Gems & Gemology

GEMS & GEMOLOGY is the quarterly official organ of the American Gem Society, and in it appear the Confidential Services of the Gemological Institute of America. In harmony with its position of maintaining an unbiased and uninfluenced position in the jewelry trade, no advertising is accepted. Any opinions expressed in signed articles are understood to be the views of the author and not of the publishers.

VOLUME IV SPRING, 1943 NUMBER 5

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Published by

THE GEMOLOGICAL INSTITUTE OF AMERICA

541 South Alexandria Ave. Los Angeles 5, California

Local Peculiarities of Sapphires*

by

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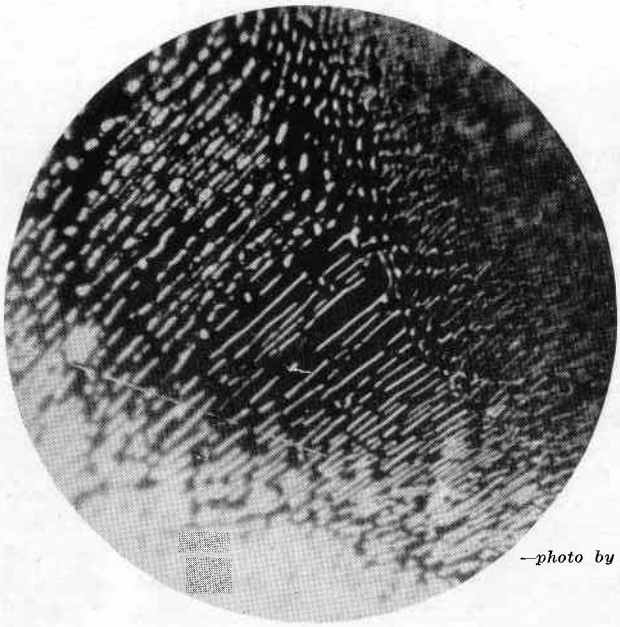
Lucerne, Switzerland

(Continued from last issue)

Although all other sapphires embrace liquid inclusions, those in Ceylon sapphires are so very typical, always having something in common, that identification is made easy. They are "feathers" or "flags" consisting of countless worm-like and hose-shaped cavities (Fig. 11) oftentimes extending into single drops of most fantastic shapes (Fig. 12). Many of them contain a movable, floating gas bubble, so-called libella (reminding of a water-level). Researches of my own proved these liquids to be carbon dioxide.**

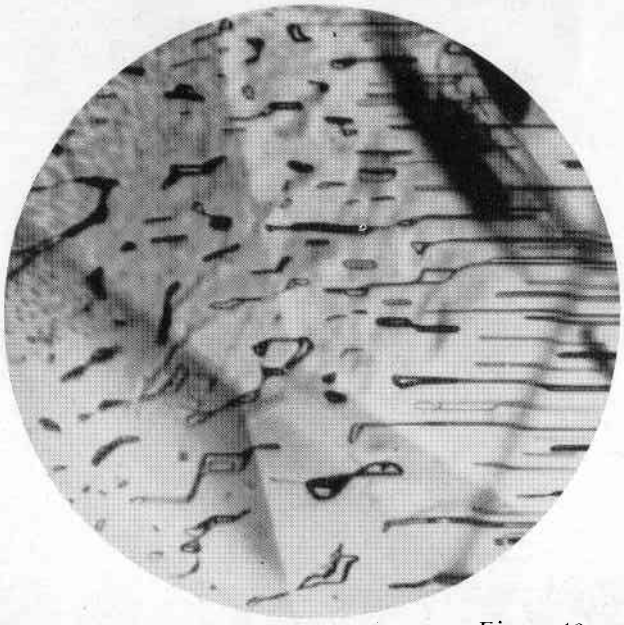


—photo by Dr. Gübelin

Figure 11
Large "feather" consisting of hose-shaped liquid cavities in Ceylon sapphire. 100x. Lateral illumination of the microscope.

*G.I.A. Research Service.

**The chemical composition of some liquid inclusions will be dealt with in another article of mine in one of the future issues of this organ.



