lithos, stone.

Prehnite occurs as a secondary mineral in veins and cavities in the more basic eruptive rocks as basalt and diabase; less often in the crystalline rocks, granite, gneiss, and syenite.

One hundred parts contain: Silica, 43.8; alumina, 24.8; lime, 27.1; water, 4.3.

PYRITE AND MARCASITE.

Pyrite and marcasite are occasionally cut into squares, ovals, and other shapes for use as settings for rings, scarf pins, trinkets, etc. The two minerals contain the same elements in the same proportions—iron 46.7 and sulphur 53.3 parts per 100—but differ in their physical properties. Pyrite has a hardness of 6.5; specific gravity, 5.2; crystalline form, isometric; color, brass yellow, and is the kind more commonly used for ornaments. Marcasite has a hardness of 6; specific gravity, 4.8; crystalline form, orthorhombic; color, pale or grayish yellow. During the eighteenth century both pyrite and marcasite were cut into faceted forms and extensively used for jewelry.

QUARTZ.

Quartz crystallizes in the hexagonal system, the most common form being a six-sided prism, generally striated horizontally. The crystals are often highly modified; some appear to have each alternate plane of the prism suppressed; some have the prism with pyramids at each end; others have the two pyramids only; still others have the edges and angles replaced by new planes. It occurs also in stalactitic, mam-

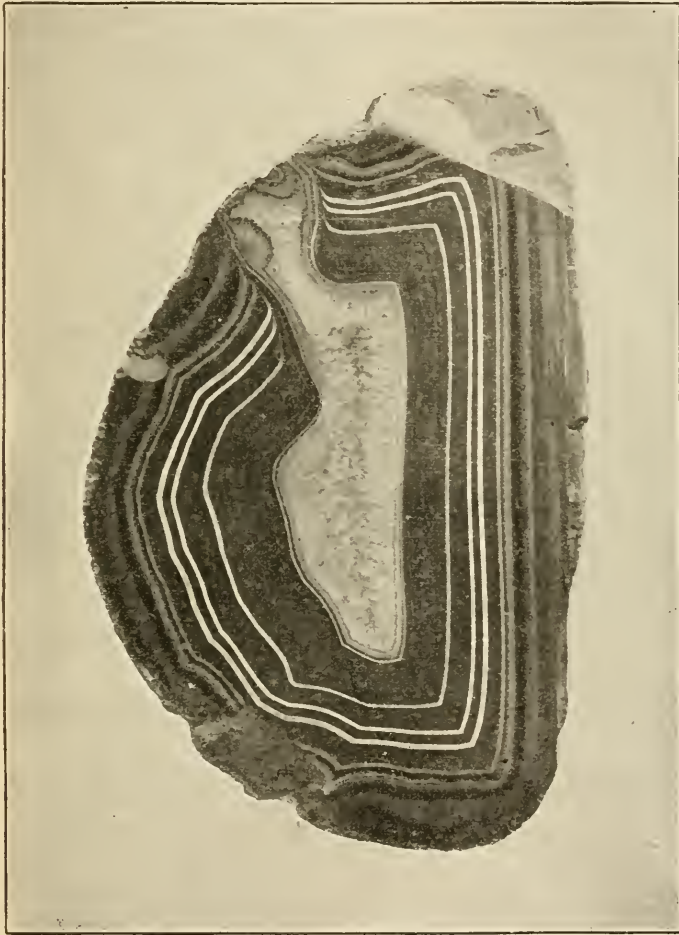


Fig. 8.
AGATE,
Brazil.

Specimen No. 4998, U.S.N.M.

millary, and other imitative shapes, and massive, either impalpable, fine, or coarse granular. Hardness, 7; specific gravity, 2.5 to 2.8, depending upon the amount of impurity present, the purest kinds 2.65. Luster, vitreous, sometimes inclining to resinous, and varying in degree from splendid to dull. Colorless when pure; often various shades of yellow, red, brown, green, blue, and black. Quartz is doubly refractive and the colored kinds are dichroic. (Plate 5.)

Quartz includes a larger number of kinds of gems among its varieties than any other mineral. The varieties arise from differences in color, mode of formation, or crystallization. These varieties, though differing widely in appearance and passing under a variety of names, are chemically all of one substance. The following is a list of the kinds commonly recognized:

Agate.—A variegated chalcedonic quartz, the colors in clouds, spots, bends, or layers. The bands or layers may be either parallel or concen-



Fig. 9.

AGATIZED WOOD.

Chalcedony Park, Arizona.

Specimen No. 82485, U.S.N.M.

tric, and either in straight, circular, or zigzag forms. Banded agates may be called *fortification*, *banded*, or *eye agates*, according to the arrangement of the layers. (See fig. 8.)

Agatized wood.—Wood silicified by silica and usually having the structure of the original material. The western part of the United States affords some remarkable specimens of this material. In Apache County, Arizona, there is a silicified forest in which trunks 150 feet



CRYSTALS OF QUARTZ.

Dauphiny, France.

Specimen No. 82218, U.S.N.M.



long and 3 feet in diameter are not uncommon. The locality affords perhaps the finest specimens known for warmth and combination of colors, in which red predominates. (Fig. 9.)

Amethyst.—A clear purple or bluish violet quartz. The color of the amethyst is often irregularly diffused, the deep purple fading into pink and white. (See fig. 10.)

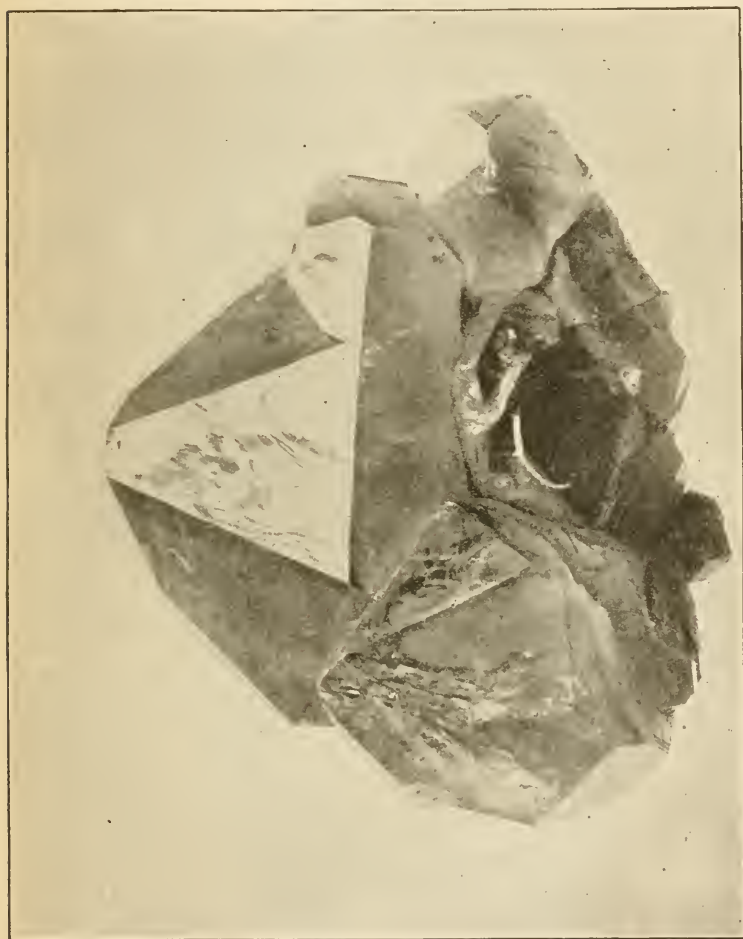


Fig. 10.
AMETHYST CRYSTALS.
Upper Providence, Pennsylvania.
Specimen No. 83676, U.S.N.M.

Asteriated or star quartz.—Contains impurities or opacity so arranged that when cut cabochon across the prism it exhibits asterism.

Aventurine quartz is minutely spangled throughout the mass with yellow scales. It is transparent to opaque, and of a gray, brown, reddish-brown, or yellow color.

Basanite, lylian stone, or touchstone.—A velvet-black siliceous quartz or flinty jasper.

Beekite.—Silicified corals, shells, or limestones, resembling chalcodony.

Bloodstone or heliotrope.—A translucent to opaque jasper of a deep-green color interspersed with red spots.

Cairngorm, smoky quartz, or morion.—Having a smoky gray, yellow, yellowish-brown, and brown color. The crystals are often pellucid, but occasionally the color is so deep as to render them nearly opaque.

Carnelian.—A reddish variety of chalcedony passing into grayish red, yellow, and brown; translucent, like horn. The carnelian takes a fine polish and is often of a clear bright tint. The colors are commonly heightened by exposure to the sun or by heat. (Plate 6.)

Cat's-eye.—Translucent quartz exhibiting opalescence or chatoyancy when cut cabochon, an effect due to inclusions of fibrous minerals, such as hornblende, asbestos, actinolite, and crocidolite. The color is commonly light greenish gray; sometimes yellow, red, or brownish.

Chalcedony.—Translucent, subtranslucent, or opaque, usually having a waxy luster and a white, yellow, brown, or bluish color. It occurs massive in imitative shapes.

Chrysoprase.—An apple, leek-green, bluish, or yellowish translucent chalcedony.

Citrine quartz, false, Saxon, Scotch, or Spanish topaz.—A light-yellow, brown, or greenish-yellow, pellucid quartz.

Ferruginous quartz, rubasc, Ancona ruby, or Mont Blanc ruby, is opaque-red, brownish-red, or ocher-yellow crystallized quartz.

Flint.—A more or less opaque chalcedonic quartz, usually gray, smoke brown, and brownish black. Breaks with a conchoidal fracture and a sharp cutting edge.

Hornstone closely resembles flint, but has a more splintery fracture.

Hyaline is an opalescent white quartz.

Jasper.—An impure massive quartz or chalcedonic rock, presenting little beauty until polished. Color, dull red, yellow, brown, or green, sometimes blue or black. When the colors are banded it is called *ribband jasper*. If zoned with colors, yellow, red, brown, or black, it is called *Egyptian jasper*. Jasper takes a high polish, and is extensively used in the manufacture of mosaics, vases, snuff and match boxes, knife handles, etc.

Milky quartz is a massive, vitreous variety, having a milk-white color. It is occasionally opalescent, and sometimes has a greasy luster.

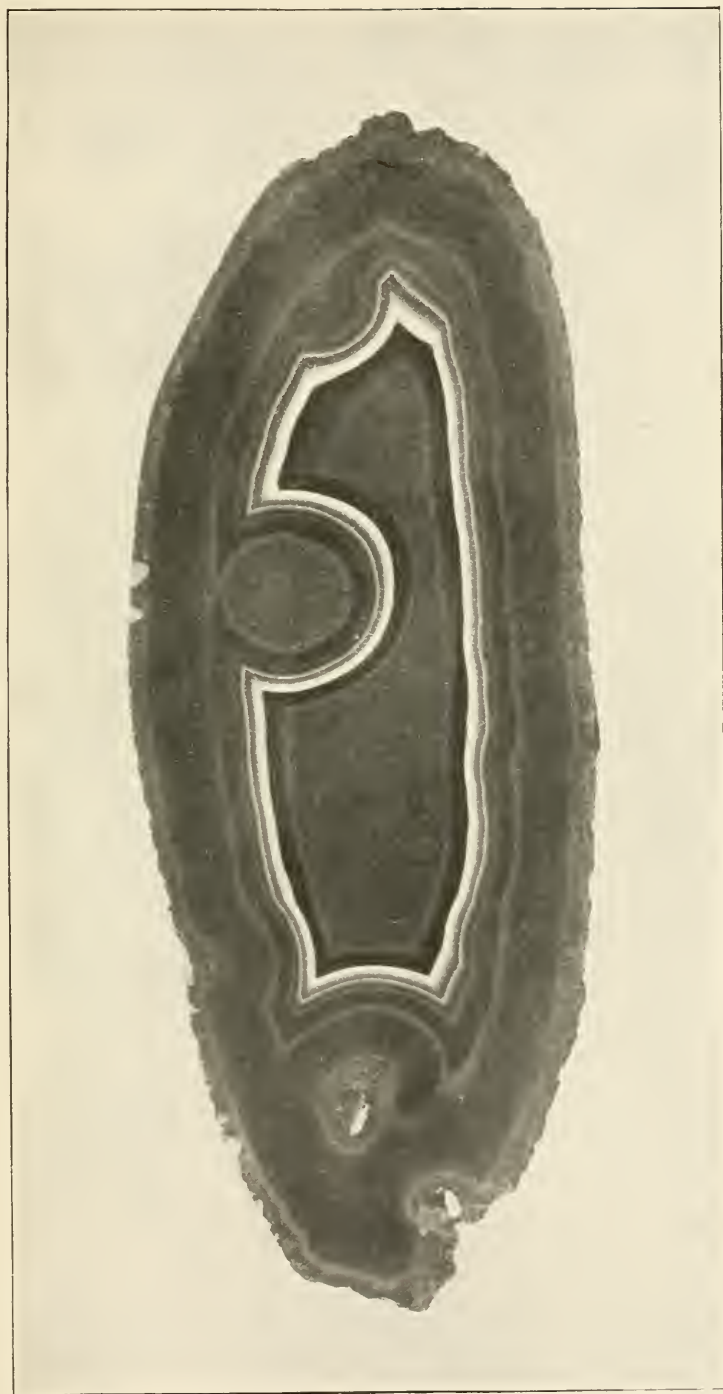
Moss agate or mocha stone is a chalcedony, containing dendritic or moss-like markings.

Onyx.—Like agate, but the colors are arranged in horizontal planes or layers, so that it can be used in cutting cameos. When the layers consist of reddish and white chalcedony the stone is called *sardonyx*.

Plasma.—A more or less translucent chalcedony, having a leaf-green color.

Prase.—A leek or olive green, somewhat spotted, massive quartz.

Rock crystal.—Transparent and colorless; includes the pure crystals of quartz.



CARNELIAN AGATE.

Uruguay.

Specimen No. 61770, U.S.N.M.



Rose quartz.—Rose to pale pink, more or less transparent, and usually massive. Luster, vitreous, occasionally greasy, and sometimes opalescent. Rose quartz is liable to lose its color on exposure to light.

Sagenitic quartz.—Quartz penetrated with acicular crystals of other minerals, as rutile (*Venus hair stone* or *flèche d'amour*) hornblende, tremolite, actinolite (*Thetis'-hair stone*), göthite, tourmaline, etc. (Plate 7.) Chlorite in quartz is common, and advantage is often taken of its



Fig. 11.
MOSS AGATE,
Sheridan, Kansas,
Specimen No. 49361, U.S.N.M.

presence in working up the specimen. Gold, silver, copper, etc., are frequent inclusions, and such specimens are largely used in jewelry. Often the included mineral is so abundant that the quartz is present only as a cementing material. An example of this is seen in the *crocidolite quartz* or *tiger-eye*.

Sapphirine or *siderite*.—A translucent, indigo, Berlin, or pale grayish blue, vitreous quartz.

Sard.—A translucent, red, brownish red, blood red, golden or amber colored chalcedony. Quartz crystals are occasionally met with which are iridescent within, an effect due to fractures and cavities in the interior. Such crystals are cut and sold under the name of *ir'is*. The irised effect is frequently produced by artificial means, usually by heating and then suddenly cooling the specimen.

Quartz is widespread in its occurrence, being found in some of its varieties in nearly every rock stratum. The varieties consist essentially of either amorphous or crystalline silica in various forms, associated with various coloring compounds, such as those containing iron, manganese, or nickel.

RHODONITE.

FOWLERITE.

Rhodonite has a hardness of 6.5, a specific gravity of 3.6, and a vitreous luster. The kinds used as ornamental stones are a fine rose to flesh red, often streaked with black. Though somewhat soft, the mineral is nearly as tough as jade. The variety known as fowlerite occurs in fine flesh-red crystals, some of them over 4 inches thick, at Franklin, Sussex County, New Jersey.

Rhodonite contains: Silica, 45.9; manganese oxide, 54.1.

RUTILE.

NIGRINE.

Rutile occurs crystallized and massive. The crystals are frequently acicular; often geniculated, and usually have their vertical planes striated. Hardness, 6 to 6.5; specific gravity, 4.25; luster, metallic adamantine; color, reddish brown passing into red, black, yellowish, violet, blue, and occasionally green. The black variety, nigrine, more closely approaches the black diamond in appearance than any other gem. The reds have the tone and color of the garnet; acicular crystals penetrating limpid quartz when cut affords the *Venus hair stone*, *flèche d'amour*, or *love's arrows*. Rutile occurs in granite, gneiss, mica, slate, and syenitic rocks, occasionally in granular limestones.

One hundred parts contain: Titanium, 60.98; oxygen, 39.02.

SAMARSKITE.

This mineral is occasionally cut as a collector's gem. Its color is velvety black; luster, submetallic and shining; hardness, 5.5; specific gravity, 5.68; color, opaque.

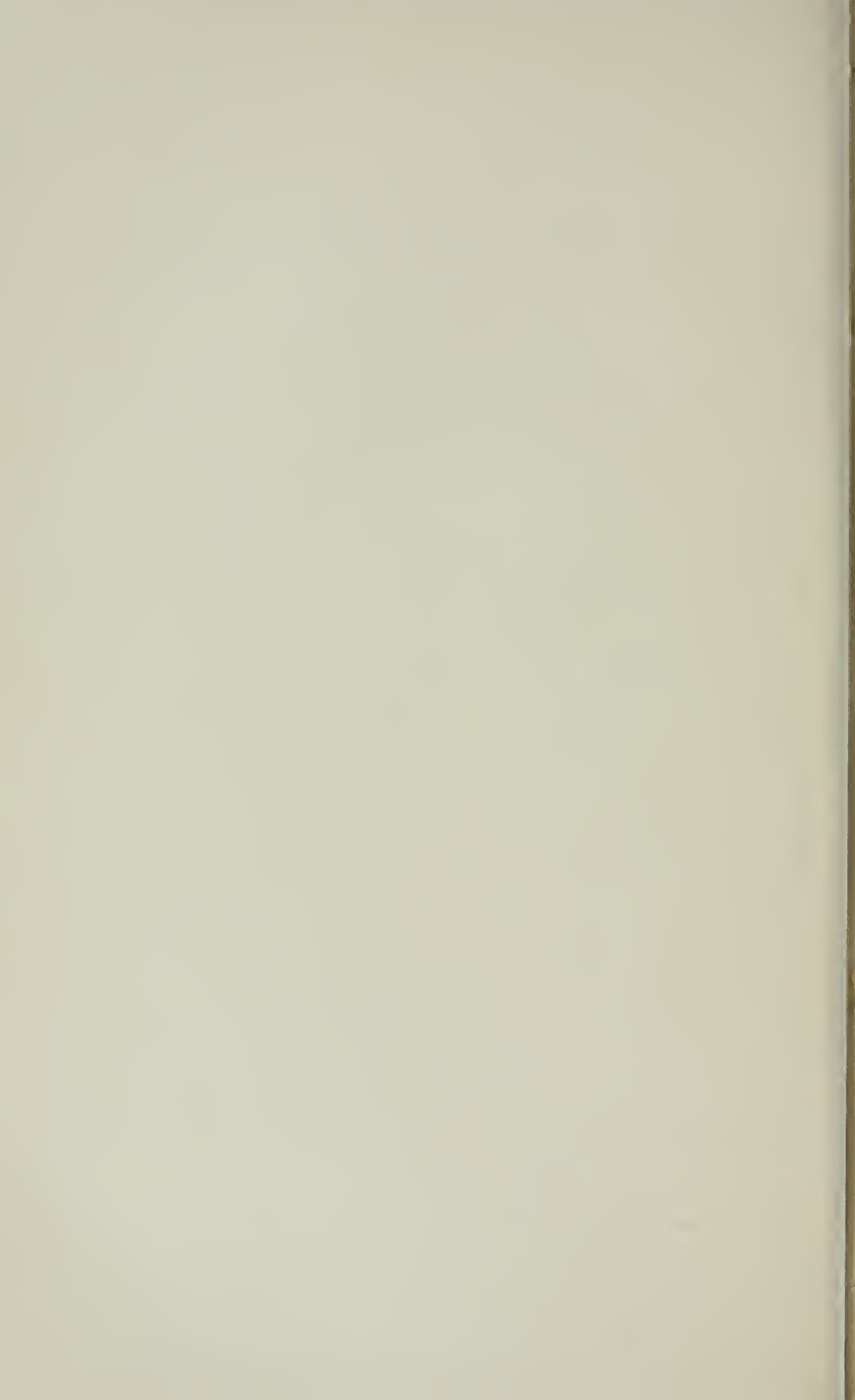
SCAPOLITE.

WERNERITE—WILSONITE.

Scapolite occurs in tetragonal crystals and massive; luster, vitreous to pearly, occasionally resinous; color, white, gray, blue, green, and red, usually of faint shades; hardness, nearly 6; specific gravity, 2.7.



RUTILE IN QUARTZ (VENUS' HAIR STONE),
Alexander County, North Carolina.
Specimen No. 47629, U. S. N. M.



The variety wilsonite is of a rich purplish-red color and takes a good polish. Scapolite is usually found in crystalline rocks and in granular limestone, more commonly near granite contacts.

SERPENTINE.

Serpentine admits of a high polish and is often employed as a material for ornaments, vases, etc. Its hardness is about 4; specific gravity, 2.5; luster, resinous to greasy; color, dark green, and blackish green to oil and siskin green, yellow, and white; frequently clouded with green of various shades and occasionally mottled with red. *Bowenite* is a cream-colored variety resembling nephrite and having a hardness of 5. *Williamsite* is of a rich blackish oil-green color, often having chromic iron disseminated through it, giving it a mottled appearance. *Verde antique* is a serpentinous rock used as a marble. It is clouded with green of various shades and is extensively used for indoor ornamental work.

Serpentine often constitutes rock masses, and as such is the result of the alteration of an igneous rock composed largely of magnesian silicates.

One hundred parts of the mineral contain: Silica, 43.64; magnesia, 43.35; water, 13.01.

SMITHSONITE.

Smithsonite has a hardness of 5, a specific gravity of 4.45, and a vitreous to pearly luster. Color, white, often grayish, greenish, and brownish white; sometimes green, blue, orange yellow, brown, and pink. The rich-colored kinds are occasionally cut for cabinet gems.

Smithsonite is found in beds and veins associated with other zinc minerals, galena, copper, and iron, usually in calcareous rocks.

One hundred parts contain: Oxide of zinc, 64.81; carbonic acid, 35.19.

SODALITE.

The fine blue-colored varieties of sodalite are cut cabochon for gem purposes. Hardness, 6; specific gravity, 2.29; luster, vitreous, inclining to greasy. Sodalite is met with in mica-slate, granite, gneiss, and certain eruptive rocks.

One hundred parts contain: Silica, 37.2; soda, 19.1; chlorine, 7.3.

SPINEL.

ALMANDINE—BALAS-RUBY—RUBICELLE—SAPPHIRINE—PLEONAST.

Spinel crystallizes in the isometric system, commonly in octahedrons. Its hardness is 8; specific gravity about 3.65; luster, vitreous. Color, red of various shades, passing into blue, green, yellow, brown, black, and occasionally nearly white. The mineral affords a wider range of color than any other gem. Following the order of the prismatic hues there are red, orange, yellow, green, blue, indigo, and vio-

let colored spinels; and also there are those showing a whole series of intermediate hues such as pink, heliotrope, lavender, lilac, purple, fawn, corn color, etc. The transparent, lively, red-colored spinels are called *spinel rubies*, and may readily be taken for the true ruby, though its small refractive and dispersive power together with the absence of pleochroism render it less brilliant than and lacking the fire of the red corundums. The rose-red to pink-colored kinds are called *balas ruby*; the yellow or orange-red spinels are known as *rubicelle*; the violet and purple ones as *almandine*; the pale to sapphire-blue kinds as *sapphirine*; the blacks as *pleonast*



Fig. 12.
SPINEL CRYSTALS.
Kandy, Ceylon.
Specimen No. 49163, U.S.N.M.

Spinel occurs embedded in granular limestone, and with calcite in serpentine, gneiss, and allied rocks; occurring also in cavities in the ejected masses of certain volcanoes. Found also as rolled pebbles in certain alluvials, such as those of Ceylon and Burma, where it occurs in water-worn masses of fine colors in the channels of streams along with quartz, garnet, tourmaline, sapphire, zircon, and other gem minerals. Spinel ruby is frequently found along with the ruby corundum in the crystalline limestone of the ruby mines of Burma. Most of the gem spinel comes from Ceylon, Burma, Siam, India, and other

Eastern countries. Small crystals of good color are found in the gem-bearing gravel of Expailly, France. The old lavas of Monte Somma, Italy, afford small black crystals of great brilliancy. A pale blue to pearl gray kind is found in the limestone near Aker, Sweden. From Amity, New York, to Andover, New Jersey, a distance of about 30 miles, is a region of granular limestone and serpentine in which localities of spinel abound, the crystals sometimes being fine enough to afford green, black, brown, and, less commonly, red gems. The localities near Franklin, New Jersey, afford crystals of various shades of black, blue, green, and red, which will occasionally afford small gems.

Spinel, when pure, contains essentially 28 parts of magnesia and 72 parts of alumina per 100; the magnesia, however, may be, and often is replaced by oxides of iron, zinc, manganese, or lime. These replacements give rise to several varieties known as automolite and gahnite, zinc spinels, having a dark green to black color and a specific gravity of 4.1 to 4.9. Ceylonite, an iron magnesia spinel, usually black in color, and having a density of 3.57. Chlorospinel, a magnesia, iron, and alumina spinel, having a grass-green color and a specific gravity of 3.59. Dysluite, a zinc, manganese, and iron spinel, having a yellowish or grayish brown color with a specific gravity of 4.55. Hercynite, an iron spinel, having a specific gravity of 3.9.

SPODUMENE.

HIDDENITE—LITHIA EMERALD.

Transparent spodumene affords gems varying in color from green of several shades, straw yellow to yellowish white, faint reddish to amethystine, and colorless. The mineral occurs in monoclinic crystals of a prismatic habit and in cleavable masses. Its hardness is 6.5 to 7. Specific gravity, 3.13. Cleavage, prismatic and perfect. Fracture, uneven; brittle. Luster, vitreous; somewhat pearly on cleavage surfaces.

Hiddenite, or lithia emerald, is a variety of spodumene varying in color from a yellowish green to a deep emerald green tinged with yellow, the colors of the crystal usually being yellow at one extremity and a more or less deep green at the other. The deeper colored kinds afford a gem resembling the emerald but having a greater variety of color because of its strong pleochroism. The mineral occurs in slender prismatic crystals one-half inch to 2 inches in length, affording small gems only, the largest being under 3 carats in weight. Hiddenite is at present known from but one locality, Stony Point, Alexander County, North Carolina, where it is found in metamorphic rocks, generally gneiss or mica schist, in veins of kaolin. The associated minerals are quartz, mica, rutile, beryl, and feldspar.

Most of the gem spodumene proper comes from the province of

Minas Geraes, Brazil, where it occurs rather abundantly in crystals closely resembling chrysoberyl in color.

Spodumene contains in 100 parts: Silica, 64.5; alumina, 29.3; lithia, 6.2.

STAUROLITE.

FAIRY STONE.

Staurolite is occasionally used as a gem. It occurs in orthorhombic crystals of a prismatic habit, often cruciform from twinning. Color, dark reddish brown to brownish black. Hardness, 7.5; specific gravity, 3.7. The transparent kinds when cut resemble garnets. From their resemblance to a cross, the twinned forms are used to quite an extent as ornaments and charms, a use based to a certain degree upon the belief that they fell from heaven. Staurolite occurs commonly embedded in schist and gneiss.

One hundred parts contain: Silica, 29.3; alumina, 53.5; peroxide of iron, 17.2.

THOMSONITE.

LINTONITE.

The thomsonite, and a variety, lintonite, occurring as amygdules in the basalt and as rolled pebbles on the beaches of Lake Superior, find a limited use as gem minerals. The pebbles vary in size from that of a pea to a hickory nut, and are often made up of a series of concentric layers of various shades of color, flesh red and other reds, green, yellow, and white; affording, when polished, an attractive ornament resembling the eye agate. Hardness, 5.5; specific gravity, 2.4; luster, vitreous, inclining to pearly.

One hundred parts contain: Silica, 37.4; alumina, 31.8; lime, 13; soda, 4.8; water, 13.

TITANITE.

SPHENE.

Titanite, or sphene, is employed to some extent as a gem mineral. Its hardness is 5.5; specific gravity, 3.5; luster, vitreous; color, brown, gray, yellow, green, and black; possessing strong refractive and dispersive powers on light. The transparent and colorless, greenish or yellowish kinds when cut show a great deal of fire and present an appearance approaching that of the fire opal.

One hundred parts contain: Silica, 30.45; titanite oxide, 41.33; lime, 28.22.

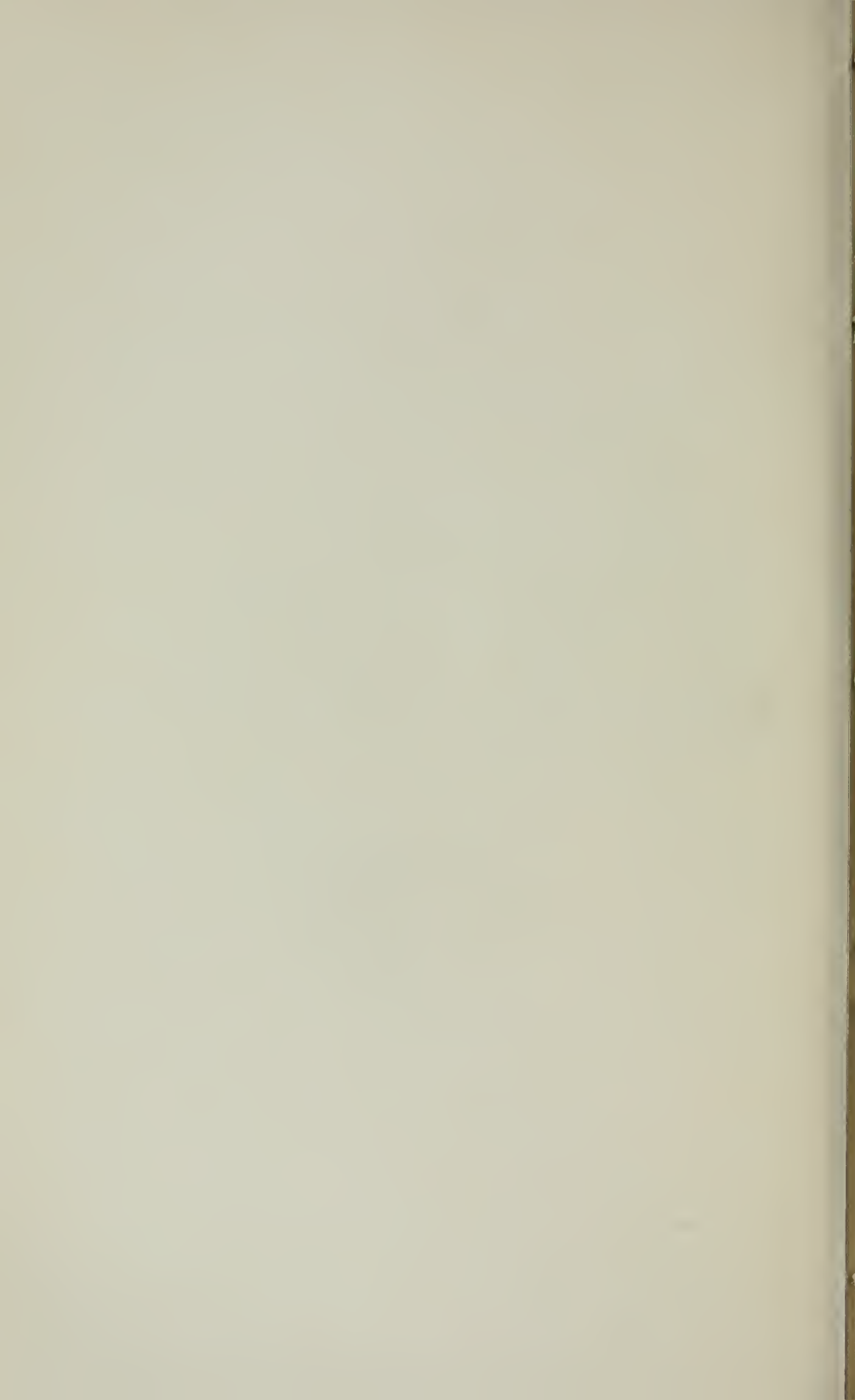
TOPAZ.

Topaz crystallizes in the orthorhombic system, occurring commonly in prismatic forms having the prism faces more or less striated vertically; also occurring massive. The mineral has a highly perfect basal cleavage, i. e., transverse to the length of the prism; a hardness of 8;



TOPAZ WITH SMOKY QUARTZ.

Specimen No. 81242, U.S.N.M.



a specific gravity of 3.5 to 3.65; becomes strongly electric by friction, heat, or pressure, remaining in that condition for some time, a characteristic so marked as to afford a valuable means for its discrimination; a vitreous luster; a strong double refraction; and, in colored kinds, a marked pleochroism.

The colors of the topaz include wine, amber, honey, and straw-yellow, pale blue to pale green of several shades, grayish, reddish, and white. Colorless specimens, especially the rolled pebbles, are peculiarly limpid, hence the name *gouttes d'eau*. (Fig. 13.) The best colorless topazes have considerable fire, and, when properly cut, exhibit brilliant reflec-



Fig. 13.

TOPAZ PEBBLES [GOUTTES D'EAU].
Mitchell River, New South Wales.
Specimen No. 83782, U.S.N.M.

tions of white light, approximating that of the diamond. The rose-pink topaz is probably not known in nature, the delicate tint being commonly obtained by heating the yellow or brown colored kinds. The process of "pinking" is quite simple. The selected stone is packed in magnesia, asbestos, or lime, and carefully heated to a low red heat, care being taken that the temperature is raised gradually; the stone is then allowed to slowly cool. If the temperature reached has been sufficiently high, the desired rose-petal tint is obtained; if not high enough, a salmon tint; if too high or too long continued, the color is lost completely.

There are several distinct minerals which are commonly called topaz, the yellow sapphire known as the "oriental topaz," the topaz proper, and certain colored kinds of quartz, known as "Saxon," "Scotch," "Spanish," "smoky," and "false topaz." These stones vary rather widely in hardness and specific gravity, which, together with the power of developing frictional electricity (possessed by the true topaz) furnishes a ready means for their discrimination. Thus:

Name.	Hardness.	Specific gravity.
Oriental topaz.....	9	4.01
True topaz	8	3.53
Scotch topaz, etc	7	2.65

Topaz occurs in gneiss or granite, associated with tourmaline, mica, beryl, etc., and occasionally with apatite, fluorite, and cassiterite; occurring also in certain talcose rocks, in mica slate, in rhyolite, and in alluvial deposits and drift.

In composition the mineral is a fluo-silicate of alumina, containing in 100 parts: Silicon, 15.5; aluminum, 30.2; oxygen, 36.8; fluorine, 17.5.

TOURMALINE.

ACHROITE—APHRIZITE—INDICOLITE—RUBELLITE.

The tourmaline crystallizes in the rhombohedral division of the hexagonal system. The crystals are commonly prismatic in habit, and often slender to acicular. The prismatic faces are strongly striated longitudinally, giving a rounded, barrel-shaped, or triangular appearance to the crystal. The crystals are sometimes isolated, but occur more commonly in parallel and radiating groups. The mineral also occurs massive, compact, or in parallel to divergent, columnar shapes. Hardness, 7 to 7.5; specific gravity, 2.94 to 3.3; luster, vitreous; transparent to opaque, and unlike in transparency across the prism and in the line of the axis; becomes electric by friction. Color, black, brown, blue, green, red, and white; some specimens red internally, and green externally; others red at one extremity and green, blue, or black with intermediate shades at the other; dichroism marked.

The question of color is of interest. Some specimens are of one color only; others are green at one extremity and red at the other; some are green, then yellow, red, and finally green; others are crimson, tipped with black, or dark green passing into blue. A crystal may be white at the termination, then green of varying shades, pink and colorless, and in cross section dark blue or red at the center, surrounded by concentric layers of white, pink, and green. Another specimen may be red internally, passing into a lighter hue and finally



SIBERIAN TOPAZ.
Specimen No. 8124, U.S.N.M.



green; or it may be blue or black internally, then red, and then green externally. In some specimens the different colors pass imperceptibly into one another; in others the line of demarcation is well defined.

The colorless tourmalines are called *Achroite*; to the black the names *Aphrizite* and *Schorl* are applied; the blues, either pale, indigo, or blackish blue, are called *Indicolite*; this also includes the kinds known as *Brazilian sapphire* having a transparent Berlin-blue color; the red tourmalines, varying from a fine ruby red to violet red (*siberite*) and pale rose red or pink, are called *Rubellite*.

The optical structure of the tourmaline is unique. When a crystal is viewed along the direction of its vertical axis it is less transparent and of different color than when viewed across that axis. For instance, a crystal viewed through the side is a transparent green, but when viewed through the end of the prism it may be either opaque or yellow green.

The marked pleochroism of the colored tourmalines influences to a great degree the appearance of the fashioned stone. For example, if a green-colored specimen is cut so that the table is parallel with the vertical axis of the crystal, the gem will exhibit a play and interchange of colors of two shades of green; if, however, the specimen is so cut that the table of the fashioned stone is perpendicular to the vertical axis, the gem will appear more or less opaque and dark colored, and will exhibit its transparency and green coloring only when viewed across the girdle. Care should be taken, therefore, in fashioning the tourmaline that the table is parallel with the vertical axis of the crystal; further, the facets of the crown should be large and well-developed in order to exhibit to the utmost the differences of color for light transmitted in different directions as the gem is viewed from different positions.

In composition the tourmalines are very complex boro-silicates of aluminum, magnesium, iron, or alkalies, falling under four types: Lithia tourmalines, iron tourmalines, magnesia-iron tourmalines, and magnesia tourmalines.

The geological occurrence of the four types of tourmaline is of interest. The lithia group—which is often beautifully colored and affords the best gem material—is associated with soda and potash feldspar in pegmatite veins along with lepidolite and muscovite. The iron and the magnesia-iron groups, which are commonly black or brownish black, occur in granites, gneisses, schists, and also to a certain extent in pegmatites along with the lithia group. The magnesia group—commonly brown in color—occur chiefly in crystalline magnesian limestones associated with mica, pyroxene, scapolite, etc.

Tourmaline is usually found in granite, gneiss, or mica slate. It occurs also in dolomite or granular limestone, and in certain contact

rocks near dikes of igneous rocks; also in rolled pebbles in alluvial deposits.

In the United States magnificent colored tourmalines have been found in Maine at Auburn, Hebron, Norway, Andover, Rumford, Standish, and Paris. The more famous locality is at Mount Mica, near Paris. It was discovered in 1820 and is still yielding fine specimens of red, green, and parti-colored tourmalines; some crystals are over an inch in diameter, transparent ruby red within, surrounded by green, or red at one extremity and green at the other. One blue crystal found was nine inches long. The locality affords all of the colored varieties, achroite, aphrizite, indicolite, and rubellite. Red and green tourmalines are found at Chesterfield, Massachusetts, in a granite vein with albite, uraninite, and pyrochlore; the crystals small and curved, nearly opaque, and fragile; the green crystals, often with distinct prisms of red color inside, are found at this locality. At Goshen, Massachusetts, similar varieties occur, and the blue is met with in great perfection. At Haddam, Connecticut, in crystals in mica-slate with anthophyllite, also in granite with iolite, and also at the gneiss quarries, on the east side of the river. At Haddam Neck, in fine green, and parti-colored crystals affording magnificent gems. Near Gouverneur, New York, light and dark brown crystals, often highly modified. Good crystals are found in Pennsylvania at Newlin, Chester County, at London Grove, and Unionville. Fine stellate and divergent rubellites in lepidolite are found in San Bernardino County, California. In Canada magnificent greenish-yellow crystals occur in the limestone at Great Calumet Island; amber-colored ones at Fitzroy, Ontario; transparent brown at Hunterstown, Quebec; black at Bathurst and Elmsley, Ontario, and St. Jerome, Quebec. Small brilliant crystals found in decomposed feldspar, at Andreasberg in the Hartz, are of the Aphrizite variety. Rubellite and green tourmaline occur near Ekaterinburg in Siberia. The island of Elba yields pink, red, white, green, black, and parti-colored crystals. Brazil affords a large proportion of the specimens used for gems, and has been one of the great sources of supply for more than two hundred years. Ceylon, India, and Burma produce good gem material, the latter locality affording some magnificent rubellites, rivaling the ruby in color.

TURQUOISE.

CALLAINITE—TURKIS.

Turquoise occurs massive, reniform stalactitic or encrusting; in thin seams and disseminated grains; and in rolled masses. The hardness of the mineral is 6. Specific gravity about 2.75. Cleavage, none. Fracture, small conchoidal; rather brittle. Luster, somewhat waxy. Color, sky-blue, bluish green, apple-green, and greenish gray; the

color is liable to change, a fine blue stone becoming a verdigris or sickly green.

Turquoise of poor color is frequently given the approved robin's-egg or peculiar bluish green tint by artificial means. Many of these sophistications can be detected by washing the stone in strong ammonia water, which will attack the coloring matter. The reagent does not affect the color of the true Persian turquoise, although soap and water does, so that the hands should never be washed with a turquoise on them.

The best specimens, which generally do not lose their color easily, come from the vicinity of Nishâpûr, Persia, where they occur in narrow seams and irregular patches in the brecciated portions of a porphyritic trachyte and the surrounding clay slate. Inferior specimens are found in Asia Minor, Turkestan, and the Kirghiz Steppes. In the United States, turquoise is found in a trachytic rock in the Los Cerillos Mountains, near Santa Fe; the locality was early worked by the Indians and has lately afforded some fine gems. Other occurrences are at Turquoise Mountain, Cochise County, and Mineral Park, Mojave County, Arizona; near Columbus, Nevada; at the Holy Cross Mountain, Colorado, and in Fresno and San Bernardino counties, California.

Chemically, the turquoise is a hydrous phosphate of aluminum and copper and contains in 100 parts: Phosphoric acid, 30.9; alumina, 44.50; oxide of copper, 3.75; water, 19.

VARISCITE.

UTAHITE.

The compact massive kinds of variscite are occasionally cut for use as a gem. The color of the mineral is a rich green of several shades, bright green, emerald, and bluish green. Hardness, 4; specific gravity, 2.6. It takes a high polish, and its strong rich colors would make it an attractive ornamental stone were it not so soft. The best variscite is found in compact nodular masses, locally called *utahite*, near Lewiston, Cedar Valley, Tooele County, Utah.

Variscite contains in 100 parts: Phosphorous pentoxide, 44.9; alumina, 32.3; water 22.8.

VESUVIANITE.

CYPRINE—IDOCRASE.

Vesuvianite occurs in tetragonal crystals commonly of a prismatic habit and massive, either columnar or granular. Hardness, 6.5; specific gravity, 3.349 to 3.45. Luster, vitreous, often inclining to resinous. Color, brown to green, the latter frequently bright and clear and appearing of a different color when viewed across the lateral axis of the prism; occasionally sulphur-yellow, wine-yellow, pale blue, and black.

Vesuvianite was first found in the ancient Vesuvian lavas, and in the dolomite of Monte Somma. It occurs rather abundantly in granular limestone, serpentine, chlorite schist, gneiss, etc., frequently as a result of contact metamorphism. Its common associates are garnet, diopside, epidote, wollastonite, and titanite.

The name *vesuvianite* is from the first known locality. *Idocrase* is from *ειδος*, *I see*, and *κρασις*, *mixture*, in allusion to the resemblance between its form and those of other minerals. *Cyprine* is the name applied to a pale blue kind occurring near Tellemarken, Norway.

One hundred parts of vesuvianite contain approximately: Silica, 39.6; alumina, 22.5; lime, 32.6; iron, 5.3.

WILLEMITE.

Anhydrous silicate of zinc has a hardness of 5.5; a specific gravity of 3.9; and a vitreo-resinous luster. Sufficiently transparent specimens affording fair cabinet gems have been found at Franklin, Sussex County, New Jersey. The color varies from golden or greenish yellow, near that of chrysoberyl, to a canary-yellow. The mineral is commonly opaque and of a brown, apple-green, or flesh-red color, and at Franklin is usually mixed with zincite and franklinite.

ZIRCON.

HYACINTH—JACINTH—JARGON.

Zircon crystallizes in the tetragonal system, occurring commonly in square prisms; also in irregular forms and grains. Its hardness is 7.5; specific gravity, commonly 4.7, sometimes as low as 4.2, or as high as 4.86; luster, adamantine; double refraction, strong. Its range of color includes green, red, brown, blue, yellow, all presenting many gradations of hue, to colorless. Its "fire" is second only to that of the diamond, and this, together with its brilliant luster and range of rich and delicate tones of color, makes it an attractive gem.

The zircon includes the gems known as *hyacinth*, or *jacinth* and *jargon* or *jargoon*. The hyacinth includes the reddish, brownish, and orange-red specimens; the jargon the yellowish, smoky, and colorless kinds.

Zircon occurs in crystalline rocks such as granular limestone in gneiss, granite, and syenite; in chlorite and other schists, and in alluvial deposits derived from them.

Chemically it contains in 100 parts: Zirconia, 67.2; silica, 32.8.

III. COMPARATIVE TABLES OF THE COLORS AND DISTINGUISHING CHARACTERS OF THE BETTER-KNOWN GEMS.

I.—LIMPID OR COLORLESS STONES.

Name.	Specific gravity.	Hardness.	Refraction and refractive index.	Dispersion.	Remarks.
Zircon (jargon).	4.44-4.8	7.5. Will just scratch quartz.	Double. 1.990.	0.014	Distinguished from diamond, which it resembles, by its hardness and specific gravity and by the fact that strong hydrochloric acid dropped upon a polished face will, upon removal, have destroyed or dulled its brilliancy. The acid is without effect on the diamond. The zircon acquires + electricity by friction.
Sapphire	3.916-4.27	9. Scratched by diamond; will scratch all others of the class.	Double, but not strong. 1.765.	.026	Distinguished by its hardness and specific gravity. Becomes electrified by friction.
Spinel	3.5-3.8	8. Scratched by sapphire; will scratch quartz easily.	Single. 1.755 to 1.810.	.040	Distinguished from other members of the group, except topaz, by its specific gravity and hardness, and from topaz by not possessing pyro-electricity.
Topaz	3.54-3.6	8. Scratched by sapphire; will scratch quartz easily.	Double. 1.635.	.025	Becomes electrified by friction and heat. Distinguished from all stones in the group, except spinel, by its specific gravity and hardness, and from spinel by its electrical properties.
Diamond	3.48-3.52	10. Scratches all other stones.	Single. 2.455.	.38	Readily distinguished by its hardness.
Tourmaline	2.99-3.22	7-7.5. Will barely scratch quartz.	Double. 1.625.	.028	Becomes + and - electrified by heat or friction; one portion of a crystal attracts and another repels light bodies.
Beryl	2.73-2.76	7.5-8. Specimens vary. Scratched by spinel; scratches quartz.	Double; weak. 1.585.	.026	Specimens may become electrified by friction.
Quartz (rock crystal).	2.55-2.7	7. Scratches glass	Double. 1.549.	.026	

III.—Comparative tables of the colors and distinguishing characters of the better-known gems—Continued.

II.—YELLOW STONES.

Name.	Specific gravity.	Hardness.	Refraction and refractive index.	Dispersion.	Remarks.
Zircon (jacinth).	4.44-4.8	7.5. Harder than quartz.	Double, strongly so. 1.990.	0.044	Distinguished from quartz in that its luster is dulled by strong hydrochloric acid; also by its higher specific gravity, and from all others of the group by hardness and specific gravity.
Sapphire (oriental topaz).	3.97-4.27	9. Scratches all other stones of the group except diamond.	Double. 1.765.	.026	Distinguished by its hardness and specific gravity. Becomes electrified by friction.
Garnet (topazolite or grossularite, also esonite or cinnamon stone).	3.5-4.3	6.5-7.5. Varies, but majority of specimens will scratch quartz slightly.	Single. 1.759..	.033	
Chrysoberyl (oriental chrysolite).	3.5-3.89	8.5. Scratched by sapphire; scratches all others except diamond.	Double. 1.760.	.033	The yellow is tinged with green. Acquires electricity by friction. Distinguished by its hardness, specific gravity and peculiar yellow color.
Spinel	3.5-3.8	8. Scratched by diamond, sapphire; scratches quartz.	Single. 1.755 to 1.810.	.40	Distinguished by its specific gravity and hardness. Does not become electrified by friction.
Topaz	3.54-3.6	do	Double. 1.635.	.025	Distinguished from spinel by its electrical properties, and from other stones by its hardness and specific gravity.
Diamond	3.48-3.52	10.....	Single. 2.455..	.38	Readily distinguished by its hardness.
Olivine (chrysolite).	3.33-3.5	6-7. Scratched by quartz.	Double. 1.660.	.033	The yellow is tinged with green. Distinguished by its hardness and specific gravity.
Tourmaline	2.99-3.22	7-7.5. But little harder than quartz.	Double. 1.625.	.028	Becomes electrified by friction; one extremity of crystal +, other -.
Beryl.....	2.73-2.76	7.5-8. Specimens vary.	Double; weak. 1.585.	.026	
Quartz (citrine or Scotch, Spanish, Saxon, or false topaz).	2.55-2.7	7.....	Double. 1.549.	.026	

III.—Comparative tables of the colors and distinguishing characters of the better-known gems—Continued.

III.—BROWN STONES.

Name.	Specific gravity.	Hardness.	Refraction and refractive index.	Dispersion.	Remarks.
Zircon (jacinth).	4.44-4.8	7.5.....	Double. 1.990.	0.044	See previous tables.
Sapphire (adamantine spar).	3.97-4.27	9. Scratched by diamond.	Double. 1.765.	.026	Distinguished by its hardness and specific gravity.
Chrysoberyl.....	3.5 -3.89	8.5.....	Double. 1.760.	.033	Distinguished by its hardness and specific gravity. Becomes electrified by friction.
Garnet (essonite or cinnamon stone).	3.5 -4.3	7.5. Varies, but as a rule will scratch quartz.	Single. 1.759..	.033	
Diamond.....	3.48-3.52	10.....	Single. 2.487..	.38	
Tourmaline.....	2.99-3.22	7-7.5. But little harder than quartz.	Double. 1.625.	.028	Becomes + and - electrified by heat or friction.
Quartz (cairn-gorm).	2.55-2.7	7. Scratches glass.	Double. 1.549.	.026	

IV.—RED AND FLAME-COLORED STONES.

Zircon (hyacinth).	4.44-4.8	7.5. Scratched by diamond, ruby, etc.; will just scratch quartz.	Double. 1.990.	0.044	Distinguished from ruby and red diamond by its hardness and specific gravity.
Ruby.....	3.97-4.27	9. Scratches all others except diamond.	Double. 1.765.	.026	Distinguished by its hardness and specific gravity. Becomes electrified by friction, a property wanting in the spinel, with which it is frequently confused.
Garnet (pyrope, rhodolite, almandite, essonite).	3.5 -4.5 Usually 4.	7-7.5. Varies, but as a rule will scratch quartz.	Single. 1.759..	.033	Distinguished by its specific gravity and hardness.
Spinel (Balas ruby, rubicelle, spinel ruby).	3.5 -3.9	8. Scratched by sapphire; scratches zircon, garnet, tourmaline, etc.	Single. 1.755 to 1.810.	.040	Distinguished from ruby by not becoming electrified by friction, and from it and all others of the group by its hardness and specific gravity.
Diamond (rare).	3.48-3.52	10. Hardest of stones.	Single. 2.455..	.38	Readily distinguished by its hardness.
Tourmaline (rubicelle).	2.99-3.22	7-7.5. But little harder than quartz.	Double. 1.625.	.028	Becomes electrified by friction; one extremity of the crystal +, the other -.

III.—Comparative tables of the colors and distinguishing characters of the better-known gems—Continued.

V.—PINK STONES.

Name.	Specific gravity.	Hardness.	Refraction and refractive index.	Dispersion.	Remarks.
Sapphire (ruby).	3.97-4.27	9. Scratched by diamond; will scratch all others.	Double. 1.765.	0.026	Distinguished by its hardness and specific gravity.
Garnet (grossularite).	3.5-4.3	6.5-7.5. Varies; but the majority of the specimens will scratch quartz.	Single. 1.759..	.033	
Chrysoberyl.....	3.5-3.89	8.5. Scratched by diamond and sapphire.	Double. 1.760.	.033	
Spinel (rubicelle).	3.5-3.8	8. Scratched by diamond and sapphire.	Single. 1.755 to 1.810.	.40	Distinguished by its hardness and specific gravity. Does not become electrified by friction.
Topaz.....	3.54-3.6	8. Scratches quartz.	Double. 1.635.	.025	The pink color is usually produced artificially by heating yellow stones.
Diamond.....	3.48-3.52	10.....	Single. 2.455..	.38	Readily distinguished by its hardness.
Tourmaline (rubellite).	2.99-3.22	7-7.75. But little harder than quartz.	Double. 1.625.	.028	
Beryl (rare).....	2.73-2.76	7.5-8. Specimens vary.	Double, weak. 1.585.	.026	

VI.—REDDISH YELLOW OR ORANGE COLORED STONES.

Zircon (jacinth).	4.44-4.48	7.5.....	Double. 1.990.	0.044	Distinguished by its hardness and specific gravity. See ante.
Sapphire (oriental topaz).	3.97-4.27	9. Scratched by diamond only.	Double. 1.765.	.026	Distinguished by its hardness and specific gravity.
Garnet (spessartite and essonite).	3.5-4.3	6.5-7.5. Varies...	Single. 1.759..	.033	
Chrysoberyl.....	3.5-3.89	8.5. Scratched by diamond and sapphire.	Double. 1.760.	.033	Distinguished by its hardness and specific gravity.
Spinel (rubicelle).	3.5-3.8	8.....	Single. 1.755-1.810.	.40	Does not become electrified by friction.
Topaz.....	3.54-3.6	8.....	Double. 1.635.	.025	Distinguished from spinel by becoming electrified by friction.
Diamond.....	3.48-3.52	10.....	Single. 2.455..	.38	
Tourmaline.....	2.99-3.22	7-7.5. But little harder than quartz.	Double. 1.625.	.028	See previous tables.

III.—Comparative tables of the colors and distinguishing characters of the better-known gems—Continued.

VII.—GREEN STONES.

Name.	Specific gravity.	Hardness.	Refraction and refractive index.	Dispersion.	Remarks.
Zircon.....	4.14-4.8	7.5 Harder than quartz.	Double. 1.990.	0.041	See previous tables.
Sapphire (oriental emerald).	3.97-4.27	9.....	Double. 1.765.	.026	Do.
Garnet (demantoid and uvarovite).	3.5-4.3	6.5-7.5. Varies, but as a rule will scratch quartz.	Single. 1.759..	.033	Distinguished from emerald, olivine, and diopside by its specific gravity, hardness, and optical characters.
Chrysoberyl (alexandrite).	3.5-3.89	8.5. Nearly as hard as sapphire; harder than beryl, topaz, garnet, etc.	Double. 1.760.	.033	Characterized by exhibiting a columbine red or reddish color by transmitted light.
Spinel.....	3.5-3.8	8.....	Single. 1.755-1.810.	.40	See previous tables.
Topaz.....	3.54-3.6	8.....	Double. 1.635.	.025	Do.
Diamond.....	3.48-3.52	10.....	Single. 2.455..	.38	Rare.
Olivine (peridot)	3.33-3.5	6-7.....	Double. 1.660.	.033	Color, olive green; distinguished from beryl by its hardness and specific gravity. Acquires electricity by friction.
Tourmaline (Brazilian emerald)	2.99-3.22	7-7.5.....	Double. 1.625.	.028	See previous tables.
Beryl (emerald and aquamarine).	2.73-2.76	7.5-8. Specimens vary.	Double. 1.585.	.026	Do.
Quartz (chryso-prase, plasma, prase, and jasper).	2.55-2.7	7.....	Double. 1.549.	.026	For the colors of the several varieties see under Quartz.
Turquoise.....	2.62-3	6. May or may not scratch glass. Scratched by quartz.	.....	.....	Can readily be distinguished by its earthy, compact appearance and specific gravity.

III.—Comparative tables of the colors and distinguishing characters of the better-known gems—Continued.

VIII.—BLUE STONES.

Name.	Specific gravity.	Hardness.	Refraction and refractive index.	Dispersion.	Remarks.
Sapphire	3.97-4.27	9.....	Double. 1.765.	0.026	See previous tables.
Spinel	3.5 -3.8	8.....	Single. 1.755- 1.810.	.40	Do.
Topaz	3.54-3.6	8.....	Double. 1.635.	.025	Do.
Diamond	3.48-3.52	10.....	Single. 2.455.	.38	Rare.
Tourmaline (indicolite).	2.99-3.22	7-7.5.....	Double. 1.625.	.028	See previous tables.
Beryl (aquamarine).	2.73-2.76	7.5-8. Specimens vary.	Double. 1.585.	.026	Do.
Iolite (water sapphire, dichroite).	2.60-2.65	7-7.5.....	Double. $\alpha=1.537$; $\beta=1.542$; $\gamma=1.543$.	Feeble	The chief distinguishing character of this stone is that it possesses a double color, i. e., it is a fine blue or a yellow to smoke gray as it is viewed in the direction of its base or the planes of the prism, which is its crystalline form.
Turquoise	2.62-3	6.....			

IX.—VIOLET OR AMETHYSTINE STONES.

Sapphire (oriental amethyst).	3.97-4.27	9.....	Double. 1.765.	0.026	See previous tables.
Garnet	3.5 -4.3	6.5-7.5. Varies, but in general is above 7.	Single. 1.759..	.033	Do.
Spinel	3.5 -3.8	8.....	Single. 1.755- 1.810.	.040	Do.
Diamond	3.48-3.52	10.....	Single. 2.455..	.38	Do.
Tourmaline	2.99-3.22	7-7.5.....	Double. 1.625.	.028	Do.
Quartz (amethyst).	2.55-2.7	7.....	Double. 1.549.	.026	Do.

X.—BLACK-COLORED STONES.