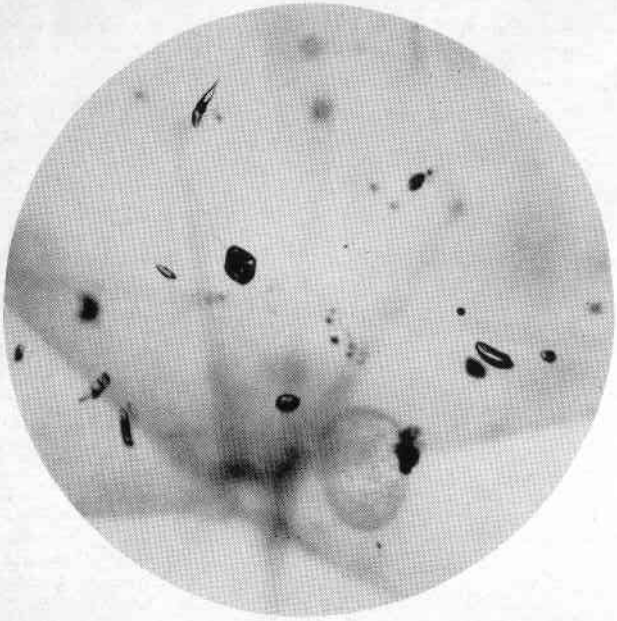
—photo by Dr. Gübelin

Figure 12

Liquid "feathers" ranging downward to single drops of irregular shapes, in a Ceylon sapphire. 75x.

Scores of loosely scattered microlites (= small foreign minerals) represent another characteristic peculiarity in Ceylon sapphires (Fig. 13). Moreover, long, broad, sausage-like tubes filled with a liquid substance are sometimes seen in Ceylon stones (Fig. 14). They are irregularly distributed and do not seem to follow any crystallographic direction of the host-jewel. I am not familiar with any record of these strange liquid tubes appearing in sapphires from deposits other than those on the isle of Ceylon.

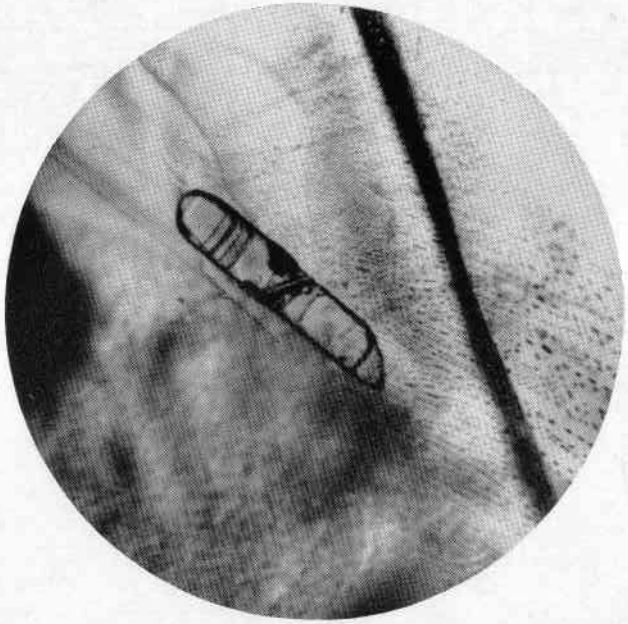
But the most characteristic and surest inclusion to be found within Ceylon sapphires are small, usually xenomorphic crystals of brown zircon. These zircons exhibit all stages of decay, thanks to the destructive bombardment from radioactive atoms within the included zircons. The presence of minute amounts of the radioactive elements uranium, thorium, cerium, and ytterbium in almost all zircons is well known, notably in those from Ceylon, which is said to be the source of abnormal zircons.[6] It is quite natural that these zircons do not only occur among the outer paragenetic minerals of the gem corundum in Ceylon, but also mark their presence within the interior mineral association of Ceylon sapphires. The radium rays darting from the radioactive elements, of course, do not only cause a breakdown in



—photo by Dr. Gübelin

Figure 13

Small scattered included crystals in a Ceylon sapphire. 50x



—photo by Dr. Gübelin

Figure 14

Large cavity filled with various non-miscible liquids. In the background large feathers, as they are typical for Ceylon sapphires. 150x

the crystal lattice of the enclosed zircons but also affect the structure of the surrounding sapphire, leaving remarkable traces in the form of brown "pleochroic radiohalos" (refer to Fig. 6 in previous article[1]). A detailed account on these interesting features in Ceylon rubies has already been given in this previous paper. Considering the disturbing activity those radioactive zircons have upon the crystal structure of Ceylon corundums I wish to propose that these particularly destructive microlites be named "irritants" or "irritant microlites" in future.