Sapphire	3.96-4.27	9.....	Double. 1.765.	0.026	See previous tables.
Garnet (schorlomite).	3.5 -4.3	6.5-7.5. Varies, but in general will scratch quartz.	Single. 1.759..	.033	Do.
Spinel	3.5 -3.8	8.....	Single. 1.755- 1.81.	.040	Do.
Diamond	3.48-3.52	10.....	Single. 2.455..	.38	Do.
Tourmaline	2.99-3.22	7-7.5.....	Double. 1.625.	.028	Do.
Quartz (morion).	2.55-2.77	7.....	Double. 1.549.	.026	Do.

III.—Comparative tables of the colors and distinguishing characters of the better-known gems—Continued.

XI.—GEMS POSSESSING A PLAY OF COLOR OR EXHIBITING A CHATOYANT OR OPALESCENT EFFECT.

[No attention is here paid to the ground or body color of the gem, but only to the play of color, chatoyancy, and opalescence. These effects may be of several kinds. In some, as in the opal and labradorite, there may be a variety of hues of color, which change as the gem is viewed from different positions; in others there may be a reflection having the appearance of a white six-rayed star on the body or ground color of the gem, as in the sapphire; or the reflection may have the appearance of a point or mass of pearly light, which sometimes appears to occupy the whole of the stone, and which varies according to the inclination given to the gem. The moonstone is an example of this class.]

(a) GEMS HAVING A PLAY OF COLOR OR IRIDESCENCE.

Name.	Specific gravity.	Hardness.	Refraction and refractive index.	Dispersion.	Remarks.
Opal.....	1.9 -2.3 Commonly 2.1.	5.5-6.5. Varies, but in general will scratch glass slightly.	.....	.....
Labradorite	2.72	6. Scratches glass slightly.	.....	.....
Oligoclase (helio- lite sunstone.)	2.72	.....do .....	.....	.....
Albite (peristerite).	2.62	.....do .....	.....	.....

(b) GEMS HAVING STAR-LIKE REFLECTIONS, ASTERIA.

Corundum (star ruby, star sapphire, asteria).	3.16-4.27	9.....	Double		
Garnet	3.5 -4.3	6.5-7.5	Single		
Tourmaline	2.99-3.22	7-7.5.....	Double		

(c) GEMS HAVING CHATOYANT REFLECTIONS.

Chrysoberyl (cymophane).	3.5 -3.89	8.5.....	Double		
Beryl	2.73-2.76	7.5-8.....	.....do		
Quartz (cat's-eye)	2.35-2.7	7.....	.....	
Orthoclase (moonstone).	2.4 -2.6	6.....	.....	
Albite (moonstone).	2.62	6.....	.....	

XII.—GEMS HAVING A SACREOUS LUSTER.

Pearl	2.5-2.7	2.5-3.5 .....	.....	
Apophyllite (ichthyophthalmite, fish-eye-stone).	2.33	4.5-5.....	.....	

IV. INDEX OF NAMES OF GEMS.

- Achirite, see Dioptase.
 Achroite, see Tourmaline.
 Actinolite, see Cat's-eye.
 Adamantine spar, see Corundum.
 Adularia, see Orthoclase.
 Agate, see Quartz.
 Agatized wood, see Quartz.
 Alabaster, see Gypsum.
 Alaska diamond, see Quartz.
 Alexandrite, see Chrysoberyl.
 Allanite.
 Almandite, see Garnet.
 Amazonstone, see Microcline.
 Amethyst, see Quartz.
 Amethyst (oriental), see Corundum.
 Anatase, see Octahedrite.
 Ancona ruby, see Quartz.
 Andalusite.
 Andradite, see Garnet.
 Anhydrite.
 Apatite.
 Apophyllite.
 Asteria, see Corundum.
 Asteria, see Quartz.
 Aquamarine, see Beryl.
 Aragonite, see Carbonate of lime.
 Arkansite, see Brookite.
 Antomolite, see Spinel.
 Aventurine, see Oligoclase.
 Aventurine, see Orthoclase.
 Aventurine, see Quartz.
 Axinite.
 Azurite.
 Balas ruby, see Spinel.
 Banded agate, see Quartz.
 Barite.
 Basanite, see Quartz.
 Beekite, see Quartz.
 Beryl.
 Beryllonite.
 Bloodstone, see Quartz.
 Bort, see Diamond.
 Bone turquoise, see Odontolite.
 Aphrizite, see Tourmaline.
 Bottle stone, see Obsidian.
 Bowenite, see Serpentine.
 Brazilian diamond, see Quartz.
 Brazilian emerald, see Tourmaline.
 Brazilian pebble, see Quartz.
 Bronzite.
 Brookite.
 Cacholong, see Opal.
 Cairngorm, see Quartz.
 Calcite, see Carbonate of lime.
 Callainite, see Turquoise.
 Cancrinite.
 Carbonado, see Diamond.
 Carbuncle, see Garnet.
 Carnelian, see Quartz.
 Cassiterite.
 Catlinite.
 Ceylonite, see Spinel.
 Chaledony, see Quartz.
 Chialstolite, see Andalusite.
 Chlorastrolite, see Prehnite.
 Chloromelanite, see Jade.
 Chlorophane, see Fluorite.
 Chlorospinel, see Spinel.
 Chondrodite.
 Chromic iron.
 Chrysoberyl.
 Chrysocolla.
 Chrysolite, see Olivine.
 Chrysolite (Oriental), see Chrysoberyl.
 Chrysoptase, see Quartz.
 Cinnamon stone, see Garnet.
 Citrine quartz, see Quartz.
 Coal.
 Cobaltite.
 Cobra-stone, see Fluorite.
 Colophonite, see Garnet.
 Congo emerald, see Dioptase.
 Coral, see Carbonate of lime.
 Cornelian, see Quartz.
 Corundum.
 Crocidolite.
 Cymophane, see Chrysoberyl.
 Cyprine, see Vesuvianite.
 Damourite.
 Datohte.
 Demantoid, see Garnet.
 Diamond.
 Diaspore.
 Dichroite, see Iolite.
 Diopside.
 Dioptase.
 Disthene, see Kyanite.
 Dumortierite.
 Dysluite, see Spinel.
 Egyptian jasper, see Quartz.
 Emerald, see Beryl.
 Emerald (Brazilian), see Tourmaline.
 Emerald (Congo), see Dioptase.
 Emerald (Evening), see Olivine.

- Emerald (Oriental), see Corundum.
 Emerald (Uralian), see Garnet.
 Enstatite.
 Epidote.
 Essonite, see Garnet.
 Euclase.
 Eye agate, see Quartz.
 Eye-stone, see Quartz.
 Fairy stone, see Staurolite.
 Fire opal, see Opal.
 Fish-eye stone, see Apophyllite.
 Flèche d'amour, see Quartz.
 Fluorite.
 Fossil coral, see Carbonate of lime.
 Fossil coral, see Quartz.
 Fossil turquoise, see Odontolite.
 Fowlerite, see Rhodonite.
 Gadolinite.
 Gahnite, see Spinel.
 Garnet.
 Girasol, see Corundum.
 Gold.
 Gold quartz, see Gold.
 Göthite.
 Graphic granite, see Pegmatite.
 Grenat syriam, see Garnet.
 Grossularite, see Garnet.
 Guarnaccino, see Garnet.
 Gypsum.
 Harlequin opal, see Opal.
 Heliolite, see Oligoclase.
 Heliotrope, see Quartz.
 Hematite.
 Hereynite, see Spinel.
 Hiddenite, see Spodumene.
 Hornblende.
 Hornstone, see Quartz.
 Hyacinth, see Garnet.
 Hyacinth, see Zircon.
 Hyaline, see Quartz.
 Hyalite, see Opal.
 Hyalosiderite, see Olivine.
 Hydrophane, see Opal.
 Hypersthene.
 Iceland agate, see Obsidian.
 Ichthyophthalmite, see Apophyllite.
 Idocrase, see Vesuvianite.
 Ilmenite.
 Indicolite, see Tourmaline.
 Iolite.
 Iris, see Quartz.
 Isopyre.
 Jacinth, see Zircon.
 Jade.
 Jargon, see Zircon.
 Jargon, see Zircon.
 Jasper, see Quartz.
 Jet, see Coal.
 Job's tears, see Olivine.
 Kyanite.
 Labradorite.
 Lapis-lazuli.
 Lechosos opal, see Opal.
 Leelite, see Orthoclase.
 Leopardite, see Porphyry.
 Lepidolite.
 Lintonite, see Thomsonite.
 Lithia emerald, see Spodumene.
 Lithoxyle, see Opal.
 Lodestone, see Magnetite.
 Lydian stone, see Quartz.
 Macle, see Anadalousite.
 Magnetite.
 Malachite.
 Marble, see Carbonate of lime.
 Marcasite, see Pyrite.
 Marekanite, see Obsidian.
 Melanite, see Garnet.
 Microlite.
 Milky quartz, see Quartz.
 Mocha stone, see Quartz.
 Moldavite, see Obsidian.
 Monazite.
 Mont Blanc ruby, see Quartz.
 Moonstone, see Oligoclase.
 Moonstone, see Orthoclase.
 Morion, see Quartz.
 Moss agate, see Quartz.
 Moss opal, see Opal.
 Mountain mahogany, see Obsidian.
 Müllers glass, see Opal.
 Natrolite.
 Nephrite, see Jade.
 Nicolo, see Quartz.
 Nigrine, see Rutile.
 Obsidian.
 Octahedrite.
 Odontolite.
 Oligoclase.
 Olivine.
 Onyx, see Carbonate of lime.
 Onyx, see Quartz.
 Oolite, see Carbonate of lime.
 Opal.
 Opalized wood, see Opal.
 Orthoclase.
 Ouachita stone, see Quartz.
 Ouvarovite, see Garnet.

- Pearl, see Carbonate of lime.
 Pearlyte, see Obsidian.
 Pegmatite.
 Peridot, see Olivine.
 Peristerite, see Albite.
 Perthite, see Orthoclase.
 Phantom quartz, see Quartz.
 Phenacite.
 Pipestone, see Catlinite.
 Pisolite, see Calcite.
 Plasma, see Quartz.
 Pleonast, see Spinel.
 Porphyry.
 Prase, see Quartz.
 Prehnite.
 Pseudonephrite, see Jade.
 Pyrite.
 Pyrope, see Garnet.
 Quartz.
 Rhodolite, see Garnet.
 Rhodonite.
 Ribband jasper, see Quartz.
 Rock crystal, see Quartz.
 Romanzovite, see Garnet.
 Rose quartz, see Quartz.
 Rubasse, see Quartz.
 Rubellite, see Tourmaline.
 Rubicelle, see Spinel.
 Rubino-di-rocca, see Garnet.
 Ruby, see Corundum.
 Rutile.
 Sagenite, see Quartz.
 St. Stephen's stone, see, Quartz.
 Samarskite.
 Saphir d'eau, see Iolite.
 Sapphire, see Corundum.
 Sapphire, see Quartz.
 Sard, see Quartz.
 Sardonyx, see Quartz.
 Satin spar, see Carbonate of lime.
 Satin spar, see Gypsum.
 Saussurite, see Jade.
 Saxon topaz, see Quartz.
 Scapolite.
 Schorl, see Tourmaline.
 Scotch topaz, see Quartz.
 Serpentine.
 Siderite, see Quartz.
 Silicified wood, see Opal.
 Silicified wood, see Quartz.
 Smithsonianite.
 Smoky quartz, see Quartz.
 Sodalite.
 Spanish topaz, see Quartz.
 Spessartite, see Garnet.
 Sphaerulite, see Obsidian.
 Sphene, see Titanite.
 Spinel.
 Spodumene.
 Stalagmite, see Carbonate of lime.
 Star quartz, see Quartz.
 Star ruby, see Corundum.
 Star sapphire, see Corundum.
 Staurolite.
 Succinite, see Amber.
 Sunstone, see Oligoclase.
 Sunstone, see Orthoclase.
 Tabasheer, see Opal.
 Thetis'-hair stone, see Quartz.
 Thomsonite.
 Thulite, see Epidote.
 Tiger-eye, see Crocidolite.
 Titanite.
 Toad's-eye stone, see Cassiterite.
 Topaz.
 Topaz (false), see Quartz.
 Topaz (oriental), see Corundum.
 Topaz (Saxon), see Quartz.
 Topaz (Scotch), see Quartz.
 Topaz (smoky), see Quartz.
 Topaz (Spanish), see Quartz.
 Topazolite, see Garnet.
 Touchstone, see Quartz.
 Tourmaline.
 Turkis, see Turquoise.
 Turquoise.
 Turquoise (bone), see Odontolite.
 Turquoise (fossil), see Odontolite.
 Uralian emerald, see Garnet.
 Utahite, see Variscite.
 Variolite, see Orthoclase.
 Variscite.
 Venus'-hair stone, see Quartz.
 Verde antique, see Serpentine.
 Vesuvianite.
 Volcanic glass, see Obsidian.
 Vulpinite, see Anhydrite.
 Water sapphire, see Iolite.
 Wernerite, see Scapolite.
 Willemite.
 Wilsonite, see Scapolite.
 Wiluite, see Garnet.
 Wolf's-eye stone, see Crocidolite.
 Wood tin, see Cassiterite.
 Zircon.
 Zonochlorite, see Prehnite.

V. THE CUTTING OF GEM STONES.

The cutting of gem stones is necessary for the complete development of those properties upon which their beauty largely depends. Rarely does the gem stone, as found in nature, present those qualities which make it attractive to the eye. In its natural state it is often opaque, dull, or flawed, and even if transparent and flawless its form is rarely adapted to the display of those characters which distinguish the fashioned stone. Occasionally a gem stone may, without artificial treatment, show to a sufficient degree those qualities which give it rank; but such cases are rare, and in order that its inherent beauty may be developed to the maximum it should be cut and polished.

The several styles of cut may all be brought under one or the other of the following heads: I. Those bounded by plane surfaces only. II. Those bounded by curved surfaces only. III. Those bounded by both curved and plane surfaces. The several examples under the above heads may be tabulated thus:

I. Bounded by plane surfaces:

- Brilliant cut.
- Double brilliant or Lisbon cut.
- Half brilliant or single cut.
- Trap or split brilliant cut.
- Portuguese cut.
- Star cut.
- Rose cut, or briolette.
- Step brilliant or mixed cut.
- Table cut.

II. Bounded by curved surfaces:

- Double cabochon cut.
- Single cabochon cut.
- Hollow cabochon cut.

III. Bounded by curved and plane surfaces—mixed cabochon cut.

BRILLIANT CUT.

The brilliant cut may be described as two truncated pyramids, placed base to base. The upper pyramid is called the *crown*, and is so truncated as to give a large plane surface; the lower one, called the *pavilion*, terminates almost in a point. The line of union of the two pyramids is called the *girdle*, and is the widest part of the stone. This fashion of cut, though occasionally modified as to the size, mutual proportions, and even the number of facets, requires, when perfect, 58 facets. The uppermost facet is called the *crown*, and is formed by removing one-third of the thickness of the fundamental octahedron; the lowermost facet is called the *culet*, or *collet*, and is formed by removing one-eighteenth of the thickness of the stone (*a* and *b*, in text fig. 14). The triangular facets touching the table (*s* in *c*, fig. 14) are called *star facets*; those touching the girdle fall into two groups,

skill facets (E in *c*) and *skew facets* (D in *c*). The corner facets touching the table and girdle on the crown (B in *c*), and the eulet and girdle on the pavilion (Q in *d*) are called *quoins*. The facets between the quoins, and touching the table and girdle when on the crown, and the eulet and girdle when on the pavilion, are called, respectively, *bezel*

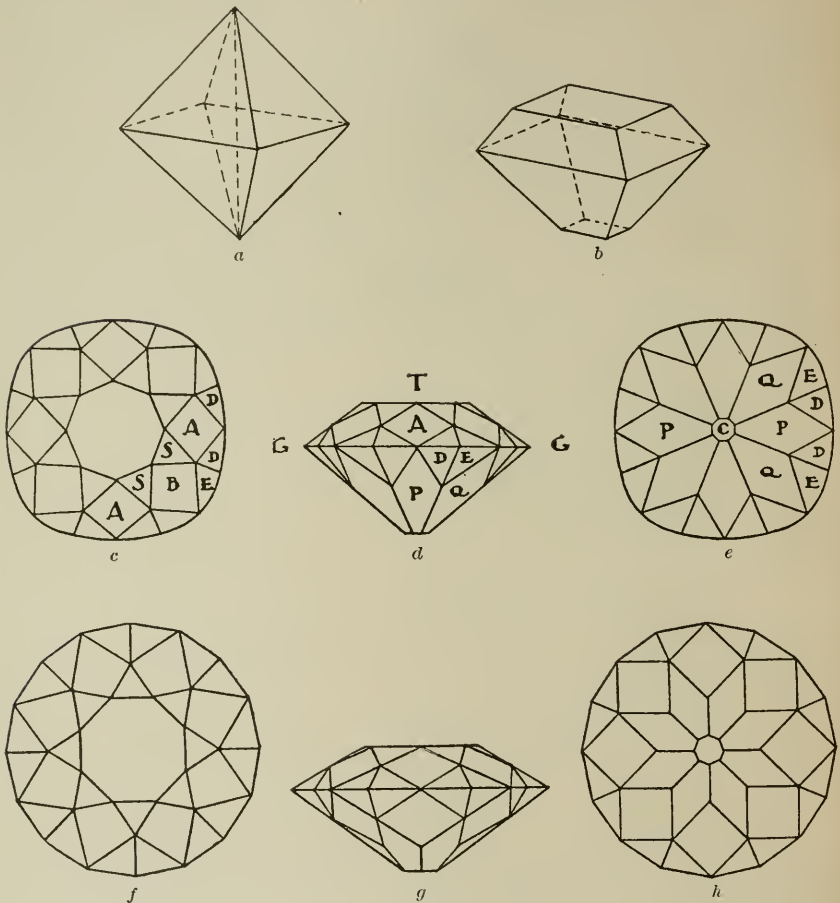


Fig. 14.

THE BRILLIANT.

a and *b*, manner in which the brilliant is derived from the fundamental form; *c*, *d*, and *e*, top, side, and back view of brilliant with 58 facets; *f*, *g*, and *h*, top, side, and back view of modified brilliant with 66 facets.

facets (A in *c*) and *pavilion* facets (P in *d*). The total number of facets are distributed as follows: 1 table, 16 skill facets, 16 skew facets, 8 star facets, 8 quoins, 4 bezel facets, 4 pavilion facets, and 1 culet, as shown in *c*, *d*, and *e* of the text figures, representing the top, side, and bottom views of a brilliant with 58 facets. Occasionally the cut is modified by cutting extra facets around the culet, making 66 in all.

The brilliant cut is especially applied to the diamond, and when perfect should be of the following proportions: From the table to the girdle, one-third, and from the girdle to the culet two-thirds of the total. The diameter of the table should be four-ninths of the breadth of the stone. When applied to other stones these proportions are more or less modified to suit their individual optical constants.

DOUBLE BRILLIANT CUT.

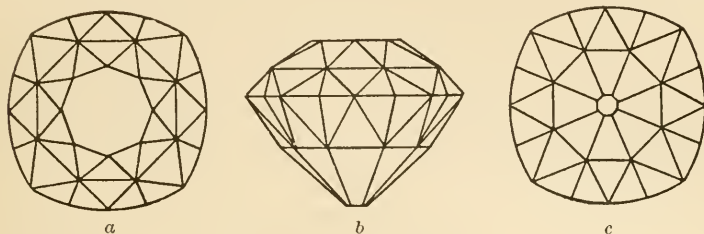


Fig. 15.

THE DOUBLE BRILLIANT.

Top (*a*), side (*b*), and back (*c*) view.

The double brilliant, or Lisbon cut, is a form with two rows of lozenge-shaped facets, and three rows of triangular-shaped facets, 74 in all. The figure shows top (*a*), side (*b*), and bottom (*c*) views of this fashion.

HALF BRILLIANT CUT.

The half brilliant, single, or old English cut is the simplest form of the brilliant, and is generally employed for stones too small to admit

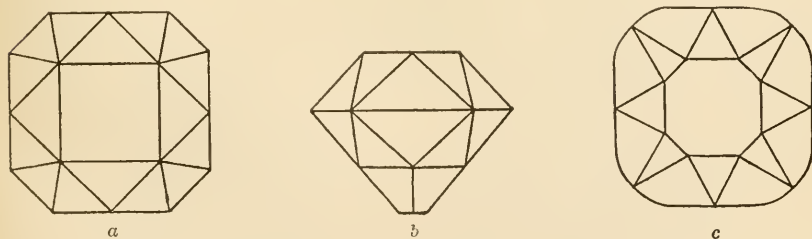


Fig. 16.

THE HALF BRILLIANT.

Top (*a*) and side (*b*) view of the half brilliant. In *c* the top is cut in the form of a star, then called English single-cut.

of numerous facets. The figure shows top (*a*) and side (*b*) views of this style of cut. Occasionally the top is cut so as to form a star (*c* in fig. 16) and then called English single-cut.

TRAP BRILLIANT CUT.

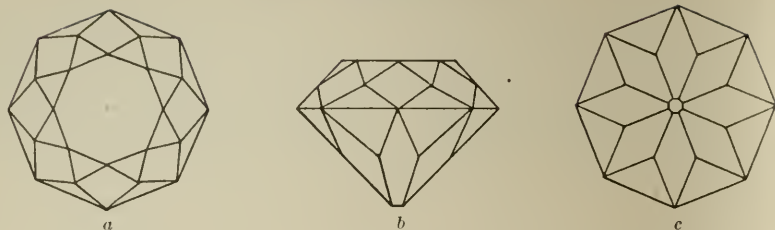


Fig. 17.

THE TRAP BRILLIANT.

Top (a), side (b), and back (c) view.

The trap brilliant, or split brilliant, differs from the full brilliant in having the foundation squares divided horizontally into two triangular facets, making 42 in all.

PORTUGUESE CUT.

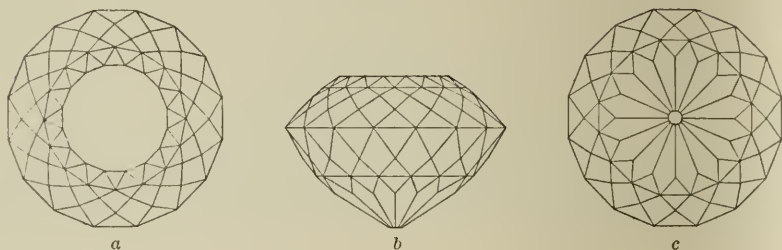


Fig. 18.

THE PORTUGUESE CUT.

Top (a), side (b), and back (c) view.

The figures show the top, side, and bottom views of the Portuguese cut, which has two rows of rhomboidal and three rows of triangular facets above and below the girdle.

STAR CUT.

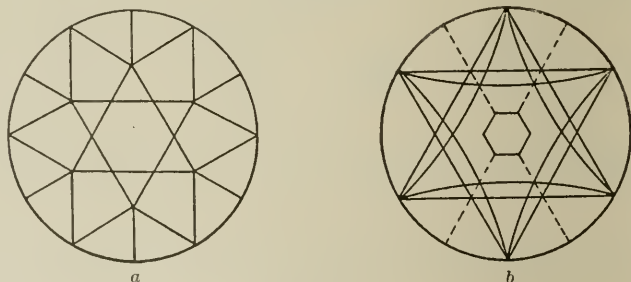


Fig. 19.

THE STAR CUT.

Front (a) and back (b) view.

The figures show the front and back views of the star cut. The table is hexagonal in shape, and is one-fourth of the diameter of the

stone; from the table spring six equilateral triangles, whose apices touch the girdle, and these triangles, by the prolongation of their points, form a star.

ROSE CUT.

The rose cut differs from the brilliant cut in that the crown consists of triangular or star facets, whose apices meet at the point or crown of the rose. The base lines of these star facets form the base lines for a row of skill facets whose apices touch the girdle, leaving spaces

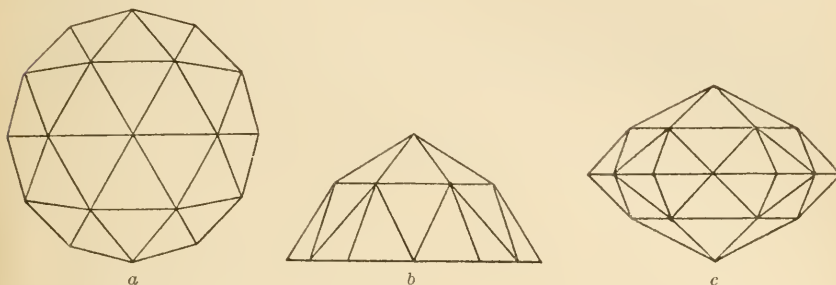


Fig. 20.

THE ROSE CUT.

a and *b*, top and side view; *c*, side view of a double rose.

which are each cut into two facets. The base may be flat or the bottom may be cut like the crown, making a double rose or briolette cut. The shape of a rose-cut stone may be circular, oval, or indeed any other that the rough gem may permit.

TRAP OR STEP CUT.

In the trap or step cut the facets run longitudinally around the stone from the table to the girdle and from the girdle to the culet. There are usually but two or three sets of step facets from the table

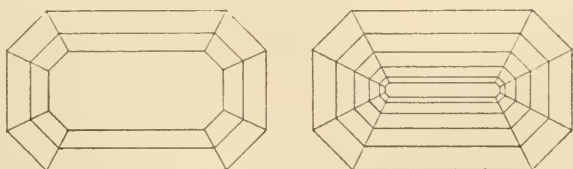


Fig. 21.

UPPER AND UNDER SIDE OF TRAP CUT.

to the girdle, while the number of steps from the girdle to the culet depends upon the thickness and color of the stone. The fashion is best adapted to emeralds and other colored stones.

STEP BRILLIANT OR MIXED CUT.



Fig. 22.

THE STEP BRILLIANT CUT.

Here the form from culet to girdle is the same as that of the trap cut, while from the girdle to the table the stone is brilliant cut, or the opposite.

TABLE CUT.

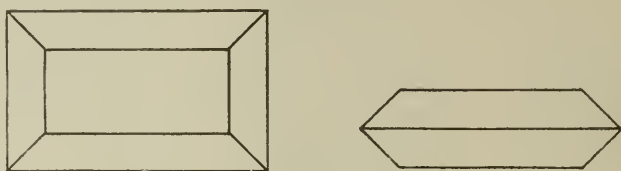


Fig. 23.

TOP AND SIDE VIEW OF TABLE CUT.

The table cut consists simply of a greatly developed table and culet meeting the girdle with beveled edges. Occasionally the 8 edge facets are replaced by a border of 16 or more facets.

CABOCHON CUT.

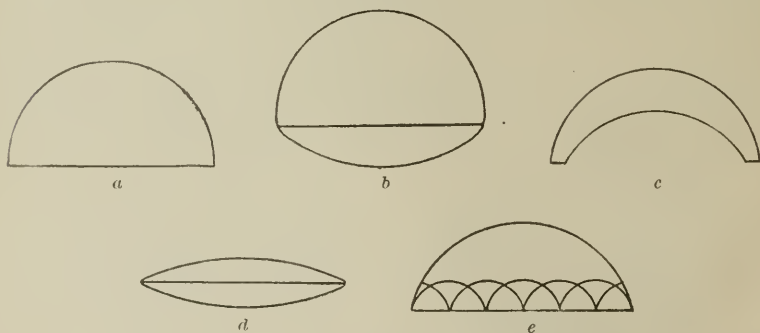


Fig. 24.

THE CABOCHON CUT.

a, the single cabochon; *b*, the double cabochon; *c*, the hollow cabochon; *d*, flat or tallow-top cabochon; *e*, mixed cabochon.

The cabochon cut is usually applied to opaque, translucent, deep colored, or chatoyant stones. The double cabochon is usually cut with a smaller curvature on the base than on the crown. The single

cabochon is a characteristic cut for the turquoise. The hollow cabochon is adapted to very deep colored transparent stones. The mixed cabochon has either the edge or side faceted, or both. In all of the cabochon cuts the arches may be of a varying degree of flatness, depending upon the nature of the stone.

VI. IMITATIONS, SOPHISTICATIONS, AND ARTIFICIAL FORMATION OF GEMS.

Practically all of the gem stones have been and are successfully imitated. Deceptions are practiced by means of imitations, pure and simple; or by combining a genuine stone with an imitation, or an inferior one with a superior; by substituting one stone for another; or by intensifying, improving, or changing the color of a stone.

The basis of most imitation gems is a lead glass of great brilliancy called paste or strass. Its composition varies considerably, but a typical mixture is the following:

Pure powdered quartz.....	38.2
Red lead.....	53.3
Potassium carbonate.....	7.8

The materials are carefully powdered, mixed, and heated in a crucible. The temperature is gradually raised to fusion and carefully kept at that point for about thirty hours, after which it is very slowly lowered. The value of the product depends entirely on the intimacy of the previous admixture, the regularity of temperature, the duration of fusion, and the slowness of cooling.

Imitation diamonds are cut from the uncolored paste, but for the imitation of colored gems the desired color is imparted by the solution of certain metallic oxides and other substances in the paste, some of the more typical mixtures being given in the following table:¹

	Strass.	Glass of anti-mony.	Purple of cassius.	Gold.	Cobalt oxide.	Copper oxide.	Chrome oxide.	Manganese oxide.	Iron oxide.	Uranium tri-oxide.
Ruby	1,000	40	1	1						
	1,000		Trace.					5		
	1,000							25		
Sapphire.....	1,000				14					
	1,000				25					
Topaz.....	1,000	40	1							
	1,000									16
Emerald	1,000					8	0.2			
	1,000					8	0.53			
Amethyst.....	1,000				25					
	1,000	8	0.2		5					
	1,000		2		5				8	
Garnet.....	1,000		1 to 8							
	1,000	500	4					4		
Aquamarine.....	1,000	7			0.4					

¹Thorpe's Dictionary of Applied Chemistry, II, p. 222.

These proportions admit of considerable variation. For example, borate and chloride of silver are added to produce topaz yellow; or the first mixture given for topaz is, after fusion, mixed with 8 parts of strass and re-fused for thirty hours and used as a ruby glass. The ruby composition is colorless and only acquires its color upon re-fusion, the depth of color being varied by the addition of compounds of tin.

These imitations can, as a rule, be readily detected. They are deficient in hardness and yield readily to the file. Further, they are liable to tarnish in impure air, are not pleochroic as the majority of colored gems are, and under the magnifying glass they show the many lines, striae, and bubbles characteristic of fused glassy masses. Finally they differ in specific gravity from the gems they represent.

Instead of a purely imitative preparation being used, what is known as a "doublet" may be constructed. The doublet is made up of the table and crown of a genuine stone, usually somewhat off-colored, cemented to a pavilion made of a paste having the approved color, thus giving the valueless crown the appearance of a fine stone. The doublet usually betrays itself by the softness of its pavilion. To avoid this the "triplet" has been devised. This consists of a crown and pavilion made usually from a pale or off-colored stone with a thin layer of colored glass at the girdle. Here the hardness test will be found wanting and the magnifying glass and specific gravity test must be used. The glass usually distinguishes the composite nature of the triplet, and if soaked in alcohol, carbon bisulphide, or ether, the fraud will usually betray itself by falling to pieces.

The manufacture of imitation pearls by coating the inner surfaces of glass beads with a preparation made from the scales of certain fishes is extensively carried on as a home industry in the glass-making centers of Europe. The manufacture of the fish-scale extract, as carried on in Thuringia, is substantially as follows: Four to five pounds of bleak scales (obtained from the Baltic) are washed in fresh water to remove dirt; they are then churned for about two hours in six quarts of cold fresh water and the whole subjected to pressure in a linen bag. The silvery, lustrous runnings are caught and set aside and the operation repeated until the scales have lost their silvery appearance. The runnings, to which a little ammonia has been added, are put aside to clarify, care being taken to prevent putrefaction. The sediment is washed repeatedly with fresh water and left to settle. When the washings are quite clear, the lustrous sediment is bottled with its own volume of alcohol, shaken, and allowed to settle. The alcohol is then decanted off and the operation repeated until the sediment has lost its water and has the consistency of butter. For use, the preparation is mixed, in small quantities, with a hot aqueous solution of gelatin to which a small amount of alcohol has been added. Colored pearls are made from it by the addition of the desired coal-tar dyestuff.

Sophistications include substitutes pure and simple, such as substituting quartz, white topaz, zircon, or other colorless stones for the diamond, and so on. Or the stone may be treated with chemicals or heat to heighten or change its color. Topaz, sapphire, and other stones may have their color removed or their brilliancy increased by heating. The color of the wine-yellow Brazilian topaz is changed to a rose pink by heat; an off colored or spotted diamond is made to appear whiter and more brilliant by the same means. The color of the cairngorm, citrine quartz, and other stones is altered and improved in a similar manner. The color of the turquoise is deepened and its permanency increased by treating it with solutions of certain chemicals. The colors of agates, chalcedony, chrysoprase, etc., may be changed or improved with the aid of dyes and chemicals, and in a similar manner imitation moss agates may be manufactured from colorless chalcedony. An off colored diamond may be given a wash of aniline blue, and the result is apparently a stone of good water as long as the wash remains. The interior of a setting may be backed, painted, or enameled; in fact, there are a hundred or more methods by means of which a tint is improved or given a beauty and depth not inherent in the specimen.

A sharp distinction is to be drawn between the imitation of a gem stone and its formation by artificial methods. The imitation gem only simulates the natural substance; the artificial gem is identical with it in all its chemical and physical properties. Until recently the laboratory gem was hardly more than a curiosity, though its synthesis has undoubtedly been of value from a theoretical standpoint. Examples of this class are to be found in the diamond as produced by Moissan in the electric furnace and the synthesis of spinel and chrysoberyl by Ebelmen from mixtures of alumina and glucina, respectively, using boric acid at very high temperatures as a solvent. Hydrofluoric acid and silicon fluoride have also been used to induce combination between silica and other oxides. In this manner topaz, a complex fluo-silicate, has been made by the action of fluoride of silicon upon alumina.

The minerals thus formed have usually been very small and of no commercial value. Quite recently, however, rubies have been produced by the fusion of alumina with traces of chromium oxide in the electric furnace, and the art has progressed to such an extent that the product is now on the market for sale as watch jewels. The electric furnace has also produced another product which, while strictly speaking, not a synthetic gem, yet is essentially an artificial one. Imperfect rubies, chips, and small stones are fused in the furnace together with the addition of a small amount of coloring oxide such as chromium. The fused product is then cut and polished, and the result is a ruby of good color and fairly large size. Emeralds and other colored stones have been made in the same way, and so promising has the industry

become that the courts have been called in to decide what constitutes a ruby. Their decision was in substance that the word ruby could be applied only to the red-colored corundum, anhydrous oxide of aluminum occurring ready formed in nature.

VII. GEMS OF THE BIBLE.

The Bible contains three lists of gems. The first of these is an account of the jewels on the *ephod* of Aaron. The *ephod* is described as having a front part and a back part fastened at each shoulder with an onyx mounted in gold and engraved with the names of the children of Israel, six on each stone, to memorialize the Lord of the promise made to them. [Exodus xxviii, 6, 12, 29.] The breastplate was made of the same material as the *ephod*, and folded so as to form a kind of a pouch in which the Urim and Thummin were placed. [Exodus xxxix, 9.] The external part of this gorget, or "breastplate of judgment" was set with four rows of gems, three in each row, each stone set in a golden socket and having engraved upon it the name of one of the twelve tribes of Israel. [Exodus xxviii, 17-20.]

The following lists taken from Biblical antiquities by Adler and Casanowicz¹ give the names of these stones in the original and in the Septuagint, together with the meaning adopted by most authorities, the rendering of the Revised Version, both in text and margin being added in parentheses:

1. <i>Odem</i> (<i>sardion</i>), carnelian (sardius, ruby).	2. <i>Pitdah</i> (<i>topazion</i>), topaz or peridot.	3. <i>Barcketh</i> (<i>smaragdus</i>), smaragd or emerald (carbuncle emerald).
4. <i>Nofek</i> (<i>anthrax</i>), carbuncle, probably the Indian ruby (emerald, carbuncle).	5. <i>Sappir</i> (<i>sapfeiros</i>), sapphire or lapis lazuli (sapphire).	6. <i>Yahalom</i> (<i>iaspis</i>), onyx, a kind of chalcodon (diamond, sardonyx).
7. <i>Leshem</i> (<i>lygyrion</i>), jacinth, others, sapphire (jacinth, amber).	8. <i>Shebo</i> (<i>achates</i>), agate.	9. <i>Achlamah</i> (<i>amethystos</i>), amethyst.
10. <i>Tarshish</i> (<i>chrysolithos</i>), chrysolite, others, topaz, (beryl, chalcodony).	11. <i>Shoham</i> (<i>beryllion</i>), beryl (onyx, beryl).	12. <i>Yashpeh</i> (<i>onychion</i>), jasper.

In many instances the equivalent of the Biblical names of gems is uncertain in the nomenclature of modern mineralogy, and as a consequence there are several distinct lists of names given for the stones in the breastplate. In the Division of Oriental Religions in the U. S. National Museum is a very old silver breastplate employed as an ornament for the manuscript copy of the Torah, or Pentateuch, used in an ancient synagogue. The twelve stones, with the names of the twelve tribes, according to it are as follows: Garnet, Levi; diamond, Zebulon; amethyst, Gad; jasper, Benjamin; chrysolite, Simeon; sapphire,

¹ Report of the U. S. National Museum, 1896, p. 943.

Issachar; agate. Naphthali; onyx. Joseph; sard. Reuben; emerald. Judah; topaz. Dan; beryl. Asher.

The second list is that given in the description of the ornaments of the Prince of Tyrus [Ezekiel xxviii, 13]:

1. <i>Odem.</i>	2. <i>Piddah.</i>	3. <i>Yahalom.</i>
4. <i>Turshish.</i>	5. <i>Shoham.</i>	6. <i>Yashpeh.</i>
7. <i>Sappir.</i>	8. <i>Nofek.</i>	9. <i>Bareketh.</i>

The third list is that given in the description of the Heavenly City. [Revelations xxi, 19, 20.] As in the preceding list, the word used in the original or Septuagint is followed by the rendering given by most authorities, that of the Revised Version in parentheses:

1. <i>Iaspis</i> , jasper.	2. <i>Sappheiros</i> , sapphire or lapis lazuli.	3. <i>Chalkedon</i> , chalcidony.
4. <i>Smaragdus</i> , smaragd (emerald).	5. <i>Sardonyx</i> , sardonyx.	6. <i>Sardios</i> , sardius.
7. <i>Chrysolithos</i> , chrysolite.	8. <i>Beryllus</i> , beryl.	9. <i>Topazion</i> , topaz.
10. <i>Chrysoprasos</i> , chrysoptase.	11. <i>Hyakinthos</i> , jacinth (sapphire).	12. <i>Anethystos</i> , amethyst.

In addition to the gems enumerated in these lists, there is mentioned the diamond by the Hebrew name of *shamir* [Jeremiah xvii, 1; Ezekiel iii, 9; Zechariah vii, 12]; amber, Hebrew *hashmal* (margin of Revised Version gives *electrum*) [Ezekiel i, 4.], and crystal (quartz) Hebrew *qerah* and *gabish* [Ezekiel i, 22; Job xxviii, 18; Revelation iv, 6].

The complete list of gems mentioned being as follows:

Agate (Hebrew *shebo*).—One of the stones in the breastplate of judgment, Exodus xxviii, 19.

Amber (Hebrew *hashmal*).—Ezekiel i, 4. Some render the Hebrew *leshem* as amber, thus making it one of the gems in the breastplate, Exodus xxvii, 19.

Amethyst (Hebrew *ahlamah*).—One of the stones in the breastplate, Exodus xxviii, 19. In Revelation xxi, 20, it is mentioned as garnishing the twelfth foundation of the heavenly Jerusalem.

Beryl (Hebrew *shoham*).—One of the stones in the breastplate, Exodus xxviii, 20. Mentioned as one of the ornaments of the King of Tyre, Ezekiel xxviii, 13. In Revelation it is spoken of as adorning the eighth foundation of the Holy City.

Caruncle (Hebrew *nofek*).—One of the stones in the breastplate, Exodus xxviii, 18; see also Ezekiel xxviii, 13. The word *nofek* has been rendered ruby.

Carnelian, perhaps the Hebrew *odem* of the breastplate, Exodus xxviii, 17, and the sardius in Revelation xxi, 20. In Revelation iv, 3, of the revised version is the rendering sardius. In the Authorized Version the reading is: "And he that sat was to look upon like a jasper and a sardine stone." In the Vulgate: "Et qui redbat similis erat aspectui lapidis jaspidis et sardinis." The Textus receptus (Greek) is: "Καὶ ὁ καθήμενος ἦν ὁμοίος ὀράσει λιθῶ ἰάσπιδι καὶ σαρδίῳ." All other editions have for the last word, "σαρδίῳ." It is evident that the Vulgate and the Authorized Version simply followed the Textus receptus, and that the correct rendering is "sardius" and not "sardine stone."

Chalcedony.—The Hebrew *tarshish*, Exodus xxviii, 20, has been rendered chalcedony. In Revelation xxi, 19, it is enumerated in the description of the foundation of the New Jerusalem.

Chrysolite.—See Revelation xxi, 20. The Hebrew *tarshish*, Exodus xxviii, 20, has been rendered chrysolite.

Chrysoptase.—One of the stones in the foundation of the Heavenly City, Revelation xxi, 20.

Diamond, Hebrew *shamir*.—See Jeremiah xvii, 1; Ezekiel iii, 9; and Zechariah vii, 12, where it is spoken of as an object of extreme hardness. In the Authorized Version the Hebrew *yahalom*, Exodus xxviii, 18, is rendered diamond.

Emerald, Hebrew *bareketh*.—One of the stones in the breastplate; also see Revelation iv, 3.

Jacinth, Hebrew *leshem*.—A stone in the breastplate, Exodus xxviii, 19. The eleventh foundation of the Heavenly Jerusalem, Revelation xxi, 20.

Jasper, Hebrew *yashpeh*.—A stone in the breastplate, Exodus xxviii, 20. Mentioned as adorning the Prince of Tyrus, Ezekiel xxviii, 13. One of the stones enumerated in the description of the Heavenly City, Revelation xxi, 19.

Onyx, Hebrew *shoham*.—One of the stones in the breastplate, Exodus xxviii, 20; see also Genesis, ii, 12; and Ezekiel xxviii, 13. According to certain renderings the *shoham* is beryl. *Shohams* set in gold were put on each of the two shoulder straps of the *ephod* of the high priest, and the two were engraved with the names of the twelve tribes, six on each, Exodus xxviii, 12.

Ruby, Hebrew *nofek* or *odem*.—One of the gems in the breastplate, Exodus xxviii, 17; see also Ezekiel xxvii, 13.

Sapphire, Hebrew *sappir*.—One of the stones in the breastplate, Exodus xxviii, 18; also mentioned in Ezekiel xxviii, 13, and Revelation xxi, 19. Some authorities render *sappir* as lapis lazuli, and not sapphire.

Sardonyx, Hebrew *yahalom*.—One of the stones in the breastplate, Exodus xxviii, 18.

Topaz, Hebrew *pitdah*.—One of the stones in the breastplate, Exodus xxviii, 17; also mentioned in Ezekiel xxviii, 13, and in Revelation xxi, 20.

Pearl.—It is thought that pearl is meant by the Hebrew *penimim*, a word often employed in the Old Testament as a figure of something valuable and precious; see Proverbs iii, 5; xxxi, 10, and Job xxviii, 18. Jesus uses the pearl for the same purpose in Matthew vii, 6, and xiii, 45.

VIII. MYSTICAL PROPERTIES OF GEMS.

Man has endowed gems with talismanic, curative, and supernatural powers. Certain gems preserved him from incubi, vampires, and kindred terrors; others preserved him from the powers of sorcery or conferred the powers of witchcraft; by their aid he controlled the spirits of evil or was protected from their malign influence. With a suitable gem he could foretell the future, review the past, or conjure up pictures of events taking place at a distance. Protected by their mystic influences he feared neither plague nor poison, while his belief in the marvelous efficacy of their curative powers gave them a place among his most potent remedies.

The virtues of gems were diverse. Some procured the favor of the great; others rendered their possessors amiable, wise, strong, and brave; some protected him from fire, lightning, and tempests; others from

danger and disease; some were preferred as talismans and charms; others were used as drugs, either alone or with electuaries, and with or without prayers, incantations, or other prescribed formulas.

Certain gems brought good or evil through the planetary influence of certain days. All yellow gems were appropriate for Sunday wear through the name giver, the sun. On Monday, the moon day, all white stones, except the diamond, were to be worn. Tuesday, the day of Mars, claimed garnets, rubies, and all red stones. Wednesday demanded blue stones. Thor's day, or Thursday, required amethysts and other stones of a sanguine tint. Friday, the day of Venus, had for its gem the emerald. Saturn's day claimed the diamond.

A particular stone was potent for good during a particular month, and, under the proper astrological control, was supposed to have a mystical influence over the twelve parts of the human anatomy. Such a gem was the more potent if the natal day of the wearer corresponded with its particular sign, and when worn as a birth or month stone was supposed to attract at all times propitious influences and avert malign effects. The more important stones, their zodiacal control, and most potent periods of influence are:

Stone.	Zodiacal control.	Period.
Garnet.....	Aquarius.....	Jan. 21 to Feb. 21.
Amethyst.....	Pisces.....	Feb. 21 to Mar. 21.
Bloodstone.....	Aries.....	Mar. 21 to Apr. 20.
Sapphire.....	Taurus.....	Apr. 20 to May 21.
Agate.....	Gemini.....	May 21 to June 21.
Emerald.....	Cancer.....	June 21 to July 22.
Onyx.....	Leo.....	July 22 to Aug. 22.
Carnelian.....	Virgo.....	Aug. 22 to Sept. 22.
Chrysolite.....	Libra.....	Sept. 22 to Oct. 23.
Aquamarine.....	Scorpio.....	Oct. 23 to Nov. 21.
Topaz.....	Sagittarius.....	Nov. 21 to Dec. 21.
Ruby.....	Capricorn.....	Dec. 21 to Jan. 21.

A closely related idea is found in the twelve stones which, according to the Jewish cabalists, when engraved each with an anagram of the name of God were supposed to have a mystical power over, and a prophetic relation to, the twelve angels. Thus:

Ruby.....	Malchediel.
Topaz.....	Asmodel.
Carbuncle.....	Ambriel.
Emerald.....	Muriel.
Sapphire.....	Herchel.
Diamond.....	Humatiel.
Jacinth.....	Zuriel.
Agate.....	Barbiel.
Amethyst.....	Adnachiell.
Beryl.....	Humiell.
Onyx.....	Gabriel.
Jasper.....	Barchiell.

These stones also had reference to the twelve tribes of Israel, the twelve parts of the human body, twelve hierarchies of devils, etc. By their aid a system of prognostication was practiced, based upon the change of hue or brilliancy of the stone, so that the cabalist was enabled to foretell future events.

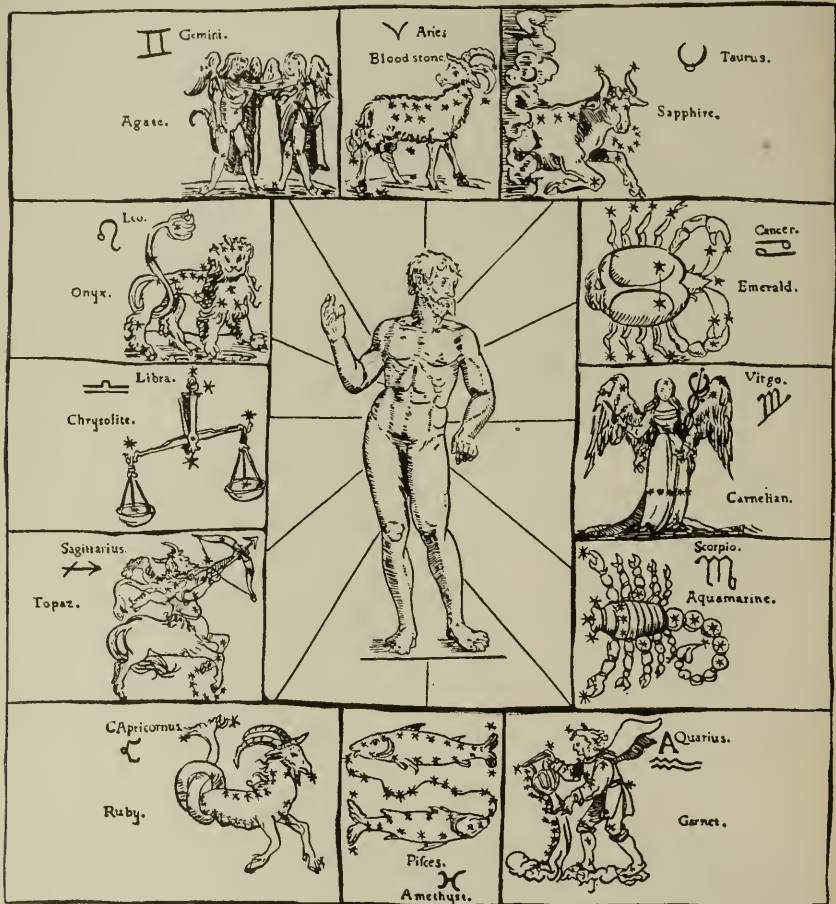


Fig. 25.

THE ZODIACAL STONES WITH THEIR SIGNS [AFTER AN OLD PRINT].

The Twelve Apostles were represented, symbolically, by precious stones: Jasper, St. Peter; sapphire, St. Andrew; chaledony, St. James; emerald, St. John; sardonyx, St. Philip; carnelian, St. Matthew; beryl, St. Thomas; chrysoprase, St. Thaddeus; topaz, St. James the Less; hyacinth, St. Simeon; amethyst, St. Matthias.

The superstitions connected with the twelve stones have persisted, in one form or another, from the times of the Magii to the present, and the belief in their virtues can still be traced in the wearing of "birthstones."

By those who are in January born
 No gem save *garnets* should be worn;
 They will insure you constancy,
 True friendship and fidelity.

The February born will find,
 Sincerity and peace of mind—
 Freedom from passion and from care,
 If they the *amethyst* will wear.

Who on this world of ours their eyes
 In March first open, shall be wise,
 In days of peril firm and brave,
 And wear a *bloodstone* to their grave.

Those who in April date their years,
Diamonds should wear, lest bitter tears
 For vain repentance flow. This stone
 Emblem of innocence is known.

Who first behold the light of day
 In spring's sweet flowery month of May,
 And wears an *emerald* all her life,
 Shall be a loved and happy wife.

Who comes with summer to this earth,
 And owes to June her day of birth,
 With ring of *agate* on her hand,
 Can health, wealth, and peace command.

The glowing *ruby* should adorn
 Those who in warm July are born;
 Thus will they be exempt and free
 From love's doubts and anxiety.

Wear a *sardonyx*, or for thee
 No conjugal felicity;
 The August born without this stone
 'Tis said must live unloved alone.

A maiden born when autumn's leaves
 Are rustling in September's breeze,
 A *sapphire* on her brow should bind,
 'Twill cure diseases of the mind.

October's child is born for woe,
 And life's vicissitudes must know;
 But lay an *opal* on her breast,
 And hope will lull the woes to rest.

Who first comes to this world below,
 With dull November's fog and snow,
 Should prize the *topaz* amber hue,
 Emblem of friends and lovers true.

If cold December gave you birth,
 The month of snow and ice and mirth,
 Place on your hand a *turquoise* blue—
 Success will bless you if you do.

In the *Sympathia Septem Metallorum ac Septem Selectorum Lapidum ad Planetas* is a list of stones recorded as being in sympathy with the planets, and as such were possessed of astrological and medicinal properties which, under the proper sign, rendered them of service to men. Thus—

- [♄] Saturn..... Turquoise, sapphire.
- [♃] Jupiter Carnelian, topaz, amethyst.
- [♂] Mars Jasper, emerald.
- [♀] Venus..... Emerald, amethyst, topaz.
- [☿] Mercury... Crystal, agate, emerald.
- [☾] Moon Moonstone, topaz, and all white stones.
- [☼] Sun Diamond, ruby.

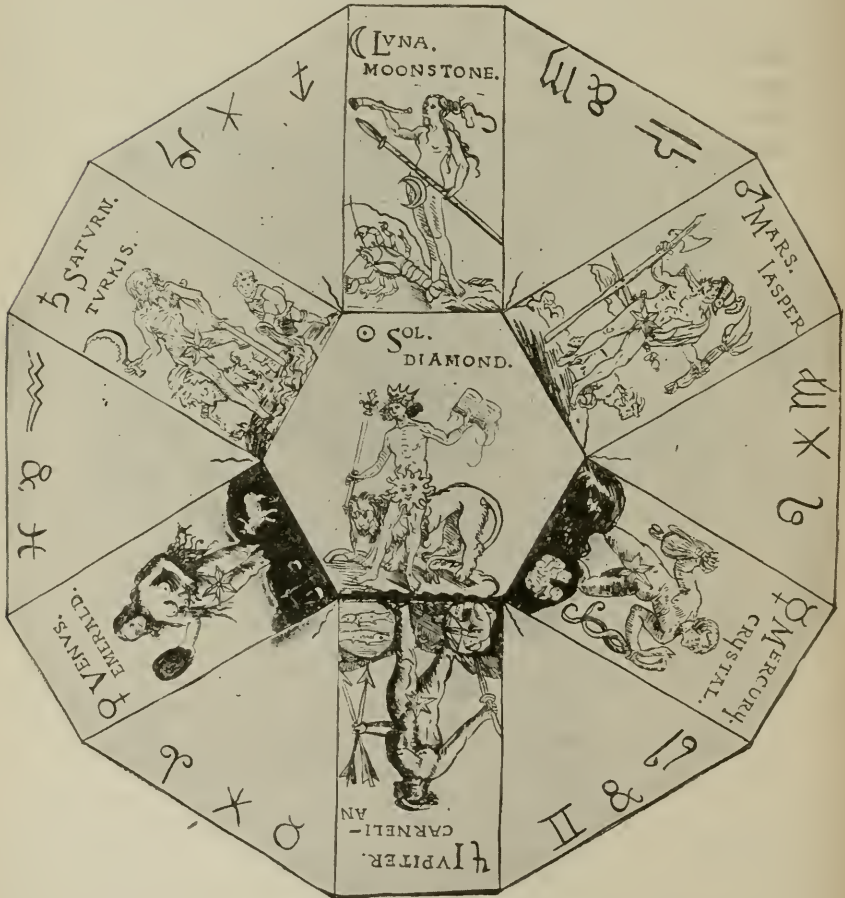


Fig. 26.

THE FIGURES OF THE PLANETS WITH THEIR SIGNIFICANT STONES [AFTER AN OLD PRINT].

The Hindu propitiated hostile stars by the bestowal of gems. If the sun was hostile, a pure ruby; the moon, a good pearl; if *sani*, a star affecting to a powerful degree the destinies of men, a sapphire. He

also averted the evil effects of adverse astral influences by wearing certain stones. If the sun was adverse, the cat's-eye; if the moon, the sapphire, etc.

The mystic ascribed a certain significance both to the gem and to its various colors. For example, white was the emblem of light, purity, faith, innocence, joy, and life; worn by women it was emblematic of chastity; by the ruler, of humility and integrity. Red signified pure love and wisdom; in another sense it signified passion, love of evil, hatred, etc. Blue was indicative of truth constancy, and fidelity. Yellow in one sense was symbolical of marriage and faithfulness; in another sense of inconstancy, jealousy, and deceit. Green was the color of hope, especially that of immortality. Amethystine signified love, truth, passion, suffering, and hopefulness, and among the Rosicrucians was symbolical of the divine male sacrifice.

Stones of all sorts were engraved with the figure of a cockatrice, which, under the proper planetary influence, were preservatives against the evil eye. The names of Jesus, Mary, and Joseph were engraved on stones, chiefly amethyst, onyx, and bloodstone, which were worn as preventives of contagious diseases, the larger the stone, the greater its efficacy. Gems were also supposed to indicate the state of health of the donor or wearer. If the stone became dull, opaque, or colorless it was thought to be significant of danger and death. In a similar manner they lost or changed color in contact with poisons.

Dreaming of gems was usually fraught with good, while seeing or handling them on the eve of a journey, or at certain phases of the moon, was regarded as auspicious.

Supernatural influences have been attributed to gems which still pass current. For example, an onyx ring, supposed to be the espousal ring of Mary and Joseph, exhibited in the Duomo of Perugia, is thought to be efficacious in the cure of every disorder. Amber is still used as a prophylactic and curative for goiter, croup, and diseases of the throat. The opal is thought by many to bring ill luck to the wearer. The coral is still believed to be a charm against diseases of childhood, and is extensively worn in Italy as a protection against the "evil eye." Pearls are dreaded by some and favored by others. No French bride will wear them on her wedding day, since they would bring tears to her married life. In the East the believers are dogmatic in their faith and it is heresy to assert that the use of gems has no practical influence over body or mind.

It is impossible here to do more than hint at the many beliefs concerning gems which were or are current, and the following notes merely suggest a few of the more prevalent beliefs on this subject.

Agate.—Emblematic of health and wealth. An enemy to all venomous things; assuages thirst when held in the mouth; gives victory to its wearer; repels storms; sharpens the sight; preserves and increases

strength, and renders its wearer gracious and eloquent. (Camillus Leonardus, *Speculum Lapidum*, 1502.) Efficacious as an amulet against scrofula and skin diseases. (Albertus Magnus, *De Vertutibus Herbarium, Lapidum, Animalum, etc.*) Various properties are attributed to it by Mohammedan authorities. It cured insanity when administered with water or with the juice of the fruit *Sheu* (an apple?); a remedy for hemorrhage in the genital organs or in the rectum; for the spitting of blood; for the unusual discharge of the menstrual fluid. In conjunction with other medicines it cured hard boils and porous ulcers, gravel, spleen, and kidney troubles. It prevented bleeding of the gums and rendered them hard when applied to the parts as a calcined powder.

Agates having the reddishness of the water after washing raw flesh in the shape of finger rings prevent bleeding of all kinds. The wearer strikes terror to the heart of his enemies, obtains his heart's wishes from the gods, and becomes free from pain in the breast.

The *Akik* (agate) confers upon the wearer all the blessings that the use of the turquoise does. Its internal use may do harm to the stomach, but this can be avoided by mixing it with *Katira*, or, in its absence, with the *Basul* stone. (Views of Arabic and Persian writers on gems and stones.)

If taken internally, the agate drives away fear, increases the power of digestion, cures insanity and monomania of that kind which creates the impression of being beaten and abused by others. If worn, it cures stricture and the vomiting of blood coming from the chest; worn on the neck, it cures the spitting of blood issuing from the lungs at the time of coughing. Calcined, powdered, and administered with white wine in doses weighing 16 barleycorns, it cured the gravel. If tied about the thighs of a woman under painful labor, it helps to a speedy and easy delivery. The weight of the stone here prescribed should be about 120 barleycorns. (Ben Adloulah.)

The eye-agate was considered efficacious as an amulet in cases of scrofula and other skin diseases. In great repute to-day in Syria as a curative for "Aleppo" sores.

Pierre de Boniface, writing in 1315, said:

The agate of India or Crete renders its possessor eloquent and prudent, amiable and agreeable.

Ben Jonson, in the *Alchemist*, speaking of the medicinal properties of gems, wrote:

My meat shall come in Indian shells, dishes of agate set in gold, and studded with emeralds, sapphires, hyacinths, and rubies. The tongues of carps, dormice, and camel's heels boiled in the spirit of Sol, and dissolv'd pearl, apicus diet 'gainst the epilepsy. And I will eat these broths with spoons of amber, headed with diamond and carbuncle.

Dioscorides, in his *Materia Medica*, recommends the use of the agate as a preventive of contagion.

Alabaster.—According to Leonardus, it is the best for vessels to hold unguents, which are preserved in them without spoiling. Dioscorides and many other doctors account it good in physicks. He who carries it will prove victorious in suits at law.

Amber.—Supposed to be “generated out of the urine of the lynx, and is hardened by time; that voided by the male, brown; by the female, saffron, inclining to a darkness.” Amber assuaged pain in the stomach, cured jaundice, flux, and king’s evil.

It naturally restrains the flux of the belly; is an efficacious remedy for all disorders in the throat (a belief still prevalent). It is good against poison. If laid on the breast of a wife when she is asleep, it makes her confess all her evil deeds. Being taken inwardly it provokes urine, brings down the menses, and facilitated a birth. It fastens teeth that are loosen’d, and by the smoke of it poisonous insects are driven away. (Camillus Leonardus, *Speculum Lapidum*. 1502.)

When buried in a moist soil it was supposed to generate a fungus, which was administered to those troubled with the gravel. It cured fits, dysentery, scrofula, and jaundice. Used as an amulet it charmed away toothache, asthma, croup, and diseases of the throat: supposed to be efficacious as a curative and prophylactic if rubbed on the parts or taken internally, after dissolving in white wine. (*Dissertatio medica de Succino*, 1682.) These beliefs are still current.

Thomas Nicols states that the—

white odoriferous amber is esteemed the best for physic use, and thought to be of great power and force against many diseases, as against the *vertigo* and *asthmatic paroxysms*, against *catharres* and *arthritical* pains, against diseases of the stomach, and to free it from sluffings and putrefactions, and against diseases of the heart, against plagues, venoms, and contagions. It is used either in powder, or in oil, or in troches, either in distempers of men or of women, either married or unmarried, either with child or without, or in the distempers of children. [*Arcula Gemmea*, 1653.]

Olaus Worm, of Copenhagen, writing in 1640, says that amber was received as a panacea; a sovereign remedy for toothache, asthma, and dropsy.

In the work “*De Proprietatibus Rerum*,” by Bartholomaeus Glanvillia, amber is reported to possess the property of driving away adders and of being contrary to friends.

The Shah of Persia is said to wear an amulet of amber reported to have fallen from heaven, and which has the property of rendering him invulnerable.

Amber is used to-day in Lombardy and the Piedmont as a cure for goitre, a belief that dates back to the time of Pliny.

Amethyst.—Emblematic of sincerity.

As an amulet it dispelled sleep, sharpened the intellect, prevented intoxication, gave victory to soldiers, and protected its wearer from sorcery. (Leonardus.)

“The amethyst banishes the desire for drink and promotes chastity.” (Art Magic; or Mundane, Submundane, and Supermundane Spiritism.)

Lost its color in contact with and was an antidote for all poisons. (Albertus Magnus.)

According to Pliny, the amethyst was an antidote to drunkenness,

and it takes its name from this property. Moreover, if the name of the moon or sun be engraved on it and it be thus hung about the neck from the hair of a baboon or the feathers of a swallow, it is a charm against witchcraft. It is also serviceable to persons having petitions to make to princes. With the assistance of a spell or incantation, it kept off hailstorms and flights of locusts.

Porta, in his treatise on magic, says that the amethyst neutralizes magic incantations.

The Puranas hold that the amethyst "gives strength and cures morbid heat and fistula."

Beryl.—Used with incantations to foretell the future and review the past; was efficacious in detecting thieves, forewarned death, and was supposed to have power over and to be the abode of evil spirits that could be made to work the wearer's will by means of suitable incantations. It rendered its owner cheerful, preserved and increased conjugal love, cured diseases of the throat and jaws and disorders "proceeding from the humidity of the head, and is a preservative against them." (Camillus Leonardus, *Speculum Lapidum*. 1502.)

According to Freeman, who wrote in 1701—

The beryl disturbs devils beyond all others. If it be thrown in water with the words of its charm sung, it shews various images of devils and gives answers to those that question it. Being held in the mouth, a man may call a devil out of hell and receive satisfaction to such questions as he may ask.

Browning, in one of his poems, makes use of this belief.

The beryl was largely used for divination in 1600. The method was as follows: A bowl was filled with water and the ring suspended in it. The answer to the question propounded was spelled out by the ring striking the sides of the vessel. A modification of this, and one still in use, was to mark the edges of the bowl with the letters of the alphabet; the stopping of the ring at certain letters composed the answer. Still another method, and one said to have been used by Napier, was to throw a sphere cut from the stone into a bowl of water. The character of the circles formed announced whether the presiding demon was favorable or not. If favorable, the information desired was pictured on the surface of the bowl.

Prior to the seventeenth century the beryl was in some repute as a curative. Mixed with an equal weight of silver, its powder, taken internally, was thought to cure leprosy. Water in which the stone had stood was good for the eyes, and, taken internally, it dispelled flatulency and cured indisposition of the liver.

Nicols, in the "Arcula Gemmea," published in 1653, said:

Wurtzung, in his general practise, saith that the beryll is used in all distempers of the heart. But take this caution by the way: Beware of the use of gemms (unless you are sure they be true) in physick, by reason they are so frequently adulterated.

Bloodstone.—Symbolical of wisdom, firmness, and courage.

Used with the proper incantations, its owner was enabled to foretell the future, and if rubbed with the juice of the heliotrope, it rendered its wearer invisible. The stone brought safety and long life to its possessor, stopped the flow of blood, and was an antidote for poisons. (Camillus Leonardus, *Speculum Lapidum*. 1502.)

Albertus Magnus taught that it cured dyspepsia, strengthened the stomach, and, if "washed according to medicinal art," was a styptic. Mixed with honey or the white of an egg, its powder was held by him to be an excellent remedy for hard tumors, while its dust would cure proud flesh and running sores.

Pliny and Leonardus mention that if placed in a basin of water containing the juice of the heliotrope and set in the sun, the water will appear red and the sun bloody. After a time the water will apparently boil and overflow the basin. Taken out of the water, the sun and solar eclipses could then be viewed in the water as in a mirror.

In a "Booke of the Things that are brought from the West Indies," published in 1574, the statement is made—

They doo bring from the New Spain a stone of great virtue, called the stone of the blood. The Bloodstone is a kind of jasper of divers colours, somewhat dark, full of sprinkles like to blood, being of colour red, of the which stones the Indians dooth make certayne Hartes, both great and small. The use thereof both there and here is for all fluxe of bloode, and of wounds. The stone must be wet in cold water, and the sick man must take him in his right hand and from time to time wet him in cold water. And as touching the Indians, they have it for certayne that touching the same stone in some part where the blood runneth, that it doth restrain.

The bishop of Rennes, in the eleventh century, writing on the talismanic efficacy of stones, asserts that the bloodstone endows its bearer with the gift of prophecy and renders him proof against poison.

During the Middle Ages the belief was prevalent in Europe that the stone had its origin in a dark-green jasper which happened to lie at the foot of the cross at the time of the crucifixion, and upon which the blood of Christ fell, hence the red spots.

Carnelian.—According to Epiphanius, it cured tumors and all wounds made by iron.

It preserved the strength, prevented hoarseness, and cleared the voice. (Camillus Leonardus.)

It cheered the soul, banished fear and enchantments, and preserved harmony. (Albertus Magnus.)

According to the work by Giov. B. Porta, the wearing of a carnelian insured victory in all contests save those of love.

As an amulet and as a powder it was supposed to be a sovereign remedy for hemorrhage. De Laet, in 1647, has described from a personal experience its power in stopping bleeding at the nose, and advises the wearing of rings cut entirely from the stone for this purpose. The belief in its efficacy in such cases still persists.

Cat's-eye.—The cat's-eye cheers the mind, cures pallor, brings on a safe delivery in case of protracted labor, especially if tied in the hair of a patient. Applied locally, it causes infants suffering from the croup to bring up phlegm.

Applied as an ointment to the eyes, it cures lachryma. Calcined, the powder applied to sores heals them, and will cause new flesh to appear in the place of proud flesh. (Ben Adoulah.)

According to the Mani-Málá, "the cat's-eye is warm, sour, and curative of cold, chronic derangements of the spleen, and colic, and is generally auspicious when worn." The same authority says that the perfect cat's-eyes, which are "heavy, deliciously cool, flawless, smooth, and otherwise faultless," are considered very lucky, while those that are defective bring about loss of friends, ruin, and wasting of the body.

The Hindus group the cat's-eye in four castes, according to their quality, all of which are replete with lucky signs.

The Persians held that the stone ground to a fine powder, mixed with water, and then dried in the sun, and the operation repeated until the powder soaks up four times as much water as was first put in, would cure dropsy and inflammation of the navel if applied locally.

The Assyrians dedicated the stone to the god *Belus*, and ornaments containing it would, after the proper religious ceremony, render its wearer invisible to his enemies.

Chalcedony.—Prevented and cured melancholy. Worn as an amulet and in contact with the hairs of an ass, it was a preventive of danger during tempests and sinister events. (Camillus Leonardus, *Speculum Lapidum*. 1502.)

Reported to drive away evil spirits, a preventive of melancholy and sadness, and would bring victory to its wearer. (Andrea Baccius, *Arnot. Super. 6, c. de Natur. gem.*)

Chrysoberyl.—As an amulet it dispelled evil dreams, fear, and melancholy; in addition, it possessed the properties of the beryl. (The *Mirror of Stones*. 1750.)

The oriental chrysolite (chrysoberyl) dispelled pestilential vapors and infectious airs. Taken internally, it alleviated asthma. (Rulandus, *Medicina Practica*. 1564.)

It was said to cool boiling water when immersed in it, soften anger, lose its luster on contact with poison, and induce its wearer to repent of the faults he had committed. (Porta, *Magiæ Naturalis*. 1561.)

According to the Mani-Málá, the chrysoberyl, when set in gold and worn about the neck or hand, removes disease and vicious habits, and increases family, life, and happiness.

Chrysolite.—Cardanus, in his "de subtilitate," says that he cured one C. Palavicinus of a fever and another person of the "falling sickness" by the administration of powdered chrysolite with wine.

The powder was prescribed as a remedy for asthma. Held under the tongue, it assuaged thirst in fever. (*Arcula Gemmea*. 1653.)

Chrysoprase.—Preserved the sight, banished covetousness, and rendered its wearer cheerful. (Mirror of Stones. 1750.)

Worn as an amulet, it assuaged the pains of gout. (Arcula Gemmea. 1653.)

Bound around the arm, it was supposed to become a diuretic, to expel gravel, and prevent the generation of the stone. (Rulandus, Medicina Practica. 1564.)

Citrini.—The citrini (yellow corundum) protected the wearer from danger while traveling, secured him from pestilential vapors, and procured him every courtesy. (Arcula Gemmea. 1653.)

Coral.—In the "Arcula Gemmea" is a rather interesting account of the coral, as follows:

This is a bud of maritime beauty, and the delight of children, the best of nature's buds, as somewhat furthering the springtide of their growth. The corall is a plant of nature's setting in the sea, which, though being covered with the waters of the sea, it bee green and soft, yet so soon as it is elevated above the waves and discovered in the region of the aire it altereth its colour and changeth its nature: its colour from green to a very noble and beautifull red; its softnesse into the compacted firmness and solidnesse of a stone, beautifull and lasting; by the operation of the aire encompassing its sometimes soft and flaccid substance. It is (under the waters of a brinish sea) a thriving, growing plant, sprung by nature with the ornament of many pretty branches, which is no sooner violently forc'd from the place of its growth and brought to light above the overflowing of the waters, but it blushes at the injurious hand that offereth violence to its seeret, silent, tender, spreading growth.

Ovid, the Roman poet, accounts for the origin of the coral in the "Metamorphoses" in the following manner:

Perseus, having cut off the head of the Medusa, placed it upon some twigs and leaves near the seashore. The twigs were turned to stone on contact with the head, were scattered far and wide beneath the sea by sea nymphs, and thus became the seeds of coral.

The coral was thought to be of greater beauty when worn by a man than by a woman. By its change of color it was thought to forewarn the approach of disease; and should the wearer become dangerously sick, the gem became spotted. Worn as an amulet, it drove away fear, kept men from the influence of sorcery and evil spirits. It was a protection against poison, plague, and storm. (Arcula Gemmea. 1653.)

It secured women from *incubus* and men *succubus* and hindered the delusions of the devil. [Dioscorides, De Materia Medica.]

Coral was administered, according to the following prescription, for vomiting, purging, and colic:

TABELLE CORALLATE.

℞. Corallorum rubeorum præparatorum, ℥ii; margaritar præparator, ℥i; boli armeni, ℥β; ligni aloes, ℥i. Sacch. albissimi dissoluti in aqua rosaru cinnamomi tenuioris quantum sufficit; fiat confectio in tabellis. [Arcula Gemmea. 1653.]

According to the "Medicina Practica" of Rulandus, written in 1564, a half a drachm of powdered coral was given as a cardiac stimulant;

and in all contagious diseases, fevers, and poisonings the "tinctura corallorum" and the "sal corallorum" were equally efficacious.

Stopped every flux of blood; drove away ghosts, illusions, and dreams; was a protection against lightning, wind, tempest, and attacks of wild beasts. (Methrodorus.)

It gave relief to pains in the stomach and heart and strengthened those organs. It made sound diseased gums, and cleansed putrid sores. The powder, taken with wine, was given for the gravel. If hung on fruit-bearing trees, it insured fertility and protected them from hail and blighting winds. A kind known as *Grogius* had the power of stopping thunder and lightning. [Leonardus, Speculum Lapidum. 1502.]

Before the time of Pliny coral was held in great esteem, but during his period it was apparently not so highly appreciated, since he remarks "that formerly it was deemed a most excellent antidote for poison." During the Middle Ages, however, it was in great repute throughout Europe both as a drug and as an amulet. It was at that time deemed a powerful astringent, and in demand as a talisman against witchcraft, poison, epilepsy, etc.

Boetius de Boot, writing in 1636, says that he was cured of a dangerous pestilential fever by taking 6 drops of tincture of coral. A. de Villeneuve prescribed 10 grains of coral for infants in order to preserve them from epilepsy or any other fit through life. It is still in repute as a preservative against children's diseases and is not infrequently worn suspended from the neck for this purpose. In India it is occasionally given to children in the hope of ridding them of the bites and kindred itches.

According to the Mani-Málá a deep red coral was worn as an immediate cure for poisoning. Kar, an oriental sage, says that any man who wears an ugly discolored and rough coral courts death.

Sanskrit medical science taught that coral is sour, sweet, a specific for cold and biliousness, nutritious, and grace imparting; and the wearing of it very beneficial to women.

According to the Arabic and Persian writers, as given by Tagore in his Treatise on Gems, a dose of coral was considered to be a good astringent, a remedy for all bleedings, and an antidote for all poisons. Worn over the parts it cured all stomach complaints; worn around the neck it stopped crying in infants and protected them from fear and sudden starts while asleep. In Afghanistan the coral mixed with gold dust is given as a tonic. In Egypt it is used according to the following receipt:

Cut open a lemon and put a piece of coral inside, cover the opening with a paste of clay, and place the whole under a fire for some time until it gets white from burning; remove it and after grinding the stone use it as an ointment for the eyes. Mixed with electuaries and taken internally it will give great physical strength.

Porta, in his *Magiæ Naturalis*, says that the coral will arrest the flow of blood and keep off evil spirits. This belief still persists in Italy where a hand holding a branch of coral is not infrequently worn as a protection against the evil eye.

Diamond.—This stone being of all gems the purest, hardest, and most brilliant, was considered to be the most powerful in spiritual influences and was consecrated to all that was holy and heavenly.

It was symbolical of constancy, purity, and innocence, and hence early used in betrothal rings. It softened anger, strengthened love, and was considered an infallible test of conjugal fidelity. To the ancients the diamond represented inexorable justice and unchangeable fate, hence the judges of Hades were described as having hearts and bosoms of adamant.

According to the Talmud, a certain gem, supposed to have been the diamond, worn in the girdle of the high priest, if brought in contact with an accused man became dark and dim if the suspect was guilty; if innocent the stone shone with increased brilliancy.

In Europe as late as 1700 the diamond was thought to be the most potent talisman against poison, pestilence, witchcraft, etc. It was esteemed a safeguard to virtue; was used as a preventive of and a cure for lunacy. It was supposed to drive away lemures, incubi, and kindred terrors; and was considered a preservative against lightning. The gem was supposed to possess sex, and Boetius de Boot mentions two such diamonds which by their union produced others and thus left a numerous progeny.

Sir John Mandeville also bears witness to the procreative powers of diamonds:

They grow together, male and female, and are nourished by the dew of heaven; and they engender commonly, and bring forth small children that multiply and grow all the year. I have oftentimes tried the experiment, that if a man keep them with a little of the rock, and wet them with May dew often, they shall grow every year and the small will grow great.

Speaking further concerning the diamond, Mandeville held that in order to secure the greatest good from a diamond it should be worn on the left side.

For it is of greater virtue than on the right side; for the strength of their growing is toward the north, that is the left side of the world, and the left part of a man is when he turns his face toward the east. He who so carries the diamond upon him, it gives him hardness and manhood, and it keeps the limbs of his body whole. It gives him victory over his enemies, if his cause is just; and it keeps him that bears it in good wit; and it keeps him from strife and riot; from sorrows and enchantments; and from phantasies and illusions of wicked spirits. It makes a man stronger and firmer against his enemies; and heals him that is a lunatic, and those whom the fiend pursues or torments. And if venom or poison be brought in presence of the diamond, anon it begins to grow moist and sweat. Nevertheless, it happens often that the good diamond loses its virtue by sin, and for incontinence of him who bears it; and then it is needful to make it recover its virtue again, or else it is of little value.

Pierre de Boniface, a fourteenth century alchemist, taught that one of the virtues of the diamond was to render its wearer invisible and invincible.

In this connection the Shah of Persia is the possessor of a diamond set in a scimitar which is believed to render him invincible so long as he has it by him. The shah also has a five-pointed star of diamonds which is thought to make conspirators instantly confess their crimes when in its presence.

A diamond ring was given to Mary Queen of Scots, by Ruthven, as a talisman against danger and poison. The queen also possessed two other diamonds—"one medicinable and against poison," the other "medicinable for the collicke."

According to the Puranas, the diamond varies in the preponderance of one or the other of the five primal elements—

Earth, water, sky, energy, and air. The "airy" sort gives heart and gracefulness, the "skyey" diamonds bring about the possession of all kinds of wealth. The ownership and use of those kinds in which energy predominates adds to puissance, heroism, and hope. Those diamonds which are white like the jessamine flower, white clouds, or the moon, and are possessed of six or eight corners, sharp ridged, that have originated from water, and that shine in the darkness, lead to the instant cure of snake bites, and prove efficacious in neutralizing the effects of other poisons, and prove a panacea as soon as worn.

Like men, diamonds are divided into castes, Brahmins, Vaisya, Kshatriyas, and Súdras. The wearing of superior Brahmin diamonds gives favor in the eyes of the gods. The better sort of the Kshatriya class bring about uniform success, accession of power, and destruction of foes. The best stones of the Vaisya class are productive of fame, wisdom, and skill in the fine arts. The higher order of the Súdra caste induce benevolence in their owner and make him hale and wealthy.

As the promiscuous intercourse of one caste with another gives rise to mixed castes among men, so it is with diamonds. These mixed castes give rise to impurities and flaws in the stones, and which, according to their nature and kind, are fraught with grave trouble to man. Such diamonds cause: Unchastity; brings destruction; renders man apprehensive of snake bites; creates fear; leads to ruin, loss of family dignity, and death. Such stones are dangerous to pregnant women and contact with them may lead to abortion.

A shapeless diamond is fraught with danger; a dirty diamond with grief; a rough diamond with unhappiness, and a black diamond with various troubles. A three-cornered diamond gives rise to quarrels; a four-cornered diamond occasions various fears; a five-cornered one brings death; but a six-cornered stone is productive of good.

Since the use of impure diamonds leads to danger, causes swelling in wounds, faintness, leprosy, pleurisy, jaundice, etc., it is highly advisable to refine and purify the stone before using it medicinally.

The process is as follows: On some auspicious day dip the diamond in the juice of *Kantakari* (solarium jaquiri) and then burn it in a fire made of dried cow or buffalo dung. The burning should be carried on for a whole night. In the morning the diamond should be put under horse's urine and again burnt. These operations are continued for seven days. The stone is then immersed in a gruel made of various leguminous seeds to which assafoedita and rock salt have been added and heated repeatedly twenty and one times. By this means the diamond is purified and reduced to ashes. The taking of a diamond so treated gives longevity, strength, energy, beauty, develops the parts, and effects a cure for every distemper. (Mani-Málá.)

The Brahmin diamond is useful in chemical operations, and brings about the acquisition of power, friends, wealth, position, and good luck to one's family. A Kshatriya diamond wards off old age and premature death; a Vaisya one crowns every endeavor with success; while a Súdra one is a panacea.

The Hindu held that the diamond was masculine, feminine, or neuter according to its marking and appearance. The masculine kinds were considered the best, and were useful in medicine. The feminine diamond was auspicious to women; but the neuter diamond was destructive of vigor and brought weakness and disappointment; as a medicine it was administered for impotency.

According to the views of Arabian and Persian authorities the diamond, if worn, imparted health and dispelled fear. Tied around the thighs of a woman about to be confined it brought on a safe and speedy delivery and assuaged the pain of labor. Cut into a hexagon and worn on the arm it cured epilepsy. Combined with other ingredients and used as a dentifrice it rendered the teeth bright and hard; its use in this manner was attended with risks, for on too long a contact with the teeth it caused them to fall out; while the presence of a single particle in the stomach was liable to produce death. It was a fatal poison if taken internally without electuaries; and—

if by accident one takes a quantity of it his life should not be considered safe until he is made to vomit it out by means of drinking a quantity of fresh cow's milk or some heated clarified butter, or by any other means, such as applying the fingers to the inside of the throat. The soup of some fatty flesh is then to be given to the patient to complete the recovery. (Tagore, Treatise on Gems.)

The Burmese call the diamond and arsenic by the same name, *chein*, on the ground that they are both fatal poisons.

This idea was not unknown in Europe, for we find the diamond listed as one of the poisons given to Sir Thomas Overbury when a prisoner in the Tower; while Benvenuto Cellini, the famous goldsmith, writing about 1560, relates how his life was preserved by the roguery of an apothecary, who, being employed to pulverize a diamond intended to be mixed in a salad for Cellini with the intention of poisoning him, substituted a beryl as cheaper, thus saving the life of Cellini.

According to Sanskrit medicine the diamond combined all the six tastes, cured every disease, brought health and strength, and was very useful in chemical operations. (Mani-Málá.)

In Egypt the diamond, when set in gold, gives health and wealth to its wearer.

According to Porta, in his *Magiæ Naturalis*, the diamond contends against sleeplessness, enchantments, and turns away wrath.

Rabbi Benoni, a fourteenth century mystic, held that the diamond was capable of producing somnambulism, and when used as a talisman

with lodestone and sapphire it would attract such powerful planetary influences as to render its wearer almost invincible.

In Art Magic; or Mundane, Submundane, and Supermundane Spiritism, it is stated that the diamond is the most powerful of all stones to promote spiritual ecstasy.

Emerald.—Emblematic of happiness. As an amulet it was a preserver of chastity, and betrayed or punished its violation by flying into pieces or losing color. It preserved women in childbirth and eased the pains of labor; water in which the stone had stood hastened the afterbirth. (Leonardus.) Applied to the lips it stopped hemorrhage. When hung around the neck it prevented epileptic attacks. (Albertus Magnus.)

Dedicated to Mercury.

Much used by astrologers for the purposes of divination. (Cardanus, De Lapidibus Preciosis.)

Albertus Magnus cites the case of a certain King of Hungary who, while wearing an emerald, had knowledge of his wife, upon which the stone broke in three parts.

There is such an enmity betwixt it and illegitimate venery, or the uncleanness of the flesh, as that if it do but touch the skin of an adulterer it will break, and that it doth bridle the reins of lasciviousness and much temper it. (Arcula Gemmea.)

Avenzoar held that it was an antidote for poisons, and that six grains of its powder taken in water made an excellent cordial.

Mundella, a sixteenth century physician, calls attention to the purchase of a fine emerald by Francisus Maria, Prince of Urbine, for use as a remedy in the treatment of a disorder which he was troubled with. (Arcula Gemmea.)

Ahmed Ben Abdalaziz, in his Treatise on Jewels, says that if a serpent fix his eyes on the luster of emeralds he immediately becomes blind. Thus Moore in "Lalla Rookh:"

Blinded like serpents when they gaze
Upon the emerald's virgin blaze.

The Shah of Persia has a small casket of gold studded with emeralds, said to have been blessed by Mahomet, which has the property of rendering the royal wearer invisible so long as he remains celibate.

The San Greal was a chalice made from a single emerald, and which possessed the power of preserving chastity, prolonging life, curing wounds and disease, and other wonderful properties. The Holy Grail was used at the Last Supper, and in it were caught the last drops of the blood of Christ as he was taken from the cross. In the legends and poetry of the middle ages are many notices of the Greal. A subject revived by Tennyson.

The Romans used it to rest, strengthen, and preserve the eyes, a practice which persisted through the Middle Ages, during which period water in which the stone had stood was used as a specific for ophthalmia.

Boetius de Boot gives directions for its treatment for use as a drug as follows:

Pound the emerald in an iron mortar, sift the powder through the muslin, then cover it with *spiritus urinae*; the spirit must be distilled off, leaving the powder of a gray color, but which will communicate that of the emerald to the spirits of wine.

This taken internally was considered a powerful remedy for many diseases such as dysentery, epilepsy, venomous bites, fevers, etc.

According to Sanskrit medicine—

The emerald is cool, good in poisoning, sweet, and purgative, helps digestion, cures biliousness, removes disrelish, is nutritious, and wards off spectral influences. (Tagore, Treatise on Gems.)

The Hindu authorities held that the perfect emerald was an infallible remedy for all cases of poisoning; cleansed men from sin, brought about success in war, and rendered successful the rites performed according to the Atharva-Veda. The defective emerald lead to sickness, injury, loss of male children, and rendered one liable to bites. (Mani-Málá.)

The Persian and Arabian sages taught that, whether worn or taken as a medicine, the emerald—

bestows contentment of mind, quickens the pulse, gives nourishment to the soul, heart, brains, and stomach, cures epilepsy, removes all bodily pain, stops the vomiting and purging of blood, is an antidote to poison, allays unnatural thirst, and is a panacea for jaundice, liver troubles, stricture, gravel, and leprosy.

If administered in doses weighing 8 wheat corns to a patient suffering from poison, it neutralizes its action, provided it be taken soon enough. To prevent vomiting of blood, the dose of the emerald should be the weight of 4 barleycorns. The powder applied to the eyes, brings out all impurities therein and stops the flow of fluid substances. When set in a gold ring and worn on the forefinger or thumb, it is a prophylactic against cholera. The ashes of burnt emerald heals ulcers if applied locally.

According to the Rosicrucians, if at the time when Sol enters Libra an emerald be set in a gold ring of the same weight and worn on the finger, its wearer would attain his cherished object and could detect the presence of poisons by the sweating of the stone.

The possessor of an emerald would never become poor.

If a serpent looked at this stone, he was struck with blindness.

The Egyptians held that the best test for a genuine emerald was that a serpent immediately fell to licking it as soon as it came across it.

The Aztecs administered its powder as a remedy for venereal diseases.

Garnet.—Emblematic of constancy. Its virtue was to dispel "poisonous and infectious airs" (Leonardus). During the Middle Ages it was considered to possess the same marvelous and medicinal properties as the ruby, though to a less degree. It gave and preserved health, drove away vain thoughts, and reconciled differences between friends.

Suspended from the neck, it kept off plague and thunder, strengthened the heart, and increased riches and honors. (Giov. B. Porta, *Magiae Naturalis*. 1561.)

According to the Puranas—

A garnet which is colored like the conch, the lotus, the black bee, or the sun, and which is strung on a thread, is sound and auspicious, and heralds good fortune. A garnet which is colored like the crow, the horse, the ass, the jackal, the bull, or the blood-stained beak of a vulture holding a piece of flesh, brings on death.

Jacinth.—Procured sleep, riches, honor, and wisdom. A preservative against pestilence and foes. (Leonardus, *Speculum Lapidum*. 1502.)

Cardanus, in *De Lapidibus preciosis*, says that he was in the habit of carrying a jacinth about him for the purpose of inducing sleep, which he says "it did seem somewhat to confer, but not much."

Nicols, quoting Cardanus, says that jacinth procured sleep, cheered the heart, drove away plagues, brought protection from thunder, and increased wisdom and honor when worn on the finger or about the neck as an amulet. (*Arcula Gemmea*. 1653.)

Jade.—Worn as an amulet or administered internally, it was a curative of diseases of the kidney and loins.

Wecker, in the *Antidotæ speciale de Lapidibus minus preciosis Alterantibus*, says that a nobleman, well known to him, had a fine "nephritick stone," which he wore on his arm—

by the power of which he voided a very great quantity of gravel, so great as that he feared lest he should suffer harm by so large an expulsion of it in so short a time.

Porta, in the *Magiae Naturalis*, says:—It alleviates the pain of the kidneys, expels gravels from the bladder, and when worn as a charm is a preservative against venomous things.

Jasper.—Was a charm against scorpions and spiders. (Boot, *Gemmarum et Lapidarum Historia*. 1690.)

Checked the flow of blood; strengthened the chest, lungs, and stomach; cured fevers and dropsy; cleared the sight, and prevented conception. (Leonardus, *Speculum Lapidum*. 1502.)

In the list of valuables left by George, Earl Marischal, who died in 1620, is "ane jaspe stone for stemming of bluid."

Mottled jasper, suitably engraved, was believed to prevent its wearer from death by drowning and to render him free from injury while on the water. (*Arcula Gemmea*. 1653.)

Burton, in the *Anatomy of Melancholy*, says: "If hung about the neck, or taken in drink, it much resisteth sorrow."

Nonus, a physician of the Middle Ages, reported of it that it cured epilepsy.

Galen asserted that a green jasper, worn as an amulet suspended from the neck so that it was above the navel, would cure dyspepsia and strengthen the stomach.

Jet.—Cardanus (de subtilitate, lib. 5) says that—

the wearing of this stone doth secure men from nocturnal fears, from incubus or succubus, or the nightmare, and from evil spirits; and that being drunk will show whether a maid hath her virginity or no.

Believed to dissolve spells and enchantments. "If burned as incense, its smoke drives away devils and relieves the dropsical." (Boetius, De Gagate.)

Bruised in water and given to a gravid animal, it brings forward the foetus. Its powder cures epilepsy and fastens loose teeth. Mixed with the marrow of a stag and taken internally, it cures snake bites. (Speculum Lapidum. 1502.)

Used as a perfume, it prevented irregularity in female periods. (Wurtz, Tab. gener. prac.)

Lapis-lazuli.—Believed to cure melancholia. (Speculum Lapidum.)

Dioscorides, in De Materia Medica, suggests its use as a cure for melancholy, and states that it is a good purgative.

Cardanus advises its use in pectoral diseases of children and in epilepsy. The dose to be five grains. (De Subtilitate.)

Boetius (Tract. de Lapidibus et Gemmis) states that it is a good purgative. Unwashed, it purges by vomiting; washed, it purges by stool. Used for this purpose to-day in India, Chile, and Peru.

A. Mussa Brassavolus (Lib. de Med. purgant.) used it as a purgative according to the following prescription:

℞. Lapidis lazuli præparati, ʒj. Camphoræ, anisi, cinnamomi, zinziberis, mastiches ana, gr. 6. Misce, cum succo salviæ vel diacatholico fiant pilule quinq. Dosis est à ʒij ad ʒj, aut in pilulis, aut in pulvere, aut in jure, aut in aqua Boraginis, aut in conserva Boraginis, aut in vino cretico.

According to Sanskrit medical science lapis-lazuli is cooling, and a curative of biliousness. (Mani-Mâkâ.)

Lodestone.—Orpheus, in the Hymni et de Lapidibus, says:

It will confer strength, banish disease, and when worn constantly about the person ward off epidemics and plagues. Sitting before it and fixing the eyes earnestly upon it one has but to ask the gods for light on any subject, and the answer will come breathing out through the stone. The soul will hear it and the senses discover it clearly.

In great repute in Europe during the fifteenth, sixteenth, and seventeenth centuries for its numerous virtues as an amulet and drug. Carried about the person it cured cramp and gout; held in the hand during the hour of travail it shortened the time and eased the pains of labor. Bruised and taken with honey, it was used as a purgative; also cured dropsy. The same dose applied locally afforded relief from wounds made by poisoned iron. Taken internally with the juice of fennel it cured disorders of the spleen; applied as an ointment it prevented baldness. A dram of the stone mixed with the fat of a serpent and the juice of nettles caused insanity. The powder thrown

over a household fire caused the inmates to flee in a panic, an artifice, according to the popular belief, made use of by thieves. (The Mirror of Stones. 1750.)

It is good against the headache, convulsions, and poisons; and that it causeth easy delivery, and procureth love 'twixt man and wife, and preserveth peace and concord amongst friends, and that it driveth away fears and increases wisdom. Galen and Dioscorides say it. (Arcula Gemmea. 1653.)

Lodestone is in repute to-day as a preventive and cure for cramps, colic, and rheumatism. Among the American negroes it is used as a voodoo stone, and is thought to be a love charm; to possess phallic properties; to increase the strength of the body, and to cure lumbago, rheumatism, and hernia.

Malachite.—Thought to increase the strength and growth of children and ward from them all dangers and infirmities. (Pliny, Nat. Hist.; Solinus, Polyhist., C. 36; Baccius de Nat. gem., C. 29.)

It strengthened the stomach; preserved children from hurt and convulsions. (Arcula Gemmea.)

Boetius states that six grains taken internally acts as an excellent purgative. It will cure "cardialgia" and colic. (Tract. de Lapidibus et Gemmis.)

Held to be a powerful local anæsthetic, for "being taken in drink or bruised in vinegar and applied to the members that are to be cut off and burnt, it makes them so insensible that they feel scarce any pain." (Speculum Lapidum.)

Moonstone.—According to Pliny, "the image of the moon contained therein daily waxes or wanes according to the period of the lunar motion."

During the period of the increase of the moon it was a potent love charm; during the period of decrease it enabled its wearer to foretell the future. Carried in the mouth it became an aid to the memory. As a powder and amulet it was prescribed in cases of epilepsy. (Camillus Leonardus.) It is still used for this purpose among the Basques. (Creveccœur.)

Onyx.—Its origin, according to the Greek legend, was due to Cupid cutting the nails of the sleeping Venus with his arrow; these falling into the Indus were changed to onyx.

The stone was thought to be a powerful aphrodisiac; to increase spittle in children; hasten a birth; give rise to nightmare, and stir up strife. Used as an eyestone "it enters of its own accord, and if it found anything within that is noxious, it drives it out and tempers the hurtful and contrary humors." (Camillus Leonardus, Speculum Lapidum. 1502.)

The belief in its causing nightmare and strife was widespread. This belief was explained by Benoni on the assumption that "in the onyx is a demon imprisoned in the stone who wakes only of a night, causing terror and disturbance to sleepers who wear it."

Among the Persians the onyx is to-day administered as a drug for the cure of epilepsy.

Opal.—Symbolical of hope.

The gem was in great repute as an eyestone, and was used in all diseases of the eye. It partook of all the virtues of those stones whose colors it showed. (Camillus Leonardus, *Speculum Lapidum*. 1502.)

It stimulated the heart; preserves from contagious and infectious airs; drives away despondency; prevents fainting, heart disease, and malignant affections. (Giov. B. Porta, *Magiæ Naturalis*. 1561.)

The opal was supposed to indicate the state of health of its wearer by change of color, losing its brilliancy if the wearer was ill, and vice versa.

The idea that the opal is unlucky is based on a teutonic superstition, and is comparatively modern. Mention of its supposed evil qualities is made in a work entitled *Art Magic; Mundane, Submundane, and Supermundane Spiritism*, in which the opal is credited with being fatal to love and sowing discord between giver and receiver.

Pearl.—Emblematic of purity, beauty, and nobility.

Pliny states that pearls were supposed to be generated by a celestial dew falling on the shellfish, which, in the early mornings of certain seasons, left the bottom of the sea to draw in the air containing the dew from which the pearls were derived, the size and quality of the pearl depending upon the size of the dewdrop and the purity of the air. Cloudy weather spoiled the color, lightning stopped the growth, and thunder ruined the gem.

According to the ancient Hindu authorities, pearls were held to originate in elephants, clouds, boars, conch shells, fishes, frogs, oysters, and bamboos. Of these, the oysters were the most productive. The pearls were formed by rain drops falling into the open shell of the mollusk, the finest gems being found during the period when the sun rested on *arcturus*, the fifteenth lunar asterism.

In the Orient the pearl was and is extensively used as a medicine for syncope, hemorrhage, stomach troubles, etc. In China large quantities of seed pearls are made into an electuary, and taken to restore manly vigor and as a stimulant.

According to Sanskrit medical science, the pearl is "sweet in taste, very cool, and a specific for eye diseases, cures poisoning and atrophy, and brings strength to weak limbs." (*Mani-Málá*.)

The Arabian and Persian sages held that the use of pearls was conducive to contentment of body and soul; cured insanity and all mental diseases; all diseases of the heart, stomach, and bowels; piles, stricture, and excessive and insufficient menstruation. It was an antidote for poison, stopped bleeding from cuts, and cured leprosy and skin diseases.

Rambam recommends the use of the burnt powder as an ointment

in the treatment of ulcers and diseases of the eye, such as conjunctivitis, cataract, etc. The burnt powder taken internally cured vomiting of blood and purging.

According to Egyptian medicine, pearl powder taken with electuaries strengthened the body and added luster to the eyes.

The Hindu authorities recognized four shades as belonging to pearls—yellow, honey, white, and blue. The first brings wealth, the second fosters understanding, the third brings fame, and the fourth good luck. If defective, according to the kind and degree, the pearl brought on leprosy, loss of male issue, loss of fortune, disgrace, slothfulness, insanity, and death. (Mani-Málá.)

According to Art Magic; or Mundane, Submundane, and Supermundane Spiritism, the wearing of pearls brought one en rapport with spirits and promoted chastity.

In Bengal bracelets of pearl are worn by virgins to preserve their virtue.

In Europe as late as the seventeenth century decoctions containing pearls were thought to be powerful mental stimulants and a cure for insanity. A decoction of pearl powder and distilled water was one of the remedies given to the insane Charles, King of Spain.

Leonardus states that pearls boiled in meat would cure the quartan ague; powdered and taken with milk, they healed ulcers and cleared the voice; they comforted the heart, gave relief in cramps and colic, cured epilepsy and dysentery; taken with sugar, they were of assistance in the cure of pestilential fevers, and that they rendered their wearers virtuous.

According to Nicols (*Arcula Gemmea*), pearls were—

good against synopes, and cardiacall passions, that they do comfort the spirits, stop the fluxes of blood, cure henteries and diarrheas, and that they are good for the sight.

Prase.—Supposed to possess all the properties of the emerald, but to a less degree. Lost its color on contact with poison or venom, but recovered it again on being washed. Reported to be an excellent cordial and cardiac stimulant. Applied to the eyes, it strengthened the sight. (*Arcula Gemmea*. 1653.)

Benoni states that the powder mixed with the milk of a ewe that has had but one lamb will, if applied locally, cure the gout; taken internally, it was a deadly poison.

Quartz.—The powder mixed with wine was given for dysentery in the north of England during the twelfth century. A crystal held against the tongue assuaged thirst. (Leonardus, *Speculum Lapidum*.)

Applied locally to-day in the mountains of Georgia for faintness, headaches, and bleeding at the nose. Used in parts of Virginia to cure styes; the sty is rubbed with the crystal three times a day for three days. In northern New York a so-called "vital ore," consisting

entirely of quartz sand, is sold as a veritable panacea, curing sore eyes, piles, carbuncles, indigestion, sore throat, giddiness, and blood-poisoning.

In the Middle Ages the clear, transparent quartz was believed to betray the presence of poison, either by becoming opaque or breaking. The powder, mixed with wine, was given in dysentery; held in the mouth, it assuaged thirst, cured headaches and faintness; powdered and taken with wine and honey, it filled the breasts of nursing women with milk. (Leonardus.)

Orpheus recommended its use as a medicine for diseases of the kidneys.

Andrea Bacci, writing in 1605, says:

It is used either in powder, or the salt of it, or the oil of it, against all obstructions of the bowels, against gout, swoonings, and all cephalic diseases.

A drachm of the powder taken with oil of sweet almonds cures those that have taken sublimate. (Arcula Gemmea. 1653.)

Quartz balls were and are used by mystics, astrologers, and diviners to foretell the future, review the past, and conjure up distant scenes. The famous "show-stone" of Dr. Dee, a sphere three inches in diameter, was made of quartz. It is interesting to note that while the modern mystic and the mystic of the Middle Ages differ somewhat in their methods, each have the same end in view, and each have produced witnesses to show that they attained that end. The methods used to induce a vision as practiced by the mystic of the Middle Ages are as follows: The crystal, according to Scot, in his "Discovery of Witchcraft," when "charged" with the name of St. Helen written on the stone with olive oil while the operator faced the east, and held in the hands of an innocent child born in wedlock, would, upon the recital of a prayer to the saint, become an oracle and answer any question put to it.

In an eighteenth century manuscript is the following statement—

Take a christall stone or glasse, most clear, without a craise, and wrape about it a pece of harte's lether, saying, "In the name of the Holy Trinity, and of the hey Deity Amen." Then holde the cristalle in the beam where the ☉ is most bright, at the hottest of the day, and say there con (jurations) subscribed, and by and by you shall sie the spirit peradventer, appeiring himselfe.

The spirit is then to be "charged," upon which he will point out the whereabouts of stolen property; the location of buried treasure; give information concerning relatives, friends, or enemies, or such other information as may be desired.

According to Hindu authorities the quartz is—

cool and cooling, cures hemorrhage from the nose and mouth, and when worn removes baneful astral influences.

The crystal gives strength and cures biliousness, morbid heat, and fistula. A specific for consumption, leprosy, and poisoning. It may enter into medicines as a substitute for diamonds. (Mani-Mālá.)

A good rock crystal is an infallible remedy in all cases of poisoning. Wild animals like the leopard, the elephant, the lion, and the tiger, can not approach this gem. It neutralizes snake, rat, and scorpion poisons, and the wearer need never fear drowning, fire, or a thief. A moss-colored, clouded, rough, yellow, dull, dirty, and discolored rock crystal the authorities shun from a distance. (Tagore, a Treatise on Gems.)

Ruby.—Emblematic of love.

A sovereign remedy and amulet against plague, poison, evil thoughts, nightmare, and diverted the mind from sadness and sensuality. (Leonardus, *Speculum Lapidum*.)

It forewarned the wearer of the approach of any misfortune by loss of color. In this connection Wolfgang Gabelchoyer gives his experience:

On December 5, 1600, as I was travelling from Studtgard in company with my beloved wife, Catherine Adelmann, of pious memory, I observed most distinctly during the journey that a very fine ruby, her gift, which I wore set in a ring upon my finger, had lost almost all its splendid color, and had put on dullness in place of brilliancy and darkness in place of light; which blackness and opacity lasted not for one or two days only, but for several. * * * Whereupon I warned my wife that some grievous mishap was impending over either her or myself, as I foreboded from the change of color in my ruby. Nor was I wrong in my anticipation, inasmuch as within a few days she was taken with a fatal sickness that never left her till the day of her death. And truly, after her decease, its former brilliant color returned spontaneously to my ruby.

Arabian and Persian writers taught that the wearer of the ruby obtained peace of mind and strength of brain.

A *durm* dose of it, taken internally, cures epilepsy, insanity, cholera, and the spitting of blood; causes free circulation of blood throughout the system, and prevents uneasiness of mind. It cures all kinds of poisonings from snake bite or from administration of poison by enemies. It frees the atmosphere from the pollution engendered by cholera. It purifies the blood and brings back to its normal state the fatally quick action of the pulse. The wearer of the ruby in the form of a finger ring obtains from the deity all the desires of his heart and becomes proof against thunder stroke and cholera. Worn over the eyes or applied to them as an ointment it cures all complaints of the vision; over the mouth it takes away the bad smell of it, allays thirst, and gives constant satisfaction to the mind. It brings honor to the wearer. The dose for internal use is from 1 kirat (4 barleycorns) to 1 dang (16 barleycorns). (See the work Karabadin Kabir, as cited by Tagore in his Treatise on Gems.)

The ruby enters into the Chinese pharmacopœia as an ingredient in the "five precious fragments," supposed to consist of ruby, topaz, emerald, sapphire, and hyacinth.

The Hindu writers held that those rubies—

which are flawless and of approved color are auspicious, produce health, wealth, wisdom, and happiness. If flawed or offcolored they bring humiliation, loss of friends, liability to wounds, loss of wealth, and lightning stroke; are fatal to domestic animals, and are inimical to life, wealth, and fame.

The man who treasures a ruby furnished with every perfection, and which when cast in a quantity of milk a hundred times its bulk, makes the white mass one entire

sheet of red, or sends out a red flame, is as meritorious as the celebration of the *Asvamedha jagna*.¹ Such a stone leads to wealth, success, happiness, and long life. (Mani-Málá.)

Sapphire.—Emblematic of wisdom. If placed on the heart it bestows strength and energy. St. Jerome states that the sapphire procures royal favors, softens anger, frees people from enchantment, obtains release from captivity, and prevents evil and impure thoughts.

Because of its extreme coldness it was thought to preserve the chastity of its wearer, hence especially suited for ecclesiastical rings.

Worn in a ring or in any other manner it is able to quench concupiscence, and for this reason it is proper to be worn by the priesthood and by all persons vowed to perpetual chastity. It is said to grow dull if worn by an adulterous or lascivious person.

It rendered its wearer chaste, virtuous, pious, devout, wise, amiable, and pacific. It cured boils, carbuncles, and headaches, rested and refreshed the body, and gave a color to the cheeks. Taken with milk it cured cramps. (Leonardus, *Speculum Lapidum*. 1502.)

Soaked in vinegar its vinegar extract was administered in fevers; powdered and soaked in vinegar for one phase of the moon, it was given to insure continency and conjugal love. (Galen.)

Placed on the heart it cured fever; on the forehead it stopped bleeding at the nose. The powder taken with milk was a remedy for fevers, plague, and poison. (Albertus Magnus.)

The powdered sapphire used as an ointment cured inflammation and irritation of the eyes; it was also thought to be able to draw out any foreign substance that might be present in them. (Canones Medicinæ.)

According to Giov. Porta the sapphire was of great service in necromancy and the magic arts, and a deadly enemy to all venomous reptiles and insects. (Magiæ Naturalis. 1561.)

The Hindus regarded the stone as unlucky and as a bringer of misfortune. Thus—

A sapphire, the surface of which wears a mica-like sheen, * * * brings about loss of wealth and life. That mark in a sapphire which at first sight looks like a rift, * * * renders one liable to bites. That sapphire which is parti-colored causes loss of family dignity. The sapphire which contains dirt produces a variety of skin diseases like itching. That which contains gritty fragments is destructive; that which is rough causes banishment. (Mani-Málá.)

The same authority says, however, "that sapphire which when placed in a pot of milk darkens it all through, increases wealth, and is conducive to fame and increase of family," while "a flawless, sterling sapphire brings its wearer strength, fame, and length of days," and "the man who wears a sapphire of spotless chastity finds favor with *Narayana*,² and acquires longevity, family dignity, fame, understanding, and wealth."

¹The Horse Sacrifice, a celebrated ceremony, the antiquity of which dates back to the Vedic period.

²The preserver of the Hindu Triad.

According to the Sanskrit medical science the sapphire is bitter, warm, and good in cold and biliousness, and when worn alleviates the rage of *Sani*.¹

In Egypt the sapphire is taken with *majoom* (electuaries) to add strength to the body. (Tagore, Treatise on Gems.)

The Buddhists esteem the sapphire above all gems, claiming that it produced tranquillity of mind, and when worn by one wholly pure and devoted to God insures protection against disease, danger, and venomous reptiles.

The sapphire is of a cold and drie faculty, even as are most pretious stones; it is reported of it that it is good against feverish distempers, hence this old distick.

Corporis ardorem refrigerat interiorem
Sapphirus, & cypriæ languida vota facit.

The best of these are very comfortable to the eyes if they be often looked on. (Arcula Gemmea. 1653.)

It is reported of it that if it be worn by an adulterer, by loosing its splendor it will discover his adultery. (Cardanus, De Lapidibus preciosis.)

The sapphire is of so contrary a nature to poisons that if placed in a glass with a spider the insect will quickly die. (Arcula Gemmea. 1653.)

St. Jerome wrote that the sapphire conciliates to its wearer the condescension of princes, quells his enemies, disperses sorcery, sets free the captive, and may even assuage the wrath of God.

In the inventory of the jewels of Charles V, mention is made of a "bluestone with two clasps of gold, good for the gout."

In the church of Old St. Paul's, London, was a famous sapphire which was supposed to cure the infirmities of the eyes of all those thus afflicted who might resort to it.

The modern mystic holds it capable of attracting powerful planetary influences, and nearly equal to the diamond and quartz in inducing visions. (Art Magic; or Mundane, Submundane, and Supermundane Spiritism.)

The star sapphire was and is still reputed to be a potent love charm. The powder of this gem was taken as an aphrodisiac during the Middle Ages. Star sapphire as a powder was given for vertigo in the low countries as late as 1810.

Sard.—Said to possess sex.

The males shine brighter than the females; for the females are the fattest and glitter more obscurely. (Leonardus, Speculum Lapidum.)

The sard nullified the evil effects of the onyx when worn with it; sharpened the wit; gave cheerfulness, and prevented dysentery. (Albertus Magnus, Leonardus, and De Boot.)

Epiphanius, writing in 1565, says that the sard conferred upon its wearer a cheerful heart, courage, and presence, and protected him from witchcraft and noxious humors.

¹One of the stars influencing the destinies of men.

Baccius in his *Annotations* says that powdered sard taken in spirits stops the menses and prevents miscarriage.

Sardonyx.—Symbolical of conjugal bliss. It rendered its possessor virtuous, cheerful, and agreeable. (Leonardus, *Speculum Lapidum*, 1502.)

Spinel.—Reconciled differences between friends; gave health and strength to the body; cured disorders of the liver; restrained passion and fiery wrath; and was a preservative from lightning. (Leonardus.)

Powdered and taken with water Arnobis used it as a remedy for diseases of the eye. (*Dissertatio Medica*.)

Boetius held that the wearing of a balas ruby (spinel) restrained fury, wrath, and lust.

In the *Arcula Gemmea*, written in 1653, the author, Nicols, says:

Rulandus reporteth this of it. That if the four corners of a house, arbor, or vineyard be covered with this stone it will preserve it from lightning, tempests, and worms.

According to Arabian and Persian medicine, the wearing of the spinel gives contentment, prevents the spitting of blood, cures piles, and all diseases caused by the increase of phlegm. The dose for internal use is from 1 *kirat* (4 barleycorns) to 1 *dang* (16 barleycorns). Applied as an ointment to the eyes the stone adds to their luster.

According to an Arabic work, entitled *Azaabul beldan*, as cited by Tagore:

The sea cows get spinel stones from the Kokaf Mountains and put them on the ground when they come grazing toward Ceylon. The stone gatherers, who remain concealed all about, then come out in stealthy steps, carefully throw lumps of clay over the stones left, and then retire. When after grazing these animals go back to the sea, disappointed at not finding the stones and fretting and fuming with rage, those people came back and took away the precious stones.

Staurolite.—In Brittany, France, a superstitious reverence is attached to the cruciform crystals of this stone, based on a belief that they fell from heaven.

In Virginia and the Carolinas the staurolite, locally known as fairy stone, is worn as a lucky charm and is believed to bring good fortune and ward off danger and disease.

Sunstone.—According to Sanskrit authorities—
the sunstone is warm, flawless, and good in cold and defective oxidation, and sacred; it is an *elixir vite*, and is the delight of the Sun. (Mani-Málá.)

Topaz.—Symbolical of friendship.

It cooled boiling water on being immersed in it; became opaque on contact with poisons; restrained anger and desire; cured insanity; checked the flow of blood; cleansed hemorrhoids, and averted sudden death. (Camillus Leonardus, *Speculum Lapidum*.)

Benoni states that the topaz is favorable for all hemorrhages, and imparts strength and good digestion. Powdered and taken in wine it cured asthma and insomnia. (*Dissertatio Medica*.)

Rubbed on a hone the topaz gave a milky juice in quantities, and yet lost none of its original weight. The juice was taken internally in cases of dropsy, and certain poisonings. Used as an ointment it was in repute as a curative for diseases of the eye. (Epiphanius.)

Worn as an amulet, so says Porta, it drove away sadness and nightmare; strengthened the intellect and bestowed courage. Mounted in gold and hung around the neck it dispelled enchantments; worn on the left hand it preserved its wearer from sensuality.

In the *Honest Jeweller*, written in the seventeenth century, the statement is made that—

the virtue and strength of the topaz is said to increase and decrease with the moon, and consist in the fact that when thrown into boiling water, it at once deprives it of its heat.

According to the Sanskrit authorities, the—

topaz is sour, cool, and curative of abnormal oxidation, gives an appetite, and brings fame and wisdom.

The Hindu sages held that the medicinal properties of the topaz were similar to those of the coral, and in addition it prevented and cured sterility. (Mani-Málá.)

Like the ruby, the topaz was supposed to possess the power of emitting light to a great degree. A topaz given by the wife of Theoderic, count of Holland, to Adelbert, gave out so brilliant a light in the chapel where it was kept that prayers could be read by it.

Turquoise.—Emblematic of success. Highly valued by all orientals and worn by them to insure health and success. Supposed to preserve the wearer from injury through accidents. In the presence of poisons the stone sweated profusely, a property thought to be characteristic of many of the noble gems. Its color paled as its owner sickened and was lost entirely on his death, to be recovered only on its becoming the property of a healthy person.

The turquoise, according to Arabian and Persian authorities, as cited in the *Mani-Málá*, cured all diseases of the head and heart. A sovereign remedy for hernia, swellings, flatulence, dyspepsia, insanity, and cancerous sores. Whether taken alone, mixed with honey or with other drugs, it cures epilepsy, spleen, and stricture. In cases of poisoning or snake bite, it was given with wine. Aristotle advises a similar dose for the same purpose. Applied as an ointment to the eyes, it increased their luster, restored the vision, and prevented the fall of fluids therefrom. Worn as an amulet, the turquoise brought happiness, dispelled fear, and rendered its wearer safe from drowning, lightning stroke, and snake bite. Seen after looking at the moon on the first day after the new moon, it brought good luck.

In Egypt cure of a cataract is believed to be effected by the local application of a turquoise set in a silver ring and dipped in water,

the application being accompanied by the chanting of the name of God.

Variolite.—Supposed to be a preventive and cure for variola (small-pox). (Castellani, History of Gems.)

Water sapphire or iolite.—A woman possessing a ring set with this stone as a signet and on which was cut one-half of a fish, a mirror, a branch, and a nude female, procured any desire.

Zircon.—Supposed to bring riches, honor, and wisdom; a charm against plague and evil spirits; and afforded its wearer protection against thunderbolts. (Europe During the Middle Ages.)

According to the Mani-Málá—

The wearing of a weighty, lustrous, white, cool, tender, very old, and transparent gameda (zircon) leads to prosperity. A light, discolored, exceedingly rough, delusion creating, and cool, yet dirty, gameda blights happiness and saps the foundations of energy.

The same treatise, speaking of its medicinal value, says:

The zircon is sour, heating, and curative of unhealthy oxidation, sharpens the appetite, helps digestion, and takes away sin.

In conclusion, it would be expected to find the belief in the marvelous and medicinal properties of gems prevalent during the age of faith, while during the age of reason and inquiry it seems somewhat childish that they should still continue to exist. In India, the land of occultism, the mystics still pursue their researches after the occult virtues of precious stones. The modern Western spiritualist endeavors to discover and apply the occult knowledge of the East. He still believes in and teaches the virtues of gems, and is emphatic in his opinion that certain gems facilitate the rapport of a certain class of spirits with the wearers of those gems.

Swedenborg, the Swedish mystic, in his spirit revelations to L. A. Cahagnet, as cited in his *Magie Magnetique* (Paris, 1838), gives numerous categorical answers to questions asked by the medium concerning the spiritual and material powers of certain precious stones.

In Paris a school has been established which has for its object the study of the magnetic emanations, radiance, and crystals. In Nice a Dr. de Lignieres has issued a prospectus of a work of 644 pages that seriously considers the medicinal properties and virtues of precious stones.

IX. CATALOGUE OF THE ISAAC LEA COLLECTION OF GEMS.

PREFATORY NOTE.