Many other accessory minerals, such as garnets, spinels, mica, hematite, calcite, corundum, tourmaline, and pyrite may be integral parts of the "interior paragenesis" of the oriental sapphires but, since they occur almost everywhere, they do not contribute toward a sure distinction between the sapphires from different sources of origin.

The specialized microscopic method of distinguishing certain gem stones from their various sources of origin according to their inclusions becomes more efficent and reliable as increased knowledge is gained of the innumerable and varying types of inclusions, and as heaps of stones are scrupulously tested. Only by studying a large number of stones is it possible to become expert in analytical work of this kind. The microscopic distinction has, of course, the added advantage that objectively proving and good photomicrographs will always fascinate interested customers.

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[6]B. W. Anderson, The Three Zircons, *The Gemmologist*, December, 1940, p. 56.

Further literature dealing with the differentiation of local peculiarities in gem stones:

Bach, S. R. Notes on Inclusions in Gem Stones, *The Gemmologist*, April, 1940, p. 113.

Gübelin, E. Differentiation Between Russian and Colombian Emeralds, *Gems & Gemology*, Summer, 1940, p. 89.

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Conclusion

GEMOLOGICAL INSTITUTE OF AMERICA, INC.

In December, 1942, the Gemological Institute of America, Inc., received a charter as a non-profit corporation. Its purposes are, broadly, to further gemological education by various means and methods to be decided by its Board of Governors. This Board is annually elected by Sustaining Members of G.I.A., Inc., a number which is to be increased by invitation from among those individuals or firms possessing certain required qualifications as to gemological education.

Endowment Fund Established

In April, 1943, the Committee of the American Gem Society presented to the Board of Governors a Research and Endowment Fund of approximately $50,000, raised entirely by voluntary contribution. Members of the Society were the principal contributors, but a number of non-member firms in the importing, manufacturing and jobbing branches of the North American jewelry industry, as well as the South African diamond producers, also were invited to become Endowment Members, and many accepted. All contributions above specified amounts qualify donors as Endowment Members—a new membership classification established by G.I.A., Inc.

As is the custom with educational institutions, it has been decided to keep the Research and Endowment Fund open at all times.

Details of the raising of this fund and classified lists of its contributors are to appear in the Spring, 1943, issue of *Guilds*, the publication of the American Gem Society. An alphabetical list of all Endowment Members will appear in a future issue of *Gems & Gemology*, and subsequent contributions to the fund will be reported from time to time in this periodical.

The Board of Governors, which will act as the executive board and as Trustees of the Endowment Fund, as well as other property of G.I.A., Inc., consists of the following:

Nolte C. Ament, C.G., Geiger & Ament, Louisville.
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F. B. Thurber, C.G., Tilden-Thurber Corp., Providence.

(Continued on page 72)

Refractometers—Their Upkeep

by

EDWARD WIGGLESWORTH, Ph.D., C.G.

Director, Eastern Headquarters Gemological Institute of America

Those of us who are fortunate enough to possess a refractometer have found, after continued use over a period of time, that readings become faint and perhaps almost disappear. This is due to the glass of the instrument, on which the stone is placed, losing its high polish. If the glass is not actually scratched, it is possible to restore its polish very easily.

The writer's attention was called to this on reading two very excellent English books that have recently appeared. In the first, "Practical Gemmology," by Robert Webster, on page 60, is the statement that "occasionally the glass table should be gently polished with a clean leather and jeweller's rouge." In the second, "Gem Testing for Jewellers," by B. W. Anderson, on page 25, it says, "If the glass should have become affected and is giving poor readings, a useful 'tip' is to clean it with a little wad of cotton wool, dipped in a paste of 'jeweller's rouge and water'." A trial of this latter method at the Eastern Laboratory gave greatly improved readings.