The exhibit of gems made by the United States National Museum at the New Orleans and Cincinnati expositions in 1884 and 1885 marked the beginning of what is now one of the most complete public collections of gems in the United States. From 1886 to 1890 the growth

of the collection, through gift or purchase, was steady, though slow. In 1891 the museum purchased, for exhibition at the World's Columbian Exposition at Chicago, the greater part of a collection of gems belonging to the estate of Dr. Joseph Leidy, of Philadelphia, and which was incorporated with the museum collections proper at the close of the exposition. In 1894 it became the possessor, under the provisions of the will of Mrs. Francis Lea Chamberlain, of a valuable collection of 1,316 gems formerly belonging to her father, Dr. Isaac Lea, of Philadelphia. This collection, known as the "Isaac Lea Collection of Gems," has, since that time, been steadily increased by contributions from Dr. L. T. Chamberlain. A notable accession of gems and gem minerals, chiefly from the United States, was received from Dr. Chamberlain in 1896. This, added to the original "Lea Collection," made it so large that it was decided to incorporate with it all of the gem material belonging to the museum, distinguishing those specimens obtained by gift or deposit, other than the Lea material, by a special label. In 1897 Dr. Chamberlain was appointed honorary custodian of the collection, and largely through his efforts the collection now contains a fine series of gems native to the United States, including nearly every variety and representing the majority of the gem localities.

In the catalogue is given the name, locality, description, and catalogue numbers of each specimen, and, when donated or deposited, the name of the parties from whom it was received. As all the stones were weighed in grams, the weights are given in carats and decimals of carats, instead of the more cumbersome fractions. The carat is equal to 0.205 gram; its fractions are known as fourths, eighths, sixteenths, thirty-seconds, and sixty-fourths.

CATALOGUE.

Adularia, see Orthoclase.

Agalmatolite. China. A small greenish-gray snuff bottle. Cat. Nos. b-899; 83553.

Agalmatolite. China. A carving representing a bird and a tree. Cat. Nos. b-900; 51515.

Agalmatolite. China. A carving representing a group of five baboons. Cat. Nos. b-902; 51515.

Agalmatolite. China. Two carved images. Cat. Nos. b-903, 904; 81803.

Agalmatolite. China. Two carvings. Cat. Nos. b-905, 906; 84236.

Agalmatolite. Japan. A carved platter brought to Holland by Dutch merchants early in the seventeenth century. Cat. Nos. b-907; 46057. Deposited by G. Browne Goode.

Agate, see Quartz.

Agatized wood, see Quartz.

Albite, var. moonstone. Amelia Court-House, Virginia. Colorless. Double cabochon cut; 18 by 14 by 10 mm. Cat. Nos. c-285; 50329.

Albite, var. moonstone. Amelia Court-House, Virginia. Colorless. Cabochon cut, elliptical girdle. Four stones varying in size from 10 by 8 by 4 mm. to 16 by 11 by 5.5 mm. Cat. Nos. c-286-9; 47846.

- Albite*, var. moonstone. Amelia Court-House, Virginia. White, opaque, with fine change of color. Single cabochon cut; elliptical girdle; size, 30 by 16 by 8 mm. Cat. Nos. c-290; 84184.
- Albite*, var. moonstone. Amelia Court-House, Virginia. White, opaque, with change of color. Double cabochon cut; elliptical girdle; size, 14 by 8 by 6 mm. Cat. Nos. c-291; 84184.
- Albite*, var. moonstone. Amelia Court-House, Virginia. White, opaque, with change of color. Single cabochon cut; elliptical girdle; size, 46 by 30 by 8 mm. Cat. Nos. c-292; 84184.
- Albite*, var. moonstone. Amelia Court-House, Virginia. White, opaque, with change of color. Single cabochon cut; elliptical girdle; size, 37 by 25 by 9 mm. Cat. Nos. c-293; 84184.
- Alexandrite*, see Chrysoberyl.
- Almandite*, see Garnet.
- Amazon stone*, see Microcline.
- Amber*. Coast of the Baltic. Color, wax yellow. A carved bottle 6.5 cm. high. Cat. Nos. c-72; 51338.
- Amber*. Coast of the Baltic. Color, yellow. Pair of cuff buttons. Cat. Nos. c-91-2; 84246.
- Amber*. Coast of the Baltic. A breastpin of 3 beads and a pendant. Cat. Nos. c-93; 84247.
- Amber*. Coast of the Baltic. Necklace of 50 beads on a silk cord. Cat. Nos. c-94; 84248.
- Amber*. Burmah. Color, resin yellow. A heart-shaped charm. Cat. Nos. c-95; 50259.
- Amber*. Burmah. Color, resin brown. A mass of amber having one side polished. Cat. Nos. c-96; 50259.
- Amethyst*, see Quartz.
- Andalusite*. Brazil. Color, dark green. Brilliant cut; rectangular girdle. Size, 7 by 6 by 4 mm.; weight, 1 carat. Cat. Nos. a-566; 50326.
- Andalusite*. Brazil. Color, brownish green. Step-brilliant cut; square girdle. Size, 6 by 3.5 mm.; weight, 0.70 carat. Cat. Nos. a-567; 50371.
- Andalusite*. Brazil. Color, brownish green. Step-brilliant cut; rectangular girdle, size 11 by 6 by 3 mm.; weight, 1.35 carats. Cat. Nos. a-568; 84105.
- Andalusite*. Brazil. Brownish green. Step cut; rectangular girdle. Size, 10 by 4.5 by 2 mm.; weight 0.81 carat. Cat. Nos. a-569; 84105.
- Aquamarine*, see Beryl.
- Aragonite*. Colusa County, California. Single cabochon cut. Color, brown. Size, 27 by 14 by 7 mm. Cat. Nos. a-597; 84114.
- Aragonite*. Colusa County, California. Color, brown. A polished slab. Cat. Nos. b-840; 48540.
- Aventurine*, see Quartz.
- Axinite*. Dauphiny, France. Color, violet brown. Step-brilliant cut; square girdle. Sizes, 7.5 by 7 by 4.5 mm.; weight, 1.55 carats. Cat. Nos. a-581; 84109.
- Beekite*, see Quartz.
- Beryl*. Fitchburg, Massachusetts. Color, yellowish green. Brilliant cut. Size, 6.5 by 5 by 4 mm.; weight, 0.74 carat. Cat. Nos. 787; 50301.
- Beryl*. Litchfield County, Connecticut. Color, brownish yellow. Brilliant cut; circular girdle. Size, 6.5 by 5 mm.; weight, 0.96 carat. Cat. Nos. 784; 47568. Gift of the New England Mining Company, through J. F. Barse.
- Beryl*. Litchfield County, Connecticut. Color, greenish yellow. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.06 carats. Cat. Nos. 782; 47568. Gift of the New England Mining Company, through J. F. Barse.

- Beryl.* Litchfield County, Connecticut. Color, citrine. Brilliant cut; circular girdle. Size, 7.5 by 6 mm.; weight, 1.43 carats. Cat. Nos. 780; 47568. Gift of the New England Mining Company, through J. F. Barse.
- Beryl.* Avondale, Pennsylvania. Color, citrine. Step-brilliant cut; square girdle. Size, 10 by 10 by 7 mm.; weight, 3.19 carats. Cat. Nos. 792; 50299.
- Beryl.* Avondale, Pennsylvania. Color, yellow green. Step-brilliant cut; rectangular girdle. Size, 8 by 6 by 4 mm.; weight, 2.07 carats. Cat. Nos. 793; 50299.
- Beryl.* Ray's mine, North Carolina. Colorless. Brilliant cut; square girdle. Size, 8 by 8 by 6 mm.; weight, 1.64 carats. Cat. Nos. 759; 47840.
- Beryl.* Ray's mine, North Carolina. Colorless. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.35 carats. Cat. Nos. 760; 47840.
- Beryl.* Ray's mine, North Carolina. Colorless. Brilliant cut; circular girdle. Size, 7 by 7 by 5 mm.; weight, 1.12 carats. Cat. Nos. 761; 47840.
- Beryl.* Ray's mine, North Carolina. Colorless. Brilliant cut; circular girdle. Size, 7 by 7 by 5 mm.; weight, 1.14 carats. Cat. Nos. 703; 47840.
- Beryl.* Ray's mine, North Carolina. Colorless. Brilliant cut; square girdle. Size, 7 by 7 by 5 mm.; weight, 1.08 carats. Cat. Nos. 764; 47840.
- Beryl.* Brazil. Colorless. Brilliant cut; circular girdle. Size, 13 by 6 mm.; weight, 4.55 carats. Cat. Nos. 738; 50296.
- Beryl.* Brazil. Colorless. Step-brilliant cut; elliptical girdle. Size, 9 by 5.5 by 3.5 mm.; weight, 0.87 carat. Cat. Nos. 740; 50296.
- Beryl.* Brazil. Color, yellowish green. Step-brilliant cut; oval girdle. Size, 9 by 6 by 3 mm.; weight, 1.23 carats. Cat. Nos. 743; 82843. The Lea Collection.
- Beryl.* Alabashka, the Urals. Color, yellowish green. Table cut. Size, 31 by 16 by 6.5 mm.; weight, 20.94 carats. Cat. Nos. 713; 50293.
- Beryl.* Alabashka, the Urals. Color, yellow. Step-brilliant cut; rectangular girdle. Size, 18 by 14 by 10 mm.; weight, 17.04 carats. Cat. Nos. 714; 50294.
- Beryl.* Alabashka, the Urals. Color, yellow. Table cut. Size, 16 by 13 by 7 mm.; weight, 9.04 carats. Cat. Nos. 715; 50294.
- Beryl.* Alabashka, the Urals. Color, yellow. Step-brilliant cut; rectangular girdle. Size, 12 by 9 by 5 mm.; weight, 3.03 carats. Cat. Nos. 716; 50294.
- Beryl.* Alabashka, the Urals. Color, yellow. Brilliant cut; rectangular girdle. Size, 8 by 7 by 6 mm.; weight, 1.69 carats. Cat. Nos. 717; 50294.
- Beryl.* Alabashka, the Urals. Color, greenish yellow. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 6 mm.; weight, 3.05 carats. Cat. Nos. 718; 84050.
- Beryl.* Alabashka, the Urals. Color, yellow. Brilliant cut; circular girdle. Size, 8 by 8 by 5 mm.; weight, 1.28 carats. Cat. Nos. 719; 84050.
- Beryl*, var. aquamarine. Stoneham, Maine. Color, aquamarine blue. Brilliant cut; elliptical girdle. Size, 10 by 9 by 7 mm.; weight, 3.06 carats. A beautiful flawless gem. Cat. Nos. 789; 84065.
- Beryl*, var. aquamarine. Stoneham, Maine. Color, aquamarine green. Brilliant cut; rectangular girdle. Size, 7 by 6 by 5 mm.; weight, 1.02 carats. Cat. Nos. 790; 84065.
- Beryl*, var. aquamarine. Paris, Maine. Brilliant cut; rectangular girdle. Size, 7 by 5.5 by 5 mm.; weight, 0.96 carat. Cat. Nos. 791; 50300.
- Beryl*, var. aquamarine. Royalston, Massachusetts. Color, deep bluish green. Brilliant cut. Size, 14 by 13 by 9 mm.; weight, 8.16 carats. Cat. Nos. 785; 84064.
- Beryl*, var. aquamarine. Fitchburg, Massachusetts. Color, faint green. Trap cut; rectangular girdle. Size, 7 by 6 by 4 mm.; weight, 0.86 carat. Cat. Nos. 786; 50301.
- Beryl*, var. aquamarine. Fitchburg, Massachusetts. Color, faint yellowish green. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.72 carat. Cat. Nos. 788; 50301.

- Beryl*, var. aquamarine. Portland, Connecticut. Color, deep bluish green. Brilliant cut; rectangular girdle. Size, 17 by 15 by 10 mm.; weight, 13.91 carats. Perhaps the finest specimen ever found at the locality. Cat. Nos. 779; 84063.
- Beryl*, var. aquamarine. Litchfield County, Connecticut. Color, aquamarine green. Brilliant cut. Size, 8 by 6 mm.; weight, 1.44 carats. Cat. Nos. 781; 47568. Gift of the New England Mining Company, through J. F. Barse.
- Beryl*, var. aquamarine. Litchfield County, Connecticut. Color, pale aquamarine green. Brilliant cut. Size, 7 by 5 mm.; weight, 1.09 carats. Cat. Nos. 783; 47568. Gift of the New England Mining Company, through J. F. Barse.
- Beryl*, var. aquamarine. Asheville, North Carolina. Bluish green. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 7 mm.; weight, 2.79 carats. Cat. Nos. 777; 50298.
- Beryl*, var. aquamarine. Mitchell's Peak, North Carolina. Color, deep greenish blue. Step-brilliant cut; rectangular girdle. Size, 14 by 12 by 10 mm.; weight, 9.32 carats. A superb gem. Cat. Nos. 776; 83729. The Lea Collection, through Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Mitchell County, North Carolina. Color, blue; opaque. Single cabochon cut. Size, 17 by 10 by 6 mm.; weight, 7.24 carats. Cat. Nos. 778; 81309. Gift of J. K. Bruner.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 13 by 9 mm.; weight, 7.43 carats. Cat. Nos. 746; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 11 by 8 mm.; weight, 5 carats. Cat. Nos. 747; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 9 by 6.5 mm.; weight, 2.80 carats. Cat. Nos. 748; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 8 by 6 mm.; weight, 1.98 carats. Cat. Nos. 749; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 8 by 6 mm.; weight, 1.48 carats. Cat. Nos. 750; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.09 carats. Cat. Nos. 751; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.01 carats. Cat. Nos. 752; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 6 by 4.5 mm.; weight, 0.85 carat. Cat. Nos. 753; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.70 carat. Cat. Nos. 754; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.64 carat. Cat. Nos. 755; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, bluish green. Brilliant cut; circular girdle. Size, 5 by 3 mm.; weight, 0.39 carat. Cat. Nos. 756; 83731. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. aquamarine. Near Ray mine, North Carolina. Color, pale bluish green. Brilliant cut. Size, 9 by 5 mm.; weight, 1.98 carats. Cat. Nos. 757; 47840.

- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, pale greenish yellow. Brilliant cut; square girdle. Size, 8 by 8 by 6 mm.; weight, 1.78 carats. Cat. Nos. 758; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, pale bluish green. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.28 carats. Cat. Nos. 762; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, faint green. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.03 carats. Cat. Nos. 765; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, pale bluish green. Brilliant cut; circular girdle. Size, 6.5 by 5 mm.; weight, 0.97 carat. Cat. Nos. 766; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, pale bluish green. Brilliant cut; circular girdle. Size, 6 by 5 mm.; weight, 0.85 carat. Cat. Nos. 767; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, faint green. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.70 carat. Cat. Nos. 768; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, pale green. Three stones. Brilliant cut; circular girdle. Total weight, 1.40 carats. Cat. Nos. 769-771; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Three small stones; brilliant cut. Total weight, 0.62 carat. Cat. Nos. 772-774; 47840.
- Beryl*, var. aquamarine. Ray's mine, North Carolina. Color, sea green. Brilliant cut; circular girdle. Size, 12 by 8 mm.; weight, 6.28 carats. Cat. Nos. 775; 50297.
- Beryl*, var. aquamarine. Brazil. Color, faint sea green. Step-brilliant cut; elliptical girdle. Size, 15 by 12.5 by 7 mm.; weight, 7.68 carats. Cat. Nos. 737; 50296.
- Beryl*, var. aquamarine. Brazil. Color, bluish green. Step-brilliant cut; elliptical girdle. Size 10 by 7 by 4 mm.; weight, 1.80 carats. Cat. Nos. 739; 50296.
- Beryl*, var. aquamarine. Brazil. Color faint green. Step-brilliant; oval girdle. Size, 20 by 10 by 5 mm.; weight, 4.52 carats. Cat. Nos. 741; 82843. The Lea Collection.
- Beryl*, var. aquamarine. Brazil. Color, bluish green. Step-brilliant cut; oval girdle. Size, 17 by 9 by 4 mm.; weight, 2.97 carats. Cat. Nos. 742; 82843. The Lea Collection.
- Beryl*, var. aquamarine. Brazil. Color, pale green. Step-brilliant cut; oval girdle. Size, 8 by 5 by 3 mm.; weight, 0.55 carat. Cat. Nos. 744; 82843. The Lea Collection.
- Beryl*, var. aquamarine. Mourne Mountain, Ireland. Color, bluish green. Brilliant cut; circular girdle. Size 8 by 8 by 6 mm.; weight, 1.72 carats. Cat. Nos. 745; 84061.
- Beryl*, var. aquamarine. Siberia. Color sea green. Rose cut; elliptical girdle. Size, 27 by 23 by 13 mm.; weight, 39.42 carats. Cat. Nos. 693; 50303.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Rose cut; elliptical girdle. Size, 26 by 17 by 9 mm.; weight, 21.94 carats. Cat. Nos. 694; 50303.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Table cut. Size, 37 by 12 by 9 mm.; weight, 28.89 carats. Cat. Nos. 695; 50303.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; elliptical girdle. Size, 19 by 16 by 7 mm.; weight, 12 carats. Cat. Nos. 696; 50303.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Table cut. Size, 14 by 14 by 7 mm.; weight, 6.79 carats. Cat. Nos. 697; 50303.

- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 16 by 13 by 7 mm.; weight, 8.44 carats. Cat. Nos. 698; 50303.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step cut; rectangular girdle. Size, 19 by 8 by 6 mm.; weight, 6.22 carats. Cat. Nos. 699; 50303.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 14 by 12.5 by 6.5 mm.; weight, 8.03 carats. Cat. Nos. 700; 50295.
- Beryl*, var. aquamarine. Siberia. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 16 by 11 by 5 mm.; weight, 4.43 carats. Cat. Nos. 701; 50295.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; elliptical girdle. Size, 17 by 9 by 5 mm.; weight, 4.79 carats. Cat. Nos. 702; 50295.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 17 by 8 by 5 mm.; weight, 4.61 carats. Cat. Nos. 703; 50295.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; octagonal girdle. Size, 13 by 13 by 5 mm.; weight, 4.48 carats. Cat. Nos. 704; 50295.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 12 by 9 by 5.5 mm.; weight, 3.87 carats. Cat. Nos. 705; 50295.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; elliptical girdle. Size, 11 by 9 by 5 mm.; weight, 2.40 carats. Cat. Nos. 706; 50295.
- Beryl*, var. aquamarine, Siberia. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 10 by 9 by 5.5 mm.; weight, 2.88 carats. Cat. Nos. 707; 50295.
- Beryl*, var. aquamarine. Siberia. Color, sea green. Step-brilliant cut; elliptical girdle. Size, 11 by 8 by 5 mm.; weight, 2 carats. Cat. Nos. 708; 50295.
- Beryl*, var. aquamarine. Siberia. Color, bluish green. Step-brilliant cut; elliptical girdle. Size, 29 by 22 by 9 mm.; weight, 46.77 carats. Cat. Nos. 709; 82839. The Lea Collection.
- Beryl*, var. aquamarine. Siberia. Color, sea green. Step-brilliant cut; elliptical girdle. Size, 16 by 12 by 7 mm.; weight, 10 carats. Cat. Nos. 710; 82839. The Lea Collection.
- Beryl*, var. aquamarine. Siberia. Color, greenish blue. Rose cut; elliptical girdle. Size, 12 by 8 by 6 mm.; weight, 3.20 carats. Cat. Nos. 711; 82839. The Lea Collection.
- Beryl*, var. aquamarine. Siberia. Color, pale green. Step-brilliant cut; octagonal girdle. Size, 9 by 9 by 5 mm.; weight, 1.90 carats. Cat. Nos. 712; 82839. The Lea Collection.
- Beryl*, var. aquamarine. Ceylon. Color, pale bluish green. Step-brilliant cut; elliptical girdle. Size, 17 by 13 by 7 mm., weight, 7.52 carats. Cat. Nos. 732; 82840. The Lea Collection.
- Beryl*, var. aquamarine. Ceylon. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 10 by 7 by 5 mm.; weight, 1.53 carats. Cat. Nos. 733; 82840. The Lea Collection.
- Beryl*, var. aquamarine. Ceylon. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 8 by 6 by 4 mm.; weight, 0.98 carat. Cat. Nos. 734; 82840. The Lea Collection.
- Beryl*, var. aquamarine. Ceylon. Color, pale green. Step-brilliant cut; rectangular girdle. Size, 8 by 6 by 4 mm.; weight, 1 carat. Cat. Nos. 735; 82840. The Lea Collection.
- Beryl*, var. aquamarine. Ceylon. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 8 by 6 by 4 mm.; weight, 1.02 carats. Cat. Nos. 736; 82840. The Lea Collection.
- Beryl*, var. aquamarine. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 12.5 by 10 by 6 mm.; weight, 3.90 carats. Cat. Nos. 720; 82844. The Lea Collection.

- Beryl*, var. aquamarine. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 12 by 9 by 3 mm.; weight, 3.28 carats. Cat. Nos. 721; 82844. The Lea Collection.
- Beryl*, var. aquamarine. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 10 by 7 by 4 mm.; weight, 1.74 carats. Cat. Nos. 722; 82844. The Lea Collection.
- Beryl*, var. aquamarine. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 9 by 7 by 3.5 mm.; weight, 1.15 carats. Cat. Nos. 723; 82844. The Lea Collection.
- Beryl*, var. aquamarine. Color, pale green. Step-brilliant cut; elliptical girdle. Size 9 by 7 by 4 mm.; weight, 1.22 carats. Cat. Nos. 724; 82844. The Lea Collection.
- Beryl*, var. aquamarine. Color, pale green. Step-brilliant cut; elliptical girdle. Size, 10 by 6 by 3 mm.; weight, 0.88 carat. Cat. Nos. 725; 82844. The Lea Collection.
- Beryl*, var. aquamarine. Color, sea green. Brilliant cut; circular girdle. Size, 7 by 7 by 4 mm.; weight, 1.13 carats. Cat. Nos. 726; 82844. The Lea Collection.
- Beryl*, var. aquamarine. Color, bluish green. Step-brilliant cut; elliptical girdle. Size, 9 by 7 by 4 mm.; weight, 1.93 carats. Cat. Nos. 727; 84060.
- Beryl*, var. aquamarine. Color, sea green. Brilliant cut; circular girdle. Size, 7 by 7 by 4 mm.; weight, 1.23 carats. Cat. Nos. 728; 84060.
- Beryl*, var. aquamarine. Color, pale green. Brilliant cut; circular girdle. Size, 7 by 7 by 4 mm.; weight, 0.81 carat. Cat. Nos. 729; 84060.
- Beryl*, var. aquamarine. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 7 by 5 by 3 mm.; weight, 0.90 carat. Cat. Nos. 730; 84060.
- Beryl*, var. aquamarine. Color, bluish green. Step-brilliant cut; elliptical girdle. Size, 6 by 4 by 2 mm.; weight, 0.25 carats. Cat. Nos. 731; d-4060.
- Beryl*, var. emerald. Stonypoint, Alexander County, North Carolina. Color, emerald green. Trap cut. One lot of 26 small emeralds having an average size of 4 by 3.5 by 3 mm. Cat. Nos. 801 to 826; 83127. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. emerald. Stonypoint, Alexander County, North Carolina. Color, emerald green. A crystal 7.6 by 4.2 cm.; weight, 8 oz. 3 dwts., the largest ever found in the United States. It is doubly terminated by base. Cat. Nos. b-865; 83730. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. emerald. Stonypoint, Alexander County, North Carolina. Three crystals. Cat. Nos. b-866-868; 83727. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. emerald. Muso, U. S. of Colombia. A crystal of emerald in a calcite geode. Cat. Nos. b-869; 83848. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Beryl*, var. emerald. Color, emerald green. Table cut. Size, 8 by 6 by 4 mm.; weight, 1.37 carats. Cat. Nos. 794; 50302.
- Beryl*, var. emerald. Step-brilliant cut; rectangular girdle. Size, 6.5 by 6 by 3 mm.; weight, 0.68 carat. Cat. Nos. 795; 50302.
- Beryl*, var. emerald. Trap cut; rectangular girdle. Size, 6 by 5 by 3 mm.; weight, 0.50 carat. Cat. Nos. 796; 50302.
- Beryl*, var. emerald. A polished pebble. Weight, 4.72 carats. Cat. Nos. 797; 84066.
- Beryl*, var. emerald. Step-brilliant cut. Three small stones having a weight of 0.40 carat. Cat. Nos. 798-800; 84066.
- Beryl*, var. emerald. Step-brilliant cut. An emerald doublet set in a gold ring. Cat. Nos. 827; 82842. The Lea Collection.
- Beryl*, var. emerald. Step cut. An "off-color" stone set in a gold ring. Cat. Nos. 828; 84067.

- Beryl*, var. emerald. Step cut. Set in a gold ring with 4 diamond chips, one of which is missing. Cat. Nos. 829; 84068.
- Beryllonite*. Stoneham, Maine. Colorless. Brilliant cut; square girdle. Size, 11 by 11 by 8 mm.; weight, 4.88 carats. Cat. Nos. c-423; 51130.
- Beryllonite*. Stoneham, Maine. Colorless. Step-brilliant cut; square girdle. Size, 10 by 10 by 7 mm.; weight, 3.76 carats. Cat. Nos. c-424; 50334.
- Beryllonite*. Stoneham, Maine. Colorless. Brilliant cut. Size, 9 by 9 by 7.5 mm.; weight, 3.25 carats. Cat. Nos. c-425; 48449.
- Bloodstone*, see Quartz.
- Bowenite*, see Serpentine.
- Carbonate of lime*. Fossil coral. Petosky, Michigan. A polished block 5.7 by 3.9 by 2 cm. Cat. Nos. b-915; 48325. Gift of E. F. Boss.
- Carbonate of lime*. Fossil coral. Iowa. Two paper weights. Cat. Nos. b-916; 50394 and b-917; 84238.
- Carbonate of lime*. Limestone. Japan. A veined black and white limestone carved. The artist has cleverly taken advantage of the colors in the stone and produced a black dragon with Fusi Yama in the distance. Cat. Nos. b-918; 51722.
- Carbonate of lime*. Lunachelle, or fire marble. Carinthia, Austria. A slab, one of the best of its kind, of highly fossiliferous limestone, in which the original color of the fossils has been so deepened and intensified that it rivals the finest of fire opal. Cat. Nos. b-919; 45015.
- Carbonate of lime*. Brecciated marble. Japan. Eleven balls averaging 8 cm. in diameter. Cat. Nos. b-922; 84471. Gift of O. C. Marsh.
- Carbonate of lime*. Onyx. Siskiyou County, California. Two paper weights. Cat. Nos. b-913-4; 47356. Gift of J. S. Diller.
- Carbonate of lime*. Stalagnite. Rock of Gibraltar, Europe. A mounted cannon. Cat. Nos. b-921; 46005.
- Carnelian*, see Quartz.
- Cassiterite*. Chesterfield County, South Carolina. Color, yellow tinged with green. Brilliant-cut stone mounted as a scarf pin. Cat. Nos. a-623; 84170. Deposited by T. M. Chatard.
- Callinite*. Conteau du Prairie, Pipestone County, Minnesota. An Indian pipe. Cat. Nos. b-864; 50384.
- Callinite*. Conteau du Prairie, Pipestone County, Minnesota. Carving of Indian chief's head cut by Patrick. Cat. Nos. b-863; 45112. Gift of J. F. Boughter.
- Cat's-eye*, see Chrysoberyl or Quartz.
- Chalcedony*, see Quartz.
- Chlorastrolite*, see Prehnite.
- Chromic iron*. Thetford, Canada. One lot of 5 unbored beads. Cat. Nos. c-248-252; 83343. The Lea collection; gift of Dr. L. T. Chamberlain.
- Chrysoberyl*. Brazil. Color, greenish yellow. Brilliant cut; square girdle. Size, 11 by 11 by 7.5 mm.; weight, 6.7 carats. Cat. Nos. 640; 60327.
- Chrysoberyl*. Brazil. Color, greenish yellow. Brilliant cut. Size, 10 by 7 by 5 mm.; weight, 2.44 carats. Cat. Nos. 641; 50327.
- Chrysoberyl*. Brazil. Color, greenish yellow. Step-brilliant cut. Size, 8 by 7 by 4 mm.; weight, 1.80 carats. Cat. Nos. 642; 50327.
- Chrysoberyl*. Brazil. Color, greenish yellow. Table cut. Size, 7 by 5 by 3 mm.; weight, 0.97 carat. Cat. Nos. 643; 50327.
- Chrysoberyl*. Brazil. Color, greenish yellow. Step-brilliant cut. Size, 7.5 by 6 by 3 mm.; weight, 0.94 carat. Cat. Nos. 644; 50327.
- Chrysoberyl*. Brazil. Color, pale yellowish green. Table cut. Size, 5.5 by 3 mm.; weight, 0.72 carat. Cat. Nos. 645; 50327.
- Chrysoberyl*. Brazil. Color, pale yellow. Step-brilliant cut. Size, 6 by 5 by 2 mm.; weight, 0.45 carat. Cat. Nos. 646; 50327.

- Chrysoberyl*. Brazil. Color, greenish yellow. Step-brilliant cut. Size, 5 by 5 by 3 mm.; weight, 0.48 carat. Cat. Nos. 647; 50327.
- Chrysoberyl*. Brazil. Color, greenish yellow. Step-brilliant cut; pentagonal girdle. Size, 5 by 5 by 3 mm.; weight, 0.47 carat. Cat. Nos. 648; 50327.
- Chrysoberyl*. Brazil. Color, greenish yellow. Step-brilliant cut. Weight, 2.53 carats. A lot of 13 small stones. Cat. Nos. 649; 50327.
- Chrysoberyl*. Brazil. Color, greenish yellow. A lot of 26 small cut stones. Weight, 2.71 carats. Cat. Nos. 662; 82823. The Lea Collection.
- Chrysoberyl*. Ceylon. Color, dark green. Brilliant cut. Size, 10 by 9 by 7 mm.; weight, 5 carats. Cat. Nos. 634; 50098.
- Chrysoberyl*. Ceylon. Color, dark greenish brown. Step-brilliant cut. Size, 8 by 7 by 6 mm.; weight, 3.01 carats. Cat. Nos. 635; 50098.
- Chrysoberyl*. Ceylon. Color, brownish green. Step-brilliant cut. Size, 12 by 10 by 4 mm.; weight, 3.81 carats. Cat. Nos. 636; 82823. The Lea Collection.
- Chrysoberyl*. Ceylon. Color, yellowish green. Step-brilliant cut. Size, 7 by 6 by 5 mm.; weight, 1.86 carats. Cat. Nos. 637; 82822. The Lea Collection.
- Chrysoberyl*. Ceylon. Color, brown. Step-brilliant cut. Size, 8 by 6 by 9 mm.; weight, 4.15 carats. Cat. Nos. 638; 84048.
- Chrysoberyl*. Ceylon. Color, brown. Rose cut; circular girdle. Size, 6.5 by 4 mm.; weight, 1.13 carats. Cat. Nos. 639; 84048.
- Chrysoberyl*, var. alexandrite. The Urals. Color, emerald green. Step cut. Size, 6.5 by 5.5 by 3.5 mm.; weight, 1.07 carats. Cat. Nos. 688; 82821. The Lea Collection.
- Chrysoberyl*, var. alexandrite. The Urals. Color, emerald green. Step-brilliant cut. Size, 6 by 5 by 2 mm.; weight, 0.37 carat. Cat. Nos. 689; 82821. The Lea Collection.
- Chrysoberyl*, var. alexandrite. The Urals. Color, emerald green. Trap cut. Size, 5 by 4 by 3 mm.; weight, 0.42 carat. Cat. Nos. 690; 82821. The Lea Collection.
- Chrysoberyl*, var. alexandrite. The Urals. Color, emerald green. Step-brilliant cut. Size, 8 by 7 by 4 mm.; weight, 2.19 carats. Cat. Nos. 691; 84049.
- Chrysoberyl*, var. cat's-eye. Siam. Cabochon cut; 17 cat's-eyes and 16 diamond chips mounted in a heavy gold tower ring of Oriental workmanship. Cat. Nos. 692; 82847.
- Chrysolite*. Arizona. Color, bottle green. Brilliant cut; square girdle. Size, 9 by 6 mm.; weight, 2.67 carats. Cat. Nos. a-557; 82818. The Lea Collection.
- Chrysolite*. Near Fort Wingate, Arizona. Color, bottle green. Brilliant cut; circular girdle. Size, 8 by 6 mm.; weight, 1.61 carats. Cat. Nos. a-558; 50101.
- Chrysolite*. Near Fort Wingate, Arizona. Color, dark green. Brilliant cut; circular girdle. Size, 8 by 5 mm.; weight, 1.44 carats. Cat. Nos. a-559; 50101.
- Chrysolite*. Near Fort Wingate, Arizona. Color, dark green. Brilliant cut; circular girdle. Size, 7.5 by 5.5 mm.; weight, 1.52 carats. Cat. Nos. a-560; 50101.
- Chrysolite*. Near Fort Wingate, Arizona. Color, dark green. Size, 7.5 by 5 mm.; weight, 1.20 carats. Cat. Nos. a-561; 50101.
- Chrysolite*. Near Fort Wingate, New Mexico. Color, dark green. Brilliant cut. Size, 8 by 5 mm.; weight, 1.38 carats. Cat. Nos. a-562; 50101.
- Chrysolite*. Near Fort Wingate, New Mexico. Color, green. Step-brilliant cut; rectangular girdle. Size, 7 by 6 by 4 mm.; weight, 1.06 carats. Cat. Nos. a-563; 50101.
- Chrysolite*. The Levant. Color, yellowish green. Step cut. Size, 15 by 12 by 6 mm.; weight, 8.64 carats. Cat. Nos. a-553; 50331.
- Chrysolite*. The Levant. Color, bottle green. Step cut; rectangular girdle. Size, 20 by 16 by 7 mm.; weight, 18.06 carats. Cat. Nos. a-554; 84102.
- Chrysolite*. Ceylon. Color, yellowish brown. Step-brilliant cut; rectangular girdle. Size, 14 by 9 by 8 mm.; weight, 8.27 carats. Cat. Nos. a-555; 82915. The Lea Collection.

- Chrysolite*. Ceylon. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 5.5 by 5 by 3 mm.; weight, 0.42 carats. Cat. Nos. a-556; 82915. The Lea Collection.
- Chrysoprase*, see Quartz.
- Corundum*, var. ruby. Corundum Hill, Macon County, North Carolina. Color, blood red. Step-brilliant cut; rectangular girdle. Size, 9 by 5 by 4 mm.; weight, 1.49 carats. Cat. Nos. 194; 50289.
- Corundum*, var. ruby. Corundum Hill, Macon County, North Carolina. Color, blood red. Step-brilliant cut; square girdle. Size, 6 by 6 by 4 mm.; weight, 0.87 carats. Cat. Nos. 195; 50289.
- Corundum*, var. ruby. Corundum Hill, Macon County, North Carolina. Color, blood red. Step-brilliant cut; square girdle. Size, 4 by 4 by 2.5 mm.; weight, 0.33 carats. Cat. Nos. 196; 50289.
- Corundum*, var. ruby. Ceylon. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 11 by 7 by 6.5 mm.; weight, 4.09 carats. Cat. Nos. 197; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, deep rose red. Rose cut; heart-shaped girdle. Size, 13 by 10 by 7 mm.; weight, 6.67 carats. Cat. Nos. 198; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, blood red. Step-brilliant cut; square girdle. Size, 5 by 5 by 4 mm.; weight, 0.80 carats. Cat. Nos. 200; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, blood red. Step-brilliant cut; square girdle. Size, 6 by 6 by 3 mm.; weight, 0.86 carats. Cat. Nos. 201; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 6.5 by 6 by 5 mm.; weight, 1.23 carats. Cat. Nos. 202; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, blood red. Step-brilliant cut; oval girdle. Size, 7.5 by 6 by 3 mm.; weight, 0.72 carats. Cat. Nos. 203; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, blood red. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 4 mm.; weight, 0.80 carats. Cat. Nos. 205; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, blood red. Step-brilliant cut; circular girdle. Size, 5.5 by 3 mm.; weight, 0.61 carats. Cat. Nos. 206; 82887. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, blood red. Step-brilliant cut; elliptical girdle. Size, 6 by 4.5 by 3 mm.; weight, 0.61 carats. Cat. Nos. 207; 82877. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, blood red. Step-brilliant cut; rectangular girdle. Size, 5.5 by 4.5 by 3 mm.; weight, 0.62 carats. Cat. Nos. 208; 82877. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, bright red. Brilliant cut; elliptical girdle. Size, 6 by 5 by 4 mm.; weight, 0.69 carats. Cat. Nos. 209; 82877. The Lea Collection.
- Corundum*, var. ruby. Ceylon. Color, red, of several shades. 245 small rubies, having a total weight of 21.32 carats. Cat. Nos. 219-464; 82877. The Lea Collection.
- Corundum*, var. ruby. Asteria. Ceylon. Color, milky red. Cabochon cut; circular girdle. Size, 7 by 5 mm.; weight, 2.47 carats. Cat. Nos. 199; 82877. The Lea Collection.
- Corundum*, var. ruby. Asteria. Ceylon. Color, blood red. Cabochon cut; elliptical girdle. Size, 7 by 6 by 4 mm.; weight, 1.25 carats. Cat. Nos. 204; 82877. The Lea Collection.

- Corundum*, var. ruby. Asteria. Ceylon. Color, red. Cabochon cut; circular girdle. Size, 11 by 9 mm.; weight, 9.10 carats. Cat. Nos. 210; 82886. The Lea Collection.
- Corundum*, var. ruby. Asteria. Ceylon. Color, red. Cabochon cut; circular girdle. Size, 7 by 4 mm.; weight, 1.27 carats. Cat. Nos. 211; 82886. The Lea Collection.
- Corundum*, var. ruby. Asteria. Ceylon. Color, grayish red. Cabochon cut; circular girdle. Size, 6.5 by 5 mm.; weight, 1.55 carats. Cat. Nos. 212; 82886. The Lea Collection.
- Corundum*, var. ruby. Asteria. Ceylon. Color, violet red. Cabochon cut; circular girdle. Size, 6 by 6 mm.; weight, 2.30 carats. Cat. Nos. 213; 82886. The Lea Collection.
- Corundum*, var. ruby. Asteria. Ceylon. Color, milky red. Cabochon cut; circular girdle. Size, 6 by 5 mm.; weight, 1.33 carats. Cat. Nos. 214; 82886. The Lea Collection.
- Corundum*, var. ruby. Asteria. Ceylon. Color, grayish red. Cabochon cut; circular girdle. Size, 6 by 5 mm.; weight, 1.13 carats. Cat. Nos. 215; 82886. The Lea Collection.
- Corundum*, var. ruby. Asteria. Color, blood red. Cabochon cut; circular girdle. Size, 7 by 4 mm.; weight, 1.53 carats. Cat. Nos. 216; 50264.
- Corundum*, var. ruby. Asteria. Color, blood red. Cabochon cut; circular girdle. Size, 7 by 7 by 3 mm.; weight, 1.04 carats. Cat. Nos. 217; 50264.
- Corundum*, var. ruby. Color, blood red. Brilliant cut; square girdle. Size, 5.5 by 5.5 by 4 mm.; weight, 1 carat. Mounted in ring. Cat. Nos. 218; 82888. The Lea Collection.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, dark greenish blue. Step-brilliant cut; rectangular girdle. Size, 11 by 8 by 6 mm.; weight, 3.56 carats. Cat. Nos. 162; 50289.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 9 by 7 by 5 mm.; weight, 1.87 carats. Cat. Nos. 163; 50289.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, pale greenish yellow. Step-brilliant cut; rectangular girdle. Size, 6 by 4 by 3 mm.; weight, 0.74 carats. Cat. Nos. 164; 50289.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 6.5 by 5 by 4 mm.; weight, 1 carat. Cat. Nos. 165; 50289.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, prussian blue, with a green play of color. Step-brilliant cut; rectangular girdle. Size, 5.5 by 4 by 4 mm.; weight, 0.76 carats. Cat. Nos. 166; 50289.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, pale yellowish green. Step-brilliant cut; rectangular girdle. Size, 6 by 3.5 by 2 mm.; weight, 0.42 carats. Cat. Nos. 167; 50289.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, pale bluish green. Step-brilliant cut; rectangular girdle. Size, 5 by 3.5 by 3 mm.; weight, 0.35 carat. Cat. Nos. 168; 50289.
- Corundum*, var. sapphire. Corundum Hill, Macon County, North Carolina. Color, blue. Step-brilliant cut; oval girdle. Size, 8 by 6 by 3 mm.; weight, 0.94 carat. Cat. Nos. 169; 47314. Gift of Clarence S. Bement.
- Corundum*, var. sapphire. Montana. Color, pale green. Table cut; rectangular girdle. Size, 9 by 6 by 5 mm.; weight, 2.43 carats. Cat. Nos. 156; 50290.
- Corundum*, var. sapphire. Montana. Color, bluish green. Step-brilliant cut; square girdle. Size, 5.5 by 5.5 by 4 mm.; weight, 0.80 carat. Cat. Nos. 157; 47315. Gift of Clarence S. Bement.
- Corundum*, var. sapphire. Montana. Color, greenish blue. Brilliant cut; square girdle. Size, 6 by 6 by 5 mm.; weight, 1.12 carats. Cat. Nos. 158; 84042.

- Corundum*, var. sapphire. Montana. Color, wine yellow. Brilliant cut; square girdle. Size, 6 by 5.5 by 3 mm.; weight, 0.70 carat. Cat. Nos. 159; 84042.
- Corundum*, var. sapphire. Montana. Color, bluish green. Brilliant cut; circular girdle. Size, 5 by 5 by 4 mm.; weight, 0.70 carat. Cat. Nos. 160; 84042.
- Corundum*, var. sapphire. Montana. Color, straw yellow. Brilliant cut; square girdle. Size, 4 by 4 by 2 mm.; weight, 0.26 carat. Cat. Nos. 161; 84042.
- Corundum*, var. sapphire. Montana. Twenty-one stones selected to show variations in color and varying in weight from 1 to 3.5 carats. Cat. Nos. c. 457; 84478. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Corundum*, var. sapphire. Yogo gulch, Fergus County, Montana. Color, royal blue. Step-brilliant cut. Weight, 3.5 carats. Cat. Nos. c. 458; 84482. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Corundum*, var. sapphire. The Urals, Siberia. Color, deep blue. Step-brilliant cut; elliptical girdle. Size, 7 by 6 by 4 mm.; weight, 1.16 carats. Cat. Nos. 170; 50291.
- Corundum*, var. sapphire. Ceylon. Color, strongly dichroic—c=prussian blue; a=sky blue. Step-brilliant cut; elliptical girdle. Size, 18 by 12 by 15 mm.; weight, 28.06 carats. Cat. Nos. 1; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; rectangular girdle. Size, 12 by 10 by 7 mm.; weight, 7.41 carats. Cat. Nos. 2; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sea green. Step-brilliant cut; rectangular girdle. Size, 12.5 by 11 by 8.5 mm.; weight, 7.145 carats. Cat. Nos. 3; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; elliptical girdle. Size, 14 by 10 by 4.5 mm.; weight, 6.434 carats. Cat. Nos. 4; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; rectangular girdle. Size, 14 by 10 by 9 mm.; weight, 10.51 carats. Cat. Nos. 5; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, bluish gray. Step-brilliant cut; rectangular girdle. Size, 17 by 13.5 by 10 mm.; weight, 21 carats. Cat. Nos. 6; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; square girdle. Size, 12 by 13 by 8.5 mm.; weight, 11.05 carats. Cat. Nos. 7; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lavender blue. Step-brilliant cut; circular girdle. Size, 10 by 10 by 7 mm.; weight, 5.35 carats. Cat. Nos. 8; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale bluish green. Step-brilliant cut; rectangular girdle. Size, 13 by 10 by 6 mm.; weight, 4.16 carats. Cat. Nos. 9; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, smalt blue. Step-brilliant cut; square girdle. Size, 12 by 11 by 6 mm.; weight, 6.76 carats. Cat. Nos. 10; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, violet blue. Step-brilliant cut; elliptical girdle. Size, 13 by 8 by 13 mm.; weight, 12.89 carats. Cat. Nos. 11; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, blue. Step-brilliant cut; elliptical girdle. Size, 5 by 4.5 by 3 mm.; weight, 0.57 carats. Cat. Nos. 12; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, smalt blue. Step-brilliant cut; elliptical girdle. Size, 11 by 9 by 7 mm.; weight, 5.12 carats. The Lea Collection.

- Corundum*, var. sapphire. Ceylon. Color, pink. Step-brilliant cut; elliptical girdle. Size, 10 by 7.5 by 6 mm.; weight, 3.41 carats. Cat. Nos. 14; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; square girdle. Size, 10.5 by 10 by 5 mm.; weight, 3.96 carats. Cat. Nos. 15; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale pink. Step-brilliant cut; elliptical girdle. Size, 9 by 7.5 by 5 mm.; weight, 2.68 carats. Cat. Nos. 16; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 4.5 mm.; weight, 2.58 carats. Cat. Nos. 17; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, wine yellow. Step-brilliant cut; elliptical girdle. Size, 9.5 by 7.5 by 5 mm.; weight, 3.22 carats. Cat. Nos. 18; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; circular girdle. Size, 9 by 8 by 5 mm.; weight, 2.74 carats. Cat. Nos. 19; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; oval girdle. Size, 8 by 7 by 6 mm.; weight, 2.89 carats. Cat. Nos. 20; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, violet. Step-brilliant cut; circular girdle. Size, 8 by 8 by 5.5 mm.; weight, 2.35 carats. Cat. Nos. 21; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, light bluish green. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 5 mm.; weight, 3.19 carats. Cat. Nos. 22; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; elliptical girdle. Size, 9 by 7 by 4 mm.; weight, 2.10 carats. Cat. Nos. 23; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; oval girdle. Size, 10.5 by 8 by 6 mm.; weight, 4.41 carats. Cat. Nos. 24; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, milk white. Cabochon cut; elliptical girdle. Size, 12.5 by 7 by 5 mm.; weight, 3.48 carats. Cat. Nos. 25; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, light violet. Step-brilliant cut; square girdle. Size, 7 by 7 by 4 mm.; weight, 1.86 carats. Cat. Nos. 26; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale violet. Step-brilliant cut; rectangular girdle. Size, 9 by 7 by 6 mm.; weight, 3.51 carats. Cat. Nos. 27; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, smalt blue. Step-brilliant cut; circular girdle. Size, 7 by 7 by 6 mm.; weight, 1.74 carats. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale greenish yellow. Step-brilliant cut; elliptical girdle. Size, 9 by 8 by 5 mm.; weight, 2.28 carats. Cat. Nos. 29; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; rectangular girdle. Size, 10 by 7 by 5 mm.; weight, 2.97 carats. Cat. Nos. 31; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, smalt blue. Step cut; square girdle. Size, 7 by 7 by 7 mm.; weight, 2.89 carats. Cat. Nos. 32; 82895. The Lea Collection.

- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; rectangular girdle. Size, 10 by 7 by 6 mm.; weight, 3.19 carats. Cat. Nos. 33; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, grayish blue. Step-brilliant cut; rectangular girdle. Size, 7.25 by 6.5 by 6 mm.; weight, 2.38 carats. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 9 by 7.5 by 4.5 mm.; weight, 2.31 carats. Cat. Nos. 35; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale yellow. Step-brilliant cut; square girdle. Size, 5.5 by 5.5 by 3.25 mm.; weight, 0.73 carats. Cat. Nos. 36; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; square girdle. Size, 7 by 7 by 4 mm.; weight, 1.62 carats. Cat. Nos. 37; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; circular girdle. Size, 8 by 7 by 5 mm.; weight, 1.87 carats. Cat. Nos. 38; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 7 by 5.5 by 4.5 mm.; weight, 1.42 carats. Cat. Nos. 39; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, bluish gray. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 6 mm.; weight, 1.45 carats. Cat. Nos. 40; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lilac. Step-brilliant cut; elliptical girdle. Size, 8 by 6 by 4 mm.; weight, 1.36 carats. Cat. Nos. 41; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, wine yellow. Step-brilliant cut; elliptical girdle. Size, 8 by 4 by 6 mm.; weight, 1.48 carats. Cat. Nos. 42; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; unsymmetrical girdle. Size, 7.5 by 7.5 by 4.75 mm.; weight, 1.93 carats. Cat. Nos. 43; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, smalt blue. Step-brilliant cut; square girdle. Size, 7 by 6.5 by 4 mm.; weight, 1.31 carats. Cat. Nos. 44; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 4 mm.; weight, 1 carat. Cat. Nos. 45; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; elliptical girdle. Size, 8 by 6 by 4 mm.; weight, 1.74 carats. Cat. Nos. 46; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, blue. Step-brilliant cut; elliptical girdle. Size, 8 by 6 by 3.5 mm.; weight, 1.57 carats. Cat. Nos. 47; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; oval girdle. Size, 7.5 by 5 by 4 mm.; weight, 1.24 carats. Cat. Nos. 48; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; rectangular girdle. Size, 8 by 5 by 5 mm.; weight, 1.53 carats. Cat. Nos. 49; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 7 by 6 by 4 mm.; weight 1.33 carats. Cat. Nos. 50; 82895. The Lea Collection.

- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; oval girdle. Size, 5.5 by 4 by 4 mm.; weight, 0.70 carat. Cat. Nos. 51; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; circular girdle. Size, 7 by 7 by 4 mm.; weight, 1.16 carats. Cat. Nos. 52; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lilac. Step-brilliant cut; rectangular girdle. Size, 8 by 7 by 2 mm.; weight, 0.80 carat. Cat. Nos. 53; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, wine yellow. Step-brilliant cut; elliptical girdle. Size 7 by 6 by 4 mm.; weight, 1.23 carats. Cat. Nos. 54; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, violet. Step-brilliant cut; rectangular girdle. Size, 8 by 6 by 4 mm.; weight, 1.20 carats. Cat. Nos. 55; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, bluish white. Step-brilliant cut; circular girdle. Size, 6.5 by 6.5 by 4 mm.; weight, 1.13 carats. Cat. Nos. 56; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lavender blue. Step cut; square girdle. Size, 6 by 6 by 5 mm.; weight, 1.58 carats. Cat. Nos. 57; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, claret. Step-brilliant cut; rectangular girdle. Size, 7 by 5.5 by 5 mm.; weight, 1.42 carats. Cat. Nos. 58; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 6.5 by 5 by 4.5 mm.; weight, 1.08 carats. Cat. Nos. 59; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, light blue. Step-brilliant cut; circular girdle. Size, 7 by 7 by 4 mm.; weight, 1.38 carats. Cat. Nos. 60; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; elliptical girdle. Size, 7 by 6 by 3.5 mm.; weight, 1 carat. Cat. Nos. 61; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, straw yellow. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 4 mm.; weight, 1 carat. Cat. Nos. 62; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with blue blotches. Step-brilliant cut; elliptical girdle. Size, 7 by 5.5 by 4 mm.; weight, 1.19 carats. Cat. Nos. 63; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, blue. Step-brilliant cut; circular girdle. Size, 7 by 7 by 4 mm.; weight, 1.50 carats. Cat. Nos. 64; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless. Step-brilliant cut; square girdle. Size, 6 by 6 by 3 mm.; weight, 1 carat. Cat. Nos. 65; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, blue. Step cut; square girdle. Size, 6 by 6 by 4 mm.; weight, 1.22 carats. Cat. Nos. 66; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 3 mm.; weight, 1 carat. Cat. Nos. 67; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, deep blue. Step-brilliant cut; rectangular girdle. Size, 6 by 6 by 4 mm.; weight, 1 carat. Cat. Nos. 68; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, grayish pink. Step cut; square girdle. Size, 4 by 4 by 2.5 mm.; weight, 0.50 carat. Cat. Nos. 69; 82895. The Lea Collection.

- Corundum*, var. sapphire. Ceylon. Color, amethystine. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 4 mm.; weight, 0.94 carat. Cat. Nos. 70; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, deep violet blue. Step-brilliant cut; oval girdle. Size, 6.5 by 5 by 3.5 mm.; weight, 0.90 carat. Cat. Nos. 71; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; rectangular girdle. Size, 6 by 4.5 by 5 mm.; weight, 1.12 carats. Cat. Nos. 72; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with blue streaks. Step-brilliant cut; rectangular girdle. Size, 6.5 by 5 by 4 mm.; weight, 0.83 carat. Cat. Nos. 73; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, blotched with blue. Step-brilliant cut. Size, 7 by 6 by 4 mm.; weight, 1.32 carats. Cat. Nos. 74; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with bluish streaks. Step-brilliant cut; oval girdle. Size, 6 by 6 by 5 mm.; weight, 1.40 carats. Cat. Nos. 75; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 5 mm.; weight, 1.15 carats. Cat. Nos. 76; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with blue streaks. Step-brilliant cut; elliptical girdle. Size, 6.5 by 5 by 5 mm.; weight, 1.24 carats. Cat. Nos. 77; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; elliptical girdle. Size, 7 by 5 by 5 mm.; weight, 1.26 carats. Cat. Nos. 78; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; square girdle. Size, 6 by 6 by 4 mm.; weight, 1.08 carats. Cat. Nos. 79; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lilac. Step-brilliant cut; rectangular girdle. Size, 6.5 by 5 by 4 mm.; weight, 1.05 carats. Cat. Nos. 80; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, light blue. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 3.5 mm.; weight, 0.77 carats. Cat. Nos. 81; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with blue blotches. Step-brilliant cut; elliptical girdle. Size, 6 by 4.5 by 5 mm.; weight, 0.93 carat. Cat. Nos. 82; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 3.5 mm.; weight, 0.75 carat. Cat. Nos. 83; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; elliptical girdle. Size, 7 by 5 by 4 mm.; weight, 1.01 carats. Cat. Nos. 84; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with blue streaks. Step-brilliant cut; elliptical girdle. Size, 6.5 by 5 by 3.5 mm.; weight, 0.87 carat. Cat. Nos. 85; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, smoky blue. Step-brilliant cut; elliptical girdle. Size, 5.75 by 5 by 3 mm.; weight, 0.66 carat. Cat. Nos. 86; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with blue streaks. Step-brilliant cut; elliptical girdle. Size, 6 by 4.5 by 5 mm.; weight, 0.93 carat. Cat. Nos. 87; 82895. The Lea Collection.

- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; elliptical girdle. Size, 7 by 5 by 3 mm.; weight, 0.86 carat. Cat. Nos. 88; 83895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 3 mm.; weight, 0.75 carat. Cat. Nos. 89; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; elliptical girdle. Size, 6.5 by 5 by 4 mm.; weight, 0.95 carat. Cat. Nos. 90; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; elliptical girdle. Size, 6 by 4.5 by 3.25 mm.; weight, 0.66 carat. Cat. Nos. 91; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; oval girdle. Size, 6.5 by 5 by 3 mm.; weight, 0.79 carat. Cat. Nos. 92; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 3 mm.; weight, 0.62 carat. Cat. Nos. 93; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 4 mm.; weight, 0.70 carat. Cat. Nos. 94; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 4 mm.; weight, 0.70 carat. Cat. Nos. 95; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 5.5 by 4.5 by 3.5 mm.; weight, 0.64 carat. Cat. Nos. 96; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, light blue. Step-brilliant cut; circular girdle. Size, 5 by 5 by 4 mm.; weight, 0.72 carat. Cat. Nos. 97; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, lemon yellow. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 3 mm.; weight, 0.72 carat. Cat. Nos. 98; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, with blue blotches. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 3.5 mm.; weight, 0.73 carat. Cat. Nos. 99; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale wine yellow. Step-brilliant cut; elliptical girdle. Size, 6 by 4.5 by 3 mm.; weight, 0.63 carat. Cat. Nos. 100; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless, blotched with blue. Step-brilliant cut; circular girdle. Size, 5 by 5 by 5 mm.; weight, 0.83 carat. Cat. Nos. 101; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, sky blue. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 4 mm.; weight, 0.87 carat. Cat. Nos. 102; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, light blue. Step-brilliant cut; elliptical girdle. Size, 6 by 4.5 by 3 mm.; weight, 0.56 carat. Cat. Nos. 103; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, smoky blue. Step-brilliant cut; rectangular girdle. Size, 5.5 by 4 by 3 mm.; weight, 0.54 carat. Cat. Nos. 104; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, violet blue. Step-brilliant cut; circular girdle. Size, 6 by 5 by 4 mm.; weight, 0.71 carat. Cat. Nos. 105; 82895. The Lea Collection.

- Corundum*, var. sapphire. Ceylon. Color, smalt blue. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 3 mm.; weight, 0.70 carat. Cat. Nos. 106; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, prussian blue. Step-brilliant cut; oval girdle. Size, 5.5 by 5 by 3 mm.; weight, 0.55 carat. Cat. Nos. 107; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale blue. Step-brilliant cut; elliptical girdle. Size, 6 by 4 by 4.5 mm.; weight, 0.68 carat. Cat. Nos. 108; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, bluish. Step-brilliant cut; circular girdle. Size, 6 by 5 by 4 mm.; weight, 0.75 carat. Cat. Nos. 109; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, deep blue. Step-brilliant cut; elliptical girdle. Size, 5 by 4.5 by 3.5 mm.; weight, 0.55 carat. Cat. Nos. 110; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, wine yellow. Step-brilliant cut; rectangular girdle. Size, 5 by 4 by 3 mm.; weight, 0.45 carat. Cat. Nos. 111; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, pale green. Step-brilliant cut; elliptical girdle. Size 4 by 4 by 3 mm.; weight, 0.39 carat. Cat. Nos. 112; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Colorless. Step-brilliant cut; elliptical girdle. Size, 5 by 4 by 2 mm.; weight, 0.22 carat. Cat. Nos. 113; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Blue of various shades. Step-brilliant cut. 16 small gems, less than one-half carat each. Total weight, 7.51 carats. Cat. Nos. 114-129; 82895. The Lea Collection.
- Corundum*, var. sapphire. Ceylon. Color, violet. Step-brilliant cut; rectangular girdle. Size, 8.5 by 6 by 4 mm.; weight, 1.41 carats. Cat. Nos. 130; 50274.
- Corundum*, var. sapphire. Ceylon. Color, deep bluish green. Step-brilliant cut; circular girdle. Size, 7 by 7 by 3.5 mm.; weight, 0.84 carat. Cat. Nos. 131; 50274.
- Corundum*, var. sapphire. Ceylon. Color, deep bluish green. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 3.5 mm.; weight, 0.64 carat. Cat. Nos. 132; 50274.
- Corundum*, var. sapphire. Ceylon. Color, greenish blue. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 3.5 mm.; weight, 0.71 carat. Cat. Nos. 133; 50274.
- Corundum*, var. sapphire. Ceylon. Color, greenish yellow. Brilliant cut; square girdle. Size, 6 by 6 by 4 mm.; weight, 0.86 carat. Cat. Nos. 134; 47313. Gift of C. S. Bement.
- Corundum*, var. sapphire. Ceylon. Color, amethyst. Brilliant cut; circular girdle. Size, 5 by 5 by 4 mm.; weight, 0.48 carat. Cat. Nos. 135; 47312. Gift of C. S. Bement.
- Corundum*, var. sapphire. Ceylon. Color, blue. Step-brilliant cut. Twenty small gems; average size, 3 by 3 by 2 mm. Total weight, 5.10 carats. Cat. Nos. 136-155; 84041.
- Corundum*, var. sapphire. (Asteria.) Ellijay, Macon County, Georgia. Color, bronze. Cabochon cut; circular girdle. Size, 14 by 7 mm.; weight, 10.42 carats. Cat. Nos. 191; 84043.
- Corundum*, var. sapphire. (Asteria.) Ellijay, Macon County, Georgia. Color, bronze. Cabochon cut; circular girdle. Size, 10 by 5.5 mm.; weight, 4.55 carats. Cat. Nos. 192; 84043.
- Corundum*, var. sapphire. (Asteria.) Ellijay, Macon County, Georgia. Color, bronze. Cabochon cut; elliptical girdle. Size, 11 by 8 by 4 mm.; weight, 3.35 carats. Cat. Nos. 193; 84043.

- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, gray (banded). Cabochon cut; circular girdle. Size, 25 by 10 mm.; weight, 50.50 carats. Cat. Nos. 171; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, blue. Cabochon cut; circular girdle. Size, 24 by 14 mm.; weight, 67.10 carats. Cat. Nos. 172; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) *Ceylon. Color, violet. Cabochon cut; circular girdle. Size, 22 by 13 mm.; weight, 49.12 carats. Cat. Nos. 173; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, light blue. Cabochon cut; circular girdle. Size, 24 by 8 mm.; weight, 38.79 carats. Cat. Nos. 174; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, sky blue. Cabochon cut; circular girdle. Size, 18 by 10 mm.; weight, 27.61 carats. Cat. Nos. 175; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, gray. Cabochon cut; circular girdle. Size, 14 by 10 mm.; weight, 14.93 carats. Cat. Nos. 176; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, bluish gray. Cabochon cut; circular girdle. Size, 8 by 5 mm.; weight, 2.30 carats. Cat. Nos. 177; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, milk white. Cabochon cut; circular girdle. Size, 11 by 6.5 mm.; weight, 6.23 carats. Cat. Nos. 178; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, sky blue. Cabochon cut; circular girdle. Size, 11 by 8 mm.; weight, 7.34 carats. Cat. Nos. 179; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, light blue. Cabochon cut; elliptical girdle. Size, 11 by 9 by 6 mm.; weight, 5.35 carats. Cat. Nos. 180; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, dark blue. Cabochon cut; circular girdle. Size, 9 by 6 mm.; weight, 4 carats. Cat. Nos. 181; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, lead gray. Cabochon cut; circular girdle. Size, 8 by 7 by 7 mm.; weight, 2.24 carats. Cat. Nos. 182; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, milk white. Cabochon cut; circular girdle. Size, 9 by 5 mm.; weight, 2.94 carats. Cat. Nos. 183; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, bluish gray. Cabochon cut; circular girdle. Size, 6 by 6 mm.; weight, 1.62 carats. Cat. Nos. 184; 82893. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, milky white. Cabochon cut; circular girdle. Size, 11 by 9.5 mm.; weight, 10 carats. Cat. Nos. 185; 50292.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, light violet. Cabochon cut; circular girdle. Size, 10 by 7 mm.; weight, 4.86 carats. Cat. Nos. 186; 50292.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, bluish gray. Cabochon cut; circular girdle. Size, 9 by 7 mm.; weight, 4.37 carats. Cat. Nos. 187; 50292.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, bluish white. Cabochon cut. Size, 9 by 9 by 6 mm.; weight, 4.74 carats. Cat. Nos. 188; 82892. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, bluish white. Cabochon cut. Size, 9 by 9 by 6 mm.; weight, 4.74 carats. Cat. Nos. 188; 82892. The Lea Collection.

- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, gray. Cabochon cut. Size, 5 by 5 by 3 mm.; weight, 0.97 carat. Cat. Nos. 189; 82892. The Lea Collection.
- Corundum*, var. sapphire. (Asteria.) Ceylon. Color, grayish blue. Cabochon cut. Size, 7 by 5 mm.; weight, 2.23 carats. Cat. Nos. 190; 84044. The Lea Collection.
- Crocidolite*. Griqua Land, South Africa. Color, brown. Cabochon cut; elliptical girdle. Size, 44 by 33 by 5 mm. Cat. Nos. b-944; 47583. Gift of Geo. F. Kunz.
- Crocidolite*. Griqua Land, South Africa. Color, brown. Cabochon cut; elliptical girdle. Size, 24 by 17 by 5 mm. Cat. Nos. b-945-946; 82806. The Lea Collection.
- Crocidolite*. Griqua Land, South Africa. Color, brown. Cabochon cut; elliptical girdle. Size, 12 by 6 by 4 mm. Cat. Nos. b-947; 47345.
- Crocidolite*. Griqua Land, South Africa. Twelve beads and other cut pieces. Cat. Nos. b-948-959; 84242.
- Crocidolite*. Griqua Land, South Africa. Color, brown. Size, 5.5 cm. Cat. Nos. b-960; 83530. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Crocidolite*. Griqua Land, Orange River, South Africa. Cut slab. Cat. Nos. b-961; 81433.
- Crocidolite*. Griqua Land, South Africa. Three slabs. Cat. Nos. b-962-964; 51733.
- Crocidolite*. Griqua Land, South Africa. Color, dark bluish black. A rectangular block. Cat. Nos. b-965; 84243.
- Crocidolite*. Griqua Land, South Africa. Cut into dish. Cat. Nos. b-966; 84243.
- Crocidolite*. Griqua Land, South Africa. Color, brown. A thin slab. Cat. Nos. b-967; 84243.
- Crocidolite*. Eland Island, South Africa. Color, dark gray. A slab. Cat. Nos. b-968; 45047.
- Cyanite*. Spruce Pine, Mitchell County, North Carolina. Color, blue. Step-brilliant cut; rectangular girdle. Size, 12 by 7 by 5 mm.; weight, 3.63 carats. Cat. Nos. a-564; 47860. Gift of D. A. Bowman.
- Cyanite*. Russia. Color, blue. Step-brilliant cut; rectangular girdle. Size, 7 by 4 by 2 mm.; weight, 0.56 carat. Cat. Nos. a-565; 84103.
- Demantoid*, see Garnet.
- Diamond*. Cabin Fork Creek, near Montpelier, Kentucky. Color, yellow. Natural faces of crystal polished. Size, 8 by 4 by 3 mm.; weight, 0.75 carats. Cat. Nos. 465; 83723. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Diamond*. South Africa. Colorless. Brilliant cut; rectangular girdle. Size, 6 by 5 by 4 mm.; weight, 0.90 carat. Cat. Nos. 466; 84045.
- Diamond*. South Africa. Colorless. Partly cut. Size, 5 by 5 by 5 mm.; weight, 1.63 carats. Cat. Nos. 467; 84046.
- Diamond*. South Africa. Six small, variously colored stones: 1 pink, 1 green, 1 brown, 1 milk white, 1 yellow, 1 yellow green. Brilliant cut. Total weight, 0.95 carat. Cat. Nos. 468-473; 82902. The Lea Collection.
- Diamond*. India. Colorless, very clear. Brilliant cut. 122 small stones. Total weight, 18.32 carats. Cat. Nos. 474-595; 47351. Gift of the Imaun of Muscat.
- Diopside*, see Pyroxene.
- Emerald*, see Beryl.
- Epidote*. Tyrol. Color, dark brown. Step-brilliant cut; rectangular girdle. Size, 14 by 8 by 3 mm.; weight, 3.82 carats. Cat. Nos. a-579; 84108.
- Epidote*. Tyrol. Color, dark green. Step-brilliant cut; rectangular girdle. Size, 8 by 4.5 by 2 mm.; weight, 0.72 carat. Cat. Nos. a-580; 50324.
- Essonite*, see Garnet.
- Euclase*. Brazil. Color, pale green. Step-brilliant cut; square girdle. Size, 7 by 7 by 4 mm.; weight, 1.03 carats. Cat. Nos. 832; 84070.

Flint, see Quartz.

Fluorite. Amelia Court-House, Virginia. Color, smoky brown. Step-brilliant cut; rectangular girdle. Size, 11 by 9 by 7 mm.; weight, 4.92 carats. Cat. Nos. a-607; 50330.

Fluorite. England. Two trays. Average size, 8.6 cm. diameter. Cat. Nos. b-896-897; 46964.

Fluorite. England. Color, dark purple. Cup on black marble base. Cat. Nos. b-898; 84235.

Fossil Coral, see Carbonate of lime.

Gadolinite. Near Burnett, Llano County, Texas. Color, black; opaque. Brilliant cut; circular girdle. Size 13 by 8 mm.; weight, 8.35 carats. Cat. Nos. a-587; 83743. The Lea Collection; gift of L. T. Chamberlain.

Garnet, var. almandite. Green Creek, Delaware County, Pennsylvania. Color, dark red. Cabochon cut; circular girdle. Size, 9 by 5 mm.; weight, 4.24 carats. Cat. Nos. a-25; 50310.

Garnet, var. almandite. Green Creek, Delaware County, Pennsylvania. Color, dark cherry red. Cabochon cut; elliptical girdle. Size, 12 by 8 by 4 mm.; weight, 3.56 carats. Cat. Nos. a-26; 50310.

Garnet, var. almandite. Macon County, North Carolina. Color, cherry red. Cabochon cut; pear shaped. Size, 14 by 10 by 6 mm.; weight, 5.53 carats. Cat. Nos. a-27; 82881. The Lea Collection.

Garnet, var. almandite. Macon County, North Carolina. Color, brownish red. Cabochon cut; elliptical girdle. Size, 8.5 by 7 by 4 mm.; weight, 2.10 carats. Cat. Nos. a-28; 82881. The Lea Collection.

Garnet, var. almandite. North Carolina. Color, light violet. Step-brilliant cut; rectangular girdle. Size, 7.5 by 6 by 4 mm.; weight, 1.54 carats. Cat. Nos. a-29; 50102.

Garnet, var. almandite. Fort Defiance, Arizona. Color, dark violet red. Brilliant cut; circular girdle. Size, 10 by 5 mm.; weight, 3.30 carats. Cat. Nos. a-30; 50109.

Garnet, var. almandite. Fort Defiance, Arizona. Color, dark violet red. Step-brilliant cut; rectangular girdle. Size, 8 by 7 by 4 mm.; weight, 1.63 carats. Cat. Nos. a-31; 50277.

Garnet, var. almandite. Fort Defiance, Arizona. Color, deep violet red. Brilliant cut; 2 circular, 1 rectangular girdle. Size, 6 by 6 by 4 mm.; weight, 2.62 carats. Cat. Nos. a-32-34; 84084.

Garnet, var. almandite. New Mexico. Color, violet red. Brilliant cut. Size, 8 by 8 by 4 to 5 by 5 by 4 mm. Seven gems; total weight, 6.70 carats. Cat. Nos. a-35-41; 82878.

Garnet, var. almandite. Bohemia. Color, violet red. Cabochon cut; elliptical girdle. Size, 24 by 13 by 7 mm.; weight, 22.66 carats. Cat. Nos. 968; 82877. The Lea Collection.

Garnet, var. almandite. Bohemia. Color, violet red. Cabochon cut; elliptical girdle. Size, 25 by 13 by 7 mm.; weight, 23.82 carats. Cat. Nos. 969; 82877. The Lea Collection.

Garnet, var. almandite. Bohemia. Color, violet red. Cabochon cut; pear-shaped girdle. Size, 23 by 13 by 7 mm.; 20.85 carats. Cat. Nos. 970; 82877. The Lea Collection.

Garnet, var. almandite. Bohemia. Color, violet red. Cabochon cut; elliptical girdle. Size, 18 by 12 by 6.5 mm.; weight, 14.92 carats. Cat. Nos. 971; 82877. The Lea Collection.

Garnet, var. almandite. Bohemia. Color, brownish red. Rose cut; elliptical girdle. Size, 15 by 13 by 6 mm.; weight 8.90 carats. Cat. Nos. 972; 82877. The Lea Collection.

- Garnet*, var. almandite. Bohemia. Color, violet red. Cabochon cut; elliptical girdle. Size, 15 by 12 by 6 mm.; weight, 10.53 carats. Cat. Nos. 973; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, brownish red. Rose cut; circular girdle. Size, 13 by 5 mm.; weight, 5.94 carats. Cat. Nos. 974; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, brownish red. Rose cut; square girdle. Size, 11 by 7 mm.; weight, 6.30 carats. Cat. Nos. 975; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, violet red. Cabochon cut; elliptical girdle. Size, 12 by 9 by 6 mm.; weight, 6.36 carats. Cat. Nos. 976; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, brownish red. Step-brilliant cut; pear-shaped girdle. Size, 13 by 10 by 4 mm.; weight, 3.26 carats. Cat. Nos. 977; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, violet red. Step-brilliant cut; oval girdle. Size, 10 by 7.5 by 4 mm.; weight, 2.67 carats. Cat. Nos. 978; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 11 by 8.5 by 4 mm.; weight, 2.55 carats. Cat. Nos. 979; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, brownish red. Step cut; square girdle. Size, 7 by 7 by 3 mm.; weight, 1.59 carats. Cat. Nos. 980; 82877. The Lea Collection.
- Garnet*, var. almandite. Bohemia. Color, violet red. Cabochon cut. Thirteen gems. Size, 12 by 10 by 3 to 6 by 5 by 2.5 mm.; total weight, 22.52 carats. Cat. Nos. 981-993; 82877. The Lea Collection.
- Garnet*, var. almandite. Tyrol. Color, brownish red. Cabochon cut; circular girdle. Size, 11 by 5 mm.; weight, 4.28 carats. Cat. Nos. 994; 84083.
- Garnet*, var. almandite. Tyrol. Color, brownish red. Rose cut; pear-shaped girdle. Size, 15 by 8 by 4 mm.; weight, 3.80 carats. Cat. Nos. 995; 84083.
- Garnet*, var. almandite. Tyrol. Color, brownish red. Rose cut. Four gems, average size, 6 by 5 by 3 mm.; total weight, 3.94 carats. Cat. Nos. 996-999; 84083.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 31 by 27 by 9 mm.; weight, 56.06 carats. Cat. Nos. 833; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 20 by 8 mm.; weight, 23.74 carats. Cat. Nos. 834; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; rectangular girdle. Size, 19 by 17 by 10 mm.; weight, 23.40 carats. Cat. Nos. 835; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 21 by 17 by 7 mm.; weight, 14.15 carats. Cat. Nos. 836; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 10 by 17 by 6 mm.; weight, 11.75 carats. Cat. Nos. 837; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 18 by 17 by 7 mm.; weight, 19.34 carats. Cat. Nos. 838; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 18 by 15 by 6 mm.; weight, 13.29 carats. Cat. Nos. 839; 50316.
- Garnet*, var. almandite. India. Color, violet red. Brilliant cut; elliptical girdle. Size, 15 by 13 by 7 mm.; weight, 12.50 carats. Cat. Nos. 840; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 15 by 7 mm.; weight, 14.03 carats. Cat. Nos. 841; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 16 by 14 by 7 mm.; weight, 10.69 carats. Cat. Nos. 842; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 15 by 7 mm.; weight, 8.94 carats. Cat. Nos. 843; 50316.

- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 15.5 by 14 by 5 mm.; weight, 9.63 carats. Cat. Nos. 844; 50316.
- Garnet*, var. almandite. India. Color, violet red. Rose cut. Size, 15 by 14 by 7 mm.; weight 12.14 carats. Cat. Nos. 845; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; heart girdle. Size, 17 by 12 by 5 mm.; weight, 8.92 carats. Cat. Nos. 846; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 15 by 13 by 6 mm.; weight, 9.84 carats. Cat. Nos. 847; 50316.
- Garnet*, var. almandite. India. Color, violet red. Rose cut; oval girdle. Size, 14 by 13 by 5 mm.; weight, 9.47 carats. Cat. Nos. 848; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 13 by 4.5 mm.; weight, 5.38 carats. Cat. Nos. 849; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 12 by 4 mm.; weight, 4.84 carats. Cat. Nos. 850; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 12 by 4 mm.; weight, 4.39 carats. Cat. Nos. 851; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 11 by 3 mm.; weight, 3.13 carats. Cat. Nos. 852; 50316.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 14 by 13 by 6 mm.; weight, 8.82 carats. Cat. Nos. 853; 50313.
- Garnet*, var. almandite. India. Color, brownish red. Rose; heart-shaped girdle. Size, 16 by 13 by 5 mm.; weight, 9.14 carats. Cat. Nos. 854; 50313.
- Garnet*, var. almandite. India. Color, brownish red. Brilliant cut; rectangular girdle. Size, 13 by 12 by 8 mm.; weight, 10.77 carats. Cat. Nos. 855; 50313.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 11 by 5.5 mm.; weight, 6.30 carats. Cat. Nos. 856; 50313.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 11 by 9 by 3 mm.; weight, 2.90 carats. Cat. Nos. 857; 50313.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 12 by 9 by 3.5 mm.; weight, 3.11 carats. Cat. Nos. 858; 50313.
- Garnet*, var. almandite. India. Color, deep red. Step cut; rectangular girdle. Size, 13 by 10 by 5 mm.; weight, 5.22 carats. Cat. Nos. 859; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 12 by 7 by 4 mm.; weight, 2.92 carats. Cat. Nos. 860; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 11 by 8.5 by 4 mm.; weight, 2.57 carats. Cat. Nos. 861; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; square girdle. Size, 9 by 9 by 4 mm.; weight, 2.66 carats. Cat. Nos. 862; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; elliptical girdle. Size, 10.5 by 9 by 4.5 mm. Cat. Nos. 863; 50312.
- Garnet*, var. almandite. India. Color, violet red. Brilliant cut; rectangular girdle. Size, 11 by 8 by 3 mm.; weight, 2.25 carats. Cat. Nos. 864; 50312.
- Garnet*, var. almandite. India. Color, brownish red. Step cut; rectangular girdle. Size, 9 by 8 by 4 mm.; weight, 3 carats. Cat. Nos. 865; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 10 by 8 by 3.5 mm.; weight, 2.41 carats. Cat. Nos. 866; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 10 by 7 by 4 mm.; weight, 2.40 carats. Cat. Nos. 867; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 10 by 8 by 4 mm.; weight, 2.02 carats. Cat. Nos. 868; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 9 by 7.5 by 4 mm.; weight, 1.65 carats. Cat. Nos. 869; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 8 by 6.5 by 3 mm.; weight, 1.42 carats. Cat. Nos. 870; 50312.

- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 7.5 by 6.5 by 2.5 mm.; weight, 1.24 carats. Cat. Nos. 871; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 8 by 7 by 3 mm.; weight 1.30 carats. Cat. Nos. 872; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 8 by 7 by 3 mm.; weight, 1.20 carats. Cat. Nos. 873; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step cut; rectangular girdle. Size, 8 by 6 by 3 mm.; weight, 1.18 carats. Cat. Nos. 874; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step-brilliant cut; rectangular girdle. Size, 8 by 6 by 3 mm.; weight 1.33 carats. Cat. Nos. 875; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step-brilliant cut; rectangular girdle. Size, 8 by 6 by 3 mm.; weight, 1.21 carats. Cat. Nos. 876; 50312.
- Garnet*, var. almandite. India. Color, violet red. Step-brilliant cut; rectangular girdle. Size, 7.5 by 6 by 4 mm.; weight, 1.16 carats. Cat. Nos. 877; 50312.
- Garnet*, var. almandite. India. Color, violet red. Rose cut; elliptical girdle. Size, 18 by 15 by 5 mm.; weight, 6.66 carats. Cat. Nos. 878; 48486.
- Garnet*, var. almandite. India. Color, brownish red. Half-rose cut; pear-shaped girdle. Size, 21 by 11 by 5 mm.; weight, 8.10 carats. Cat. Nos. 879; 48486.
- Garnet*, var. almandite. India. Color, brownish red. Half-rose cut; pear-shaped girdle. Size, 20 by 10 by 5 mm.; weight, 6.94 carats. Cat. Nos. 880; 48486.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; elliptical girdle. Size, 14 by 11 by 4 mm.; weight, 4.46 carats. Cat. Nos. 881; 48486.
- Garnet*, var. almandite. India. Color, brownish red. Rose cut; circular girdle. Size, 13 by 5 mm.; weight, 4.65 carats. Cat. Nos. 882; 48486.
- Garnet*, var. almandite. India. Color, violet red. Step-brilliant cut; pear-shaped girdles. Thirty-four gems, average size 10 by 8 by 2.5 mm.; total weight, 40 carats. Cat. Nos. 883-916; 50311.
- Garnet*, var. almandite. Madras, India. Color, violet red. Cabochon cut; elliptical girdle. Size, 19 by 11 by 9 mm.; weight, 20.04 carats. Cat. Nos. 917; 50318.
- Garnet*, var. almandite. Madras, India. Color, violet red. Cabochon cut; elliptical girdle. Size, 23 by 9 by 5.5 mm.; weight, 10.75 carats. Cat. Nos. 918; 50318.
- Garnet*, var. almandite. Ceylon. Color, violet red. Cabochon cut. Size, 16 by 10 by 7 mm.; weight, 9.78 carats. Cat. Nos. 919; 51181.
- Garnet*, var. almandite. Ceylon. Color, violet red. Cabochon cut. Size, 17 by 9 by 6 mm.; weight, 10.15 carats. Cat. Nos. 920; 51181.
- Garnet*, var. almandite. Ceylon. Color, violet red. Cabochon cut; oval girdle. Size, 15 by 9 by 6 mm.; weight, 8.74 carats. Cat. Nos. 921; 51181.
- Garnet*, var. almandite. Ceylon. Color, violet red. Cabochon cut. Size, 16.5 by 8 by 6 mm.; weight, 7.81 carats. Cat. Nos. 922; 51181.
- Garnet*, var. almandite. Ceylon. Color, violet red. Twelve stones variously cut. Sizes, 9 by 7 by 2 to 5 by 5 by 2.5 mm.; total weight, 11.23 carats. Cat. Nos. 923-934; 82882.
- Garnet*, var. almandite. China. Color, deep red. Cabochon cut; elliptical girdle. Size, 23 by 15 by 8 mm.; weight, 18.94 carats. Cat. Nos. a-1; 46008. Gift of Dr. J. L. Holmes.
- Garnet*, var. almandite. Japan. Color, violet red. Rose and step-brilliant cut. Five gems; average size, 10 by 5 by 3 mm.; total weight, 9.20 carats. Cat. Nos. a-2-6; 50317.
- Garnet*, var. almandite. Japan. Color, violet red. Eighteen variously cut gems; average size, 8 by 6 by 4 mm.; total weight, 28.61 carats. Cat. Nos. a-7-24; 82880. The Lea Collection.
- Garnet*, var. almandite. Color, violet red. Cabochon cut; elliptical girdle. Size, 18 by 13 by 6 mm.; weight, 12.92 carats. Cat. Nos. 935; 82876. The Lea Collection.

- Garnet*, var. almandite. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 20 by 8 by 5 mm.; weight, 5.83 carats. Cat. Nos. 936; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, violet red. Brilliant cut; elliptical girdle. Size, 17 by 7 by 3.5 mm.; weight, 2.54 carats. Cat. Nos. 937; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, brownish red. Cabochon cut; elliptical girdle. Size, 12 by 10 by 3 mm.; weight, 4.36 carats. Cat. Nos. 938; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, brownish red. Step cut; rectangular girdle. Size, 11 by 8 by 2.5 mm.; weight, 2.03 carats. Cat. Nos. 939; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 9 by 7 by 3.3 mm.; weight, 1.57 carats. Cat. Nos. 940; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 9 by 7 by 3.5 mm.; weight, 1.74 carats. Cat. Nos. 941; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 8 by 6.5 by 3 mm.; weight, 1.22 carats. Cat. Nos. 942; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, brownish red. Step-brilliant cut; rectangular girdle. Size, 6.5 by 6 by 3.5 mm.; weight, 1.15 carats. Cat. Nos. 943; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, violet red. Twenty-one gems variously cut. Various sizes; total weight, 15.07 carats. Cat. Nos. 944-964; 82876. The Lea Collection.
- Garnet*, var. almandite. Color, violet red. Step-brilliant cut; elliptical girdle. Size, 12 by 8 by 5 mm.; weight, 3.58 carats. Cat. Nos. 965; 50273.
- Garnet*, var. almandite. Color, violet red. Cabochon cut; circular girdle. Size, 8 by 3 mm.; weight, 1.64 carats. Cat. Nos. 966; 50273.
- Garnet*, var. almandite. Color, violet red. Cabochon cut; circular girdle. Size, 7 by 2 mm.; weight, 1.16 carats. Cat. Nos. 967; 50273.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 10 by 5 mm.; weight, 3 carats. Cat. Nos. a-100; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 8 by 5 mm.; weight, 2.04 carats. Cat. Nos. a-101; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, blood red. Brilliant cut; circular girdle. Size, 7.5 by 4 mm.; weight, 1.41 carats. Cat. Nos. a-102; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 6.5 by 4 mm.; weight, 1.30 carats. Cat. Nos. a-103; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 7 by 4 mm.; weight, 1.31 carats. Cat. Nos. a-104; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, blood red. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.44 carats. Cat. Nos. a-105; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, blood red. Brilliant cut; circular girdle. Size, 7 by 4.5 mm.; weight, 1.40 carats. Cat. Nos. a-106; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.

- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 7 by 4 mm.; weight, 1.06 carats. Cat. Nos. a-107; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, brownish red. Brilliant cut; circular girdle. Size, 6.5 by 4 mm.; weight, 1.02 carats. Cat. Nos. a-108; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 7 by 4 mm.; weight, 1.04 carats. Cat. Nos. a-109; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 7 by 4 mm.; weight, 1.03 carats. Cat. Nos. a-110; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 7 by 6 by 4 mm.; weight, 0.96 carat. Cat. Nos. a-111; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.90 carat. Cat. Nos. a-112; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, violet red. Brilliant cut; circular girdle. Size, 6 by 3.5 mm.; weight, 0.81 carat. Cat. Nos. a-113; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, blood red. Brilliant cut; circular girdle. Size, 6 by 3.5 mm.; weight, 0.70 carat. Cat. Nos. a-114; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, deep violet red. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.72 carat. Cat. Nos. a-115; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Macon County, North Carolina. Color, brownish red. Brilliant cut; circular girdle. Size, 5 by 3.5 mm.; weight, 0.55 carat. Cat. Nos. a-116; 83733. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. pyrope. Bilin, Bohemia. Color, blood red. Half rose cut. 51 small gems; average size, 4 by 4 by 4 mm.; total weight, 12.26 carats. Cat. Nos. a-42-92; 50315.
- Garnet*, var. pyrope. Bohemia. Necklace of blood-red garnets; 103 rose cut and 2 cabochon cut. Cat. Nos. a-93; 83534. The Lea Collection.
- Garnet*, var. pyrope. Cape Colony, Africa. Six gems. Color, deep red. Brilliant cut; circular girdle. Average size, 5 by 3 mm.; total weight, 2.29 carats. Cat. Nos. a-94-99; 84085.
- Garnet*, var. rhodolite. North Carolina. Color, between almandine and blood red. Step-brilliant cut. Two gems; total weight, 3.05 carats. Cat. Nos. c-460; 84479. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Brilliant cut; circular girdle. Size, 21 by 13 mm.; weight, 39.13 carats. - Cat. Nos. a-147; 51985.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Brilliant cut; circular girdle. Size, 11.5 by 8 mm.; weight, 7.26 carats. Cat. Nos. a-148; 51985.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Brilliant cut; circular girdle. Size, 8 by 5.5 mm.; weight, 2.38 carats. Cat. Nos. a-149; 51985.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Brilliant cut; circular girdle. Size, 8 by 6 mm.; weight, 2.60 carats. Cat. Nos. a-150; 51985.

- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 1.10 carats. Cat. Nos. a-151; 51985.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Brilliant cut; circular girdle. Size, 14 by 8 mm.; weight, 11.51 carats. Cat. Nos. a-152; 50266.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Step-brilliant cut; rectangular girdle. Size, 12 by 10 by 7 mm.; weight, 8.89 carats. Cat. Nos. a-153; 51572. Gift of Ira R. Allen.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Step-brilliant cut; rectangular girdle. Size, 12 by 11 by 8 mm.; weight, 9.32 carats. Cat. Nos. a-154; 51572. Gift of Ira R. Allen.
- Garnet*, var. spessartite. Amelia Court-House, Virginia. Color, bright cinnamon. Cabochon cut; circular girdle. Size, 11 by 5.5 mm.; weight, 5.65 carats. Cat. Nos. a-155; 83348. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Garnet*, var. essonite. Ceylon. Color, light brownish red or cinnamon brown. Step-brilliant cut; elliptical girdle. Size, 14 by 11 by 6 mm.; weight, 5.54 carats. Cat. Nos. a-117; 50319.
- Garnet*, var. essonite. Ceylon. Color, cinnamon brown. Step-brilliant cut; square girdle. Size, 12 by 11 by 5 mm.; weight, 5.57 carats. Cat. Nos. a-118; 50319.
- Garnet*, var. essonite. Ceylon. Color, cinnamon brown. Step-brilliant cut; elliptical girdle. Size, 30 by 24 by 12 mm.; weight, 62.60 carats. Cat. Nos. a-119; 82884. The Lea Collection.
- Garnet*, var. essonite. Ceylon. Color, cinnamon. Brilliant cut; rectangular girdle. Size, 11 by 10 by 5.5 mm.; weight, 3.80 carats. Cat. Nos. a-120; 82884. The Lea Collection.
- Garnet*, var. essonite. Ceylon. Color, cinnamon brown. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 5 mm.; weight, 3.62 carats. Cat. Nos. a-121; 82884. The Lea Collection.
- Garnet*, var. essonite. Ceylon. Color, cinnamon. Step-brilliant cut; square girdle. Size, 6 by 6 by 3 mm.; weight, 0.82 carat. Cat. Nos. a-122; 82844. The Lea Collection.
- Garnet*, var. essonite. Ceylon. Color, cinnamon. Brilliant cut; elliptical girdle. Size, 7 by 6 by 3 mm.; weight, 0.80 carat. Cat. Nos. a-123; 82884. The Lea Collection.
- Garnet*, var. essonite. Ceylon. Color, cinnamon. Step-brilliant cut; elliptical girdle. Size, 6.5 by 5 by 3 mm.; weight, 0.80 carat. Cat. Nos. a-124; 82844. The Lea Collection.
- Garnet*, var. essonite. Ceylon. Color, cinnamon. Step-brilliant cut. Eleven small gems; total weight, 3.53 carats. Cat. Nos. a-125-135; 82844. The Lea Collection.
- Garnet*, var. essonite. Locality unknown. Color, cinnamon. Step-brilliant cut; elliptical girdle. Size, 15 by 10 by 5 mm.; weight, 4.90 carats. Cat. Nos. a-136; 84086.
- Garnet*, var. grossularite. Hull, Canada. Color, pale yellow. Brilliant cut; square girdle. Size, 7 by 7 by 4 mm.; weight, 1.21 carats. Cat. Nos. a-137; 50314.
- Garnet*, var. grossularite. Hull, Canada. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 3 mm.; weight, 0.59 carat. Cat. Nos. a-138; 50314.
- Garnet*, var. grossularite. Xalostoc, Morelos, Mexico. Color, deep rose. Step-brilliant cut; rectangular girdle. Size, 7 by 6 by 4 mm.; weight, 1.17 carats. Cat. Nos. a-139; 50108.
- Garnet*, var. grossularite. Xalostoc, Morelos, Mexico. Color, deep rose. Step-brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.86 carat. Cat. Nos. a-140; 50108.

- Garnet*, var. demantoid. Nizhni-Tagilsk, Urals. Color, grass green. Brilliant cut; square girdle. Size, 9 by 8.5 by 4 mm.; weight, 2.20 carats. Cat. Nos. a-141; 50309.
- Garnet*, var. demantoid. Nizhni-Tagilsk, Urals. Color, brownish green. Brilliant cut; circular girdle. Size, 8.5 by 6 mm.; weight, 3.03 carats. Cat. Nos. a-142; 50309.
- Garnet*, var. demantoid. Nizhni-Tagilsk, Urals. Color, grass green. Step-brilliant cut; rectangular girdle. Size, 7 by 5.5 by 3.5 mm.; weight, 0.99 carat. Cat. Nos. a-143; 84087.
- Garnet*, var. demantoid. Nizhni-Tagilsk, Urals. Color, grass green. Brilliant cut; square girdle. Size, 6 by 6 by 4 mm.; weight, 0.98 carats. Cat. Nos. a-144; 84087.
- Garnet*, var. demantoid. Nizhni-Tagilsk, Urals. Color, grass green. Brilliant cut; circular girdle. Size, 6.5 by 4 mm.; weight, 1.03 carats. Cat. Nos. a-145; 84087.
- Garnet*, var. demantoid. Nizhni-Tagilsk, Urals. Color, light green. Brilliant cut; square girdle. Size, 5 by 5 by 2.5 mm.; weight, 0.33 carats. Cat. Nos. a-146; 84087.
- Garnet rock*. Xalostoc, Morelos, Mexico. Slab of garnet, with vesuvianite in calcite. Cat. Nos. b-853; 51732.
- Gold*. California. Gold nugget mounted as a breastpin. Cat. Nos. a-608; 83529. The Lea Collection.
- Graphic granite*. Hitteroe, Norway. Tabular piece of pegmatite mounted in silver as breastpin. Cabochon cut. Cat. Nos. a-609; 47392. Gift of Mrs. Spencer F. Baird.
- Graphic granite*. Siberia. Ash tray. Cat. Nos. b-836; 50395.
- Grossularite*, see Garnet.
- Gypsum*, var. satinspar. Puebla, Mexico. Color, white. Large rectangular block. Cat. Nos. b-873; 47662. Gift of Mexican Geographical Expl. Commission.
- Gypsum*, var. satinspar. Bridgeford, England. Color, white. Two necklaces, each containing 63 beads. Cat. Nos. a-611-612; 84167.
- Gypsum*, var. satinspar. Bridgeford, England. Egg-shaped ornament of satinspar. Size, 9.5 cm. long. Cat. Nos. b-874; 84230.
- Gypsum*, var. satinspar. England. Color, white. Cabochon cut; elliptical girdle. Size, 29 by 18 by 12 mm. Cat. Nos. a-610; 51444.
- Hematite*. England. Color, black. Tabular cut; rectangular girdle. Size, 18 by 15 by 3 mm. Cat. Nos. a-614-615; 48475.
- Hematite*. England. Color, black. Tabular cut; rectangular girdle. Size, 16 by 11 by 3 mm. Cat. Nos. a-616; 84168.
- Hematite*. England. Color, black. Necklace of 49 beads, largest 12 mm., smallest 8 mm. diam. Cat. Nos. a-617; 50254.
- Huutilite* in calcite. Silver Islet, Lake Superior. Rectangular disks. Size, 20 by 15 by 4 mm. Cat. Nos. a-623-624; 47845.
- Hypersthene*. Fredericksbarn, Norway. Color, blackish gray. Slab. Cat. Nos. b-852; 51940.
- Hypersthene*. Norway. Color, dark bronze. Cabochon cut; elliptical girdle. Size, 22 by 16 by 5 mm. Cat. Nos. c-422.
- Iolite*. Bodenmais, Bavaria. Color, blue; dichroic. Table cut. Size, 11 by 9 by 6 mm.; weight, 7.27 carats. Cat. Nos. a-586; 84111.
- Iolite*. Ceylon. Color, light blue. Step-brilliant cut; rectangular girdle. Size, 14 by 12 by 4 mm.; weight, 6.60 carats. Cat. Nos. a-584; 82819. The Lea Collection.
- Iolite*. Ceylon. Color, blue. Step cut; rectangular girdle. Size, 9 by 7.5 by 3 mm.; weight, 1.34 carats. Cat. Nos. a-585; 84110.
- Jade*. Alaska. Color, olive green. Two cabrets, 9 and 5 cm. long, respectively. Cat. Nos. a-680-681; 45937.

- Jade.* China. Color, greenish. Disk with flower. Size, $5\frac{1}{2}$ cm. diameter. Cat. Nos. a-667; 51448.
- Jade.* China. Color, greenish. Vase. Size, $22\frac{1}{2}$ cm. long. Cat. Nos. a-668; 45019.
- Jade.* China. Color, greenish gray. A carved ornament. Size, $5\frac{1}{2}$ cm. in diameter. Cat. Nos. a-669; 84176.
- Jade.* China. Color, greenish gray. A carved ornament. Size, 10 by 2 cm. Cat. Nos. a-670; 84177.
- Jade.* China. Color, greenish gray. A carved ornament. Cat. Nos. a-671; 84178.
- Jade.* China. Color, light greenish. A carved ornament. Cat. Nos. a-672; 84179.
- Jade.* China. Color, light green. Carved inkstand on base of teak. Cat. Nos. b-871; 84228.
- Jade.* China. Small carved vase on base of teak. Cat. Nos. b-872; 84229.
- Jade.* Japan. Color, light green. Ring. Size, 7 cm. diameter outside; 5.2 inside. Cat. Nos. a-673; 84180.
- Jade.* New Zealand. Color, dark green. Three cameos; rectangular. Size, 15 by 12 mm. Cat. Nos. a-674-676; 51129.
- Jade.* New Zealand. Color, green. Slab. Cat. Nos. b-870; 50392.
- Jade.* New Zealand. Color, dark green. A watch charm, 28 by 19 by 6 mm., and two pendants, 6.4 and 5.5 cm. long. Cat. Nos. a-677-679; 50392.
- Jasper*, see Quartz.
- Jet.* Whitby, England. Color, black. Slab. Cat. Nos. b-856; 84225.
- Jet.* Whitby, England. Color, black. Cat. Nos. b-857; 50391.
- Labradorite.* Labrador. Polished slab. Cat. Nos. b-843-844; 81285.
- Labradorite.* Labrador. Two slabs; polished. Cat. Nos. b-845-846; 45011.
- Labradorite.* Labrador. Medallion. Size, 10.5 by 7.5 cm. Cat. Nos. b-847; 47852.
- Labradorite.* Labrador. Polished slab. Cat. Nos. b-848; 51962.
- Labradorite.* Labrador. Pyramidal-shaped ornament, 10 cm. high. Cat. Nos. b-849; 84223.
- Labradorite.* Labrador. Color, dark gray. Two knob-shaped pieces. Cat. Nos. c-253-254; 82852. The Lea Collection.
- Labradorite.* Labrador. Color, dark gray. Cabochon cut; circular girdle. Size, 20 by 6 mm. Cat. Nos. c-255; 82852. The Lea Collection.
- Labradorite.* Labrador. Color, dark gray. Circular disk. Size, 22 by 4 mm. Cat. Nos. c-256; 46830.
- Labradorite.* Labrador. Color, dark gray. Cabochon, intaglio; rectangular girdle. Size, 25 by 17 by 6 mm. Cat. Nos. c-257; 50071.
- Labradorite.* Labrador. Color, dark gray. Cabochon cut; rectangular girdle. Size, 24 by 15 by 5 mm. Cat. Nos. c-258; 50256.
- Labradorite.* Labrador. Color, dark gray. Cabochon cut; elliptical girdle. Size, 28 by 13 by 6 mm. Cat. Nos. c-259; 84164.
- Labradorite.* Labrador. Color, dark gray. A watch charm. Size, 12 mm. diameter. Cat. Nos. c-260; 84164.
- Labradorite.* Labrador. Color, grayish brown. Double Cabochon cut. Cat. Nos. c-261; 14346.
- Lapis lazuli.* Andes Mountains, Chile. Color, blue. Slab. Cat. Nos. b-875; 84231.
- Lapis lazuli.* Andes Mountains, Chile. Color, blue. Slab. Cat. Nos. b-878; 44474.
- Lapis lazuli.* Persia. Color, prussian blue. Cabochon cut; elliptical girdle. Size, 30 by 27 by 6 mm. Cat. Nos. a-622; 50432.
- Lapis lazuli.* Persia. Color, dark blue. Slab. Cat. Nos. b-877; 50432.
- Lapis lazuli.* Color, blue. Size, 8 cm. Cat. Nos. b-876; 84232.
- Lepidolite.* Rosena, Moravia. Color, purplish red. An ash tray. Size, 9 by 4.7 by 1.3 cm. Cat. Nos. b-842; 51446.
- Limestone*, see Carbonate of lime.
- Malachite.* Morenci, Arizona. Color, green. Cat. Nos. b-883; 50268.

- Malachite*. Morenci, Arizona. Small geode. Cat. Nos. b-884; 50113.
- Malachite*. Morenci, Arizona. Color, green. Cube, with truncated edges. Size, 5 cm. diameter. Cat. Nos. b-885; 50267.
- Malachite*. Morenci, Arizona. Color, dark green. Slab. Cat. Nos. b-886; 82488.
- Malachite*. Morenci, Arizona. Polished to show banded structure. Cat. Nos. b-887; 50112.
- Malachite*. Morenci, Arizona. Color, blue and green. Polished slabs. Cat. Nos. b-888-890; 84234.
- Malachite*. Siberia. Color, bright green, banded. Tabular cut; elliptical girdle. Size, 40 by 32 by 4 mm. Cat. Nos. a-618; 51139.
- Malachite*. Siberia. Color, dark green, with light green concentric rings. Size, 31 by 4 mm. Cat. Nos. a-619; 51139.
- Malachite*. Siberia. Color, bright green, with brown bands. Cabochon cut; circular girdle. Size, 34 by 6 mm. Cat. Nos. a-620; 82904.
- Malachite*. Siberia. Color, dark green, banded. Cabochon cut; elliptical girdle. Size, 33 by 26 by 5 mm. Cat. Nos. a-621; 84169.
- Malachite*. Ural Mountains, Siberia. Color, deep green. Large Botryoidal mass. Cat. Nos. b-891; 45088.
- Malachite*. Siberia. Color, green. Polished piece. Cat. Nos. b-892; 45032.
- Malachite*. Ural Mountains, Siberia. Color, green. Composite slab mounted on slate. Cat. Nos. b-893; 51483.
- Malachite*. Australia. Color, green. Polished piece. Cat. Nos. b-894; 81284.
- Malachite*. Bembe, West Africa. Color, green. Polished slab. Cat. Nos. b-895; 49239. Gift of Mrs. Mary I. Stroud.
- Marble*, see Carbonate of lime.
- Microcline*, var. amazonstone. Media, Delaware County, Pennsylvania. Color, green, with flesh bands. Elliptical disk. Size, 17 by 11 by 3 mm. Cat. Nos. a-688; 48921. Gift of Dr. Robert H. Lamborn.
- Microcline*, var. amazonstone. Mineral Hill, Delaware County, Pennsylvania. Color, green, with flesh-colored veins. Cabochon cut; elliptical girdle. Size, 45 by 34 by 12 mm. Cat. Nos. a-698; 49718. The Lea Collection.
- Microcline*, var. amazonstone. Amelia Court-House, Virginia. Color, green. Cabochon cut; elliptical girdle. Size, 48 by 34 by 9 mm. Cat. Nos. a-697; 48721.
- Microcline*, var. amazonstone. Amelia Court-House, Virginia. Color, light green. Small tray. Cat. Nos. b-835; 84221.
- Microcline*, var. amazonstone. Amelia Court-House, Virginia. Color, green. Two balls. Size, 40 mm. and 37 mm. diameter. Cat. Nos. c-451-452; 84261. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Microcline*, var. amazonstone. Pike's Peak, Colorado. Color, green. Cabochon cut; elliptical girdle. Size, 28 by 22 by 8 mm. Cat. Nos. a-696; 50383.
- Microcline*, var. amazonstone. Siberia. Color, green. Cabochon cut; elliptical girdle. Three gems. Sizes, 17 by 13 by 4 mm., 22 by 17 by 4 mm., 15 by 11 by 5 mm. Cat. Nos. a-700-702; 50382.
- Microcline*, var. amazonstone. Siberia. Color, green. Cabochon cut; elliptical girdle. Size, 18 by 13 by 3 mm. Cat. Nos. a-703; 82861. The Lea Collection.
- Microcline*, var. amazonstone. Siberia. Color, green. Rectangular slab. Size, 72 by 40 by 4 mm. Cat. Nos. a-704; 51445. Gift of C. S. Bement.
- Microcline*, var. amazonstone. Color, green. Cabochon cut; elliptical girdle. Size, 33 by 24 by 10 mm. Cat. Nos. a-705; 45118.
- Moldavite*, see Obsidian.
- Moonstone*, see Albite or Oligoclase.
- Mosaic*. Ekaterinburg, Siberia. Jewel box made of rhodonite, aventurine quartz, agate, and jasper. Cat. Nos. b-837; 51397.
- Mosaic*. Russia. Mosaic slab of the Seventeenth Century, made of agate and lapis lazuli mounted on slate. Cat. Nos. b-838; 51396.

Moss agate, see Quartz.

Obsidian. Yellowstone National Park. Color, brown, with black blotches. Two pieces of equal size. Cabochon cut; elliptical girdle. Size, 26 by 19 by 6 mm. Cat. Nos. a-682-683; 46825. The U. S. Geological Survey.

Obsidian. Yellowstone Park. Color, brown. Cabochon cut; circular girdle. Two pieces, each 25 mm. diam., 10 mm. thick. Cat. Nos. a-684-685; 46825. The U. S. Geological Survey.

Obsidian. Yellowstone National Park. Color, brown, with black blotches. Cabochon cut; rectangular girdle. Two pieces, each 22 by 18 by 10 mm. Cat. Nos. a-686-687; 46825. The U. S. Geological Survey.

Obsidian. Yellowstone National Park. Color, dark brownish black. Cabochon cut; rectangular girdle. Two pieces; respective sizes, 28 by 21 by 7 mm., 35 by 19 by 6 mm. Cat. Nos. a-688-689; 46825. The U. S. Geological Survey.

Obsidian. Yellowstone National Park. Color, black. Elliptical disks. Two pieces, each 21 by 17 by 3 mm. Cat. Nos. a-690-691; 46825. The U. S. Geological Survey.

Obsidian. Yellowstone National Park, Wyoming. Color, smoky black. Cabochon cut; elliptical girdle. Cat. Nos. a-692; 48925. Gift of Dr. Robert H. Lamborn.

Obsidian, var. moldavite. Moravia. Color, dark green. Step-brilliant cut; elliptical girdle. Size, 24 by 17 by 11 mm.; weight, 22.55 carats. Cat. Nos. a-693; 45119.

Obsidian, var. moldavite. Moravia. Color, dark green. Brilliant cut; rectangular girdle. Size, 13 by 10 by 7 mm; weight, 4.83 carats. Cat. Nos. a-694; 45119.

Oligoclase. Hawk mica mine, near Bakersville, Mitchell County, North Carolina. Colorless. Step-brilliant cut; rectangular girdle. Size, 14 by 10 by 6 mm.; weight, 5.90 carats. Cat. Nos. c-279; 50103.

Oligoclase. Hawk mine, near Bakersville, Mitchell County, North Carolina. Colorless. Brilliant cut; square girdle. Size, 8.5 by 6 mm.; weight, 2.35 carats. Cat. Nos. c-230; 48470.

Oligoclase. Norway. Color, dark gray, with change of color. Cabochon cut; 2 elliptical, 1 square girdle. Sizes, 20 by 12 by 7 mm., 14 by 10 by 4.5 mm., 11 by 4 mm. Cat. Nos. a-281-283; 84183.

Oligoclase, var. moonstone. Delaware County, Pennsylvania. Color, light gray. Diamond shaped. Size, 54 by 30 by 17 mm. Cat. Nos. c-294; 84185. Gift of Charles Wilkes, U. S. N.

Oligoclase, var. moonstone. Colorless. Cabochon cut; rectangular girdle. Size, 22 by 10 by 7 mm. Cat. Nos. c-295; 50276.

Oligoclase, var. sunstone. Arendal, Norway. Color, brown. Cabochon cut; circular girdle. Two pieces. Size, 23 by 5.5 mm. Cat. Nos. c-269-270; 50332.

Oligoclase, var. sunstone. Krageroe, Norway. Color, reddish. Size, 8 by 5 by 2 cm. Cat. Nos. b-862; 84227.

Oligoclase, var. sunstone. Norway. Color, reddish brown. Cabochon cut; elliptical girdle. Five stones. Average size, 14 by 11 by 5.5 mm. Cat. Nos. c-271-275; 82850. The Lea Collection.

Oligoclase, var. sunstone. Norway. Color, reddish brown. Double cabochon cut; elliptical girdle. Size, 14 by 11 by 5 mm. Cat. Nos. c-276; 83528. Lea Collection. Gift of Dr. L. T. Chamberlain.

Oligoclase, var. sunstone. Norway. Color, reddish brown. Cabochon cut; rectangular girdle. Size, 32 by 9 by 3 mm. Cat. Nos. c-277; 84182.

Oligoclase, var. moonstone. Ceylon (?). Colorless. Cabochon cut; elliptical girdles. Seven gems. Size of largest, 21.5 by 9 by 4 mm.; average of remainder, 7 by 4 by 3.5 mm. Cat. Nos. c-410-416; 84186.

Oligoclase, var. moonstone. Floitenthal, Tyrol. Colorless. Cabochon cut; elliptical girdle. Size, 22 by 14 by 7 mm. Cat. Nos. c-417; 84187.

- Oligoclase*, var. sunstone. Media, Delaware County, Pennsylvania. Color, reddish gray. Cabochon cut; elliptical girdle. Size, 43 by 32 by 6 mm. Cat. Nos. c-267; 50281.
- Oligoclase*, var. sunstone. Media, Delaware County, Pennsylvania. Color, light gray. Cabochon cut; elliptical girdle. Size, 27 by 19 by 5.5 mm. Cat. Nos. c-268; 50281.
- Oligoclase*, var. sunstone. Media, Delaware County, Pennsylvania. Color, streaked white and brown. Rectangular disk. Size, 19 by 11 by 3 mm. Cat. Nos. c-278; 48933. Gift of Dr. R. H. Lamborn.
- Oligoclase*, var. moonstone. Delaware County, Pennsylvania. Colorless. Cabochon cut. Two gems. Size, 6.5 by 4.5 by 2.5 mm. and 4 by 2 mm. Cat. Nos. c-296-297; 82848. The Lea Collection.
- Oligoclase*, var. moonstone. Hanover County, Virginia. Colorless. Cabochon cut; elliptical girdle. Size, 30 by 15 by 7.5 mm. Cat. Nos. c-284; 47316. Gift of C. S. Bement.
- Oligoclase*, var. moonstone. Ceylon. Colorless. Cabochon cut; elliptical and circular girdles. Ninety-one small stones. Cat. Nos. c-298-388; 50328.
- Oligoclase*, var. moonstone. Ceylon. Colorless. Cabochon cut; elliptical and circular. Twenty gems. Size of one, 38 by 15 by 9 mm.; of two, 12 by 5 mm.; remainder small. Cat. Nos. c-398-408; 82849. The Lea Collection.
- Oligoclase*, var. moonstone. Ceylon. Colorless. Triangular pendant. Size, 44 by 25 by 8 mm. Cat. Nos. c-409; 50263.
- Onyx*, see Carbonate of lime or Quartz.
- Öölite*. Bristol, England. Color, reddish. Paper weight. Size, 10 cm. long, 1.3 cm. diameter. Cat. Nos. b-851; 84224.
- Opal*. Garfield County, Washington. Uncut mass. Cat. Nos. b-969; 51863. Gift of the Washington Onyx Mining and Milling Company.
- Opal*. Douglas City, Washington. Color, green. Uncut mass. Cat. Nos. b-970; 83326. Gift of Henry Hedges.
- Opal*. Queretaro, Mexico. Massive piece of fire opal in trachyte. Cat. Nos. b-972; 82565.
- Opal*. Queretaro, Mexico. Fire opal in trachyte. Cat. Nos. b-973; 82565.
- Opal*. Queretaro, Mexico. Mass of opal in matrix of reddish trachyte. Cat. Nos. b-974; 82511. The Lea Collection. Gift of Dr. L. T. Chamberlain.
- Opal*. Queretaro, Mexico. Color, bluish. Two small gems. Cabochon cut. Cat. Nos. b-980-981; 83762. Gift of Miss Knowlton.
- Opal*. Queretaro, Mexico. Color, blue. Cabochon cut. Cat. Nos. b-982; 50340.
- Opal*. Queretaro, Mexico. Color, white. Two small gems. Cabochon cut. Cat. Nos. b-983-984; 51137.
- Opal*. Queretaro, Mexico. Color, white. Cabochon cut. Cat. Nos. b-985; 50123.
- Opal*. Queretaro, Mexico. Three gems. Cabochon cut. Cat. Nos. b-986-988; 50105.
- Opal*. Queretaro, Mexico. Three fire opals. Cabochon cut. Cat. Nos. b-989-991; 50341.
- Opal*. Queretaro, Mexico. Five small fire opals. Cabochon cut. Cat. Nos. b-992-996; 50339.
- Opal*. Queretaro, Mexico. Five fire opals. Cabochon cut. Cat. Nos. b-997; c-2; 50337.
- Opal*. Queretaro, Mexico. Six small opals. Milky color. Cabochon cut. Cat. Nos. c-3-8; 50340.
- Opal*. Queretaro, Mexico. Five pieces. Color, milky. Cabochon cut. Cat. Nos. c-9-13; 50338.
- Opal*. Queretaro, Mexico. Thirteen small gems. Cabochon cut. Cat. Nos. c-14-26; 47841.

- Opal.* La Silleta, Jalisco, Mexico. Mass of common opal. Color, grayish green, streaked. Cat. Nos. c-27; 50121.
- Opal.* Mexico. Translucent with play of color. Cabochon cut; elliptical girdle; high summit. Size, 2.5 by 1.7 by 1 mm.; weight, 20 carats. Cat. Nos. 461; 84705.
- Opal.* Mexico. Transparent with play of color. Cabochon cut; circular girdle; high summit. Size 1 by 0.9 by 0.8 mm.; weight, 2.75 carats. Cat. Nos. c-462; 84705.
- Opal.* Mexico. Cabochon cut; elliptical girdle; low arch. Size, 1 by 0.8 mm.; weight, 1.25 carats. Cat. Nos. c-463; 84705.
- Opal.* Honduras. Massive piece of fire opal. Cat. Nos. c-28; 83116. The Lea Collection. Gift of Dr. L. T. Chamberlain.
- Opal.* Honduras. Two large gems; milky white. Cabochon cut. Cat. Nos. c-29-30; 50342.
- Opal.* Honduras. Ten small precious opals. Color, white. Cabochon cut. Cat. Nos. c-31-40; 50342.
- Opal.* Czerwenitz, Hungary. Slab of trachyte containing small specks of precious opal. Polished. Cat. Nos. c-41; 45024.
- Opal.* Hungary. Color, white. Small gem. Cabochon cut. Cat. Nos. c-42; 84244.
- Opal.* Czerwenitz, Hungary. Color, bluish in gray trachyte. Cabochon cut. Cat. Nos. c-43; 50343.
- Opal.* Baracoo River, Queensland. Small piece of beautifully variegated opal in argillaceous limonite. Uncut. Cat. Nos. c-44; 83448.
- Opal.* Baracoo River, Queensland, Australia. Two large precious opals. Uncut. Cat. Nos. c-49-50; 83540. Lea Collection; gift of Dr. L. T. Chamberlain.
- Opal.* Baracoo River, Queensland, Australia. Veins of precious opal through matrix. Uncut. Cat. Nos. c-51; 81103. Gift of the Brisbane Museum.
- Opal.* Queensland, Australia. Two small pieces precious opal. Uncut. Cat. Nos. c-52-53; 51105.
- Opal.* Baracoo River, Queensland, Australia. Small polished slab containing deep blue opal. Cat. Nos. c-54; 45028.
- Opal.* Baracoo River, Queensland, Australia. Color, greenish blue. Two engraved opals on brown limonite. Cat. Nos. c-55-56; 50258.
- Opal.* Baracoo River, Queensland, Australia. Color, bluish. Seven small pieces. Cabachon cut. Cat. Nos. c-57-63; 51105.
- Opal.* Baracoo River, Queensland, Australia. Four small pieces of polished limonite containing precious opal. Cat. Nos. c-64-67; 48487.
- Opal.* Noto, Japan. Color, cream. Size, 5.7 by 2.3 cm. Cat. Nos. c-68; 18575.
- Opal.* Hacienda Esperanza, Queretaro, Mexico. Five fire opals. Cabochon cut. Total weight, 36.75 carats. Cat. Nos. c-459; 84481-3. One stone the gift of Dr. L. T. Chamberlain.
- Orthoclase*, var. *adularia*. St. Gothard, Switzerland. Three small colorless gems. Cabochon cut; elliptical girdles. Size, 10 by 9 by 4 mm.=2; 7 by 5 by 2 mm.=1. Cat. Nos. c-264-266; 50380.
- Pearl.* India. Color, white. Necklace of 148 round pearls and two pear-shaped pearls. Cat. Nos. c-97-246; 47352. Gift of Imaun of Muscat.
- Perthite.* Perth, Canada. Color, brown. Cabochon cut; elliptical girdle. Size, 45 by 35 by 10 mm. Cat. Nos. c-262; 51077. The Lea Collection.
- Perthite.* Perth, Canada. Color, brown with white veins. Cabochon cut; rectangular girdle. Size, 33 by 13 by 5 mm. Cat. Nos. c-263; 84181.
- Phenacite.* Siberia. Colorless. Brilliant cut; rectangular girdle. Size 12.5 by 11 by 7 mm.; weight, 5.10 carats. Cat. Nos. 830; 82914. The Lea Collection.
- Phenacite.* Siberia. Colorless. Brilliant cut; square girdle. Size, 8 by 8 by 5 mm.; weight, 2.09 carats. Cat. Nos. 831; 84069.

Plasma, see Quartz.

Porphyry. Sweden. Color, black matrix with red feldspar. Tabular cut; rectangular girdle. Cat. Nos. b-841; 8422.

Prase, see Quartz.