The dulling of the refractometer glass, apart from mechanical scratches, is due to chemical damage from allowing the methylene iodide to remain on it too long. Both the above books recommend the use of blotting paper to remove the liquid after the reading is made. Both books state that a film of vaseline should be applied after cleaning and before putting away. It is hardly necessary to warn anyone using rouge to polish the glass, that it must be free from grit and otherwise great care must be used not to scratch the glass.

GIRDLE-FACETED DIAMONDS

Diamonds with forty facets on the girdle are being commercially featured in the U.S.A. jewelry trade.

These diamonds are being described as ninety-eight-facet diamonds and are represented as possessing greater brilliance, fire and quality of revealing the true color of the diamond.

Diamonds with plain polished girdles had once been featured by certain retail jewelers and on some of such girdles a few facets had appeared.

Future issues of *Gems and Gemology* may contain articles regarding the comparative action of light on girdle-faceted diamonds and grey-girdled diamonds.

Arkansas Diamond Mines

During recent months considerable publicity has been given in daily and weekly news periodicals to the Arkansas Diamond Mines. The latest seems to have appeared in the *Philadelphia Inquirer*. It quotes Governor Adkins of Arkansas as having received assurances that the mines near Murpheesboro would soon be reopened after an idleness of 22 years.

The *Philadelphia Inquirer* reports that the present owner, North American Diamond Corporation, which purchased the mines in July, 1922, for $175,000, has been inquiring regarding sources of electrical power suitable for mining operations. This newspaper quotes a federal official as reporting the actual purchaser of the mines, in July, to be C. H. Wilkingson of Logansport, Ind., who exercised an option obtained by Ray E. Block of Chicago.

There is a possibility that the activity mentioned above may be either that of stock promoters or actual preliminaries to working of the mines, in the improbable event that shipments of diamonds from South Africa should cease because of some unforeseen development of the war. Otherwise, labor costs in U.S.A. are expected to continue to make operations of those mines completely unprofitable.

ROBERT M. SHIPLEY

GEMOLOGICAL INSTITUTE OF AMERICA, INC.

(Continued from page 70)

Leo J. Vogt, C.G., Hess & Culbertson, St. Louis.

John F. Vondey, C.G., Vondey's, San Bernardino.

Jerome B. Wiss, C.G., Wiss Sons, Inc., Newark.

This Board chose the following to serve until April, 1943-44, when its tenure of office expires:

Chairman of the Board, Edward F. Herschede, C.G.

Vice-Chairman of the Board, C. I. Josephson, Jr., C.G.

Secretary of the Board, Leo J. Vogt, C.G.

President of the Institute, Edward Wigglesworth, Ph.D., C.G.

Vice-President of the Institute, H. Paul Juergens, C.G.

Secretary-Treasurer of the Institute, P. K. Loud.

DIAMOND GLOSSARY

(Continued from last issue)

Framesite bort. Extremely tough variation of bort. A granular aggregate probably containing impurities.

"French Blue." See Tavernier Blue.

French Cut. A variety of mixed cut. Square in shape with a square table placed at a 45° angle to the edges of the stone. Also on the crown 24 smaller facets are usually placed, consisting of 8 star facets, 4 bezel facets and 12 girdle facets. The pavilion is either a step-cutting or a variation of the brilliant cutting.

Full Cut. A brilliant cut diamond with 58 facets. Term misleading if applied to any brilliant cut diamond with less than 58 facets. The 58 facets consist of 1 table, 8 star facets, 8 bezel facets, and 16 girdle facets on the crown, and 1 culet, 8 pavilion facets and 16 girdle facets on the pavilion (back or base).

Furrowed. Having deep grooves or striations.

Gage. See Gauge.

Garimpeiro. Brazilian term for an unlicensed digger in Brazilian diamond fields.

Gauge. A measuring device for determining diameters, thickness, height, etc. See Caliper; Leveridge; Micrometer; Moh; Vernier.

Gem. A trade term referring to quality, correctly applied to especially fine specimens of diamond or other gem species, frequently misused to refer to lesser trade grades of such stones.

Gem-Color. The most desirable color for a stone of its particular variety. Perfection color.

Gem-Gravels. Gem-bearing gravels of present or former river or lake beds.

Gemolite (trademark). An illuminator employing either monocular or binocular microscopes. Such microscopes are also less effectively used without illumination.

Gemoscope. An instrument employing a glass cup in which unmounted diamonds may be immersed in a highly refractive liquid, and then examined by transmitted light under a loupe which is held in a fixed position.

Genesis (Gemological). Origin or formation of natural diamond or other gem-mineral.

"German Diamond." Rock crystal.

German South West Africa. See South West Africa.

Girdle. The outer edge or periphery of a cut stone; the portion of a cut stone which is grasped by the mounting. See Perfect girdle.

Girdle, polished. See Polished girdle.

Girdle Facets. Same as top and bottom break facets; the small triangular facets adjoining the girdle of a brilliant cut stone, 16 on the crown and 16 on the base. Also called top half and bottom half facets; skill facets; cross facets. Facets are also sometimes placed directly upon the girdle, in which case the stone is usually said to have a polished girdle or to be girdle-faceted. See Polished girdle.

Glassies. Diamond crystals which exhibit natural bright transparent faces. More specifically in sorting diamonds. Flawless octahedrons are usually classed as glassies.

Glassy. Diamonds lacking brilliancy.

Glaziers' Diamonds. Small diamonds or corners of diamond crystals used for glass cutting.

Glessen. Semi-transparent fissures in diamonds. Feathers.

Glide Planes. The result of the shifting of one portion of a crystal with respect to another.

Gliding. A change of form by differential movements along definite planes in crystals without fracture.

Gneiss. A crystalline rock of metamorphic origin with its mineral content "bedded" so that the rock appears in crude irregular layers of lamination; similar to granite in composition.

Goa. A city in India through which the Portuguese imported diamonds during the 18th century.

Godavari. River in Hyderabad and Madras, India. At one time a source of diamonds.

Golconda. An ancient city of Hyderabad, India. A principal diamond market and cutting center in the 16th century. Sometimes identified with Hyderabad, the modern capital of the State of Hyderabad. See Golcondas; Tavernier, Jean Baptiste.

Golcondas. "Diamonds obtained from the region watered by the Kistna and Godavari Rivers, but polished in Golconda, India." G. P. Merrill. The trade term "Golconda" in the United States usually refers to a diamond of exceptionally fine color which was probably mined in India.

Gold Coast (British West Africa). An important producer of diamonds. In 1919 diamonds were discovered in the Akim Abuakaw, 90 miles from the coast. The output includes a large proportion of industrial stones.

Golden Dawn. A 133-carat diamond found in the Vaal River in 1913 which was cut into an American cut brilliant of 61½ carats.

Goniometer. An instrument for measuring angles. Several types are made; probably the most useful to the gemologist is the horizontal single circle instrument which is used for measuring the index of refraction of crystals and gems, as well as for measuring angles. (Briggs).

Goniometer Contact. An instrument for measuring the interfacial angles on crystals.

Goods. See Common goods.

Gorgulho. A diamond-bearing quartz and clay gravel of Brazil. See Cascalho.

Goyaz (Brazil). A minor diamond-bearing region of Brazil.

Grades, Color. See Color grades.

Grain. In gemology one-quarter of a metric carat (.0500 grams), a unit of weight commonly used for pearls, also with other gems. In the English system of weights .0648 grams or 1/7000 of a pound avoirdupois. Also refers to a cleavage direction.

Grain Marks. Lines on facets resulting from imperfect polishing, especially refers to the marks appearing on a facet placed parallel to the girdle. See Running marks.

Grainers. Diamonds which in weight correspond to fourths of a carat. A diamond of one-quarter carat weight is a one grainer; a diamond of one-half carat, two grainer; a diamond of one carat, four grainer.

Grao Mogol (Brazil). Diamond-bearing region in the State of Minas Geraes, the district was soon worked out, but in 1839 some 2000 people were engaged here.