Prehnite. Hoxies Quarry, Paterson, N. J. Color, light green. Two gems; cabochon cut; each 17 by 6 mm. Cat. Nos. a-632-633; 84174.

Prehnite. Hoxies Quarry, Paterson, New Jersey. Color, light green. Cabochon cut. Size, 54 by 14 by 8 mm. Cat. Nos. a-634; 83580.

Prehnite, var. chlorastrolite. Isle Royale, Lake Superior. Color, green, speckled. Cabochon cut; elliptical girdle. Size, 20 by 17 by 4 mm. Cat. Nos. a-635; 51136.

Prehnite, var. chlorastrolite. Isle Royale, Lake Superior. Color, green, speckled. Cabochon cut. Average size, 15 by 11 by 5 mm. Cat. Nos. a-636-638; 83330. The Lea Collection. Gift of Dr. L. T. Chamberlain.

Prehnite, var. chlorastrolite. Isle Royale, Lake Superior. Color, green, speckled. Cabochon cut; elliptical girdle. Size, 12 by 8.5 by 6 mm. Cat. Nos. a-639; 50106.

Prehnite, var. chlorastrolite. Isle Royale, Lake Superior. Color, green, speckled. Cabochon cut; elliptical girdle. Five stones, three of which are small. Two are 14 by 11 by 5 mm. Cat. Nos. a-640-644; 84175.

Pyrope, see Garnet.

Pyroxene. South Fork of Yadkin River, Davidson County, North Carolina. Color, dark green. Polished slab. Cat. Nos. b-861; 13709. Gift of Dr. Edward Palmer.

Pyroxene, var. diopside. De Kalb, St. Lawrence County, New York. Color, bottle green. Cabochon cut; elliptical girdle. Size, 18.5 by 13 by 6 mm.; weight, 10.42 carats. Cat. Nos. a-571; 46828.

Pyroxene, var. diopside. De Kalb, St. Lawrence County, New York. Color, grass green. Step-brilliant cut; square girdle. Size, 6.5 by 5.5 mm.; weight, 2.16 carats. Cat. Nos. a-572; 46828.

Pyroxene, var. diopside. De Kalb, St. Lawrence County, New York. Color, green. Step-brilliant cut; rectangular girdle. Size, 8 by 7 by 5 mm.; weight, 1.87 carats. Cat. Nos. a-573; 46828.

Pyroxene, var. diopside. De Kalb, St. Lawrence County, New York. Color, light green. Brilliant cut; rectangular girdle. Size, 7.5 by 6.5 by 5 mm.; weight, 1.52 carats. Cat. Nos. a-574; 84106.

Pyroxene, var. diopside. Renfrew County, Canada. Color, light green. Step-brilliant cut; rectangular girdle. Size, 7.5 by 7 by 4.5 mm.; weight, 1.68 carats. Cat. Nos. a-575; 82816. The Lea Collection.

Pyroxene, var. diopside. Tyrol. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 9 by 7 by 3 mm.; weight, 1.56 carats. Cat. Nos. a-576; 50323.

Pyroxene, var. diopside. Tyrol. Color, deep green. Step-brilliant cut; rectangular girdle. Size, 7.5 by 6 by 4 mm.; weight, 1.30 carats. Cat. Nos. a-577; 50323.

Pyroxene, var. diopside. Color, grass green. Step-brilliant cut; rectangular girdle. Size, 10.5 by 5 by 2.5 mm.; weight, 1.16 carats. Cat. Nos. a-578; 84107.

Quartz. Paris, Maine. Color, white, opalescent. Cabochon cut. Size, 44 by 23 by 12 mm. Cat. Nos. a-990; 49194.

Quartz. Fairfax Court-House, Virginia. Color, greenish, banded. Tabular cut. Size, 22 by 17 by 5 mm. Cat. Nos. a-994-995; 47847.

Quartz. Fairfax Court-House, Virginia. Color, greenish, banded. Cabochon cut; elliptical girdle. Cat. Nos. c-421; 48927. Gift of Dr. Robert H. Lamborn.

Quartz. Silesia. Colorless; opalescent. Two stones; double cabochon cut; circular girdles. Cat. Nos. a-991-992; 50362.

- Quartz*. Silesia. Color, pale yellow, opalescent. Brilliant cut; circular girdle. Size, 10 by 5 mm. Cat. Nos. a-993; 50362.
- Quartz*, var. agate. Agate Bay, Minnesota. Color, light brown. Ellipsoid; mounted as charm. Cat. Nos. b-199; 83328. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. agate. Lake Superior. Color, brown, banded. Rectangular disks. Size, 27 by 15 mm. Cat. Nos. b-312-313; 13426.
- Quartz*, var. agate. Lake Superior. Color, mottled red. Cat. Nos. b-324; 83325. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. agate. Lake Superior. Color, red, banded. Cat. Nos. b-790; 83325. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. agate. Brazil. Color, brownish gray. Cat. Nos. b-792; 44948.
- Quartz*, var. agate. Brazil. Color, brown. Cat. Nos. b-793; 49629. The Lea Collection.
- Quartz*, var. agate. Brazil. Color, brown. Cat. Nos. b-794; 44948.
- Quartz*, var. agate. Brazil. Color, red, banded. Cat. Nos. b-795; 44948.
- Quartz*, var. agate. Brazil. Color, brown and white bands. Cat. Nos. b-796; 44948.
- Quartz*, var. agate. Brazil. Color, green and gray. Cat. Nos. b-797; 45027.
- Quartz*, var. agate. Brazil. Color, reddish. Cat. Nos. b-798; 49273.
- Quartz*, var. agate. Brazil. Color, red and white banded. Large slab of agate carnelian. Cat. Nos. b-799; 50135.
- Quartz*, var. agate. Brazil. Color, red and gray. Carnelian agate cube, with edges truncated. Size, 5 cm. Cat. Nos. b-800.
- Quartz*, var. agate. Brazil. Color, reddish banded. Cat. Nos. b-801-802; 50135.
- Quartz*, var. agate. Brazil. Large mass. Cat. Nos. b-803; 51534. The U. S. Geological Survey.
- Quartz*, var. agate. Brazil. Color, white. Cat. Nos. b-804; 49629. The Lea Collection.
- Quartz*, var. agate. Uruguay. Small polished piece. Cat. Nos. b-195; 50424.
- Quartz*, var. agate. Uruguay. One face polished. Cat. Nos. b-805; 50424.
- Quartz*, var. agate. Uruguay. One face polished. Cat. Nos. b-806; 50424.
- Quartz*, var. agate. Oberstein, Bavaria. Circular button. Cat. Nos. b-196; 82862. The Lea Collection.
- Quartz*, var. agate. Oberstein, Bavaria. Five small rectangular slabs, artificially colored. Various colors. Cat. Nos. b-200-204; 83526. Gift of George F. Kunz.
- Quartz*, var. agate. Oberstein, Bavaria. Twenty-five agates of various cuts. Cat. Nos. b-205-229; 50402.
- Quartz*, var. agate. Oberstein, Bavaria. Thirty-nine agates, various cuts. Cat. Nos. b-249-287; 46816.
- Quartz*, var. agate. Oberstein, Bavaria. Cube. Size, 4 cm. Cat. Nos. b-807; 84218.
- Quartz*, var. agate. One face polished. Cat. Nos. b-808; 45005.
- Quartz*, var. agate. Oberstein, Bavaria. Two faces polished. Cat. Nos. b-809; 84250.
- Quartz*, var. agate. Oberstein, Bavaria. One face polished. Cat. Nos. b-810; 81418.
- Quartz*, var. agate. Oberstein, Bavaria. Small dish. Size, 8 by 6.2 cm. Cat. Nos. b-811; 82856. The Lea Collection.
- Quartz*, var. agate. Oberstein, Bavaria. Carved seal handle. Size, 8.5 cm. long. Cat. Nos. b-812; 50418.
- Quartz*, var. agate. Oberstein, Bavaria. Seven snuff boxes of various sizes. Cat. Nos. b-813-819; 82798. The Lea Collection.
- Quartz*, var. agate. Oberstein, Bavaria. Dish. Cat. Nos. b-820; 82856. The Lea Collection.
- Quartz*, var. agate. Germany. Carved seal handle. Cat. Nos. b-308; 82860. The Lea Collection.
- Quartz*, var. agate. Germany. Paper cutter. Cat. Nos. b-337; 82857. The Lea Collection.

- Quartz*, var. agate. Germany. Small cane handle. Cat. Nos. b-821; 82861. The Lea Collection.
- Quartz*, var. agate. Germany. Penholder. Cat. Nos. b-822; 82858. The Lea Collection.
- Quartz*, var. agate. Italy. Ring. Cat. Nos. b-197; 82795. The Lea Collection.
- Quartz*, var. agate. Japan. Elliptical disk. Size, 25 by 20 mm. Cat. Nos. b-198; 50423.
- Quartz*, var. agate. Nine small agates; various cuts. Cat. Nos. b-230-238; 50408.
- Quartz*, var. agate. Ten agates; various cuts. Cat. Nos. b-239-248; 50403.
- Quartz*, var. agate. Twelve small agates. Various colors. Cat. Nos. b-288-299; 82864. The Lea Collection.
- Quartz*, var. agate. Six agates of various cuts. Different colors. Cat. Nos. b-300-305; 50401.
- Quartz*, var. agate. Two slabs. Cat. Nos. b-306-307; 46801. Gift of Colonel Totten.
- Quartz*, var. agate. Seal handle. Cat. Nos. b-309; 84249. Gift of Dr. Robert Fletcher.
- Quartz*, var. agate. Rectangular slab. Cat. Nos. b-310; 47470.
- Quartz*, var. agate. Table cut; rectangular girdle. Cat. Nos. b-311; 48481.
- Quartz*, var. agate. Size, 24 by 20 by 6 mm. Cat. Nos. b-314; 16458.
- Quartz*, var. agate. Nine agates variously cut. Different colors. Cat. Nos. b-315-323; 84249.
- Quartz*, var. agate. Twelve clouded agates. Cabochon cut. Cat. Nos. b-325-336; 46815.
- Quartz*, var. agate. Rectangular slab. Cat. Nos. c-418; 44366. The Abert Collection.
- Quartz*, var. agate. Small intaglio. Cat. Nos. b-823; 50068.
- Quartz*, var. agate. One face polished. Cat. Nos. b-824; 84219.
- Quartz*, var. agate. Slab, one face polished. Cat. Nos. b-825; 48513.
- Quartz*, var. agate. Cat. Nos. b-826; 50552. The Lea Collection.
- Quartz*, var. agate. Cat. Nos. b-827; 82800. The Lea Collection.
- Quartz*, var. agate. Cat. Nos. b-828; 82799. The Lea Collection.
- Quartz*, var. agate. Cube with edges truncated. Size, 5.2 cm. Cat. Nos. b-829; 84220.
- Quartz*, var. agate. Cube with truncated edges. Size, 4.5 cm. Cat. Nos. b-830; 82801. The Lea Collection.
- Quartz*, var. agate. Cat. Nos. b-831; 46-832. Gift of F. W. Taylor.
- Quartz*, var. agate. Size, 10 by 5.5 cm. Cat. Nos. b-832; 84220.
- Quartz*, var. agate. Carved paper weight. Cat. Nos. b-833; 48484.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Square slab. Cat. Nos. b-775; 47962. Gift of the Drake Company.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Square slab. Cat. Nos. b-776; 84216.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Mosaic slab of small blocks of agatized wood, mounted on slate. Cat. Nos. b-777; 50110.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Color, black. Cross section of small tree. Cat. Nos. b-778; 47962. Gift of the Drake Company.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Color, red predominates. Three slabs and one cross section of the tree. Cat. Nos. b-779-782; 47962. Gift of the Drake Company.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Dish-shaped ornament. Size, 12.5 by 8.5 by 3.5 cm. Cat. Nos. b-783; 48516.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Polished ball. Size, 11 cm. diam. Cat. Nos. b-784; 50269.
- Quartz*, var. agatized wood. Chalcedony Park, Arizona. Small carved dog's head. Cat. Nos. b-785; 48443. Gift of Maj. J. W. Powell.

- Quartz*, var. agatized wood. Humboldt County, Nevada. Rectangular block. Size, 6 by 5 by 2.5 cm. Cat. Nos. b-786; 15610.
- Quartz*, var. agatized wood. Longitudinal section of tree. Cat. Nos. b-787; 48539.
- Quartz*, var. agatized wood. Cross section of tree. Size, 9 cm. diam. Cat. Nos. b-788; 84217.
- Quartz*, var. amethyst. Stow, Maine. Color, deep amethyst. Step-brilliant cut; circular girdle. Size, 19 by 12 mm.; weight, 22.90 carats. Cat. Nos. b-717; 50278.
- Quartz*, var. amethyst. Stow, Maine. Color, amethyst. Rose cut; elliptical girdle. Size, 17 by 14 by 10 mm.; weight, 12.73 carats. Cat. Nos. a-721; 46826.
- Quartz*, var. amethyst. Brazil. Color, amethyst. Brilliant cut; circular girdle. Size, 17 by 10 mm. Cat. Nos. a-724; 84188.
- Quartz*, var. amethyst. Brazil. Color, amethyst. Brilliant cut; circular girdle. Size, 16 by 10 mm. Cat. Nos. a-725; 94188.
- Quartz*, var. amethyst. Brazil. Color, amethyst. Step-brilliant cut; elliptical girdle. Size, 22 by 16 by 8 mm. Cat. Nos. a-726; 84188.
- Quartz*, var. amethyst. Brazil. Color, amethyst. Step-brilliant cut; elliptical girdle. Size, 16 by 15 by 8 mm. Cat. Nos. a-727; 84188.
- Quartz*, var. amethyst. Brazil. Color, amethyst. Step-brilliant cut; circular girdle. Size, 13 by 8 mm. Cat. Nos. s-728; 84188.
- Quartz*, var. amethyst. Harz, Germany. Color, pale amethyst. Step-brilliant cut; elliptical girdle. Size, 10 by 9 by 6 mm. Cat. Nos. a-730; 47785. Gift of Dr. Henry A. Fisher.
- Quartz*, var. amethyst. Germany. Color, amethyst. Seal handle on gold base. Cat. Nos. a-742; 82786. The Lea Collection.
- Quartz*, var. amethyst. Siberia. Color, deep amethyst. Brilliant cut; square girdles. Eleven stones; average size, 5 by 3 mm. Cat. Nos. a-731-741; 84189.
- Quartz*, var. amethyst. Japan. Color, amethyst. Step-brilliant cut; oval girdle. Size, 21 by 19 by 11 mm. Cat. Nos. a-729; 50366.
- Quartz*, var. amethyst. Color, amethyst. Step cut; intaglio; rectangular girdle. Size, 18 by 16 by 9 mm. Cat. Nos. a-743; 50272.
- Quartz*, var. amethyst. Warlick, Burke County, North Carolina. Color, light amethyst. Step, brilliant cut; elliptical girdle. Size, 18 by 16 by 9 mm.; weight, 14.61 carats. Cat. Nos. a-718; 83742. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Macon County, North Carolina. Color, amethyst. Brilliant cut; elliptical girdle. Size, 7 by 13 by 8 mm.; weight, 9.93 carats. Cat. Nos. a-719; 48471.
- Quartz*, var. amethyst. Minas Geraes, Brazil. Color, deep amethyst. Step, brilliant cut; elliptical girdle. Size, 48 by 33 by 21 mm.; weight, 178.13 carats. Cat. Nos. a-722; 83538. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Brazil. Color, amethyst. Brilliant cut; elliptical girdle. Size, 21 by 16 by 11.5 mm. Cat. Nos. a-723; 84188.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; circular girdle. Size, 14 by 10 mm.; weight, 9.71 carats. Cat. Nos. a-713; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; circular girdle. Size, 12 by 8 mm.; weight, 6.39 carats. Cat. Nos. a-714; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, light amethyst. Step-brilliant cut; circular girdle. Size, 12 by 8 mm.; weight, 6.07 carats. Cat. Nos. a-715; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.

- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, light amethyst. Step-brilliant cut; circular girdle. Size, 8 by 6 mm.; weight, 2.36 carats. Cat. Nos. a-716; 83748. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; circular girdle. Size, 20 by 14 mm.; weight, 26.81. Cat. Nos. a-709; 83746. The Lea Collection; the gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; circular girdle. Size 15 by 11 mm.; weight, 12.57 carats. Cat. Nos. a-710; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; circular girdle. Size, 14 by 10 mm.; weight, 9.32 carats. Cat. Nos. a-711; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; circular girdle. Size, 14 by 10 mm.; weight, 9.75 carats. Cat. Nos. a-712; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; elliptical girdle. Size, 46 by 34 by 22 mm.; weight, 197.53 carats. Cat. Nos. a-706; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, deep amethyst. Brilliant cut; circular girdle. Size, 32 by 23 mm.; weight, 119.09 carats. Cat. Nos. a-707; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Ten miles southeast of Statesville, Alexander County, North Carolina. Color, amethyst. Step-brilliant cut; circular girdle. Size 21 by 14 mm.; weight, 32.39 carats. Cat. Nos. a-708; 83746. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Upper Providence, Delaware County, Pennsylvania. Color, deep amethyst. Step-brilliant cut; octagonal girdle. Size, 21 by 15 mm.; weight, 35.27 carats. Cat. Nos. a-720; 83537. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. amethyst. Color, amethyst. Step-brilliant cut; elliptical girdle. Size, 25 by 21 by 10 mm.; weight, 32.66 carats. Cat. Nos. a-744; 50365.
- Quartz*, var. amethyst. Color, amethyst. Step-brilliant cut; rectangular girdle. Size, 23 by 18 by 9 mm. Cat. Nos. a-745; 50365.
- Quartz*, var. amethyst. Color, amethyst. Size, 17 by 13 by 9 mm. Cat. Nos. a-746; 50365.
- Quartz*, var. amethyst. Color, amethyst. Brilliant cut; elliptical girdle. Size, 14 by 12 by 8 mm. Cat. Nos. a-747; 50365.
- Quartz*, var. amethyst. Color, amethyst. Step-brilliant cut; octagonal girdle. Size, 11 by 10 by 7 mm. Cat. Nos. a-748; 50365.
- Quartz*, var. amethyst. Color, amethyst. Step-brilliant cut; elliptical girdle. Size, 14 by 11 by 6 mm. Cat. Nos. a-749; 50365.
- Quartz*, var. amethyst. Color, amethyst. Step-brilliant cut. Sixteen stones. Size: Largest, 24 by 20 by 10; smallest, 7 by 7 by 4 mm. Cat. Nos. a-750-765; 82782. The Lea Collection.
- Quartz*, var. amethyst. Color, amethyst. Step-brilliant cut; elliptical girdle. Fourteen stones; average size, 14 by 10 by 4 mm. Cat. Nos. a-766-779; 50368.

- Quartz*, var. amethyst. Color, amethyst. Step-brilliant cut; triangular girdle. Size, 20 by 14 by 10 mm. Cat. Nos. a-780; 82769. The Lea Collection.
- Quartz*, var. amethyst. Pale amethyst. Step-brilliant cut. Eight stones of various sizes. Cat. Nos. a-781-788; 82782. The Lea Collection.
- Quartz*, var. amethyst. Color, pale amethyst. Step-brilliant cut; oval girdle. Size, 16 by 13 by 6 mm. Cat. Nos. a-789; 92770. The Lea Collection.
- Quartz*, var. amethyst. Color, pale amethyst. Step-brilliant cut; square girdle. Size, 12 by 5 mm. Cat. Nos. a-790; 5036E.
- Quartz*, var. amethyst. Color, smoky amethyst. Step-brilliant cut; elliptical girdle. Size, 14 by 11 by 6 mm. Cat. Nos. a-791; 82782. The Lea Collection.
- Quartz*, var. aventurine. Spain. Color, green. Polished slab. Cat. Nos. b-733; 45030.
- Quartz*, var. aventurine. Near Madrid, Spain. Color, brown. Cabochon cut; elliptical girdle. Size, 30 by 21 by 5 mm. Cat. Nos. b-735; 50364.
- Quartz*, var. aventurine. Russia. Color, brown. Polished slab. Cat. Nos. b-734; 45029.
- Quartz*, var. beekite. Devon, England. Color, yellowish. Small carved dish. Cat. Nos. b-789; 51935.
- Quartz*, var. bloodstone. India. Color, green with red spots. Five pieces, variously cut. Cat. Nos. b-632-636; 50399.
- Quartz*, var. bloodstone. India. Green with spots. Cat. Nos. b-637; 47466. Gift of George F. Kunz.
- Quartz*, var. bloodstone. India. Two small snuff boxes. Cat. Nos. b-638-639; 50400.
- Quartz*, var. bloodstone. India. Color, green with red spots. Cat. Nos. b-640; 50399.
- Quartz*, var. bloodstone. Egypt. Color, green with red spots. Cat. Nos. b-641; 44951.
- Quartz*, var. bloodstone. Color, green with red spots. Small intaglio. Cat. Nos. b-642; 48473.
- Quartz*, var. bloodstone. Color, dark green with red spots. Intaglio. Cat. Nos. b-643; 50067.
- Quartz*, var. bloodstone. **Color, green with red spots.** Six pieces of various cuts. Cat. Nos. b-644-649; 46817.
- Quartz*, var. bloodstone. Color, green with red spots. Two pieces. Cat. Nos. b-650-651; 49244.
- Quartz*, var. bloodstone. Color, green with red spots. Cabochon cut; elliptical girdle. Cat. Nos. b-652; 47393. Gift of Mrs. Spencer F. Baird.
- Quartz*, var. bloodstone. Color, green with red spots. Elliptical and shield shape. Five small pieces. Cat. Nos. b-653-657; 82796. The Lea Collection.
- Quartz*, var. bloodstone. Color, green with red spots. Cabochon cut. Two large pieces. Cat. Nos. b-658-659. Gift of Geo. F. Kunz.
- Quartz*, var. bloodstone. Color, green with red spots. Size, 2.7 cm. diam. Cat. Nos. b-660; 84211.
- Quartz*, var. bloodstone. With agate in silver mounting, as breastpin. Cat. Nos. b-661; 46508. Gift of Messrs. Harris & Shafer.
- Quartz*, var. carnelian. Brazil. Color, red. Paper cutter. Cat. Nos. b-504; 48538.
- Quartz*, var. carnelian. Germany. Color, red, banded. Bracelet of 6 buttons and 12 beads. Cat. Nos. b-605; 82859. The Lea Collection.
- Quartz*, var. carnelian. Oberstein, Bavaria. Color, red. Size, 24 by 19 mm. Cat. Nos. b-503; 14157. The Hawes Collection.
- Quartz*, var. carnelian. Palestine, Holy Land. Color, red. Size, 15 by 13 by 3 mm. Cat. Nos. b-502; 18243.
- Quartz*, var. carnelian. Color, red. Size, 12 by 10 cm. Cat. Nos. b-505; 45016.

- Quartz*, var. *carnelian*. Color, deep red. Cabochon cut; elliptical girdle. Size, 53 by 42 mm. Cat. Nos. b-506; 50406.
- Quartz*, var. *carnelian*. Color, red. Six small stones of various cuts. Cat. Nos. b-507-512; 46812.
- Quartz*, var. *carnelian*. Color, red. Twelve stones. Cat. Nos. b-513-524; 46813.
- Quartz*, var. *carnelian*. Color, red. Twenty-seven stones, variously cut. Cat. Nos. b-525-551.
- Quartz*, var. *carnelian*. Color, red. Fifty-three stones, variously cut. Cat. Nos. b-552-604; 82863. The Lea Collection.
- Quartz*, var. *carnelian*. Color, red. Fifteen small intaglios. Cat. Nos. b-606-620; 82865. The Lea Collection.
- Quartz*, var. *carnelian*. Color, red. Six small intaglios. Cat. Nos. b-621-626; 47396. Deposited by Thomas Wilson.
- Quartz*, var. *carnelian*. Color, red. Size small. Cabochon cut. Cat. Nos. b-627; 46812.
- Quartz*, var. *carnelian*. Color, red. Four small intaglios. Cat. Nos. b-628-631; 50069.
- Quartz*, var. *cat's-eye*. Cumberland, Rhode Island. Color, dark green. Cabochon cut; elliptical girdle. Size, 19 by 13 by 5 mm. Cat. Nos. b-25; 84198.
- Quartz*, var. *cat's-eye*. Bavaria. Color, brownish green. Cabochon cut; elliptical girdle. Size, 22 by 13 by 7 mm. Cat. Nos. b-27; 50379.
- Quartz*, var. *cat's-eye*. Hof, Bavaria. Color, dark green. Cabochon cut; circular and elliptical girdles. Three small stones. Size, 7 mm. diam. Cat. Nos. b-28-30; 50265.
- Quartz*, var. *cat's-eye*. Hungary. Color, dark green. Cabochon cut; elliptical girdle. Two stones. Size, 14 by 10 by 6 and 12 by 8 by 4 mm. Cat. Nos. b-31-32; 50321.
- Quartz*, var. *cat's-eye*. Ceylon. Color, pale greenish. Cabochon cut; elliptical girdle. Four pieces. Size, 29 by 17 by 10 and 10 by 6 by 5 mm. Cat. Nos. b-18-21; 82846. The Lea Collection.
- Quartz*, var. *cat's-eye*. Ceylon. Color, pale green. Cabochon cut; mounted in ring. Cat. Nos. b-32; 82847. The Lea Collection.
- Quartz*, var. *cat's-eye*. Ceylon. Color, pale green. Cabochon cut; elliptical girdle. Size, 15 by 12 by 8 mm. Cat. Nos. b-23; 50320.
- Quartz*, var. *cat's-eye*. Ceylon. Color, pale green. Cabochon cut; elliptical girdle. Size, 18 by 14 by 7 mm. Cat. Nos. b-24; 84199.
- Quartz*, var. *cat's-eye*. Madras, India. Color, pale green. 22 beads. Cat. Nos. b-26; 84200.
- Quartz*, var. *cat's-eye*. Color, dark green. Cabochon cut; circular girdle. Size, 9 by 4 mm. Cat. Nos. b-33; 84254.
- Quartz*, var. *chalcedony*. Fairfax Court-House, Virginia. Color, milky white. Cabochon cut; circular girdle. Size, 10 by 7 mm. Cat. Nos. b-70; 47849.
- Quartz*, var. *chalcedony*. Yellowstone Park, Wyoming. Cat. Nos. b-737; 83857.
- Quartz*, var. *chalcedony*. Yellowstone Park, Wyoming. Two pieces. Size, 7 cm. diam. Cat. Nos. b-738-739; 83857.
- Quartz*, var. *chalcedony*. Yellowstone Park, Wyoming. Color, gray. Cat. Nos. b-740; 83857.
- Quartz*, var. *chalcedony*. Germany. Color, milky white. Cabochon cut. Two pieces. Cat. Nos. b-68-69; 47469. Gift of George F. Kunz.
- Quartz*, var. *chalcedony*. Faroe Islands. Color, gray. Cat. Nos. b-741; 81976. The U. S. Geological Survey.
- Quartz*, var. *chalcedony*. India. Cabochon cut. Six stones. Cat. Nos. b-62-67; 50422.
- Quartz*, var. *chalcedony*. Ten stones, variously cut. Cat. Nos. b-71-80; 46808.

- Quartz*, var. *chalcedony*. Nine stones of cabochon cut. Cat. Nos. b-81-89; 46809.
- Quartz*, var. *chalcedony*. Color, yellow; banded. Four stones. Cabochon cut; rectangular girdle. Cat. Nos. b-90-93; 50413.
- Quartz*, var. *chalcedony*. Eighteen stones. Cabochon cut. Cat. Nos. b-94-111; 50416.
- Quartz*, var. *chalcedony*. Seventy stones of various cuts. Cat. Nos. b-112-181; 50417.
- Quartz*, var. *chalcedony*. Color, yellow, black, and green. Five stones of various cuts. Cat. Nos. b-182-187.
- Quartz*, var. *chalcedony*. Color, milky white. Cabochon cut. Four stones. Cat. Nos. b-188-191; 82794. The Lea Collection.
- Quartz*, var. *chalcedony*. Color, yellow. Cat. Nos. b-192; 82802. The Lea Collection.
- Quartz*, var. *chalcedony*. Cat. Nos. b-193; 44365. The Abert Collection.
- Quartz*, var. *chalcedony*. Color, light brown. Cabochon cut. Cat. Nos. b-194; 48480.
- Quartz*, var. *chalcedony*. Paper weight. Cat. Nos. b-742; 50147. The Lea Collection.
- Quartz*, var. *chalcedony*. Snuff box. Cat. Nos. b-743; 50414.
- Quartz*, var. *chalcedony*. Color, gray. Small intaglio. Cat. Nos. b-744; 47396. Deposited by Thomas Wilson.
- Quartz*, var. *chalcedony*. Color, brown. Six intaglios. Cat. Nos. b-745-750; 48472.
- Quartz*, var. *chrysoptase*. Tulare County, California. Color, green. Cabochon cut; elliptical girdle. Cat. Nos. b-726; 83554.
- Quartz*, var. *chrysoptase*. Silesia. Color, green. Sixteen stones, large and small. Brilliant and cabochon cuts. Cat. Nos. b-34-49; 50375.
- Quartz*, var. *chrysoptase*. Silesia. Color, green. Circular disk. Size, 19 mm. diam. Cat. Nos. b-50; 84251. The Lea Collection.
- Quartz*, var. *chrysoptase*. Color, apple green. Cabochon cut; circular girdle. Size, 24 by 13 mm. Cat. Nos. b-51; 46822.
- Quartz*, var. *citrine*. White Plains, Alexander County, North Carolina. Color, pale yellow. Brilliant cut; square girdle. Size, 34 by 23 mm.; weight, 133.01 carats. Cat. Nos. a-911; 83737. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. *citrine*. Brazil. Color, yellowish green. Step-brilliant cut; 5 stones. Cat. Nos. a-912-916; 50345.
- Quartz*, var. *citrine*. Brazil. Color, yellowish brown. Step-brilliant cut; elliptical girdle. Size, 43 by 35 by 18 mm.; weight, 151.91 carats. Cat. Nos. a-917; 50346.
- Quartz*, var. *citrine*. Brazil. Color, citrine yellow. Step-brilliant cut; elliptical girdle. Size, 32 by 25 by 13 mm.; weight, 57.88 carats. Cat. Nos. a-918; 50347.
- Quartz*, var. *citrine*. Brazil. Color, citrine yellow. Step-brilliant cut; rectangular girdle. Size, 23 by 20 by 11 mm.; weight, 34.14 carats. Cat. Nos. a-919; 50347.
- Quartz*, var. *citrine*. Color, brownish yellow. Step-brilliant cut; elliptical girdle. Size, 24 by 18 by 10 mm.; weight, 23.66 carats. Cat. Nos. a-920; 50347.
- Quartz*, var. *citrine*. Brazil. Color, citrine yellow. Step-brilliant cut; rectangular girdle. Size, 20 by 17 by 10 mm. Cat. Nos. a-921; 50347.
- Quartz*, var. *citrine*. Brazil. Color, citrine yellow. Step-brilliant cut; elliptical girdle. Size, 17 by 13 by 8 mm. Cat. Nos. a-922; 50347.
- Quartz*, var. *citrine*. Brazil. Color, brownish yellow. Step-brilliant cut; rectangular girdle. Size, 24 by 18 by 9 mm. Cat. Nos. a-923; 50348.
- Quartz*, var. *citrine*. Brazil. Color, yellowish brown. Step-brilliant cut; elliptical girdle. Three stones. Sizes, 17 by 11 by 6, 14 by 11 by 6, 12 by 9 by 5.5 mm. Cat. Nos. a-924-926; 50348.

- Quartz*, var. citrine. Brazil. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 44 by 33 by 20 mm.; weight, 155.95 carats. Cat. Nos. a-927; 50349.
- Quartz*, var. citrine. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 30 by 23 by 13 mm.; weight, 53.24 carats. Cat. Nos. a-928; 50349.
- Quartz*, var. citrine. Brazil. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 27 by 20 by 11 mm. Cat. Nos. a-929; 50349.
- Quartz*, var. citrine. Color, pale yellow. Brilliant cut; rectangular girdle. Size, 12 by 13 by 8 mm. Cat. Nos. a-930; 50349.
- Quartz*, var. citrine. Brazil. Color, citrine yellow. Step-brilliant cut; rectangular girdle. Size, 22 by 16 by 11 mm. Cat. Nos. a-931; 82767. The Lea Collection.
- Quartz*, var. citrine. Brazil. Color, citrine yellow. Step-brilliant cut; octagonal girdle. Size, 12 by 5 mm. Cat. Nos. a-932; 82767. The Lea Collection.
- Quartz*, var. citrine. Brazil. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 12 by 10 by 7 mm. Cat. Nos. a-933; 82767. The Lea Collection.
- Quartz*, var. citrine. Switzerland. Color, citrine yellow. Step cut; rectangular girdle. Size, 34 by 27 by 15 mm.; weight, 89.64 carats. Cat. Nos. a-934; 50358.
- Quartz*, var. citrine. Switzerland. Color, citrine yellow. Knife handle. Size, 7½ cm. long. Cat. Nos. a-935; 50357.
- Quartz*, var. citrine. Italy. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 29 by 22 by 12 mm.; weight, 49.90 carats. Cat. Nos. a-936; 82768. The Lea Collection.
- Quartz*, var. citrine. Color, citrine yellow. Step-brilliant cut. Fourteen stones. Size, largest, 34 by 23 by 11 mm.; smallest, 10 by 8 by 5 mm. Cat. Nos. a-937-950; 50368.
- Quartz*, var. citrine. Color, pale yellow. Step-brilliant cut; elliptical girdle. Size, 37 by 30 by 15 mm.; weight, 97.22 carats. Cat. Nos. a-951; 82770. The Lea Collection.
- Quartz*, var. citrine. Color, citrine yellow. Step-brilliant cut; rectangular girdle. Three stones. Sizes, 18 by 15 by 8, 17 by 14 by 5, 13 by 9 by 4 mm. Cat. Nos. a-952; 954; 82770. The Lea Collection.
- Quartz*, var. citrine. Color, citrine yellow. Step-brilliant cut; elliptical girdle. Nine stones; average size, 14 by 10 by 6 mm. Cat. Nos. a-955-963; 82770. The Lea Collection.
- Quartz*, var. citrine. Color, citrine yellow. Brilliant cut; circular girdle. Nine stones; average size, 6 by 4 mm.; two stones larger. Cat. Nos. a-964-974; 82776. The Lea Collection.
- Quartz*, var. citrine. Color, citrine yellow. Step-brilliant cut; elliptical girdle. Nine stones. Size of largest, 25 by 18 by 12; of smallest, 11 by 9 by 6 mm. Cat. Nos. a-975-983; 82776. The Lea Collection.
- Quartz*, var. citrine. Florissant, El Paso County, Colorado. Color, citrine yellow. Brilliant top or mixed cut. Weight, 138.5 carats. Cat. Nos. c-456; 84376. Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. citrine. Color, citrine yellow. Seal with coat-of-arms mounted as watch charm. Cat. Nos. a-984; 84192. Deposited by W. R. Gibbs.
- Quartz*, var. flint. Chalk beds, England. Color, brown. Cabochon cut; elliptical girdle. Size, 25 by 21 by 6 mm. Cat. Nos. b-736; 50427.
- Quartz*, with inclusions. Rhode Island. Color, greenish; elliptical disk containing actinolite. Size, 28 by 20 by 3 mm. Cat. Nos. a-996; 84192.
- Quartz*, with inclusions. Fairfax, Virginia. Colorless, with dark inclusions. Size, 14 by 11 by 5 mm. Cat. Nos. c-420; 48926. Gift of Dr. Robt. H. Lamborn.
- Quartz*, with inclusions. Alexander County, North Carolina. Colorless, with red rutile needles. Rectangular disk. Size, 24 by 18 by 5 mm. Cat. Nos. a-997; 84193.

- Quartz*, with inclusions. Color, reddish brown. Cabochon cut; elliptical girdle. Size, 21 by 17 by 6 mm. Cat. Nos. a-998; 84193.
- Quartz*, with inclusions. McDaniel's Farm, Iredell County, North Carolina. Color, brownish with rutile needles. Heart-shaped. Cat. Nos. a-999; 83741. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, with inclusions. Iredell County, North Carolina. Two pieces of quartz filled with rutile crystals. Cat. Nos. b-758-759; 83681. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, with inclusions. Iredell County, North Carolina. Polished piece containing rutile needles. Cat. Nos. b-760; 82781. The Lea Collection.
- Quartz*, with inclusions. Iredell County, North Carolina. Polished piece rock crystal, containing rutile needles. Cat. Nos. b-761; 84215.
- Quartz*, with inclusions. Burke County, North Carolina. Colorless, with crystal faces, containing black tourmaline needles. Cat. Nos. b-762; 82780. The Lea Collection.
- Quartz*, with inclusions. Near Hot Springs, Arkansas. Colorless, with green chlorite blotches. Step cut; square girdle. Cat. Nos. b-1; 84194.
- Quartz*, with inclusions. Near Hot Springs, Arkansas. Colorless, with green chlorite blotches. Step cut; elliptical girdle. Size, 24 by 19 by 7 mm. One-half filled with mossy chlorite. Cat. Nos. b-2; 84194.
- Quartz*, with inclusions. Near Hot Springs, Arkansas. Colorless, with red and green chlorite layer. Table cut. Size, 27 by 22 by 8 mm. Cat. Nos. b-3; 84194.
- Quartz*, with inclusions. Colorado. Color, black with göthite inclusions. Heart-shaped. Two stones. Sizes, 18 by 18 by 8 mm.; 16 by 16 by 5 mm. Cat. Nos. b-4-5; 50107.
- Quartz*, with inclusions. Clip, Arizona. Color, dark blue. Cabochon cut; elliptical girdle. Two pieces, containing dumortierite. Cat. Nos. b-16-17; 84196.
- Quartz*, with inclusions. California. Color, white with inclusions of gold. Small elliptical disk. Size, 27 by 21 by 3 mm. Cat. Nos. b-14; 50381.
- Quartz*, with inclusions. California. Color, white with inclusions of gold. Small slab. Cat. Nos. b-15; 84195.
- Quartz*, with inclusions. Brazil. Colorless, with reddish brown needles. Cabochon cut; elliptical girdle. Size, 34 by 27 by 6 mm. Cat. Nos. b-6; 50360.
- Quartz*, with inclusions. Brazil. Colorless, with brown rutile inclusions. Elliptical disk. Size, 40 by 35 by 4 mm. Cat. Nos. b-7; 82787. The Lea Collection.
- Quartz*, with inclusions. Brazil. Colorless, with planes of green chlorite. Cabochon cut; elliptical girdle. Size, 29 by 21 by 7 mm. Cat. Nos. b-8; 50361.
- Quartz*, with inclusions. Brazil. Colorless. Crystal of phantom quartz, with chlorite along the growth planes of crystal. Cat. Nos. b-763; 82958. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, with inclusions. Brazil. Colorless. Contains rutile needles. Cat. Nos. b-764; 46821.
- Quartz*, with inclusions. Brazil. Colorless. Contains several long rutile needles. Cat. Nos. b-765; 46821.
- Quartz*, with inclusions. Brazil. Color, yellowish. Crystal of phantom quartz, with chlorite along growth planes of crystal. Cat. Nos. b-766; 51482.
- Quartz*, with inclusions. Switzerland. Colorless. Cabochon cut; elliptical girdle. Size, 38 by 28 by 8 mm. Cat. Nos. b-9; 50374.
- Quartz*, with inclusions. Siberia. Color, yellow. Carved seal handle, containing rutile needles. Cat. Nos. b-767; 51398.
- Quartz*, with inclusions. Colorless, with black hornblende needles. Cabochon cut; elliptical girdle. Size, 24 by 19 by 6 mm. Cat. Nos. b-10; 83340. The Lea Collection; gift of Dr. L. T. Chamberlain.

- Quartz*, with inclusions. Japan. Colorless, with green tremolite. Double cabochon cut; elliptical girdle. Size, 20 by 15 by 9 mm. Cat. Nos. b-11; 83340. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, with inclusions. Japan. Colorless. Two small prisms, containing tremolite needles. Cat. Nos. b-768-769; 83340. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, with inclusions. Madagascar. Slab filled with acicular rutile needles. Cat. Nos. b-770; 83764.
- Quartz*, with inclusions. Madagascar. Large, polished rock crystal, containing long rutile needles. Cat. Nos. b-771; 83764.
- Quartz*, with inclusions. Griqualand, South Africa. Color, brownish. Rectangular cut. Contains hematite veins in jasper. Cat. Nos. b-772; 18403.
- Quartz*, with inclusions. Colorless, with blotch of dark rutile fibers. Step-brilliant cut; elliptical girdle. Size, 15 by 12 by 7 mm. Cat. Nos. b-12; 82775. The Lea Collection.
- Quartz*, with inclusions. Colorless. Step-cabochon cut; rectangular girdle. Size, 16 by 12 by 4 mm. Cat. Nos. b-13; 82775. The Lea Collection.
- Quartz*, with inclusions. Color, smoky brown. Two slabs containing rutile needles. Cat. Nos. b-773-774; 83008. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. jasper. Hertfordshire, England. Color, brown. Breastpin and cuff buttons. Cat. Nos. b-667-669; 50260.
- Quartz*, var. jasper. Hertfordshire, England. Slab of pudding stone. Cat. Nos. b-670; 50390.
- Quartz*, var. jasper. Saxony. Color, red. Cat. Nos. b-666; 84252.
- Quartz*, var. jasper. Siberia. Color, red. Cat. Nos. b-662; 50136.
- Quartz*, var. jasper. Siberia. Color, red and green. Small slab. Size, 9 by 6.3 cm. Cat. Nos. b-663; 50397.
- Quartz*, var. jasper. Orenburg, Ural Mountains. Color, red and yellow. Slab. Cat. Nos. b-664; 51479.
- Quartz*, var. jasper. Orenburg, Ural Mountains. Color, green and red banded. Size, 25 by 19 mm. Cat. Nos. b-665; 50397.
- Quartz*, var. jasper. River Nile, Egypt. Color, brown. Two pieces; cabochon cut and slab. Cat. Nos. b-671-672; 50433.
- Quartz*, var. jasper. India. Color, red and green. Two large pieces. Cat. Nos. b-673-674; 51393.
- Quartz*, var. jasper. Color, reddish brown. Elliptical disk of agate jasper. Cat. Nos. b-675; 46804.
- Quartz*, var. jasper. Color, blue. Two colored pieces. Cat. Nos. b-676-677; 46811.
- Quartz*, var. jasper. Color, red and brown. Six pieces, variously cut. Cat. Nos. b-678-683; 46810.
- Quartz*, var. jasper. Color, red. Elliptical disk of agate jasper. Cat. Nos. b-684; 50405.
- Quartz*, var. jasper. Color, red. Cat. Nos. b-685; 84212.
- Quartz*, var. jasper. Cat. Nos. b-686; 48512.
- Quartz*, var. jasper. Color, yellow and red. Slab. Cat. Nos. b-687; 84253.
- Quartz*, var. moss agate. Kansas. Seven small stones. Cabochon cut. Cat. Nos. b-438-444; 50421.
- Quartz*, var. moss agate. Kansas. Cabochon cut. Cat. Nos. c-419; 50421.
- Quartz*, var. moss agate. Yellowstone Park, Wyoming. Two small pieces. Cabochon and elliptical cuts. Cat. Nos. c-426-427; 47844.
- Quartz*, var. moss agate. Yellowstone National Park, Wyoming. Three small pieces. Cat. Nos. c-428-430; 46827.
- Quartz*, var. moss agate. Yellowstone National Park, Wyoming. Cat. Nos. c-431; 82791. The Lea Collection.

- Quartz*, var. moss agate. Near Fort Bridger, Wyoming. Small piece. Cabochon cut; elliptical girdle. Cat. Nos. c-432; 50426.
- Quartz*, var. moss agate. India. Color, green. Size, 44 by 33 mm. Cat. Nos. b-338; 50419.
- Quartz*, var. moss agate. India. Cat. Nos. b-339; 83344. Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. moss agate. India. Ninety-two small stones. Cabochon cut. Cat. Nos. b-340-431; 50420.
- Quartz*, var. moss agate. Japan. Color, gray. Five stones. Cabochon cut. Cat. Nos. b-432-436; 82789. The Lea Collection.
- Quartz*, var. moss agate. China. Color, green. Cat. Nos. b-437; 82788. The Lea Collection.
- Quartz*, var. moss agate. Five stones of various cuts. Cat. Nos. b-445-449; 50404.
- Quartz*, var. moss agate. Three pieces. Cat. Nos. b-450-452; 50407.
- Quartz*, var. moss agate. Five small stones. Cabochon cut; circular girdles. Cat. Nos. b-453-457; 50409.
- Quartz*, var. moss agate. Cat. Nos. b-458; 50412.
- Quartz*, var. moss agate. Cat. Nos. b-459; 48483.
- Quartz*, var. moss agate. Two pieces. Cabochon cut. Cat. Nos. b-460-461; 48478.
- Quartz*, var. moss agate. Six small slabs. Cat. Nos. b-462-467; 47464. Gift of George F. Kunz.
- Quartz*, var. moss agate. Twenty-one pieces, of various cuts. Cat. Nos. b-468-488; 46814.
- Quartz*, var. moss agate. Thirteen small stones. Cabochon cut. Cat. Nos. b-489-501; 82790. The Lea Collection.
- Quartz*, var. onyx. Brazil. Small cameo. Cat. Nos. b-709; 48537.
- Quartz*, var. onyx. Germany. Color, dark brown and white banded. Two large pieces. Cat. Nos. b-707-708; 47467. Gift of George F. Kunz.
- Quartz*, var. onyx. One large and two medium-sized cameos. Cat. Nos. b-710-712; 48476.
- Quartz*, var. onyx. Small cameo. Cat. Nos. b-713; 84214.
- Quartz*, var. onyx. Two cameos. Cat. Nos. b-714-715; 50275.
- Quartz*, var. onyx. Color, red banded. Cat. Nos. b-716; 50411.
- Quartz*, var. onyx. Six small pieces. Cat. Nos. b-717-722; 50410.
- Quartz*, var. plasma. India. Color, dark green. Four buttons. Cat. Nos. b-56-59; 46805.
- Quartz*, var. plasma. India. Color, apple green. Cabochon cut. Two pieces. Cat. Nos. b-60-61; 46805.
- Quartz*, var. plasma. India. Cat. Nos. b-723; 50431.
- Quartz*, var. plasma. Color, dark green. Small intaglio. Cat. Nos. b-724; 47396. Deposited by Thomas Wilson.
- Quartz*, var. prase. Germany. Color, green. Cabochon cut; elliptical girdle. Size, 18 by 13 by 11 mm. Cat. Nos. b-52; 50377.
- Quartz*, var. prase. Breitenbrunn, Saxony. Color, dirty green. Two stones. Cabochon cut; elliptical girdles. Size, 20 by 13 by 5 mm. Cat. Nos. b-53-54; 50376.
- Quartz*, var. plasma. Tartary. Color, green. Elliptical disk. Size, 53 by 40 mm. Cat. Nos. b-55; 50430.
- Quartz*, var. rock crystal. Chestnuthill Township, Ashe County, North Carolina. Colorless. Large ball. Size, 11 em. diameter. Cat. Nos. b-751; 83686. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. rock crystal. Redhill, near Bakersville, Mitchell County, North Carolina. Colorless. Eighteen quartz arrowheads. Cat. Nos. a-854-872; 83683. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. rock crystal. Brazil. Colorless. Cabochon cut; circular girdle. Cat. Nos. a-816; 50359.

- Quartz*, var. rock crystal. Brazil. Colorless. Step-brilliant cut. Size, 13 by 10.5 by 4 mm. Cat. Nos. a-851; 82767. The Lea Collection.
- Quartz*, var. rock crystal. Germany. Colorless. Two lenses. Cabochon cut; circular girdles. Size, 21 by 9 and 19 by 9 mm. Cat. Nos. a-799-800; 82772. The Lea Collection.
- Quartz*, var. prase. China. Color, green. Small, thin slab. Cat. Nos. b-725; 50378.
- Quartz*, var. rock crystal. Chestnuthill Township, Ashe County, North Carolina. Colorless. Rose cut; circular girdle. Size, 48 by 26 mm.; weight, 345 carats. Cat. Nos. a-793; 83735. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. rock crystal. Chestnuthill Township, Ashe County, North Carolina. Colorless. Rose cut; circular girdle. Size, 50 by 23 mm.; weight, 341.55 carats. Cat. Nos. a-794; 83735. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. rock crystal. Chestnuthill Township, Ashe County, North Carolina. Colorless. Brilliant cut; circular girdle. Size, 17 by 12 mm.; weight, 19.10 carats. Cat. Nos. a-795; 83725. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. rock crystal. Italy. Colorless. Step cut. Size, 13 by 10 mm. Cat. Nos. a-796; 82771. The Lea Collection.
- Quartz*, var. rock crystal. Switzerland. Colorless. Carved knob. Cat. Nos. b-752; 50355.
- Quartz*, var. rock crystal. Mursinsk, Russia. Colorless. Carved seal. Size, 7 cm. long. Cat. Nos. b-753; 51481.
- Quartz*, var. rock crystal. Siberia. Colorless. Knob for drawer. Size, 61 by 19 mm. Cat. Nos. a-797; 50356.
- Quartz*, var. rock crystal. Siberia. Colorless. Carved seal. Size, 58 mm. long. Cat. Nos. a-798; 51480.
- Quartz*, var. rock crystal. Japan. Colorless. Step-brilliant cut. Fifteen stones. Size of largest, 17 by 13 by 5 mm.; smallest, 7 by 7 by 5.5 mm. Cat. Nos. a-801-815; 82777. The Lea Collection.
- Quartz*, var. rock crystal. Japan. Colorless. Carved turtle. Cat. Nos. b-754; 83339. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. rock crystal. Colorless. Eighteen stones; step-brilliant and brilliant cuts. Size of largest, 39 by 21 by 13 mm.; smallest, 9 by 5 mm. Cat. Nos. a-817-834; 50368.
- Quartz*, var. rock crystal. Colorless. Sixteen stones, variously cut. Size of largest, 20 by 18 by 7 mm.; smallest, 10 by 5 mm. Cat. Nos. a-835-850; 82770. The Lea Collection.
- Quartz*, var. rock crystal. Colorless. Cat. Nos. a-852; 46818.
- Quartz*, var. rock crystal. Colorless. Seal. Size, 38 mm. long, base 9 mm. diameter. Cat. Nos. a-853; 46819.
- Quartz*, var. rock crystal. Colorless. Ball. Cat. Nos. b-755; 50261.
- Quartz*, var. rock crystal. Colorless. Two small intaglios. Cat. Nos. b-756-757; 47396. Deposited by Thomas Wilson.
- Quartz*, var. rock crystal. Colorless. Ball, 48 mm. diameter. Cat. Nos. c-453; 84262.
- Quartz*, var. rose. Paris, Maine. Color, light rose; opalescent. Cabochon cut; elliptical girdle. Size, 35 by 26 by 11 mm.; weight, 64.56 carats. Cat. Nos. a-985; 49185.
- Quartz*, var. rose. Stoneham, Maine. Color, light rose; opalescent. Cabochon cut; elliptical girdle. Size, 23 by 17 by 7 mm.; weight, 19.35 carats. Cat. Nos. a-286; 48485.
- Quartz*, var. rose. Albany, Oxford County, Maine. Color, rose. Ball, 42 mm. diameter. Cat. Nos. c-450; 83538. The Lea Collection; gift of Dr. L. T. Chamberlain.

- Quartz*, var. rose. McDowell County, North Carolina. Color, pale pink. Four rose-cut beads. Size, two 12 mm. diameter; two 10 mm. diameter. Cat. Nos. b-729-732; 84197.
- Quartz*, var. rose. France. Color, pink. Brilliant cut; elliptical girdle. Size, 19 by 15 by 11 mm.; weight, 17.98 carats. Cat. Nos. b-728; 46824.
- Quartz*, var. rose. Zwiesel, Bavaria. Color, light rose. Mixed cabochon cut; elliptical girdle. Size, 22 by 13 by 7 mm. Cat. Nos. a-987; 50363.
- Quartz*, var. rose. Zwiesel, Bavaria. Color, pale rose; opalescent. Step-brilliant cut; rectangular girdle. Size, 20 by 15 by 18.5 mm. Cat. Nos. a-988; 50363.
- Quartz*, var. rose. Ceylon. Color, pale rose. Brilliant cut; rectangular girdle. Size, 25 by 20 by 15 mm.; weight, 42.43 carats. Cat. Nos. a-989; 51138.
- Quartz*, var. sardonyx. Germany. Color, red and white banded. Three pieces. Cat. Nos. b-688-690. Gift of George F. Kunz.
- Quartz*, var. sardonyx. Eight small intaglios. Various colors. Cat. Nos. b-691-698; 50070.
- Quartz*, var. sardonyx. Color, reddish. Four small intaglios. Cat. Nos. b-699-702; 48474.
- Quartz*, var. sardonyx. Small cameo. Cat. Nos. b-703; 48479.
- Quartz*, var. sardonyx. Color, red. Two small elliptical discs. Cat. Nos. b-704-705; 46803.
- Quartz*, var. sardonyx. Color, red and white banded. Small intaglio. Cat. Nos. b-706; 84213.
- Quartz*, var. smoky. Mount Pisgah, Alexander County, North Carolina. Color, pale smoky brown. Rose cut; elliptical girdle. Size, 68 by 51 by 25 mm.; weight, 530.13 carats. Cat. Nos. a-873; 83734. The Lea Collection; gift of Dr. L. L. Chamberlain.
- Quartz*, var. smoky. Near Spring Mountain, Iredell County, North Carolina. Color, smoky brown. Rose; elliptical girdle. Size, 55 by 42 by 20 mm.; weight, 277.16 carats. Cat. Nos. a-874; 83726. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. smoky. Magnet Cove, Arkansas. Color, deep smoky brown. Rose cut; elliptical girdle. Size, 36 by 27 by 15 mm.; weight, 78.05 carats. Cat. Nos. a-877; 50351.
- Quartz*, var. smoky. Pikes Peak, Colorado. Color, smoky brown. Brilliant cut; circular girdle. Size, 35 by 27 mm.; weight, 159.45 carats. Cat. Nos. a-881; 50104.
- Quartz*, var. smoky. Near Florissant, Colorado. Color, smoky brown. Rose cut; elliptical girdle. Size, 73 by 54 by 33 mm.; weight, 766.05 carats. Cat. Nos. a-872; 83353. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. smoky. Brazil. Color, brown. Brilliant cut; circular girdle. Size, 25 by 13.5 mm.; weight, 43.52 carats. Cat. Nos. a-894; 47848.
- Quartz*, var. smoky. Scotland. Color, yellowish brown. Step-brilliant cut; octagonal girdle. Size, 22 by 13 mm.; weight, 34.20 carats. Cat. Nos. a-882; 50350.
- Quartz*, var. smoky. Scotland. Color, yellowish brown. Step-brilliant cut; elliptical girdle. Size, 17 by 13 by 10 mm. Cat. Nos. a-883; 50350.
- Quartz*, var. smoky. Aberdeenshire, Scotland. Color, pale smoky brown. Step-brilliant cut; rectangular girdle. Size, 19 by 16 by 7 mm. Cat. Nos. a-884; 82766. The Lea Collection.
- Quartz*, var. smoky. Aberdeenshire, Scotland. Color, pale smoky brown. Step-brilliant cut; rectangular girdle. Size, 14 by 12 by 6 mm. Cat. Nos. a-885; 82766. The Lea Collection.
- Quartz*, var. smoky. Switzerland. Color, pale smoky brown. Step-brilliant cut; elliptical girdle. Size, 51 by 40 by 21 mm.; weight, 261.95 carats. Cat. Nos. a-886; 50354.

- Quartz*, var. smoky. Australia. Color, reddish brown. Step-brilliant cut; elliptical girdle. Size, 45 by 34 by 18 mm.; weight, 164.88 carats. Cat. Nos. a-893; 50353.
- Quartz*, var. smoky. Ceylon. Color, yellowish brown. Rose cut; rectangular girdle. Size, 31 by 26 by 18 mm.; weight, 94.65 carats. Cat. Nos. a-888; 82769. The Lea Collection.
- Quartz*, var. smoky. Ceylon. Color, smoky brown. Rose cut; elliptical girdle. Size, 39 by 30 by 15 mm.; weight, 124.98 carats. Cat. Nos. a-887; 82769. The Lea Collection.
- Quartz*, var. smoky. Ceylon. Color, smoky brown. Step-brilliant cut; rectangular girdle. Size, 18 by 13 by 4 mm. Cat. Nos. a-889; 82769. The Lea Collection.
- Quartz*, var. smoky. Ceylon. Color, pale smoky brown. Step cut; square girdle. Size, 27 by 12 mm.; weight, 61.42 carats. Cat. Nos. a-890; 82769. The Lea Collection.
- Quartz*, var. smoky. Ceylon. Color, pale brown. Step-brilliant cut; circular girdle. Size, 17 by 11 mm. Cat. Nos. a-891; 82773. The Lea Collection.
- Quartz*, var. smoky. Ceylon. Color, pale brown. Step-brilliant cut; rectangular girdle. Size, 15 by 10 by 6 mm. Cat. Nos. a-892; 82773. The Lea Collection.
- Quartz*, var. smoky. Australia. Color, dark brown. Carved seal handle. Size, 5.5 cm. long. Cat. Nos. b-727; 50270.
- Quartz*, var. smoky. Color, smoky brown. Step-brilliant cut. Six stones. Size of largest, 35 by 28 by 14 mm.; of smallest, 12 by 10 by 5 mm. Cat. Nos. 2-895-900; 50368.
- Quartz*, var. smoky. Color, brown. Rose cut. Size, 49 by 35 by 22 mm.; weight, 235.84 carats. Cat. Nos. a-901; 82770. The Lea Collection.
- Quartz*, var. smoky. Color, brown. Tetragonal prism. Size, 24 by 11 mm. Cat. Nos. a-902; 46807.
- Quartz*, var. smoky. Color, brown. Two cuff buttons. Size, 19 mm. diameter. Cat. Nos. a-903-904; 50271.
- Quartz*, var. smoky. Color, pale brown. Step-brilliant cut; square girdle. Size, 25 by 14 mm. Cat. Nos. a-905; 82770. The Lea Collection.
- Quartz*, var. smoky. Color, brown. Step-brilliant cut. Four stones, various sizes. Cat. Nos. a-906-909; 82770. The Lea Collection.
- Quartz*, var. smoky. Color, reddish brown. Step-brilliant cut; intaglio. Size, 18 by 14 by 7 mm. Cat. Nos. a-910; 83533. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Quartz*, var. smoky. Mount Mica, Paris, Maine. Color, greenish brown. Step-brilliant cut; elliptical girdle. Size, 18 by 15 by 11 mm. Cat. Nos. a-876; 50352.
- Quartz*, var. smoky. Stoneham, Maine. Color, deep smoky brown. Step-brilliant cut; square girdle. Size, 27 by 14 mm.; weight, 61.44 carats. Cat. Nos. a-875; 84191.
- Quartz*, var. smoky. Fairfax Court House, Virginia. Color, smoky brown. Three gems. Brilliant cut; 2 elliptical girdles, 1 rectangular. Sizes, 16 by 13 by 7 mm.; 15 by 10 by 6 mm.; 11 by 8 by 5 mm. Cat. Nos. a-878-880; 47843.
- Rhodonite*. Cummington, Massachusetts. Color, red. Flat ellipsoid. Size, 36 by 26 by 12 mm. Cat. Nos. a-645; 46820.
- Rhodonite*. Trotter mine, Franklin, New Jersey. Color, red. Cabochon cut; elliptical girdle. Size, 53 by 40 by 9 mm. Cat. Nos. a-646; 50279.
- Rhodonite*. Selderkowa, Ural Mountains, Siberia. Color, red. Two sleeve buttons. Size, 35 mm. diameter. Cat. Nos. 647-648; 51480.
- Rhodonite*. Ural Mountains, Siberia. Color, red. Necklace of 47 rose-cut beads. Size, 10 mm. diameter. Cat. Nos. 2-649; 50111.