Graphite (plumbago). An opaque black mineral in the hexagonal system. Composition, carbon, same as the diamond. Hardness 1-2, specific gravity 2.2. Sometimes occurs as an inclusion in diamond.

Gravity, specific. See Specific gravity.

Gray. A classification. According to Sutton "probably the most frequent of all [colors as recognized at the mines]. This classification ranges from nearly colorless to nearly black." True bort also belongs to Sutton's classification.

Grease Table. Crushed blue ground, which falls to the bottom of the jig or pulsator, is dropped on tables covered with grease to which diamonds adhere while other minerals contained in the blue ground do not. Grease is boiled to release the diamonds.

Great Mogul. A 279.9 carat diamond described by Jean Baptiste Tavernier. Tavernier is the only authority for details regarding this diamond. Said to have been found about 1650 A.D., in the Kollur Mine on the River Kistna, India. In the rough it weighed 787.5 carats. Tavernier describes the Great Mogul as "rose cut, round and very high on one side . . . its water is fine." Some authorities believe Tavernier did not see the Mogul, which was in the possession of the imprisoned Shah Jehan, and that the diamond he saw was the Kohinoor, in the Treasury of Mogul Aurangzeb, the son of the Shah Jehan. Doctor Fersman, the distinguished gem authority of the U.S.S.R., is sure that the Great Mogul is the Orloff that, save for size, is singularly like the description of the Mogul. See Kohinoor; Orloff.

Great Table. A diamond which Jean Baptiste Tavernier describes as having seen in India which weighed 242 5/16 French carats. See also Table diamond.

Great White. See Victoria Diamond.

Green. Fine green stones are extremely rare. Bauer includes emerald green, but mentions as the most beautiful diamond of this color, the Dresden Green. The Dresden Green, however, has the hue and tone of greenish aquamarine. Natural light-green gems occur frequently. Olive green is also common. Bauer mentions leek green, asparagus green, pistachio green, bluish green and grayish green. See also Dresden Green; Treated diamonds.

Grinding. The shaping of a rough stone, followed by polishing. See Bruting; Cutting; Rounding; Roughing.

Griqualand West (South Africa). A division of Cape Province. Chief town, Kimberley.

Grizzley. Screen used in sorting out blue ground. 5", 2" and 1¼" screens are used.

Growth Markings. Markings on the surface of rough gem-minerals such as trigons on diamonds, which indicate the growth of the mineral in its crystallographic directions. See Trigon; Rough; Surface Markings.

Grupiaras. Brazilian term for shallow valley deposits on hills near rivers, in which diamonds are found. These also rest under red clay, but the diamonds are rarer and associated minerals more worn. See Gorgulho.

Gurgulho. See Gorgulho.

H. Used sometimes in gemology as referring to hardness. More common usage is in chemistry as a symbol for the element hydrogen.

Habit. Crystal shape or shapes in which a mineral usually is found.

Haidarabad. See Hyderabad.

Hailstone Bort. A bort differing greatly in appearance and structure from all other forms of bort. "Typically they consist of what looks like a kind of hardened and more or less porous paste [probably graphite], superficially not unlike Portland Cement, alternating with layers or shells generally of curvilinear sections of clouded crystal diamond." (Sutton) Color, gray to gray-black.

Hair. Term rarely used to describe hair-like flaws or inclusions in stones.

Half-Brilliant. A diamond cut without a lower part, the top brilliant cut; the bottom, one large culet. (Pough). In a sense, it is a rose with a brilliant cut. See Rose.

Half Dutch Rose or Half Holland Rose. A variation of the rose cut possessing 16 triangular facets on crown. See Holland Rose; Rose.

Half Facet. In gem cutting, a skill facet or cross facet on a brilliant. See Break Facets; Girdle Facets; Skill Facets.

Half Moon. A style of cutting which produces a stone shaped in a half circle.

Hand Loupes. See Loupe.

Hardebank. A compact form of kimberlite, so named because of its resistance to disintegration. Its difference from blue ground is probably caused by more rapid cooling.