- Rhodonite*. Ural Mountains, Siberia. Color, red with black inclusions. Ash tray. Size, 14.5 by 8.2 cm. Cat. Nos. a-650; 51135.
- Rhodonite*. Ural Mountains, Siberia. Color, reddish. Slab. Size, 11 by 7.7 cm. Cat. Nos. b-850; 50396.
- Rock crystal*, see Quartz.
- Ruby*, see Corundum.
- Rutile*. Hiddenite, Alexander County, North Carolina. Color, dark red, nearly opaque. Brilliant cut; circular girdles. Five gems. Average size, 5 by 3 mm.; weight, 2.86 carats. Cat. Nos. a-601-605; 46821. Gift of J. D. Dana.
- Samarskite*. Mitchell County, North Carolina. Color, black opaque. Brilliant cut; circular girdle. Size, 12 by 6 mm.; weight, 6.39 carats. Cat. Nos. a-588; 83744. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Sapphire*, see Corundum.
- Sardonyx*, see Quartz.
- Satinspar*, see Gypsum.
- Serpentine*. Newburyport, Massachusetts. Color, light and dark green. Neeklae of 51 beads. Average size, 12 mm. diameter. Cat. Nos. a-629; 50253.
- Serpentine*. Newburyport, Massachusetts. Color, dark and light green. Carved ornament. Cat. Nos. b-923; 83341. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Serpentine*, var. bowenite. Smithfield, Rhode Island. Color, light green. Ornamental piece. Cat. Nos. b-924; 46619.
- Serpentine*. Cold Springs, New York. Color, light and dark green mottled. Cat. Nos. b-925; 12370. Gift of E. Seymour.
- Serpentine*. Montville, New Jersey. Color, green and white. Cat. Nos. b-926; 47656.
- Serpentine*. Near Montville, Morris County, New Jersey. Color, green. Diamond-shaped slab. Size, 10.8 by 7.1 by 3.5 cm. Cat. Nos. b-927; 18848.
- Serpentine*. Montville, New Jersey. Color, greenish yellow. Two large pieces. Cat. Nos. b-928-929; 47656.
- Serpentine*. Montville, New Jersey. Color, dark green. Cat. Nos. b-930; 47657.
- Serpentine*. Marshall's quarry, Westchester, Pennsylvania. Color, light green with chromite. Prism. Cat. Nos. b-931; 49852. The Lea Collection.
- Serpentine*. Marshall's quarry, Westchester, Pennsylvania. Color, greenish black. Rectangular block. Size, 57 by 43 by 12 mm. Cat. Nos. b-932; 49852. The Lea Collection.
- Serpentine*. Glenn Mill, Delaware County, Pennsylvania. Color, light green. Cat. Nos. b-933; 50920.
- Serpentine*. Fritztown, Berks County, Pennsylvania. Color, yellowish green. Polished mass. Cat. Nos. b-934; 9775. Gift of H. W. Hollenbush.
- Serpentine*. Harford County, Maryland. Color, green. Polished slab. Cat. Nos. b-937; 50924. The Lea Collection.
- Serpentine*. Harford County, Maryland. Color, dark green. Rectangular block. Cat. Nos. b-938; 84239.
- Serpentine*. San Francisco, California. Color, grayish olive green. Flower ornament. Cat. Nos. a-630; 46000. Gift of Dr. R. E. C. Stearns.
- Serpentine*. Cornwall, England. Color, dark red and green. Cat. Nos. b-939; 13075.
- Serpentine*. Lizard Point, Cornwall, England. Color, dark green. Paper weight. Cat. Nos. a-631; 84173.
- Serpentine*. India. Color, deep green. Thin slab of williamsite. Cat. Nos. b-941; 46574.
- Serpentine*. China. Color, dark green. Lotus-leaf paper weight. Cat. Nos. b-942; 84240.

- Serpentine*. Color, greenish gray with black veins. Vase. Size, 20 cm. high. Cat. Nos. b-943; 84241. Gift of W. H. Abbott.
- Serpentine*, var. bowenite. Color, dark olive green. Flat ellipsoid. Size, 28 by 22 by 7 mm. Cat. Nos. a-626; 84171. Gift of George F. Kunz.
- Serpentine*, var. bowenite. Smithfield, Rhode Island. Color, pale yellow. Cabochon cut; circular girdle. Size, 9.5 by 6 mm. Cat. Nos. a-627; 84172.
- Serpentine*, var. williamsite. Wood's mine, Lancaster County, Pennsylvania. Color, bright green. Cabochon cut; circular girdle. Size, 10 by 7 mm. Cat. Nos. a-628; 48920. Gift of Dr. Robert H. Lamborn.
- Serpentine*, var. williamsite. Texas, Lancaster County, Pennsylvania. Color, grass green. Small piece. Cat. Nos. b-935; 82515. The U. S. Geological Survey.
- Silver*. Near Globe, Pinal County, Arizona. Nugget. Weight, 448 ounces. Cat. Nos. e-454; 83747. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Smithsonite*. Marion County, Arkansas. Color, lemon yellow. Two specimens. Cabochon cut; elliptical girdle. Size, 26 by 22 by 8 mm. and 18 by 12 by 5 mm. Cat. Nos. a-594-595; 48930.
- Smithsonite*. Laurium, Greece. Color, grass green banded with darker green. Cabochon cut; elliptical girdle. Size, 25 by 22 by 13 mm. Cat. Nos. a-596; 45022.
- Sodalite*. Litchfield, Maine. Color, deep blue. Cabochon cut. Size, 14 by 12 by 5 mm.; weight, 4.33 carats. Cat. Nos. a-591; 47926.
- Sodalite*. Ice River, near Kicking Horse Pass, British Columbia. Color, blue with green. Cat. Nos. b-854; 51153.
- Sodalite*. Andes Mountains, Chili. Color, blue. Polished slab of rock. Size, 66 by 36 by 7 mm. Cat. Nos. a-592; 84113.
- Spessartite*, see Garnet.
- Sphalerite*. Picos de Europa, Santander, Spain. Color, resin yellow. Brilliant cut; square girdle. Size, 12 by 9 mm.; weight, 12.15 carats. Cat. Nos. a-589; 50282.
- Sphalerite*. Picos de Europa, Santander, Spain. Color, honey yellow. Rose cut; circular girdle. Size, 11 by 6.5 mm.; weight, 5.87 carats. Cat. Nos. a-590; 50282.
- Spinel*. Ceylon. Color, clear violet. Brilliant cut; square girdle. Size, 8 by 8 by 5 mm.; weight, 1.82 carats. Cat. Nos. 596; 50335.
- Spinel*. Ceylon. Color, violet. Step-brilliant cut; rectangular girdle. Size, 7 by 6 by 4 mm.; weight, 1.15 carats. Cat. Nos. 597; 50335.
- Spinel*. Ceylon. Color, dark violet. Step-brilliant cut; square girdle. Size, 6 by 6 by 4 mm.; weight, 1.01 carats. Cat. Nos. 598; 50335.
- Spinel*. Ceylon. Color, bottle green. Brilliant cut; square girdle. Size, 9 by 9 by 4 mm.; weight, 2.34 carats. Cat. Nos. 599; 50262.
- Spinel*. Ceylon. Color, deep bluish green. Table cut; square girdle. Size, 7 by 7 by 4 mm.; weight, 1.31 carats. Cat. Nos. 600; 50262.
- Spinel*. Ceylon. Color, violet. Table cut; square girdle. Size, 7 by 6 by 4 mm. weight, 1.32 carats. Cat. Nos. 601; 50262.
- Spinel*. Ceylon. Color, light violet. Table cut; rectangular girdle. Size, 7 by 5 by 3 mm.; weight, 0.90 carat. Cat. Nos. 602; 50262.
- Spinel*. Ceylon. Color, dark bluish green. Table cut; rectangular girdle. Size, 9 by 7 by 4 mm.; weight, 2.05 carats. Cat. Nos. 608; 82897. The Lea Collection.
- Spinel*. Ceylon. Color, deep wine red. Step-brilliant cut; elliptical girdle. Size, 9 by 8 by 4 mm.; weight, 1.83 carats. Cat. Nos. 609; 82895. The Lea Collection.
- Spinel*. Ceylon. Color, bright red. Step-brilliant cut; rectangular girdle. Size, 7.5 by 7 by 4 mm.; weight, 1.60 carats. Cat. Nos. 610; 82897. The Lea Collection.
- Spinel*. Ceylon. Color, bluish green. Step-brilliant cut; elliptical girdle. Size, 8 by 7 by 5 mm.; weight, 1.32 carats. Cat. Nos. 611; 82897. The Lea Collection.

- Spinel*. Ceylon. Color, dark violet. Step-brilliant cut; circular girdle. Size, 7.5 by 4 mm.; weight, 1.42 carats. Cat. Nos. 612; 82897. The Lea Collection.
- Spinel*. Ceylon. Color, ruby red. Cabochon cut; circular girdle. Size, 6 by 3 mm.; weight, 1 carat. Cat. Nos. 603; 50262.
- Spinel*. Ceylon. Color, bright red. Cabochon cut. Size, 5 by 3 mm.; weight, 0.45 carat. Cat. Nos. 604; 50262.
- Spinel*. Ceylon. Color, ruby red. Step-brilliant cut; square girdle. Size, 5 by 5 by 3 mm.; weight, 0.42 carat. Cat. Nos. 605; 83527. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Spinel*. Ceylon. Color, reddish violet. Trap cut; rectangular girdle. Size, 10 by 8 by 5 mm.; weight, 3.07 carats. Cat. Nos. 606; 82897. The Lea Collection.
- Spinel*. Ceylon. Color, violet. Step-brilliant cut; rectangular girdle. Size, 9 by 7 by 5 mm.; weight, 1.77 carats. Cat. Nos. 607; 82897. The Lea Collection.
- Spinel*. Ceylon. Color, claret. Step-brilliant cut; square girdle. Size, 7 by 7 by 4 mm.; weight, 1.45 carats. Cat. Nos. 613; 82897. The Lea Collection.
- Spinel*. Ceylon. Color, yellowish green. Step-brilliant cut; rectangular girdle. Size, 7 by 6 by 5 mm.; weight, 1.43 carats. Cat. Nos. 614; 82897. The Lea Collection.
- Spinel*. Ceylon. Colors, green, wine-red, rose-red, violet-red, violet-blue, wine-brown. Step-brilliant cut. Six gems. Average size, 6 by 5 by 4 mm.; total weight, 4.55 carats. Cat. Nos. 615-620; 84047.
- Spinel*. East Indies. Color, deep red. Table cut; rectangular girdle. Size, 8.5 by 7 by 4 mm.; weight, 2.74 carats. Cat. Nos. 621; 50336.
- Spinel*. East Indies. Color, deep red. Eleven polished pebbles. Average sizes, 15 by 11 by 5—8 by 6 by 4 mm.; total weight, 47.80 carats. Cat. Nos. 622-632.
- Spodumene*. Brazil. Color, yellow. Brilliant cut; circular girdle. Size, 6.5 by 4 mm.; weight, 0.94 carat. Cat. Nos. a-252; 50325.
- Spodumene*. Brazil. Color, yellow. Brilliant cut; rectangular girdle. Size, 6.5 by 5.5 by 3 mm.; weight, 0.71 carat. Cat. Nos. a-253; 84092.
- Spodumene*. Brazil. Color, greenish yellow. Brilliant cut; circular girdle. Size, 4.5 by 3 mm.; weight, 0.30 carat. Cat. Nos. a-254; 84092.
- Spodumene*, var. hiddenite. Stony Point, Alexander County, North Carolina. Color, emerald green. Brilliant cut; circular girdle. Size, 6 by 3.5 mm.; weight, 0.68 carat. Cat. Nos. a-255; 83732. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Spodumene*, var. hiddenite. Stony Point, Alexander County, North Carolina. Color, emerald green. Brilliant cut; rectangular girdle. Size, 5.5 by 4 by 2.5 mm.; weight 0.36 carat. Cat. Nos. a-256; 83732. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Spodumene*, var. hiddenite. Stony Point, Alexander County, North Carolina. Color, emerald green. Step-brilliant cut; rectangular girdle. Size, 4 by 3.5 by 2 mm.; weight, 0.21 carat. Cat. Nos. a-257; 83732. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Spodumene*, var. hiddenite. Stony Point, Alexander County, North Carolina. Color, light green. Step-brilliant cut; rectangular girdle. Size, 5.5 by 5 by 3.5 mm.; weight, 0.66 carat. Cat. Nos. a-258; 84093.
- Spodumene*, var. hiddenite. Stony Point, Alexander County, North Carolina. Color, light green. Step-brilliant cut; rectangular girdle. Size, 5.5 by 5 by 3 mm.; weight, 0.52 carat. Cat. Nos. a-259; 84093.
- Spodumene*, var. hiddenite. Stony Point, Alexander County, North Carolina. Color, light green. Step-brilliant cut; rectangular girdle. Size, 7 by 4 by 3 mm.; weight, 0.57 carat. Cat. Nos. a-260; 84093.
- Spodumene*, var. hiddenite. Stony Point, Alexander County, North Carolina. Color, light green. Brilliant cut; square girdle. Size, 5 by 3 mm.; weight, 0.45 carat. Cat. Nos. a-261; 84093.

Stalagnite, see Carbonate of lime.

Sunstone, see Oligoclase.

Tablet of jasper, chalcedony, etc. Ekaterinburg, Siberia. Cat. Nos. b-829; 47853.

A tablet carved to represent fruit: Red currants, carnelian; white currants, rock crystal; blackberries, black chalcedony and serpentine; raspberries, rhodonite and amethyst; red cherries, carnelian; black cherries, black chalcedony; leaves, serpentine; base, jasper and black chalcedony.

Talc. India. Color, grayish green. Small carved box. Cat. Nos. b-911; 84237.

Talc. India. Grayish green. Carving. Cat. Nos. b-912; 84237.

Thomsonite. Grand Marais, Minnesota. Seventeen polished pieces and pebbles. Cat. Nos. c-433-449; 84263.

Thulite. Arendal, Norway. Color, brick red. Two polished slabs. Cat. Nos. b-855; 50086.

Titanite. Brewster, Putnam County, New York. Color, yellowish brown. Step-brilliant cut; circular girdle. Size, 13 by 12 by 8 mm.; weight, 8.30 carats. Cat. Nos. a-550; 51131.

Titanite. Brewster, Putnam County, New York. Color, yellow. Brilliant cut; circular girdle. Size, 9.5 by 5.5 mm.; weight, 2.49 carats. Cat. Nos. a-551; 83345. The Lea Collection; gift of Dr. L. T. Chamberlain.

Titanite. Bridgewater, Delaware County, Pennsylvania. Color, dark greenish brown. Step-brilliant cut; rectangular girdle. Size, 11 by 8.5 by 6 mm.; weight, 4.22 carats. Cat. Nos. a-553; 49517. Gift of Dr. W. H. Forwood.

Titanite. Zillerthal, Tyrol. Color, brownish green. Brilliant cut; rectangular girdle. Size, 12 by 10.5 by 7.5 mm.; weight, 6.02 carats. Cat. Nos. a-548; 50322.

Titanite. Zillerthal, Tyrol. Color, greenish yellow. Step-brilliant cut; rectangular girdle. Size, 10 by 7 by 4 mm.; weight, 2.61 carats. Cat. Nos. a-549; 84101.

Topaz. Stoneham, Maine. Colorless. Brilliant cut; square girdle. Size, 9 by 8.5 by 6 mm.; 2.80 carats. Cat. Nos. a-324; 47925.

Topaz. Baldface Mountain, Chatham, New Hampshire. Colorless. Brilliant cut; circular girdle. Size, 15 by 9 mm.; weight, 12.05 carats. Cat. Nos. a-323; 51191.

Topaz. Near Pikes Peak, Colorado. Color, cinnamon brown. Step-brilliant cut; rectangular girdle. Size, 19 by 14 by 6 mm.; weight, 14.27 carats. Cat. Nos. a-318; 82831. The Lea Collection.

Topaz. Near Pikes Peak, Colorado. Colorless. Brilliant cut; rectangular girdle. Size, 17 by 12 by 10 mm.; weight, 17.34 carats. Cat. Nos. a-319; 84094.

Topaz. Thirty miles southwest of Salt Lake City, Utah. Colorless. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.42 carats. Cat. Nos. a-320; 47842.

Topaz. Thirty miles southwest of Salt Lake City, Utah. Colorless. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.33 carats. Cat. Nos. a-320; 47842.

Topaz. Thirty miles southwest of Salt Lake City, Utah. Colorless. Brilliant cut. Size, 5.5 by 4 mm.; weight, 0.87 carat. Cat. Nos. a-322; 82830. The Lea Collection.

Topaz. Minas Geraes, Brazil. Color, honey yellow. Step-brilliant cut; elliptical girdle. Size, 13.5 by 10 by 5.5 mm.; weight, 5.80 carats. Cat. Nos. a-270; 50284.

Topaz. Minas Geraes, Brazil. Color, honey yellow. Step-brilliant cut; square girdle. Size, 10 by 5.5 mm.; weight, 3.80 carats. Cat. Nos. a-271; 50284.

Topaz. Minas Geraes, Brazil. Color, honey yellow. Step-brilliant cut; elliptical girdle. Size, 11 by 8 by 5 mm.; weight, 3.16 carats. Cat. Nos. a-272; 50284.

Topaz. Minas Geraes, Brazil. Color, honey yellow. Step-brilliant cut; rectangular girdle. Size, 11 by 6 by 3.5 mm.; weight, 2.02 carats. Cat. Nos. a-273; 50284.

Topaz. Minas Geraes, Brazil. Color, honey yellow. Step-brilliant cut; square girdle. Size, 9 by 4 mm.; weight, 2.20 carats. Cat. Nos. a-274; 50284.

Topaz. Minas Geraes, Brazil. Color, wine yellow. Step cut; rectangular girdle. Size, 10 by 6 by 3 mm.; weight, 1.76 carats. Cat. Nos. a-275; 50384.

- Topaz.* Minas Geraes, Brazil. Color, honey yellow. Step-brilliant cut; pear-shaped girdle. Size, 9 by 8 by 4 mm.; weight, 1.62 carats. Cat. Nos. a-276; 50284.
- Topaz.* Minas Geraes, Brazil. Color, wine yellow. Step-brilliant cut; circular girdle. Size, 7.5 by 4.5 mm.; weight, 1.67 carats. Cat. Nos. a-277; 50284.
- Topaz.* Minas Geraes, Brazil. Color, wine yellow. Step-brilliant cut; rectangular girdle. Size, 8 by 5 by 4 mm.; weight, 1.34 carats. Cat. Nos. a-278; 50284.
- Topaz.* Minas Geraes, Brazil. Color, wine yellow. Rose cut; elliptical girdle. Size, 7 by 5 by 4 mm.; weight, 0.91 carat. Cat. Nos. a-279; 50284.
- Topaz.* Minas Geraes, Brazil. Color, pink. Rose cut; elliptical girdle. Size, 25 by 17 by 3.5 mm.; weight, 14.34 carats. Cat. Nos. a-280; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 13 by 11.5 by 5 mm.; weight, 6.38 carats. Cat. Nos. a-281; 50283.
- Topaz.* Minas Geraes, Brazil. Color, amethystine. Step-brilliant cut; elliptical girdle. Size, 14 by 10 by 5 mm.; weight, 5.51 carats. Cat. Nos. a-282; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Rose cut; pear-shaped girdle. Size, 14 by 10 by 6 mm.; weight, 5.43 carats. Cat. Nos. a-283; 50283.
- Topaz.* Minas Geraes, Brazil. Color, rose. Step-brilliant cut; elliptical girdle. Size, 11 by 10 by 4 mm.; weight, 3.93 carats. Cat. Nos. a-284; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; square girdle. Size, 10 by 4.5 mm.; weight, 3.31 carats. Cat. Nos. a-285; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; pear-shaped girdle. Size, 16 by 6.5 by 4 mm.; weight, 2.84 carats. Cat. Nos. a-286; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 5 mm.; weight, 3 carats. Cat. Nos. a-287; 50283.
- Topaz.* Minas Geraes, Brazil. Color, wine. Step-brilliant cut; elliptical girdle. Size, 12 by 9 by 5.5 mm.; weight, 3.51 carats. Cat. Nos. a-288; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 12 by 7.5 by 4 mm.; weight, 2.78 carats. Cat. Nos. a-289; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 9 by 8 by 4 mm.; weight, 2.25 carats. Cat. Nos. a-290; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step cut; rectangular girdle. Size, 10 by 8 by 2.5 mm.; weight, 1.87 carats. Cat. Nos. a-291; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 12 by 8 by 4 mm.; weight, 2.89 carats. Cat. Nos. a-292; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; pear-shaped girdle. Size, 15 by 6 by 4 mm.; weight, 2.53 carats. Cat. Nos. a-293; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 9 by 8 by 5 mm.; weight, 2.72 carats. Cat. Nos. a-294; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 9 by 7.5 by 4 mm.; weight, 2.10 carats. Cat. Nos. a-295; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 11.5 by 7 by 5 mm.; weight, 2.15 carats. Cat. Nos. a-296; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 5 mm.; weight, 2.78 carats. Cat. Nos. a-297; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 10 by 7.5 by 4.5 mm.; weight 2.37 carats. Cat. Nos. a-298; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 10 by 7.5 by 4 mm.; weight, 2.23 carats. Cat. Nos. a-299; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 9 by 8 by 3 mm.; weight, 1.83 carats. Cat. Nos. a-300; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink wine. Step cut; rectangular girdle. Size, 11 by 5.5 by 4 mm.; weight, 1.94 carats. Cat. Nos. a-301; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 11 by 7 by 4 mm.; weight, 2.52 carats. Cat. Nos. a-302; 50283.

- Topaz.* Minas Geraes, Brazil. Color, pink. Step cut; elliptical girdle. Size, 7 by 6 by 6 mm.; weight, 2.64 carats. Cat. Nos. a-303; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 8.5 by 7 by 4 mm.; weight, 1.63 carats. Cat. Nos. a-304; 50283.
- Topaz.* Minas Geraes, Brazil. Wine. Step-brilliant cut; square girdle. Size, 7 by 4 mm.; weight, 1.70 carats. Cat. Nos. a-305; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 8 by 6.5 by 4 mm.; weight, 1.45 carats. Cat. Nos. a-306; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 9 by 6 by 4 mm.; weight, 1.49 carats. Cat. Nos. a-307; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Brilliant cut; square girdle. Size, 7 by 5 mm.; weight, 1.72 carats. Cat. Nos. a-308; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 8.5 by 6 by 4 mm.; weight, 1.43 carats. Cat. Nos. a-309; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Cat. Nos. a-310; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 9 by 5.5 by 3 mm.; weight, 1.05 carats. Cat. Nos. a-311; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 7 by 5.5 by 4 mm.; weight, 1.27 carats. Cat. Nos. a-312; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 7.5 by 5 by 3 mm.; weight, 0.99 carat. Cat. Nos. a-313; 50283.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 14 by 8 by 6.5 mm.; weight, 5.63 carats. Cat. Nos. a-314; 84095.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; elliptical girdle. Size, 15 by 9 by 4 mm.; weight, 4.45 carats. Cat. Nos. a-315; 84095.
- Topaz.* Minas Geraes, Brazil. Color, pink. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 4 mm.; weight, 2.82 carats. Cat. Nos. a-316; 84095.
- Topaz.* Minas Geraes, Brazil. Color, wine. Step-brilliant cut; rectangular girdle. Size, 8 by 6.5 by 5 mm.; weight, 2.20 carats. Cat. Nos. a-317; 84095.
- Topaz.* Japan. Colorless. Brilliant cut; circular girdle; weight, 18 carats. Cat. Nos. c-467; 84722.
- Topaz.* Takayama, Japan. Colorless. Brilliant cut; circular girdle. Size, 22 by 16.5 mm.; weight, 49.55 carats. Cat. Nos. a-268; 84097.
- Topaz.* Scotland. Color, pale blue. Step cut; square girdle. Size, 10.5 by 10 by 5 mm.; weight, 3.44 carats. Cat. Nos. a-269; 82832. The Lea Collection.
- Topaz.* Ural Mountains, Siberia. Color, aquamarine. Step cut; rectangular girdle. Size, 31 by 28 by 20 mm.; weight, 151.67 carats. Cat. Nos. a-262; 50286.
- Topaz.* Siberia. Colorless. Step cut; rectangular girdle. Size, 19 by 11 by 7 mm.; weight, 12.50 carats. Cat. Nos. a-263; 50285.
- Topaz.* Siberia. Colorless. Brilliant cut; elliptical girdle. Size, 12 by 9 by 6 mm.; weight, 4.06 carats. Cat. Nos. a-264; 50285.
- Topaz.* Siberia. Color, pale blue. Step-brilliant cut; elliptical girdle. Size, 10 by 8 by 3 mm.; weight, 2 carats. Cat. Nos. a-265; 50285.
- Topaz.* Siberia. Color, pale blue. Step-brilliant cut; elliptical girdle. Size, 13 by 9 by 7.5 mm.; weight, 7.09 carats. Cat. Nos. a-266; 84096.
- Topaz.* Siberia. Colorless. Brilliant cut; circular girdle. Size, 8 by 6 mm.; weight, 2.57 carats. Cat. Nos. a-267; 84096.
- Tourmaline.* Mount Mica, Paris, Maine. Color, dark green. Brilliant cut; square girdle. Size, 23-22.8 by 17 mm.; weight, 57.03 carats. Cat. Nos. a-156; 83739. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Tourmaline.* Mount Mica, Paris, Maine. Color, wine red. Brilliant cut; circular girdle. Size, 18 by 12 mm.; weight, 17.94 carats. Cat. Nos. a-157; 83536. The Lea Collection; gift of Dr. L. T. Chamberlain.

- Tourmaline.* Mount Mica, Paris, Maine. Color, sherry. Brilliant cut; circular girdle. Size, 17 by 11 mm.; weight, 16.31 carats. Cat. Nos. a-158; 83536. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Tourmaline.* Paris, Maine. Color, deep blue. Brilliant cut; circular girdle. Size, 11.5 by 6.5 mm.; weight, 4.35 carats. Cat. Nos. a-159; 51192.
- Tourmaline.* Paris, Maine. Color, light green. Step cut; square girdle. Size, 12 by 8 mm.; weight, 7.74 carats. Cat. Nos. a-160; 51243.
- Tourmaline.* Paris, Maine. Color, violet red. Step cut; square girdle. Size, 10.05 by 10 by 6 mm.; weight, 4.01 carats. Cat. Nos. a-161; 51243.
- Tourmaline.* Paris, Maine. Color, violet red. Brilliant cut; rectangular girdle. Size, 12 by 10 by 6 mm.; weight, 4.36 carats. Cat. Nos. a-162; 51253.
- Tourmaline.* Paris, Maine. Color, bluish green. Step cut; rectangular girdle. Size, 11 by 9 by 6 mm.; weight, 4.78 carats. Cat. Nos. a-163; 51243.
- Tourmaline.* Paris, Maine. Color, pale green. Step cut; rectangular girdle. Size, 10.5 by 7 by 4.5 mm.; weight, 2.36 carats. Cat. Nos. a-164; 51243.
- Tourmaline.* Paris, Maine. Color, rose red. Step-brilliant cut; rectangular girdle. Size, 8.5 by 6.5 by 4 mm.; weight, 1.46 carats. Cat. Nos. a-165; 51253.
- Tourmaline.* Paris, Maine. Color, dark blue. Step cut; rectangular girdle. Size, 8 by 6 by 3 mm.; weight, 1.03 carats. Cat. Nos. a-166; 51243.
- Tourmaline.* Paris, Maine. Color, faint bluish. Step-brilliant cut; rectangular girdle. Size, 6.5 by 5.5 by 5 mm.; weight, 1.07 carats. Cat. Nos. a-167; 51243.
- Tourmaline.* Paris, Maine. Color, lavender blue. Brilliant cut; square girdle. Size, 6 by 5 mm.; weight, 1.20 carats. Cat. Nos. a-168; 51243.
- Tourmaline.* Paris, Maine. Color, black, opaque. Brilliant cut; rectangular girdle. Size, 6 by 4 by 3 mm.; weight, 0.53 carat. Cat. Nos. a-169; 51243.
- Tourmaline.* Paris, Maine. Particolored, half green, half colorless. Step-brilliant cut; rectangular girdle. Size, 13 by 9 by 4.5 mm.; weight, 3.32 carats. Cat. Nos. a-170; 83347. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Tourmaline.* Paris, Maine. Particolored, half rose, half wine. Step cut; square girdle. Size, 9 by 8.5 by 4 mm.; weight, 2.22 carats. Cat. Nos. a-171; 83347. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Tourmaline.* Paris, Maine. Particolored, rose and green. Step-brilliant cut; rectangular girdle. Size, 19 by 11 by 7 mm.; weight, 11.67 carats. Cat. Nos. a-172; 50305.
- Tourmaline.* Paris, Maine. Color, light green. Step cut; rectangular girdle. Size, 16 by 10 by 6 mm.; weight, 7.50 carats. Cat. Nos. a-173; 50305.
- Tourmaline.* Paris, Maine. Color, bluish green. Brilliant cut; circular girdle. Size, 12 by 6 mm.; weight, 5.41 carats. Cat. Nos. a-174; 50305.
- Tourmaline.* Paris, Maine. Color, light green. Step cut; rectangular girdle. Size, 11 by 9 by 6 mm.; weight, 3.28 carats. Cat. Nos. a-175; 50305.
- Tourmaline.* Paris, Maine. Color, light green. Step cut; rectangular girdle. Size, 10.5 by 8 by 5 mm.; weight, 3.28 carats. Cat. Nos. a-176; 50305.
- Tourmaline.* Paris, Maine. Color, ruby red. Step cut; square girdle. Size, 9.5 by 4 mm.; weight, 2.66 carats. Cat. Nos. a-177; 50305.
- Tourmaline.* Paris, Maine. Color, pale green. Step cut; rectangular girdle. Size, 11 by 7 by 5 mm.; weight, 3.01 carats. Cat. Nos. a-178; 50305.
- Tourmaline.* Paris, Maine. Color, pale wine. Step cut; square girdle. Size, 9 by 4 mm.; weight, 2.23 carats. Cat. Nos. a-179; 50305.
- Tourmaline.* Paris, Maine. Color, dark blue. Step cut; rectangular girdle. Size, 6.5 by 5 by 2.5 mm.; weight, 0.63 carat. Cat. Nos. a-180; 50305.
- Tourmaline.* Paris, Maine. Colorless. Brilliant cut; square girdle. Size, 8 by 6 mm.; weight, 2.03 carats. Cat. Nos. a-181; 50304.
- Tourmaline.* Paris, Maine. Colorless. Step-brilliant cut; rectangular girdle. Size, 8 by 5.5 by 3 mm.; weight, 1.03 carats. Cat. Nos. a-182; 50304.

- Tourmaline.* Paris, Maine. Color, pale pink. Brilliant cut; circular girdle. Size, 6.5 by 4 mm.; weight, 1.07 carats. Cat. Nos. a-183; 50304.
- Tourmaline.* Paris, Maine. Color, green. Step cut; square girdle. Size, 6 by 3 mm.; weight, 0.93 carat. Cat. Nos. a-184; 50304.
- Tourmaline.* Paris, Maine. Colorless. Step-brilliant cut; rectangular girdle. Size, 8 by 5 by 3 mm.; weight, 0.82 carat. Cat. Nos. a-185; 50304.
- Tourmaline.* Paris, Maine. Color, deep green. Step cut; square girdle. Size, 5.5 by 3 mm.; weight, 0.64 carat. Cat. Nos. a-186; 50304.
- Tourmaline.* Paris, Maine. Colorless. Step-brilliant cut; rectangular girdle. Size, 6.5 by 4.5 by 3 mm.; weight, 0.62 carat. Cat. Nos. a-187; 50304.
- Tourmaline.* Paris, Maine. Colorless. Step-brilliant cut; rectangular girdle. Size, 7 by 5 by 3 mm.; weight 0.71 carat. Cat. Nos. a-188; 50304.
- Tourmaline.* Paris, Maine. Colorless. Step-brilliant cut; rectangular girdle. Size, 6 by 5 by 4 mm.; weight, 0.82 carat. Cat. Nos. a-189; 50305.
- Tourmaline.* Paris, Maine. Color, light green. Step cut; rectangular girdle. Size, 6 by 4 by 2.5 mm.; weight, 0.49 carat. Cat. Nos. a-190; 50304.
- Tourmaline.* Paris, Maine. Color, pale green. Brilliant cut; circular girdle. Size, 6 by 3.5 mm.; weight, 0.52 carat. Cat. Nos. a-191; 50304.
- Tourmaline.* Paris, Maine. Color, bright green. Step cut; rectangular girdle. Size, 7 by 3 by 2 mm.; weight, 0.38 carat. Cat. Nos. a-192; 50304.
- Tourmaline.* Paris, Maine. Colorless. Brilliant cut; circular girdle. Size, 4.5 by 4 mm.; weight, 0.40 carat. Cat. Nos. a-193; 50304.
- Tourmaline.* Paris, Maine. Color, apple green. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 3 mm.; weight, 0.65 carat. Cat. Nos. a-194; 50304.
- Tourmaline.* Paris, Maine. Color, light green. Brilliant cut; rectangular girdle. Size, 5.5 by 5 by 4 mm.; weight, 0.61 carat. Cat. Nos. a-195; 84090.
- Tourmaline.* Paris, Maine. Color, deep bluish green. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.65 carat. Cat. Nos. a-196; 84090.
- Tourmaline.* Paris, Maine. Color, deep green. Step cut; square girdle. Size, 5 by 3 mm.; weight, 0.50 carat. Cat. Nos. a-197; 84090.
- Tourmaline.* Paris, Maine. Color, bottle green. Step cut; rectangular girdle. Size, 6 by 5 by 3 mm.; weight, 0.60 carat. Cat. Nos. a-198; 84090.
- Tourmaline.* Paris, Maine. Color, yellowish green. Step-brilliant cut; triangular girdle. Size, 5 by 3.5 mm.; weight, 0.72 carat. Cat. Nos. a-199; 84090.
- Tourmaline.* Paris, Maine. Color, large stone smoky white; small stone grass green, cut from opposite extremities of the same crystal. Brilliant cut; circular girdle. Size, 13 by 10 mm. and 5 by 4 mm.; weights, 8.599 carats and 0.852 carat. Cat. Nos. c-454-455; 84269. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Tourmaline.* Auburn, Maine. Color, pale blue. Step-brilliant cut; rectangular girdle. Size, 12 by 6.5 by 5 mm.; weight, 2.71 carats. Cat. Nos. a-200; 51190.
- Tourmaline.* Auburn, Maine. Color, bluish green. Step-brilliant cut; rectangular girdle. Size, 8 by 7 by 4 mm.; weight, 1.75 carats. Cat. Nos. a-201; 51190.
- Tourmaline.* Auburn, Maine. Color, dark green. Step cut; rectangular girdle. Size, 7 by 6 by 5 mm.; weight, 1.58 carats. Cat. Nos. a-202; 51190.
- Tourmaline.* Auburn, Maine. Colorless. Brilliant cut; rectangular girdle. Size, 8 by 7 by 5 mm.; weight, 1.53 carats. Cat. Nos. a-203; 51190.
- Tourmaline.* Auburn, Maine. Color, green. Brilliant cut; rectangular girdle. Size, 8 by 6 by 5 mm.; weight, 1.70 carats. Cat. Nos. a-204; 51190.
- Tourmaline.* Auburn, Maine. Color, pale blue. Step-brilliant cut; elliptical girdle. Size, 7 by 6 by 4 mm.; weight, 1.05 carats. Cat. Nos. a-205; 51190.
- Tourmaline.* Auburn, Maine. Color, light green. Step-brilliant cut; rectangular girdle. Size, 7 by 5 by 5 mm.; weight, 1.19 carats. Cat. Nos. a-206; 51190.
- Tourmaline.* Auburn, Maine. Color, bluish green. Step-brilliant cut; square girdle. Size, 7 by 5 mm.; weight, 1.31 carats. Cat. Nos. a-207; 51190.

- Tourmaline.* Auburn, Maine. Color, pale bluish green. Step-brilliant cut; rectangular girdle. Size, 6.5 by 5.5 by 5 mm.; weight, 1.09 carats. Cat. Nos. a-208; 51190.
- Tourmaline.* Auburn, Maine. Color, dark green. Step cut; rectangular girdle. Size, 6 by 5 by 4 mm.; weight, 0.71 carat. Cat. Nos. a-209; 51190.
- Tourmaline.* Near Rock Landing, Middlesex County, Connecticut. Color, bluish green. Brilliant cut; circular girdle. Size, 6.5 by 5 mm.; weight, 0.97 carat. Cat. Nos. a-210; 83604.
- Tourmaline.* Near Rock Landing, Middlesex County, Connecticut. Color, bluish green. Brilliant cut; circular girdle. Size, 6.5 by 4 mm.; weight, 0.83 carat. Cat. Nos. a-211; 83604.
- Tourmaline.* Near Rock Landing, Middlesex County, Connecticut. Color, bluish green. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.75 carat. Cat. Nos. a-212; 83604.
- Tourmaline.* DeKalb, St. Lawrence County, New York. Color, pale yellow. Step-brilliant cut; rectangular girdle. Size, 11.5 by 8 by 6 mm.; weight, 5.54 carats. Cat. Nos. a-213; 50306.
- Tourmaline.* Macomb, Essex County, New York. Color, brown. Brilliant cut; circular girdle. Size, 6 by 4 mm.; weight, 0.85 carat. Cat. Nos. a-214; 49155.
- Tourmaline.* Macomb, Essex County, New York. Color, brown. Brilliant cut; circular girdle. Size, 7 by 5 mm.; weight, 1.18 carats. Cat. Nos. a-215; 49155.
- Tourmaline.* Brazil. Color, greenish yellow. Brilliant cut; rectangular girdle. Size, 15 by 13 by 8 mm.; weight, 8.96 carats. Cat. Nos. a-216; 51392.
- Tourmaline.* Brazil. Color, greenish brown. Step-brilliant cut; rectangular girdle. Size, 10 by 9 by 6 mm.; 3.73 carats. Cat. Nos. a-217; 50100.
- Tourmaline.* Brazil. Color, light yellow. Step-brilliant cut; elliptical girdle. Size 8 by 7.5 by 6 mm.; weight, 2.21 carats. Cat. Nos. a-218; 50100.
- Tourmaline.* Brazil. Color, dark green. Step cut; rectangular girdle. Size, 14.5 by 13 by 6 mm.; weight, 3.50 carats. Cat. Nos. a-219; 50307.
- Tourmaline.* Brazil. Color, dark bluish green. Step-brilliant cut; elliptical girdle. Size, 14.5 by 11 by 4 mm.; weight, 4.79 carats. Cat. Nos. a-220; 50307.
- Tourmaline.* Brazil. Color, light claret. Brilliant cut; rectangular girdle. Size, 11.5 by 9 by 7.5 mm.; weight, 5.06 carats. Cat. Nos. a-221; 50307.
- Tourmaline.* Brazil. Color, dark bluish green. Step-brilliant cut; square girdle. Size, 9 by 5 mm.; weight, 2.32 carats. Cat. Nos. a-222; 50307.
- Tourmaline.* Brazil. Color, dark bluish green. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 4.5 mm.; weight, 2.72 carats. Cat. Nos. a-223; 50307.
- Tourmaline.* Brazil. Color, dark green. Step-brilliant cut; rectangular girdle. Size, 9 by 7 by 5 by 3 mm.; weight, 1.46 carats. Cat. Nos. a-224; 50307.
- Tourmaline.* Brazil. Color, red and green in concentric bands. Cabochon cut; triangular girdle. Size, 28 by 10 mm.; weight, 58.53 carats. Cat. Nos. a-225; 50388.
- Tourmaline.* Brazil. Color, fine claret. Brilliant cut; elliptical girdle. Size, 14 by 9.5 by 6 mm.; weight, 5.03 carats. Cat. Nos. a-226; 84091.
- Tourmaline.* Brazil. Color, apple green. Step cut; rectangular girdle. Size, 9 by 6 by 3 mm.; weight, 1.38 carats. Cat. Nos. a-227; 84091.
- Tourmaline.* Color, grass green. Step cut; rectangular girdle. Size, 9 by 6 by 3 mm.; weight, 1.32 carats. Cat. Nos. a-228; 84091.
- Tourmaline.* Brazil. Color, dark green. Step-cut; rectangular girdle. Size, 7.5 by 6.5 by 3 mm.; weight, 1.10 carats. Cat. Nos. a-229; 84091.
- Tourmaline.* Brazil. Color, dark green. Step-cut; rectangular girdle. Four long gems. Average size, 15 by 4 by 3 mm.; weight, 4.49 carats. Cat. Nos. a-230-233; 84091.

- Tourmaline.* Brazil. Three small gems. Colors, 1 light green, 1 dark blue, 1 claret. One brilliant, 2 step-brilliant cut. Size, 5 by 5 by 3 mm. Cat. Nos. a-234-236; 84091.
- Tourmaline.* Isle of Elba. Color, rose and yellowish green. Step-brilliant cut; rectangular girdle. Size, 16.5 by 9.5 by 8 mm.; weight, 9.60 carats. Cat. Nos. a-251; 50099.
- Tourmaline.* Siberia. Color, light claret. Step-brilliant cut; elliptical girdle. Size, 9 by 7.5 by 6 mm.; weight, 2.44 carats. Cat. Nos. a-247; 51188.
- Tourmaline.* Siberia. Color, light claret. Step-brilliant cut; elliptical girdle. Size, 9 by 7 by 6 mm.; weight, 2.38 carats. Cat. Nos. a-248; 51188.
- Tourmaline.* Siberia. Color, claret. Step-brilliant cut; circular girdle. Size, 7 by 6 mm.; weight, 1.56 carats. Cat. Nos. a-249; 51188.
- Tourmaline.* Siberia. Color, ruby red. Step-brilliant cut; square girdle. Size, 5 by 3.5 mm.; weight, 0.54 carat. Cat. Nos. a-250; 51188.
- Tourmaline.* Ceylon. Color, grass green. Cabochon cut; elliptical girdle. Size, 15 by 12 by 6.5 mm.; weight, 12.22 carats. Cat. Nos. a-237; 82811. The Lea Collection.
- Tourmaline.* Ceylon. Color, brown. Step-brilliant cut; elliptical girdle. Size, 10 by 9 by 6 mm.; weight, 3.06 carats. Cat. Nos. a-238; 82811. The Lea Collection.
- Tourmaline.* Ceylon. Color, brown. Step-brilliant cut; square girdle. Size, 9 by 5 mm.; weight, 2.86 carats. Cat. Nos. a-239; 82811. The Lea Collection.
- Tourmaline.* Ceylon. Color, brown. Step-brilliant cut; rectangular girdle. Size, 7.5 by 7 by 5 mm.; weight, 1.86 carats. Cat. Nos. a-240; 82811. The Lea Collection.
- Tourmaline.* Ceylon. Color, resin yellow. Step-brilliant cut; elliptical girdle. Size, 8.5 by 6 by 5 mm.; weight, 2.60 carats. Cat. Nos. a-241; 83811. The Lea Collection.
- Tourmaline.* Ceylon. Color, reddish brown. Step-brilliant cut; rectangular girdle. Size, 8 by 6 by 4 mm.; weight, 1.03 carats. Cat. Nos. a-242; 82811. The Lea Collection.
- Tourmaline.* Ceylon. Color, resin yellow. Step-brilliant cut; elliptical girdle. Size, 6 by 5 by 5 mm.; weight, 0.80 carat. Cat. Nos. a-243; 82811. The Lea Collection.
- Tourmaline.* Ceylon. Color, honey yellow. Step-brilliant cut. Three small gems; same size. Total weight, 1.41 carats. Cat. Nos. a-244-246; 82811. The Lea Collection.
- Turquoise.* Los Cerillos, New Mexico. Color, blue green. Cabochon cut; elliptical girdle. Size, 23 by 18 by 6 mm. Cat. Nos. a-652; 48756. Gift of Robt. H. Lamborn.
- Turquoise.* Los Cerillos, New Mexico. Color, apple green. Cabochon cut; elliptical girdle. Size, 24 by 16 by 6 mm. Cat. Nos. a-653; 48756. Gift of Robt. H. Lamborn.
- Turquoise.* Los Cerillos, New Mexico. Color, blue green. Arrowhead mounted as scarf pin. Size, 22 by 10 mm. Cat. Nos. a-654; 50255.
- Turquoise.* Cerillos Mountains, 6 miles from Los Cerillos, New Mexico. Color, blue green. Seven gems. Cabochon cut; 2 circular, 5 elliptical girdles. Average size, 15 by 10 by 6 mm. Cat. Nos. a-655-661; 51946. Gift of the American Turquoise Company, through President John R. Andrews.
- Variscite.* Lewiston, Utah. Color, green. Polished slab. Size, 13 by 9 cm. Cat. Nos. b-881; 83765.
- Variscite.* Lewiston, Utah. Color, green. Circular piece. Size, 10 cm. diameter. Cat. Nos. b-882; 84233.

- Variscite*. Candelaria, Nevada. Color, bright green with dark spots. Tabular cut; elliptical girdle. Cat. Nos. a-613; 81156. Gift of Mack Weber.
- Vesuvianite*. Color, greenish yellow. Brilliant cut; circular girdle. Size, 5 by 4 mm.; weight, 0.51 carat. Cat. Nos. a-570; 84104.
- Wernerite*. Templeton, Quebec, Canada; Color, yellow. Cabochon cut. Size, 30 by 22 by 11 mm. Cat. Nos. a-593; 83352. The Lea Collection; gift of Dr. L. T. Chamberlain.
- Willenite*. Taylor Zinc Mine, Franklin, New Jersey. Color, light greenish yellow. Brilliant cut; circular girdle. Three small gems; total weight, 0.78 carat. Cat. Nos. a-598-600; 84115.
- Williamsite*, see Serpentine.
- Zircon*. Ceylon. Color, dark bottle green. Step-brilliant cut; rectangular girdle. Size, 18 by 17 by 7 mm.; weight, 20.70 carats. Cat. Nos. a-325; 83555.
- Zircon*. Ceylon. Color, bottle green. Step-brilliant cut; rectangular girdle. Size, 9 by 7.5 by 5 mm.; weight, 1.83 carats. Cat. Nos. a-326; 51189.
- Zircon*. Ceylon. Color, dark green. Brilliant cut; square girdle. Size, 7 by 5 mm.; weight, 0.97 carat. Cat. Nos. a-327; 51189.
- Zircon*. Ceylon. Brilliant cut; square girdle. Size, 10 by 6 mm.; weight, 4.20 carats. Cat. Nos. a-328; 47311. Gift of C. S. Bement.
- Zircon*. Ceylon. Color, light blue. Brilliant cut; elliptical girdle. Size, 9 by 7 by 5 mm.; weight, 2.34 carats. Cat. Nos. a-329; 47311. Gift of C. S. Bement.
- Zircon*. Ceylon. Color, yellowish brown. Step-brilliant cut; rectangular girdle. Size, 11 by 8 by 5 mm.; weight, 4.27 carats. Cat. Nos. a-330; 51193.
- Zircon*. Ceylon. Color, yellowish green. Step-brilliant cut; rectangular girdle. Size, 10 by 8 by 7 mm.; weight, 3.68 carats. Cat. Nos. a-331; 51193.
- Zircon*. Ceylon. Color, brownish yellow. Step-brilliant cut; elliptical girdle. Size, 7 by 6 by 3 mm.; weight, 1.38 carats. Cat. Nos. a-322; 51193.
- Zircon*. Ceylon. Color, greenish brown. Rose cut; circular girdle. Size, 12 by 4 mm., weight, 4.86 carats. Cat. Nos. a-333; 50333.
- Zircon*. Ceylon. Color, pale greenish yellow. Rose cut; circular girdle. Size, 11 by 5 mm.; weight, 4.73 carats. Cat. Nos. a-334; 50333.
- Zircon*. Ceylon. Color, pale greenish yellow. Rose cut; circular girdle. Size, 11 by 4 mm.; weight, 4.50 carats. Cat. Nos. a-335; 50333.
- Zircon*. Ceylon. Color, pale greenish yellow. Rose cut; circular girdle. Size, 11 by 4 mm.; weight, 4.23 carats. Cat. Nos. a-336; 50333.
- Zircon*. Ceylon. Color, brownish yellow. Step-brilliant cut; elliptical girdle. Size, 9 by 8 by 7 mm.; weight, 4.96 carats. Cat. Nos. a-337; 50333.
- Zircon*. Ceylon. Color, brownish green. Step-brilliant cut; elliptical girdle. Size, 11 by 7.5 by 5 mm.; weight, 2.98 carats. Cat. Nos. a-338; 50333.
- Zircon*. Ceylon. Color, sherry. Step-brilliant cut; elliptical girdle. Size, 8.5 by 8 by 5.5 mm.; weight, 3.16 carats. Cat. Nos. a-339; 50333.
- Zircon*. Ceylon. Color, dark brown. Brilliant cut; elliptical girdle. Size, 11 by 7.5 by 3 mm.; weight, 2.28 carats. Cat. Nos. a-340; 50333.
- Zircon*. Ceylon. Colorless. Rose cut; oval girdle. Size, 9 by 6.5 by 4 mm.; weight, 1.88 carats. Cat. Nos. a-341; 50333.
- Zircon*. Ceylon. Colorless. Rose cut; elliptical girdle. Size, 8 by 7 by 5 mm.; weight, 1.89 carats. Cat. Nos. a-342; 50333.
- Zircon*. Ceylon. Color, green. Step-brilliant cut; circular girdle. Size, 7 by 4 mm.; weight, 1.56 carats. Cat. Nos. a-342; 50333.
- Zircon*. Ceylon. Color, light green. Brilliant cut; elliptical girdle. Size, 7.5 by 7 by 4 mm.; weight, 1.35 carats. Cat. Nos. a-344; 50333.
- Zircon*. Ceylon. Color, pale blue. Step-brilliant cut, rectangular girdle. Size, 7 by 6 by 4 mm.; weight, 1.42 carats. Cat. Nos. a-345; 50333.

- Zircon*. Ceylon. Color, pale blue. Step-brilliant cut; rectangular girdle. Size, 7 by 5.5 by 4 mm.; weight, 1.40 carats. Cat. Nos. a-346; 50333.
- Zircon*. Ceylon. Color, violet brown. Brilliant cut; elliptical girdle. Size, 9 by 5.5 by 3 mm.; weight, 1.29 carats. Cat. Nos. a-347; 50333.
- Zircon*. Ceylon. Color, bottle green. Brilliant cut; rectangular girdle. Size, 6.5 by 5 by 4 mm.; weight, 1.24 carats. Cat. Nos. a-348; 50333.
- Zircon*. Ceylon. Color, yellow. Brilliant cut; rectangular girdle. Size, 7 by 6 by 4 mm.; weight, 1.18 carats. Cat. Nos. a-349; 50333.
- Zircon*. Ceylon. Color, brown. Step-brilliant cut; circular girdle. Size, 7 by 4.5 mm.; weight, 1.09 carats. Cat. Nos. a-350; 50333.
- Zircon*. Ceylon. Color, yellow. Step-brilliant cut; square girdle. Size, 6 by 5 by 3 mm.; weight, 0.96 carat. Cat. Nos. a-351; 50333.
- Zircon*. Ceylon. Color, greenish yellow. Step cut; elliptical girdle. Size 7 by 4 by 2 mm.; weight, 0.69 carat. Cat. Nos. a-352; 50333.
- Zircon*. Ceylon. Color, bluish and yellowish. Rose cut; circular girdle. Thirteen gems about equal in size; 5 by 3 mm.; total weight, 6.64 carats. Cat. Nos. a-353-365; 50333.
- Zircon*. Ceylon. Color, bluish and yellowish. Rose cut; circular girdle. Eighty-three small gems. Average size, 3 by 2 mm.; total weight, 11.69 carats. Cat. Nos. a-366-448; 50333.
- Zircon*. Ceylon. Color, light bottle green. Rose cut; elliptical girdle. Size, 15 by 10 by 5.5 mm.; weight, 6.70 carats. Cat. Nos. a-449; 82913. The Lea Collection.
- Zircon*. Ceylon. Colorless. Ninety-eight minute gems of equal size. Brilliant cut; circular girdle; total weight, 3.24 carats. Cat. Nos. a-450-547; 82913. The Lea Collection.
- Zoisite*. Norway. Color, red. Cabochon cut; elliptical girdle. Size, 22 by 19 by 13 mm.; weight, 43.17 carats. Cat. Nos. a-582; 84112.
- Zoisite*. Norway. Color, red. Cabochon cut; elliptical girdle. Size, 17 by 13 by 5 mm.; weight, 8.26 carats. Cat. Nos. a-583; 84112.

A BIBLIOGRAPHY.

- ABDALAZIZ (AHMED BEN). Treatise on jewels.
- ABEN EZRA (RABBI). Commentarium in Decalogum.
Basel (Basle), 1527.
- ABICH (H.). De Spinello.
Berolini (Berlin), 1831.
- ADLER (C., and CASANOWICZ). Precious stones of the Bible.
[In *Biblical Antiquities*, Report, U. S. National Museum. 1896, p. 943.]
- AGOSTINI (L.). Gemmæ et sculpturæ antiq̄ue.
Franequeræ (Franecker), 1699.
- AGRICOLA (G.). De ortu et causis subterraneorum de natura eorum que effluunt ex Terra.
Basel (Basle), 1558.
- AGRIPPA (H. C.). Philosophie occulte.
[Translated by Levasseur.] La Haye (The Hague), 1655.
Contains material relating to the mystical properties of gems.
- ALANUS AB INSULIS (ALAIN DE LISLE). Dicta alani, etc.
Lugduni-Batavorum (Leyden), 1599.
An alchemical treatise containing material relating to the mystical properties of gems. Alanus ab Insulis, b. 1114, d. 1202, was the earliest Flemish alchemist.
- ALBERTUS MAGNUS. Die mineralibus.
[In his opera, v. II.] Lugduni (Leyden), 1651.
- . De Vertutibus herbarum, lapidum animalum, etc.
Various editions.
- . Les admirable secrets d' Albert le grand, etc.
Lyon, 1758.
Contains extracts from the works of Albertus Magnus, relating to the magical and medicinal properties of gems.
- ALCOT (T.). Gems, talismans, and guardians.
New York, 1886.
- ARNALDUS DE VILLANOVA. Chymische scriften, etc.
[Translated by Johannem Hippelamum.] Wien (Vienna), 1742.
See also: Hermetischer Rosenkranz, Pretiosa Margarita, Manget, Theatrum Chemicum, etc. The several writings of this alchemist (also called Villanovanus, Arnald Bachuone, A. de Villeneuve, A. de Villneveé, and Arnaldus Novicomensis) contain much concerning the occult, medicinal, and other properties of gems.
- ARNOBIO (CLEANDRE). De Tesoro delle Gioie, trattato maraviglioso.
Venit. (Venice), 1602.
- ATHANEUS. Deiphriosophiste [Banquet des Philosophes] translated by Dalechamp.
Paris, 1873.
- AUBREY (J.). Miscellanies.
London, 1857.
Contains an account of the use of the beryl in divination.
- ANDRADA (M. D'). An account of the diamonds of Brazil.
[In *Nicholson's Journal*, I. 1797, 24.]

ANTIDOTARIO DE FRA D. D'E.

Napoli (Naples), 1639.

A treatise on pharmacy, containing a few accounts of the virtues of gems.

ARGENVILLE. *Traité de l'Oryctologie.*

Paris, 1740.

ARGENVILLE (A. J. D. D'). *De l'Historie Naturelle éclaircie dans deux de ses parties principales: la Lithologie et la Conchologie.*

Paris, 1742.

ARISTOTLE. His works, especially the "Meteorology" and "Wonderful things heard of."

Aristotle was born about 384 B. C., and died about 322 B. C.

———. *Lapidarius.*

[De novo Græco translatus, Lucas Brandis.] Regia Mersbourg (Merseburg), 1473.

AVICENNA (ABOU-ALI-ALHUSSEIN-BEN-ADLOULAH). *Canones Medicinæ.*

[Lat. reddit.] Ven. (Venice), 1843.

Contains material relating to the medicinal and magical virtues of gems.

BABINGTON (CHARLES). *A systematic arrangement of minerals, their chemical, physical, and external characters.*

London, 1795.

BACCI (ANDRÈ). *Le XII Piètre preziose.*

Roma (Rome), 1587.

———. *De Gemmis et Lapidibus pretiosis, tractatus ex Ital. Lingua Lat. red.*

Francof. (Frankfurt), 1605.

———. *De Gemmis ac Lapidibus pretiosis in S. Scriptura.*

Roma (Rome), 1577; 8°, Franc. (Frankfurt), 1628.