"Harder". When the internal crystallization of a diamond requires a longer time for the operation of sawing it is frequently said to be "harder", often confused with hardness of the mineral, but hardness is resistance to scratching. See Saw; Sawing.

Hardness. The resistance of a substance to being scratched. Diamond is 10 in Moh's hardness scale. Tests prove that the diamond is 50 to 150 times as hard as corundum, the next hardest mineral. See also "Harder".

Hatton Garden. A locality in London where diamonds are bought and sold by street dealers.

Heat. In oxygen at extremely high temperature diamonds pass directly into gas without passing through a liquid state.

Heitzler, Frank. See Finger Printing (of Diamonds).

"Herkimer Diamond". Clear quartz crystal, from Herkimer County, New York.

Hexagon Cut. A six-sided form of cutting.

Hexahedron. See Cube.

Hexakisoctahedron. See Hexoctahedron.

Hexoctahedron. In crystallography, a form in the isometric system, enclosed by 48 similar faces with unequal intercepts on all three axes.

Hindoo Cut. A form sometimes used to describe the form of cutting early practised in India which retained as much as possible of the original weight of the rough stone regardless of symmetry. See Indian Cut.

Holland Rose or Full Holland Rose. A rose cut stone with 24 triangular facets and a large single facet on the bottom. See Double Dutch Rose; Half Dutch Rose; Rose-cut; also known interchangeably as Dutch Rose.

(To be continued)

A GEMOLOGICAL ENCYCLOPEDIA

(Continued from Winter, 1942, Issue)

By HENRY E. BRIGGS, Ph.D.

GYPSUM

Gypsum is a hydrated calcium sulphate and is really too soft to be classed with the gems, although it is used in the form of beads, etc. The hardness is 2, and the specific gravity 2.2 to 2.4. It is usually colorless to white, but may also be found in reddish, brownish, yellow and black. The luster is vitreous to adamantine and dull. It is monoclinic in crystallization and has a mean index of refraction of 1.52. It is biaxial and optically positive. The formula of its composition is usually expressed thus: $CaSO_4.2H_2O$. Principal localities are England; Niagara Falls, New York; and Ontario, Canada. In fine qualities it exhibits a light effect somewhat like the chatoyant variety of chrysoberyl and is called satin spar.

GADOLINITE

Gadolinite is a blackish, greenish or brownish mineral belonging to the datolite group. Its hardness is 6½ to 7 and the specific gravity is 4.0 to 4.5. The luster is vitreous to greasy and the mineral is usually opaque. The composition is expressed by the formula $Be_2FeY_2Si_2O_{10}$. It is very little used as a gem. Localities are Sweden, Norway and Texas.

HAUYNITE

This mineral is occasionally cut into gem stones. It is translucent to opaque and is found in many shades of blue and green. The luster is vitreous to greasy. The hardness 5½ to 6 and the specific gravity 2.4 to 2.5. It is cubic in crystallization and, therefore, isotropic, the index of refraction being 1.49. Its composition is expressed by the formula $Na_2Ca(NaSO_4.Al)Al_2(SiO_4)_3$. Potassium also may be present in a small amount. Principal localities are Italy and Germany.

APOPHYLLITE

This mineral is sometimes cut as gem stones and is really quite attractive. It occurs in rose-red, yellow, green and white with a vitreous luster. It is tetragonal in crystallization. The hardness is 4½ to 5 and the specific gravity 2.3 to 2.4. It is uniaxial and occurs both negative and positive optically. The mean index of refraction is 1.53. The composition is expressed by the formula $H_7KCa_4(SiO_3)8.4½H_2O$. Principal localities are Greenland, Germany, New Jersey and Lake Superior region.

ANHYDRITE

This mineral is rather soft to cut into a gem but it is sometimes met with. The hardness is 3 to 3½ and the specific gravity is 2.89 to 2.98. The luster is vitreous to pearly. It crystallizes in orthorhombic crystals. It is biaxial and optically positive. The mean index of refraction is 1.58. Color, white to bluish and reddish. It is anhydrous calcium sulphate. Gem quality comes from Germany, New Jersey and Nova Scotia.