BACON (ROGER). *Opera Quædam hætenus inedita.*

[Edited by J. S. Brewer.] London, 1859.

The appendix—*Epistola . . . de secretis operibus artis et nature*—contains some material relating to the magical and alchemical virtues of certain gems.

BALL (V.). *On the occurrence of diamonds in India.*

[In *Geology of India*, 3 vols., pp. 1-50, 1881.]

———. *On the mode of occurrence and distribution of diamonds in India.*

[In *Proc. R. Dublin Soc.*, II, p. 551; also *Jour. R. Geol. Soc. Ireland*, VI, p. 10.]

———. *On the geology of the Mahanadi basin and its vicinity.*

[In *Records of the Geological Survey of India*, X, p. 167; map.]

———. *A manual of the geology of India.*

Calcutta, 1881.

———. *On the identification of certain diamond mines in India which were known and worked by the ancients, especially those visited by Tavernier. With a note on the history of the Koh-i-nur.*

[In *Journal of the Asiatic Society of Bengal*, L, 1881, p. 31; *Report British Association for 1882*, p. 625; and *Nature*, XXIII, p. 490, 1882.]

———. *On the diamonds, etc., of the Sambâlpûr district.*

[In *Records of the Geological Survey of India*, X, p. 186; map.]

BAPT (G.). *Les joyaux de la couronne.*

[In *Reven des Deux Mondes*, 1886, p. 861.]

BARBOT (Ch.). *Traité complet des pierres précieuses.*

Paris, 1858.

BARRERA (Mme. DE). *Gems and jewels.*

London, 1860.

BAUER (MAX). *Edelstein kunde.*

Leipzig, 1896.

BAUMER (J. W.). *Historia Naturalis Lapidum preciosorum omnium, etc.*

Franc. (Frankfurt), 1771.

- BAUMER (J. W.). *Naturgeschichte aller Edelstein, wie auch der Erde und Steine, so bisher zur artzney sind gebraucht worden. Ans dem Latein von Karl, Freih. von Meidinger.*
Wien (Vienna), 1774.
- BAUMHAUER (E. H. von). *Diamonds.*
[In *Ann. Phys. Chem.*, 2 ser., I, 1877, p. 462.]
- BEARD (C. P.). *Traité des pierres précieuses.*
Paris, 1808.
- BECHAI BEN ASCHAR. *Biur al Hattorah—Exposition of the Law of Moses, a commentary on Exodus xxviii, 17–20.*
A. M. 5207 (A. D. 1447).
Contains an account of the virtues and properties of gems.
- BECHER (JOHANN JOACHIM). *Physica Subterranea.*
Lipsiae (Leipzig), 1739. An alchemical work.
- BECK (R.). *Die diamantenlager stätte von Newland in Griqualand West.*
[In *Zeits. für Prakt. Geol.*, 1898, p. 158.]
- BEHRENS (TH. H.). *Sur la cristallisation du diamant.*
[In *Arch. Neerl.*, XVI, p. 376, 1881.]
- BEKKERHEIM (KARL). *Krystallographie des Mineralreichs.*
Wien (Vienna), 1793.
- BELLEAU (RENÉ). *Les amours et nouveaux échanges des pierres précieuses.*
Paris, 1576.
- BELERMAN (J. J.). *Die Urim und Thummim.*
Berlin, 1824.
- BENIAM (MUTAPILA). *Sententiis sacro medicis.*
Hamburg, 1640.
Contains material relating to the astrological virtues of gems.
- BERQUEN (ROBERT DE). *Les Merveilles des Indes Orientales et Occidentales, ou nouveau Traité des Pierres précieuses, et des Perles.*
Paris, 1661.
- BESONDERE Geheimnisse eines wahren Adepti von der Alchymie, etc.
Dresden, 1757.
An alchemical treatise.
- BEUMEMBERGER (J. G.). *Der Volkomene Juwelier.*
Weimar, 1828.
- BIELHE (VOX). *Ueber die Bernstein-Gräbereien in Hinter Pommeru.*
Berlin, 1802.
- BILLING (A.). *Science of gems, coins, and medals.*
New York, 1875.
- BIRDWOOD (G. C. M.). *Industrial arts of India.*
Vol. 2, pp. 17–32, 1881.
- BLEASDALE (J. J.). *Gems and precious stones found in Victoria.*
[In an essay in *Official Record, Inter-Colonial Exhibition, Melbourne, 1867.*]
- BLUM (J. R.). *Verzeichniss der geschnitten Steine in dem Königl. Museum zu Berlin.*
Berlin, 1827.
- . *Lithurgik, oder mineralien und Felsarten nach ihrer Anwendung in Oekon., artist, und Technischer Hinsicht systematische abgehandelt.*
Stuttgart, 1840.
- BLUM (R.). *Die Schmucksteine.*
Heidelberg, 1828.
- . *Taschenbuch der Edelsteinkunde.*
Stuttgart, 1840.
- BLUMENBERG. *Dissertatio Medica de Succino.*
Jena, 1682.

- BLUMHOF (J. C.). Lehrbuch der Lithurgik.
Frankfurt, 1822.
- BOETIUS (ANSELMUS). Tractatus de Lapidibus.
- BOLNEST (E.). Aurora chymica, or a rational way of preparing animals, vegetables, and minerals for a physical use; by which preparations they are made most efficacious, safe, pleasant medicines for the preservation and restoration of the life of man.
London, 1672.
- BONDARY (JEAN DE LA TAILLE DE). Blason des Pierres précieuses.
- BOOKE of the Things that are brought from the West Indies.
[English translation, 1580.] 1574.
Contains an account of the virtues of the bloodstone.
- BOOT (ANSELMUS BOETIUS DE). Le parfait joaillier, ou histoire des Pierreries, de nouveau enrichi de belles annotations par André Toll.
[Translated from Latin by J. Baehou] Lyon, 1644.
- BOOT (B. DE). Lap. Gemmarum et Lapidum Historia.
Jena, 1647.
The first edition published at Jena in 1609; the second enlarged by A. Toll, Lugduni Bat. [Leyden], 1636, contains much concerning the mystical and medicinal properties of gems.
- BOOT (ANSELMUS BOETIUS DE). Gemmarum et Lapidum Historia.
Hanover, 1690.
- BORDEAUX (A.). Les mines de l'Afrique du Sud.
Paris, 1898.
- BORN (BARON INIGO). Schneckensteine, oder die Sächsischen Topasfelsen.
Prag, 1776.
- BOURNON (COMTE DE). An analytical description of the crystalline forms of corundum from the East Indies and China.
[In Phil. Trans.: Abr., XVIII, p. 368, 1798.]
- . Description of the corundum stone, and its varieties, commonly known as oriental ruby, sapphire, etc.
[In Phil. Trans., 1801, p. 223.]
- . A descriptive catalogue of diamonds in the cabinet of Sir Abraham Hume.
London, 1815.
- BOUTAN (M. E.). Diamant.
[In Frémy's Encyclopédie Chimique.]
- . Le Diamant.
Paris, 1886.
Contains a very full bibliography.
- BOYLE (ROBERT). Experiments and considerations upon color, with considerations on a diamond that shines in the dark.
London, 1663.
- . Essay about the origin and virtues of gems.
[In his works, v. III, 1772.]
- . Exercitatio de origine et viribus gemmarum.
London, 1673.
- . An essay about the origin and virtues of gems, with some conjectures about the consistence of the matter of precious stones.
London, 1672.
[Another edition in 1673.]
- BRARD (C. P.). Traité des Pierres Précieuses, des Porphyres, Granits et autres Roches propres a recevoir le poli. 1808.
- . Minéralogie appliquée aux arts.
Paris, 1821.

- BRITISH MUSEUM. Catalogue of Gems in the British Museum (Department of Greek and Roman Antiquities).
1888.
- BRITTEN (EMMA H.). Art Magic; or mundane, submundane, and supermundane spiritism.
Contains accounts of mystical properties of gems.
- BRONGNIART (ALEXANDRE). *Traité de minéralogie, avec application aux arts.*
Paris, 1807.
- BROWN (C. B. and J. W. Judd). The rubies of Burma.
[In *Phil. Trans. Roy. Soc. London*, CLXXXVII, pp. 151-228.]
A very elaborate and complete account of the physical features, geology, and geographical distribution of the ruby-bearing rocks of the district.
- BRUCKMANN (U. F. B.). *Abhandlung von Edelsteinen.*
Braunschweig (Brunswick), 1757-73.
- . *A treatise on precious stones.*
1775.
- . *Gesammelte und eigene Beiträge zu seiner Abhandlung von Edelsteinen.*
Braunschweig (Brunswick), 1778.
- BUCHOZ (——). *Les Dons merveilleux et diversement coloriés de la Nature dans le Règne Minéral.*
Paris, 1782.
- BUFFUM (W. A.). The tears of the Heliades or amber as a gem.
New York, 1900.
- BURCH (A.). *Handbuch für Juweliere.*
Weimar, 1834.
- BURNHAM (S. M.). *Precious stones.*
Boston, 1886.
- BURTON (R. F.). Gold and diamond mines.
[In his *Explorations of the Highlands of Brazil*, 1869.]
- CADET (LE JEUNE). *Memoire sur les Jaspes et autres Pierres Précieuses de l'île de Corse.*
Bastia, 1785.
- CAESALPINUS (ANDREAS). *De metallicis Libri tres.*
Rom. (Rome) 1496.
- CAHAGNET (L. A.) *Magie magnetique.*
Paris, 1838.
A spiritualistic work containing material relating to the occult properties of gems.
- CAIRE (A.) *La Science des pierres précieuses appliquée aux arts.*
Paris, 1833.
- CAPELLER (MAUR. ANT.). *Prodomus crystallographie, de crystallis improprie sic dictis commentarium.*
Lucerne (Lucerne), 1723.
- CARDANUS (HIERONYMUS). *De Lapidibus preciosis; also De Subtilitate.*
These contain accounts of the magical and medicinal properties of gems.
- CAROSI (JOHANN). *Sur la Generation du Silex et du Quartz.*
Cracov, 1783.
- CARTON (J.) *Englischen Juwelier, Kenntniss, Werthund Preisschätzung aller Edelsteine, Perlen, Corallen, ins Deut. übersetzt nach der 10 ed.*
Gratz, 1818.
- CATALOG des Bijoux nationaux.
Paris, 1791.
- CASTELLANI (A.) *Gems, notes, and extracts.*
[Translated from the Italian, by Mrs. J. Brogden.] London, 1871.

- CELLINI (BENEVENUTO). Trattato del' Oreficeria.
 ———. Del Arte del Gioiellare.
 Fior. (Florence), 1568.
- CHIAFER (—). Note sur la région diamantifère de l'Afrique Australe.
 Paris, 1880.
 ———. On the occurrence of diamonds in India.
 [Comptes Rendus, 1884, p. 113.]
- CHAND (GULAL). Essay on diamonds.
 Lucknow, 1881.
- CHURCH (A. H.). Precious and curious stones.
 [In Spectator, July 9, 1870.]
 ———. Townsend Collection.
 [In Quart. Jour. Science, Jan., 1871.]
 ———. Precious stones.
 London, 1882.
 ———. Discrimination, etc., of precious stones.
 [In Jour. Soc. Arts. XXIX, p. 439.]
 ———. Physical properties of precious stones.
 [in Proc. Geol. Assoc., V, No. 7.]
 ———. Colours of precious stones.
 [in Magazine of Art, I, p. 33.]
- CLAUDER (G.). Schediasma de tinctura universali, vulgo lapis philosophorum dicta,
 etc.
 Norimberge (Nuremberg), 1736.
 An alchemical treatise containing 13 folding tables having a list of minerals
 with their properties grouped under the following heads: Nomen, Substantia,
 Color, Pondus, Natura, Preparatio, Tractatio, Contenta.
- CLAVE (ESTIENNE). Paradoxes, ou Traitez Philosophiques des Pierres et Pierreries,
 contre l'opinion vulgaire.
 Paris, 1635.
- CLUTIUS (AUGERIUS). Calsvee, sive Dissertatio Lapidis Nephritici, seu jaspidis viridis,
 naturam, proprietates, et operationes exhibens Belgice.
 [Amsterdam, 1621, et Lat. per Gul. Lauremberg, fil.] Rostochii (Rostock), 1627.
- COHEN (E.). Ueber Capdiamanten.
 [In Neues Jahrbuch I, p. 184, 1881.]
- COHEN (M.). Beschreibendes Verzeichniss einer Sammlung von Diamanten.
 Wien (Vienna), 1822.
- COLLINI (COSMUS). Journal d'un Voyage, qui contient différentes observations miné-
 ralogiques, particulièrement sur les agates, avec un détail sur la manière de travailler
 les agates.
 Mannheim, 1776.
- COLONNE (FRANÇOIS MARIE POMPÉE). Histoire Naturelle de l'Univers.
 [4 vols.] Paris, 1734.
- CORSI (FAUST). Delle Piedre antiche libri quattro.
 Roma (Rome), 1828.
- CROLY (G.). Gems; etched by R. Dagley, with illust., in verse.
 London, 1822.
- CROOKES (Sir W.). Diamonds.
 [In Proc. Roy. Inst., 1897, p. 477.]
- CROOKES (WILLIAM). Diamonds.
 [In Report Smithsonian Institution, 1897, p. 219.]
 ———. On radiant matter.
 [In Chemical News, XL, pp. 93, 104, and 127.]
 Contains results of experiments on the phosphorescence of the diamond, ruby,
 and other minerals.

CURIOUS speculationen.

Leipzig, 1707.

CURL (MARTHA A.). Ancient gems.

[In *American Antiquarian*, XXII, p. 284, 1900.]

DALL (W. H.). Pearls and pearl fisheries.

[In *American Naturalist*, 1883, pp. 579, 731.]

DANA (E. S.). On the emerald green spodumene (Hiddenite) from Alexander County, North Carolina.

[In *Am. Jour. Science*, 1881, XXII, p. 179.]

DANA (E. S., and H. L. WELLS). Description of the new mineral, beryllonite.

[In *Am. Jour. Science*, 1889, XXXVII, p. 23.]

DAUBRÉE (M.) Rapport sur un mémoire de M. Stanislas meunier ayant pour titre: Composition et origine du sable diamantifère de Du Toits Pan.

[In *Comptes Rendus*, LXXXIV, p. 1124.]

A summary of the subject to the date.

DAVY (HUMPHREY). Some experiments on the combustion of the diamond and other carbonaceous substances.

[In *Phil. Trans.*, 1814, p. 557.]

DE LAPIDIBUS, Avibus et Arboribus Indiae, Arabiae, et Africae.

[Harleian manuscripts.]

DERBY (O. A.). The geology of the diamantiferous region of the province of Paraná, Brazil.

[In *Proc. Am. Phil. Soc.*, XVIII, p. 251; also *Am. Jour. Science*, 1879, XVIII, p. 310.]

———. On the occurrence of diamonds in Brazil.

[In *Am. Jour. Science*, 1882, XXIV, p. 34.]

———. Notes on certain schists of the gold and diamond region of eastern Minas Geraes, Brazil.

[In *Am. Jour. Science*, 1900, X, p. 207.]

DIAMANTENGRABEREIEN in Südafrika.

[In *Zeits. deutsch. Ing. Arch. Ver.*, XXVI, 1883, p. 565.]

DIAMOND, Description of the.

[In *Phil. Trans. Abr.*, II, 1708, p. 405.]

DIAMOND, The, or the pest of a day.

London, 1797.

DIAMOND, The artificial production of.

[In *Nature*, XXII, 1880, pp. 404, 421.]

DIAMOND (The).

[In *Westminster Review*, Jan., 1883.]

DIAMOND, Fresh . . . discoveries in New South Wales.

[In *Iron*, XXIII, p. 249, 1884.]

DIAMOND. Papers and notes on the genesis and matrix of the . . . by the late Henry Carvill Lewis, edited by H. C. Bonney.

London, 1897.

DIAMONDS.

[In *Nature*, Aug. 5, 1887, p. 325.]

DIAMOND CUTTING.

[In 13 Annual Report of the U. S. Commissioner of Labor.]

Deals with subjects relating to the comparison of hand and machine work.

DIAMOND mining at Kimberly, South Africa.

[In *Geol. Mag.*, X, 1883, p. 460.]

DINGLEY (ROBERT). On gems and precious stones, particularly such as the ancients used to engrave on.

[In *Phil. Trans. Abr.*, IX, 1747, pp. 345.]

- DIEULAFAIT (L.). *Diamants et Pierres Précieuses.*
Paris, 1871.
- DIEULAFAIT (L.). *Diamonds and precious stones; a popular account of gems.*
New York, 1874.
- DIOSCORIDES *materia medica.*
Written about A. D. 50. A portion of the work treats especially of the medicinal properties of minerals.
- DIXON (A. C.). *Rocks and minerals of Ceylon.*
[In *Jour. Ceylon Branch Roy. Asiatic Soc.*, VI, No. 22, p. 39. Colombo.]
- DOELTER (C.). *Edelstein Kunde. Bestimmung und Untersuchung der Edelsteine und Schmucksteine Kuenstliche Darstellung der Edelsteine.*
Leipzig, 1893.
- DOLCE (LUDOVICO). *Libré tre, nei Quali si tratta delle diverse sorti delle gemme che produce la Natura.*
Ven. (Venice), 1564.
- DÖLL (E.). *Zum vorkommen des Diamants in Itakolumite Brasiliens und in den Kopjen afrikas.*
[In *Verh. k.-k. geol. Reichs.*, 1880, p. 78.]
- DRÉE (—). *Catalogue de Musée Mineralogique.*
Paris, 1811.
- . *Voyage aux mines de diamants dans le Sud de l'Afrique.*
[In *Tour du Mond*, Nos. 931-933, 1878.]
- DU CHESNE (J.). *A Briefe Aunswere of Iosephus Quereetanns Armeniacus, etc.*
London, 1591.
Contains a second part "concerning the use of minerall medicines."
- DU MÉRSAN (T. M.). *Histoire du cabinet des medailles, Pierres Gravées, etc.*
Paris, 1838.
- DUMONT (and JOURDAN). *Pierres précieuses.*
- DUNN (E. J.). *Notes on the diamond fields of South Africa.*
[In *Quart. Jour. Geol. Soc.*, XXXIII, p. 879, and v. 37, p. 609.]
- DUTENS (LEWIS). *Des pierres précieuses et des pierres fines, avec les moyens de les connoître et de valuer.*
[In his *Oeuvres*, II.] Londres, 1776.
- ECCHELLENSIS (ABRAHAM). *Versio Durrhamani de medicis Virtutibus animalum, plantarum et gemmarum.*
Paris, 1647.
- ECKERMAN (N.). *Electra, oder die Entstehung des Bernsteins.*
Halle, 1807.
- ECKHEL (J. H.). *Choix des Pierres gravées du Cabinet Impérial des Antiques.*
Vienne (Vienna), 1788.
- EICHORN (J. G.). *Die gemmis scalptis Hebraeorum.*
[In *Goettingen Ges. d. Wiss. Comm.*, 1811-13.]
- EKEBERG (ANDREW GUSTAVUS). *Dissertatio de Tôpazio.*
Upsal (Upsala), 1796.
- ELLIOTT (JOHN). *On the specific gravity of diamonds.*
[In *Phil. Trans.: Abr.*, IX, 1745, pp. 147.]
- EMANUEL (H.). *Diamonds and precious stones.*
London, 1865.
Contains a very full bibliography.
- ENCELIUS (CHRISTOPH). *De Re Metallica, hoc est, de origine varietate et natura corporum metallicorum, Lapidum, Gemmarum atque aliarum quae ex fodinis eruntur, Libri III.*
Francf. (Frankfurt), 1551.
- ENGELHARDT (AB. VON). *Die Lagerstätte der Diamanten im Ural-Gebirge.*
Riga, 1830.

- EPIPHANIUS. De duodecim Gemmis in veste Aaronis.
[Gr. Lat. cum corollario Gesneri.] Tig. (Turin), 1565.
- ERCKER (L.). Aula Subterranea.
1595.
- ERMANN. Beitrage zur Monographie des Marekasit, Turmalin, und Brasilianischen Topas.
Berlin, 1829.
- FABRE (P. J.). L'Abrégé des secrets chymiques, ou l'on voit la nature des animaux, végétaux, et minéraux entièrement découverte.
Paris, 1636.
- FALLOPIUS (G.). De Medicatis Aquis atque de Fossilibus, tractatus ab Andrea Marcolini collectus.
Venetia (Venice), 1564.
- FERGUSON (A. M. and J.). All about gold, gems, and pearls in Ceylon and southern India.
London, 1888.
- FERNEL (JOHN FRANCIS). Pharmacia, cum Guliel. Plantii et Franc. Sagnyerii Scholiis.
Hanov. (Hanover), 1605.
- FEUCHTWANGER (L.). Treatise on gems in reference to their practical and scientific value.
New York, 1838.
- . Popular treatise on gems in reference to their scientific value: a guide for the teacher, etc.
New York, 1859.
- FICORONI (F.). Gemmae antiquae; adnot. N. Galeotti.
Romae (Rome), 1757.
- FINOT (L.). Les Lapidaires Indiens.
Paris, 1896.
Contains eight different Sanskrit books of the art of the Indian lapidary, two of which are translated. The gems are described with reference as to origin, their value as charms, and also as to their occurrence, color, class, and value.
- FISCHER (G. DE WALDHEIM). Essai sur la Turquoise et sur la calaite.
Moscou (Moscow), 1810.
- FISCHER (G. DE W.). Essai sur la Pellegrina, ou la Perle incomparable des frères Zozima.
Moscou (Moscow), 1818.
- FLADE (C. G.). De re metallica Midianitarum et Phoenicorum.
Lipsiae (Leipzig), 1806.
- FLADUNG (J. A. F.). Versuch über die Kennzeichen der Edelsteine und deren vortheilhaftesten Schnitt.
Pesth (Budapest), 1819.
- . Edelsteinkunde.
Wien (Vienna), 1828.
- FONTENAY (——). Bijoux anciens et modernes.
- FONTENELLE (——). Nouveau manuel complet du bijoutier.
Paris, 1855.
- FORSTER (J. A.). Diamonds and their history.
[In Jour. Microscopy Nat. Science, III, 1884, p. 15.]
- FOWLE (——). Occurrence of diamonds in China.
[In U. S. Consular Report, No. 198, 1897, p. 384.]
- FOUQUÉ (F. and M. LÉVY). Synthèse des minéraux.
Paris, 1871.
- FRÉMY (E. and TEIL). Artificial production of precious stones.
[In Jour. Soc. Arts, XXVI, 1878.]

FRÉMY (E. and TEL). Sur la production artificielle du corindon du rubis et de différents silicates cristallisés.

[In Comptes Rendus, LXXXV, p. 1029.]

FRIEDLÄNDER (I.). Artificial production of diamond in silicates corresponding to the actual mode of occurrence in South Africa.

[In Geol. Mag., p. 226, 1898.]

FRIECHOLZ (J.). Lehrbuch der Steinschneidekunst, für Steinschneider, Graveurs, etc., und Jedens, welcher sich über die Veredlung der Steine zu unterrichten wünscht.

München (Munich), 1820.

GALAMAZAR (—). Liber de Virtutibus lapidum pretiosorum quem scripsit Galamazar, Thesaurarius Regis Babylonie, ipso presenti et precipiente.

[In Harleian Manuscripts.]

GAUTIER (J.). Untersuchung über die Entstehung, Bildung und den Bau des Chalcedons, etc.

Jena, 1809.

GEMS.

[In Spon's Encyclopedia of the Industrial Arts, p. 1042.]

GERIARD (C. A.). Disquisitio physico-chemica granatorum Silesie atque Bohemie.

[Inaug. Diss. Frankfurt a. d. Oder, 1760.]

GESNER (CONRAD). Liber de rerum fossilium, lapidum et gemmarum, maxime figuris.

Tig. (Turin), 1565.

GIMMA (D. GIACENTO). Della storia naturale delle gemme, delle pietre e di tutti minerali, ovvero della fisica sotterranea.

Napoli (Naples), 1730.

GINANNI (FANTUZZI M.). Osservazioni geognostiche sul coloramento di alcune pietre e sulla formazione di un agate nel museo Ginanni di Rivenna.

1857.

GIPPS (G. G. DE). Occurrence of Australian opal.

[In a paper read before the Australian Institute of Mining Engineers, 1898.]

GLOCKER (ERNST FRIEDRICH). De gemmis Plinii, imprimis de topazio.

Vratislavie (Breslau), 1824.

GOEPERT (H. R.). Ueber pflanzenähnliche Einschlüsse in den Chalcedonen.

1848.

GOLD AND GEMS. Mawe's Travels in the Brazils.

1812.

GORCEIX (H.). Les diamants et les pierres précieuses du Brésil.

[In Comptes Rendus, 1881, p. 981; also in Rev. Sci., XXIX, 1882, p. 553.]

———. Études des minéraux qui accompagnent le diamant dans le gisement de Salabro (Brésil).

[In Bull. Soc. Min. Français, VII, 1884, p. 209.]

GREGOR (WILLIAM). An analysis of a variety of the corundum.

[In Nicholson's Journal, IV, 1803, p. 209.]

GREVILLE (CHARLES). On the corundum stone from Asia.

[In Phil. Trans. Abr., XVIII, 1798, p. 356; and Nicholson's Journal, II, p. 477.]

GRIFFITHS (A. B.). On the origin and formation of the diamond in nature.

[In Chemical News, XLVI, 1882, p. 105.]

GROTH (P.). Grundriss der Edelsteinkunde.

Leipzig, 1887.

GROSIOVIUS (J.). Gemme et Sculpture antique depictæ ab Leonardo Augustino Senensi. 2 vols. in one.

Franqueere (Franeker), 1694.

- GRÜNLING (FR.). Über die Mineral vorkommen von Ceylon.
[In Zeits. Krystallographie, XXXIII, 1900, p. 209.]
- GÜTHE (J. M.). Ueber den Asterios-Edelstein des Cajus Plinius Secundus; eine anti-
quarisch-lithognostische Abhandlung.
München (Munich), 1810.
- GUYTON-MORVEAU (B. L.). On the singular crystallization of the diamond.
[In Nicholson's Journal, XXV, 1810, p. 67.]
- . Account of certain experiments and inferences respecting the combustion
of the diamond and the nature of its composition.
[In Nicholson's Journal, III, p. 298.]
- HABDARRAHAMUS (ASIUTENSIS ÆGYPTIUS). De proprietatibus ac virtutibus medicis
animalium, plantarum ac gemmarum.
[Ex Arab. Lat. redd. ab Abrahamo Echellensi]. Paris, 1647.
- HABERLE (C. C.). Beobachtungen über Gestalt der Grün- und Keimkrystalle des
schorlartigen Berylls, und dessen übrige oryctognostische und geognostische Ver-
hältnisse.
Erfurt, 1804.
- HÆCKEL (E.). A visit to Ceylon.
London, 1883.
- HÄIDINGER (W.). Ueber den Pleochroismus des Amethystes.
Wien (Vienna), 1846.
- . Ueber eine neue Varietät von Amethyst.
[In Denkschr. Akad. Wien, 1849.]
- . Pleochroismus und Krystallstructur des Amethystes.
[In Ber. Akad. Wien, 1854.]
- . Der für Diamant oder noch werthvolleres ausgegebene Topas des Herrn
Dupoisat.
[In Ber. Akad. Wien, 1858.]
- HAMLIN (A. C.). The tourmaline.
Boston, 1873.
- . Leisure hours among the gems.
1884.
- HANNAY (J. B.). On the artificial formation of the diamond.
[In Chemical News, 1880, p. 106.]
- . Artificial diamonds.
[In Nature, XXII, 22, 1880, p. 255.]
- HASSE (J. H. F.). Der Aufgefundene Eridanus, oder neue Aufschlüsse über den
Ursprung des Bernsteins.
Riga, 1769.
- HÄUY (René Just). Traite de la minéralogie.
Paris, 1780.
- . Mémoire sur les topazes du Brésil.
[In Ann. Mus. d'Hist. Nat., Paris, 1802.]
- . Observations sur les Tourmalines, particulièrement sur celles qui se trouvent
dans les États Unis.
[In Mémoire du Muséum, Paris, 1815.]
- . Traite des caracteres physiques des Pierres précieuses, pour servir a leur
determination lorsqu'elles sont taillées.
Paris, 1817.
- HELMCKACKER (R.). On the Russian diamond occurrences.
[In Eng. and Min. Jour., Oct. 28, 1898.]
- HOBBS (W. H.). The diamond field of the Great Lakes.
[In Jour. of Geol., VII, 1899, no. 4.]

HERMES TRISMEGISTUS. *Tabula smaragdina vindicata.*

1657.

An alchemical treatise.

HERTZ (B.). *Catalogue of Mr. Hope's collection of pearls and precious stones, systematically arranged and described.*

London, 1839.

HESSLING (TH. VON). *Die Perlmuschel und ihre Perlen.*

Leipzig, 1859.

HILLER (M.). *Tractus de Gemmis xii, in Pectorali Pontificis Hebraeorum.*

Tubingen, 1698.

HINDMARSH (R.). *Precious stones, being an account of the stones mentioned in the Sacred Scriptures.*

London, 1851.

HISTOIRE des Joyaux et des principales Richesses de l'orient et de l'occident.

Geneve (Geneva), 1665.

HISTORY OF JEWELS.

London, 1671.

HODGSON (JOHN). *Dissertation on an ancient cornelian.*

[In *Archaeol.*, II, 1773, p. 42.]

HOLLANDUS (L.). *Opera mineralia et vegetabilia.*

Arnhem (Arnheim), 1617.

HUDLESTON (W. H.). *On a recent hypothesis with respect to the diamond rock of South Africa.*

[In *Min. Mag.* 1883, p. 199.]

IDENTIFICATION OF GEMS.

[In *Mineral Industries* (annual), 1898, p. 278.]

JACOB (P. L.). *Curiosités des sciences occultes; alchimie, médecine chimique et astrologique, talismans, amulettes, baguette, divinatoire, astrologie, chiromancie, magie, sorcellerie, etc.*

Paris, 1885.

JACOBS (H. and N. CHATRIAN). *Monographie du diamant.*

Paris, 1880.

A second edition in 1884.

JANETTAZ (N. and E. FONTENAY, EM. VANDERHEGEN, and A. COUTANCE). *Diamant et pierres précieuses.*

Paris, 1880.

JANNETAZ (N.). *Les diamants de la couronne.*

[In *Science et Nature*, 1884.]

JENNINGS (H.). *The Rosicrucians.*

London, 1870.

Another edition, 2 vols., in 1887.

Contains some references to the mystical lore of gems.

JEFFRIES (DAVID). *Treatise on diamonds and pearls, in which their importance is considered, plain rules are exhibited for ascertaining the value of both, and the true method of manufacturing diamonds is laid down.*

London, 1750.

— *Traité des diamants et des perles.*

Paris, 1753.

— An abstract of the treatise on diamonds and pearls, by which the usefulness to all who are in any way interested in these jewels will sufficiently appear, and therefore addressed to the nobility and gentry of this kingdom, and to the traders in jewels.

London, 1754.

- JOHN (J. F.). *Naturgeschichte des Succins, oder des sogenannten Bernsteins.*
Köln (Cologne), 1816.
- JONES (W.). *Treasures of the earth, or mines, minerals, and metals.*
London, 1879.
- *Precious stones, their history and mystery.*
London, 1880.
- *Finger-ring lore.*
London, 1890.
- JOHNSTONUS (JOHANNES). *Notitia Regni Vegetabilis et Mineralis.*
Lipsiae (Leipzig), 1661.
- *Thaumatographia Naturalis.*
Amsterdam, 1632.
- JOSEPHUS. *Antiquatum Judaicarum.*
[Translated from the Greek by W. Whiston.] London, 1737.
- In book III, chap. 8 is an account of the marvelous properties of the stones in the breast-plate of the high priest.
- JUDD (J. W. and W. E. HIDDEN). *On the occurrence of ruby in North Carolina.*
[In *Min. Mag.*, 1889, p. 139.]
- JUTIER (——). *Exploitation du diamant dans la colonie du cap.*
[In *Compt. Rendus Soc. Industr. Min. St. Etienne*, p. 34.]
- JUWELIER, *Der Aufrichtige, oder Anweisung aller Arten Edelsteine, Diamanten, und Perlen zu erkennen, nebst einer aus dem Englischen uebersetzten Abhandlung von den Diamanten und Perlen.*
Frankfurt, 1772.
- KÄHLER (M.). *De Crystallorum Generatione.*
Upsal (Upsala), 1747.
- KALM (P.). *Några Kanne marken til nyttiga mineraliens eller forl och Baigarters upfinnande.*
Aboae (Abo), 1756.
- KEY to precious stones and metals.
London, 1869.
- KING (C. W.). *Antique gems.*
London, 1860.
- *The natural history of precious stones and of the precious metals.*
London, 1867.
- *The natural history of gems or decorative stones.*
London, 1867.
- *Handbook of engraved gems.*
London, 1885.
- KING (G. F.). *Topaz and associated minerals at Stoneham, Maine.*
[In *Am. Jour. Science*, XXVII, 1884, p. 212.]
- KIRANI *Kiranides et ad eas Rhyakini koronides, sive mysteria Physico-Medica.*
London, 1685.
- KIRCHER (ATHANASIUS). *Mundus subterraneus in XII libros digestus*
Amstellodami (Amsterdam), 1678.
- Another edition, *Le Monde Souterrain*, in French.
- KIRKPATRICK (T. S. G.). *Simple rules for the discrimination of gems.*
New York, 1895.
- KLAPROTH (M. H.). *Analysis of the spinel.*
[In *Nicholson's Journal*, III, 1799, p. 549.]
- KLEBS (R.). *Der Bernstein, Seine Gewinnung, Geschichte u. geologische Bedeutung.*
Berlin, 1880.
- KLEEFELD (——). *Die Halbedelstein.*
Berlin, 1879.

- KLEEFELD (—). Die Edelstein.
- KLUGE (K. E.). Handbuch der Edelsteinkunde.
Leipzig, 1860.
- KÖHLER (H. K. A. von). Kleine Anhandlungen zur Gemmenkunde.
———. Untersuchung über den sard, onyx und sardonix.
Braunschweig (Brunswick), 1801.
- KOKSCHAROW (N. von). Materialien zur mineralogie Russlands.
St. Petersburg.
Eleven vols. and atlas. Begun in 1853 and the parts issued from time to time.
Contains mineralogical descriptions of gem minerals of the Russian Empire.
- KÖNIG (EMANUEL). Regnum minerale, physice, medice, anatomice, alchymice, analogice, theoretice et practice investigatum.
Basil (Basle), 1689.
- KÖNNERITZ (L. von). Mittheilung mannichfaltiger Versuch Edelsteine Kunstgemass zu schleifen.
Weimar, 1841.
- KRAUSE (T. H.). Pyrgoteles, oder die edeln Steine der alten in Bereiche der Natur, etc.
Halle, 1856.
- KUNZ (G. F.). Precious stones.
[In Mineral Resources of the United States. Issued annually by the United States Geological Survey.]
———. Precious stones.
[In Appleton's Physical Geography.]
———. The gems in the National Museum.
[In Popular Science Monthly, April, 1886.]
———. Precious stones, gems, and decorative stones in Canada and British America.
[Ann. Rept. Geol. Survey of Canada, Ottawa, 1888.]
———. The fresh-water pearls and pearl fisheries of the United States.
[In Bulletin of the U. S. Fish Commission, 1897, p. 375.]
———. Gems and precious stones.
New York, 1890.
———. Folk-lore of precious stones.
1894.
A catalogue of specimens exhibited in the Department of Anthropology, World's Columbian Exposition, Chicago, 1893.
———. Sapphires from Montana, with special reference to those from Yogo Gulch, in Fergus County.
[In Am. Jour. Science, IV, 1897, p. 417.]
- LABARTE (M. JULES). Handbook of the arts of the Middle Ages and Renaissance, as applied to the decoration of jewels, etc.
London, 1855.
- LACAZE (DUTHIERS H.). Histoire Naturelle du Corail, Organisation, Reproduction, Pêche en Algérie, Industrie, etc.
Paris, 1864.
- LAET (JOHN DE). De Germis et Lapidibus Libri II, Quibus premittitur Theophrasti Liber; de Lapidibus Gr. Lat., cum amotationibus.
Lugd. Bat. (Leyden), 1647.
- LANCON (H.). L'Art du Lapidaire.
Paris, 1830.
- LANGIUS (JOHANNES). Epistolæ medicinales.
Lugd. (Leyden), 1557.
- LAPIDUM Pretiosorum usus magicus, sive de sigillis.
[In Harleian Manuscripts.]

- LAUNAY (L. DE). Les diamants du Cap.
Paris, 1897.
- LEA (ISAAC). Inclusions in gems.
[In Proc. Acad. Nat. Science, Philadelphia.]
- LEISNERUS (GOTT. CHRIST.). De Coralliorum Natura, Preparatis et Usibus.
Wittemberge (Witttemberg), 1720.
- LEMNIUS (LEVINUS). Occulta Nature Miracula.
Antwerp, 1567.
- LENK (J.). Neue Entdeckung eines Steines Serpentin-Agat.
Wien (Vienna), 1802.
- LEONARDUS (CAMILIUS). Speculum Lapidum.
Venet. (Venice), 1502.
- . Tratto delle Gemme che produce la Natura; traduzione di M. Ludovico Dobe.
1565.
- . The mirror of stones, in which the nature, generative properties, virtues, and various species of more than 200 different jewels, precious and rare stones are distinctly described.
London, 1750.
- LEWIS (H. C.). Genesis and matrix of the diamond.
London, New York, and Bombay, 1897.
- LIBAVLE (A.). Alchemia.
Frankfurt, 1597.
- LIBER HERMETIS, tractans de 15 Stellis et de 15 Lapidibus et de 15 Herbis et de 15 Figuris.
[In Harleian Manuscripts.]
- LIVERSEDGE (A.). On the occurrence of diamonds in New South Wales.
[In Minerals of New South Wales, London, 1888.]
- LOEWM (——). Ueber den Bernstein und die Bernstein-Fauna.
Berlin, 1850.
- LONINER (G.). Die Marmaroscher Diamanten.
Presberg, 1856.
- LÖSCH (A.). Ueber Kalkeisengranat (Demantoid) von Syssertzk am ural.
[In Neues Jahrbuch, 1879, p. 785.]
Description of locality, occurrence, etc., of the green garnet (demantoid) used in jewelry.
- LOUIS (H.). The ruby and sapphire deposits of Moung Klung, Siam.
[In Min. Mag., 1894, p. 276.]
- LUCRETIUS (——). De Rerum Natura.
- LULLIUS (RAYMUNDUS). Libelli aliquot chemici, etc.
Basilee (Basle), 1600.
[See p. 319: "De compositione gemmarum et lapidum preciosorum."]
- MAKOWSKY (A.). Ueber die Diamanten des Kaplandes auf der Weltaustellung in Wien.
[In Verh. Nat. Ver. Brünn, XII, p. 16.]
- MALLET (F. R.). On sapphires recently discovered in the Northwest Himalayas.
[In Rec. Geol. Surv. India, XV, 1881, p. 138.]
- MANDVILLE (JOHN). Le Grande Lapidaire, où sont déclarez les noms de Pierres orientales, avec les Vertus et Propriétés d'icelles, et îles et pays où elles croissant.
Paris, 1561.
- MARBODEUS (GALLUS). De Gemmarum Lapidumque pretiosorum formis atque viribus opus culum.
Colon (Cologne), 1593.

- MARBODJEUS (GALLUS). De Lapidibus pretiosis Enchiridion, cum Scholiis Pictorii.
Wolfenbüttel (Wolfenbüttel), 1740.
- MARIETTE (P. J.). Traité des Pierres gravées.
Paris, 1750.
- MARSHALL (W. P.). Notes on the Great Kimberley Diamond mine.
[In *Midl. Nat.*, VII, p. 93.]
Marlborough gems. Gemmarum Antiquarum Delectus ex præstantioribus
desumptis, quæ in Dactylithecis Ducis Marlburgiensi conservantur, 1845.
- MARTIN (K.). Notizen über Diamanten.
[In *Zeits. deutsch. geol. Gesells.* XXX, p. 521; plate.]
A crystallographic study of the diamonds in the Leyden Museum.
- MASKELYNE (N. S.). Artificial diamonds.
[In *Jour. Soc. Arts*, XXVII, p. 289.]
- MASON (F.). Burma: Its people and productions.
London, 1882.
In 2 vols., I, geology and mineralogy.
- MAWE (JOHN). A treatise on diamonds and precious stones, including their history,
natural and commercial. To which is added some account of the best method of
cutting and polishing them.
London, 1813.
- . Travels in the interior of Brazil, particularly in the gold and diamond dis-
tricts of that country.
London, 1812.
- MEINEKE (J. L. G.). Ueber den Chrysopras und die denselben begleitenden Fossi-
lien in Schlesien.
Erlangen, 1805.
- MEUNIER (S.). Composition et origine du sable diamantifère de Du Toits Pan
(Afrique-Australe).
[In *Comptes Rendus*, LXXXIV, p. 250.]
- MILES (C. E.). Diamonds.
[In *Trans. Liverpool Geol. Soc.*, II, p. 92, 1882.]
- M. L. M. D. S. D. Dénombrement, Faculté et Origine des Pierres précieuses.
Paris, 1667.
- MÖBIUS (K.). Die echten Perlen.
Hamburg, 1857.
- MORALES (G. de). Libro de las Virtudes y Propriedades maravillosas de las Piedras
preciosas.
Madrid, 1605.
- MORGAN (SYLVANUS). The Sphere of Gentry.
1661.
Contains an account of the heraldic meaning of gems.
- MORRIS (J.). Gems and precious stones of Great Britain.
1868.
- MORTIMER (CROMWELL). Remarks on the precious stone called the turquois.
[In *Phil. Trans. Abr.*, VIII, p. 324.]
- MÜLLER (J.). Nachricht von den in Tyrol entdeckten Turmalinen, oder Aschenzie-
hern, von Ignaz Edeln von Born.
Wien (Vienna), 1787.
- MURRAY (J.). Memoir on the diamond.
London, 1839.
- MURRAY (R. W.). Diamond fields of South Africa.
[In *Jour. Soc. Arts*, XXIX, p. 370.]
- NATTER (L.). A treatise on the ancient method of engraving precious stones com-
pared with the modern.
London, 1754.

- NATURAL MAGICK, in twenty books, wherein are set forth all the riches and delights of the natural sciences, with engravings.
London, 1658.
An English trans. of Porta's *Magie Naturalis*.
- NICOLS (THOMAS). A lapidary, or history of pretious stones; with cautions for the undeceiving of all those that deal with pretitious stones.
London, 1754.
- . *Arcula Gemmea; or the Nature, Virtue, and Valour of Precious Stones*, with cautions for those who deal in them.
Cambridge, 1652.
- . *Gemmarins Fidelis, or the Faithful Lapidary; experimentally describing the richest Treasures of Nature, in an Historical Narrative of the several Natures, Virtues, and Qualities of all Precious Stones, with a Discovery of all such as are adulterate and counterfeit*.
London, 1659.
- NORTHROP (H. D.). Beautiful gems.
1890.
- OCHTCHEPKOFF (J. W.). Qui à découvert le Diamant dans les Montes Ourals?
[In *Bul. Soc. Oural. Sci. Nat.*, VII, p. 87, 1884.]
- OPALS (Australian).
[In *Iron*, XXII, p. 490, 1883.]
- ORPÈX (G.). Stories about famous precious stones.
1890.
- ORPHEUS. *Hymni et de Lapidibus*. Gr. Lat., enrante A. C. Eschenbachio; accedunt H. Stephani note.
Traj. ad Rh. (Cologne), 1689.
- ORTON (J.). *Underground treasures*.
Philadelphia, 1881.
- PAGE (D.). *Economic Geology*.
London, 1874.
- PARACELSUS (PHILIPPUS AURELIUS THEOPHRASTUS). Nine books on the nature of things; into English by J. F.
London, 1650.
- PARACELSUS. *Of the chymical transmutation, genealogy, and generation of metals and minerals* [tr. by R. Turner].
London, 1657.
- PARROT (——). *Notices sur les Diamants d'Oural*.
[In *Mem. de l'Acad. Imp.*, St. Petersburg, 1832].
- PARTSCH (P.). *Beschreibendes Verzeichniss einer Sammlung von Diamanten und der zur Bearbeitung derselben nothwendigen apparate*.
Wein (Vienna), 1822.
- PAXMAN (J. N.). *The diamond fields of South Africa*.
[In *Eng. Min. Jour.*, XXXV, p. 382.]
- . *On the diamond fields and mines of Kimberley, South Africa*.
[In *Proc. Inst. Civil Eng.*, LXXIV, p. 59.]
- PAXTON (J. R.). *Jewelry and the precious stones*.
[By Hipponax Roset, pseudon.] Philadelphia, 1856.
- PETZOLDT (M.). *Beiträge zur Naturgeschichte des Diamants*.
Dresden und Leipzig, 1842.
- PHILOSTRATUS. *De Vita Apolonii*.
- PIERERUS (G. P.). *Lazulus, Dissertatio chymico, medica*.
Argentorati (Strasburg), 1668.
- PINDER (——). *De Adamante Commentatio Antiquaria*.
Berlin, 1829.

- PIRSSON (L. V.). On the corundum-bearing rock from Yogo Gulch, Montana.
[In *Am. Jour. Science*, IV, 1897, p. 421.]
- PLINY. *Historia Naturalis C. Plinii secundi*.
First issued A. D. 77.
The work is divided into 37 books, and these into short chapters; the last 5 books treat particularly of gems and other minerals.
- PLUCHE (ANTOINE NOËL DE). *Spectacle de la Nature*.
Paris, 1732-39.
- PLUMMER (J.). Australian localities of diamond.
[In *Watchmaker, Jeweller, and Silversmith*, XXIV, 1898.]
- PLYTOFF (G.). *Divination, calcul, des probabilités, oracles et sorts, songes, graphologie, chiromancie, phrénologie, physiognomie, cryptographie, magie, kabale, alchimie, astrologie, etc.*
Paris, 1891.
- POLE (W.). *Diamonds*.
[In *London Archaeol. Trans.*, 1861.]
- PORTA (JOHN BAPTIST). *Magie Naturalis*.
Porta [born 1538, died 1615] published the first edition of this work in 1553, when he was but 15 years old. It contains much concerning the mystical properties of gems. The work also contains a description of the camera obscura.
———. A method of knowing the inward virtues of things by inspection.
1601.
———. *De Distillationibus*.
Romæ (Rome), 1608.
- PORTALEONE (ABRAHAM). *Shilte Haggeborim* [The Shields of the Mighty].
Mantua, A. M. 5372 (A. D. 1612).
- POTT (M. J.). *Lithogeopnosie, ou examen chymique des Pierres et des Terres en général et de la Topaze et de la stéatite en particulier*.
Paris, 1753.
- POUGENIEFF. *Precious Stones*. Russian, with 2 coloured plates and numerous woodcuts.
St. Petersburg, 1888.
- POUGET (N.). *Traité des Pierres précieuses, et de la manière de les employer en parure*.
Paris, 1762.
- PRATT (J. H.). Notes on North Carolina minerals.
[In *Journal Elisha Mitchell Scientific Society*, XIV, part 2, p. 61, 1898.]
Describes occurrence of emerald.
- PRATT (J. H., and W. E. HIDDEN). *Rhodolite, a new variety of garnet*.
[In *Am. Jour. Science*, V, 1898, p. 293; also VI, 1898, p. 463.]
- PRECIOUS stones of the Bible; descriptive and symbolical.
1878.
- PRECIOUS stones, cutting and polishing of.
[In *Mineral Industries* (annual), p. 229, 1899.]
- PRINZ (W.). *Les enclaves du Saphir, du Rubis, et du Spinelle*.
[In *Bul. Soc. Belge. Microsc.*, 1882.]
- PSSELLUS (MICHAEL CONSTANTINUS). *De Lapidum Virtutibus*.
Lugdunî Batavorum (Leyden), 1795.
- RAGOUMOVSKY (——). *Distribution Technique des Pierres précieuses, avec leurs caractères distinctifs*.
Vienne (Vienna), 1825.
- RAMBOSSON (——). *Les Pierres précieuses*.

- RANTZOVIVS (HENRY). De Gemmis scriptum olim a poeta quodam non infeliceit carmine redditum et nunc primum in lucem editum.
Leipzig, 1585.
A manuscript on the properties and effects of precious stones attributed to "Evax, a King of the Arabs."
- RAVIUS (S. F.). Specimen arabicum, continens descriptionem et excerpta libri Achmedis Teifaschii "De Gemmis et Lapidibus Pretiosis."
Trajetum ad Rhenum (Leyden), 1784.
- REYNAUD (J.). Histoire élémentaire des minéraux usuels.
Paris, 1867.
- ROBERTSON (J. K. M.). The occurrence of opals in central Australia and Queensland.
[In Chem. News, LXV, 1882, pp. 95, 101.]
———. On the occurrence of opals in the colony of Queensland.
[In Proc. Phil. Soc. Glasgow, XIII, p. 427.]
- ROSENMÜLLER (E. F. C.). Mineralogy of the Bible.
[Translated by Repp and Morren.] Edinburgh, 1840.
- ROSS (W. A.). Pyrology.
London, 1875.
———. On the cause of the blue color of sapphire, lazulite, and lapis lazuli; the green color of emerald and the purple of amethyst.
[In Chem. News, XLVI, 1882, p. 33.]
- ROTHSCHILD (M. D.). Handbook of precious stones.
New York, 1890.
- ROY (C. W. VAN). Ansichten über Entstehung und vorkommen des Bernsteins, so wie praktische mittheilungen über den werth und die Behandlung desselben als Handelsware.
Dantzig, 1840.
- RUDLER (F. W.). Agate and agate working.
[In Pop. Science Rev., I (new series), p. 23.]
———. Artificial diamonds.
[In Pop. Science Rev., IV, 1880, p. 136.]
———. Diamonds.
[In Science for All, II.]
———. On jade and kindred stones.
[In Pop. Science Rev., III, p. 337.]
- RUDOLPH (A.). Die edeln metalle und Schmucksteine, mit 37 Tabellen.
Breslau, 1858.
- RUE (F. DE LA). De Gemmis.
Parisii (Paris), 1547.
Other editions: Lugd., 1622; Franc., 1626; Gron., 1626.
- RUENS (F.). De Gemmis aliquot, iis præsertim quarum Divus Joannes Apostolus in sua Apocalypsi notavit.
Paris, 1547.
- RULANDUS (M.). Medicina Practica.
Arg. (Strasburg), 1564.
———. Lexicon Alchemie.
Frankfurt, 1661.
First ed. dated 1612. The author, a physician to Rudolph II of Germany, gives several receipts for the development of the occult and medicinal properties of gems.
- RUSKIN (J.). On the heraldic meaning of precious stones.
[In his lecture before the London Institute, Feb., 1876.]
- SANDIVS (CHRISTOPHER). On the origin of pearls.
[In Phil. Trans.: Abr., II, p. 126, 1674.]

SAPPHIRE.

[In Mineral Industries (annual), p. 235, 1896.]

SAPPHIRE MINES OF BURMA.

[In Mineral Industries (annual), p. 239, 1896.]

SAPPHIRE MINES IN SIAM.

[In Jour. Soc. Arts, XXVIII, p. 770.]

SARMENTO (J. C. DE). An account of diamonds found in Brazil.

[In Phil. Trans.: Abr., VIII, 1731, p. 503.]

SCHINDLER (A. H.). The turquoise mines of Nishapur, Khorassan.

[In Rec. Geol. Survey, India, XVII, p. 132.]

SCHMIDT (C. J.). Das Wichtigste über dem Opal in Allgemeinen und über sein Vorkommen in Mähren im Besonderen.

[In Mitth. d. k. k. Mähr. Schles. Gesells., Brunn, 1855.]

SCHRAUF (A.). Handbuch der Edelsteinkunde.

Wien (Vienna), 1869.

SCHULZE (H.). Practisches Handbuch der Juwelierkunst und Edelsteinkunde.

Quedlinburg und Leipzig, 1830.

SCOT (REGINALD). Discovery of witchcraft.

London, 1651.

Contains several curious charms in which gems are used.

SCUDALUPIS (P. ARLENSIS DE). Sympathia Septem ac Septem Selectorum Lapidum ad Planetas.

An alchemical or astrological work; among other curiosities it contains a list of stones "in sympathy with the seven planets."

SERAPION (J.). De medicamentis tam simplicibus quam compositis.

Mediolanum (Milan), 1473.

SHELLEY (F.). Legends of gems.

New York, 1893.

SHEPARD (C. U., senior). Notice of corundum gems in the Himalaya region of India.

[In Am. Jour. Science, XXVI, 1883, p. 339.]

SHEPSTONE (T.). The geographical and physical characters of the diamond fields of South Africa.

[In Jour. Soc. Arts, XXII, 1874.]

SHIPTON (—). Precious gems.

London, 1867.

SILLIMAN (B.). Turquoise of New Mexico.

[In Proc. Am. Assoc., XIX, p. 431; also Am. Jour. Science, XXII, 1880, p. 67.]

SLEVOGTH (J. H.). De Lapide Bezoar.

Jenæ (Jena), 1698.

SOTTO (Js.). Le Lapidare du Quatorzième Siècle.

Wien (Vienna), 1862.

SPENER (J. J.). De gemmis errores vulgares.

Lipsiæ (Leipzig), 1688.

SMYTH (H. W.). Five years in Siam (1891-1896).

2 vols. London, 1898.

SPEZIA (G.). Sul colore del Zircone.

[In Atti R. Ac. Torino, XII, p. 37.]

His experiments show that the color is dependent upon the degree of oxidation of the contained iron.

STEINBECK (—). Ueber die Bernstein-Gewinnung.

Brandenburg, 1841.

STREETER (E. W.). Precious stones and gems.

London, 1877.

- STREETER (E. W.). Great diamonds of the world.
London, 1892.
- SUTTON (A. L.). *Lingua gemmæ: cycle of gems.*
1894.
- TAGOORE (S. M.). *Mani-mâlâ, or a treatise on gems.* 2 vols.
Calcutta, 1879.
Contains a bibliography of Sanskrit, Persian, Arabic, and other Oriental works on gems.
- TASSIE, (JAMES). Descriptive catalogue [of a collection of ancient and modern engraved gems, cameos, and intaglios of the most celebrated cabinets in Europe; cast in colored pastes, white enamel, and sulphur; arranged and described by R. E. Raspe, 1791.
- TAVERNIER (J. B.). *Voyages in Turquie, en Perse et aux Indes.*
Paris, 1676.
———. Account of diamond mines.
[In Pinkerton's Collection of Voyages, VIII, 1811.]
- TAYLOR (L.). *Precious stones and gems, with their reputed virtues.*
London, 1895.
- TAYLOR (N.). On the Cudgegong diamond field, New South Wales.
[In Geol. Mag.; IV, p. 399.]
- TEFASCITE (AHMED). *Fior di Pensieri sulle Pietre Preziose, opera stampata nel suo originale Arabo di Ant. Raineri.*
Firenze (Florence), 1818.
- TENNANT (J.). *Gems and precious stones.*
[In Soc. of Arts. Lect., 1851-52.]
- TESORO delle Gioie, Trattato curioso.
Venetitia (Venice), 1670.
- THEOPHRASTUS. History of stones, with the Greek text and an English version, and notes, critical and philosophical, including the modern history of gems described by that author, by Sir John Hill.
London, 1746.
- THOUSAND (A) notable things on various subjects.
London, 1814.
- TIMBERLAKE.—Discourse of the travels of two English pilgrims.
1611.
Contains, among others, an account of a great jewel used in conjuring.
- TOLL (ADRIANUS). *Gemmarum et Lapidum Historia.*
Lugduni (Leyden), 1636.
———. *Le Parfaict Joaillier, où Histoire des Pierreries, où sont amplement descrites leur naissance, juste prix, etc.*
Lyon, 1644.
- TRAITÉ des Pierres de Théophraste.
[Translated from the Greek.] Paris, 1754.
- TURNER (H. W.). The occurrence and origin of diamonds in California.
[In American Geologist, 1899, p. 182.]
- VALENTINUS (BASILUS). Of natural and supernatural things, etc.
[Translated from the Dutch by D. C.] London, 1670.
An alchemical treatise containing several accounts of the occult and medicinal properties of gems. The German edition was issued at Eisleben in 1603.
- VANE (G.). The pearl fisheries of Ceylon.
[In Journal of the Ceylon Branch Royal Asiatic Society, X, 1887. Colombo.]
- VEGA (GARCILASO DE LA). History of the Incas.
[Various editions.]

- VELTHEIM (A. F. von). Etwas über Memmons Bildsäule, Nero's Smaragd, Toreutik, und die Kunst der Alten in Stein und Glas zu schneiden.
Helmstadt, 1793.
- . Etwas über das Onyx-Gebirge des Clesias und den Handel der Alten nach Ost-Indien.
Helmstadt, 1797.
- VENETTE (NICHOLAS). *Traité des Pierres*.
Amsterdam, 1701.
- VETTERMANN (A.). Kurze Abhandlung über einige der vorzüglichsten Classen der bunten oder gefärbten Edelsteine.
Dresden, 1830.
- VOGEL (H. W.). Spectralanalytische Notizen.
[In *Ber. Deutsch. chem. Gesell.*, X, p. 373, 1887.]
Examination of garnet, ruby, etc.
- WERNHER (——). Die Gewinnung und Aufbereitung der Diamanten in Süd-Afrika.
[In *Wochenschr. Deutsch. Ing.-Arch.-Ver.*, p. 365.]
- WESTROPP (H. M.). *Manual of precious stones*.
1874.
- WECKERUS (or WECKER). *Antidotæ speciales de Lapidibus minus pretiosis alternantibus*.
- WILLIAMS (C. G.). Researches on emeralds and beryls.
[In *Chem. News*, XXXV, p. 256.]
A purely chemical paper.
- WILLIMOT (C. W.). *Canadian gems and precious stones*.
[In *Ottawa Naturalist*, Nov., 1891.]
- ZEPHAROVITCH (V. von). *Der Diamant, ein populärer Vortrag*.
Gratz, 1862.
- ZERREMER (C.). *Anleitung zum Diamanten. Waschen aus Seifengebirge, Ufer- und Flussbett-Sand*.
Leipzig, 1851.
- . *De Adamanti Dissertatio*.
Lipsie (Leipzig), 1862.