BARITE

This mineral is not suited to gem use, but has been fashioned for that purpose from time to time. It occurs in yellows, blues and reds of light tint and also in the brown to almost black. It is transparent to almost opaque. The luster is vitreous to pearly. The hardness is 2½ to 3½ and the specific gravity 4.3 to 4.6. It is orthorhombic in crystallization and is optically biaxial and positive in character. The mean index of refraction is 1.64. The composition is barium sulphate, $BaSO_4$. It is widely distributed, fine gemmy goods coming from Germany and South Carolina.

LEPIDOLITE

Lepidolite is little used as a gem, but is made into ornamental objects and is very beautiful for this purpose. Its hardness is 2.5 to 4 and the specific gravity is 2.8 to 2.9. The luster is pearly and it occurs in many beautiful colors including rose, violet, purple, yellow, etc. It is a rather complex lithia mica and is found in many localities. Those in Maine and California yielding some especially nice material.

JET

Jet is a hard variety of lignite or brown coal. It is black in color and rather light in weight. The specific gravity is 1.1 to 1.4. The luster is resinous and it is amorphous. It is composed of carbon with hydrogen and oxygen. The best material comes from England. However, much of the material now being exported is not true English jet, but an inferior grade of material which is mined in other countries and only cut in England. Jet is imitated by bakelite, glass and other waxy or pastelike materials.

CORAL

Coral is composed of a multitude of skeletons of small sea creatures known as polyps. It is essentially calcium carbonate with more or less organic matter much the same as pearl. The hardness is about 3½ and the gravity 2.6 to 2.7. Red coral comes from the Mediterranean Sea and black coral is now supplied mainly by the waters of the Persian Gulf and by the Great Barrier Reef of Australia. Coral is usually worked into beads and other cheap jewelry.

AMBER

Amber is a fossil resin of prehistoric coniferous trees. It is found in deposits which appear to be of a fairly late period as the geologist figures ages. The greater part of the world supply of amber comes from the Baltic Sea and from Germany, but it is also found in many other localities including Sicily, Burma, Denmark and Rumania.

Baltic Amber is found in irregular amorphous masses varying in size from small bits weighing a fraction of a gram to large lumps weighing several pounds. Records show one lump weighing 20 pounds and of fair quality. The hardness of amber is 2 to 2½ and the specific gravity 1.0 to 1.1. It is isotropic and the index of refraction is 1.54. The luster is greasy and it is transparent to translucent. It becomes electrically charged by friction and when burned gives off a pleasing odor. The color of amber is yellow

AMBER (Continued)

and it ranges from almost colorless through all the shades to brown and may be tinged with whitish, greenish or bluish, and sometimes black. These colors are very uncommon, however. While amber is brittle, it may be worked with an ordinary knife into many intricate shapes.

Many specimens are found with inclusions of insects, plants, leaves and other organic matter. Proving, beyond all doubt, that amber at some time was in a liquid state. It affords many fine specimens of prehistoric insect life and enables us to study these minute organisms which we would otherwise be more or less at a loss to know anything about.

Amber may be absolutely transparent and almost colorless and yet other specimens are almost opaque and are deep in color or blotched with color. There are several grades of amber as follows:

Clear—perfectly transparent including water-white to red.

Fatty—much less transparent, due to presence of small air bubbles, and having the appearance of oily fats.

Bastard—cloudy and filled with small bubbles.

Bony—white with the appearance of dry bone. Takes a good polish, but is filled with a multitude of minute bubbles.

Frothy—white, opaque and will not polish well, larger bubbles.

Some of these varieties are boiled in oil to clear them. The oil will penetrate into the amber, filling the cavities and thus clearing it. Amber chips are collected when the amber is worked and are assorted according to color. These are heated to a temperature of 190 to 220 centigrade, when they are pressed into blocks or shapes as desired. It is often a difficult matter to tell pressed amber from the natural, providing the work has been carefully done. The matter of distinguishing this material requires considerable experience, as it will be obvious that tests of the chemical composition and of the optical properties will be useless, since the material is the same as natural amber.

Burmese Amber. Amber from Burma is usually of uniform color and pale yellow, but occasional specimens of reddish and brownish are found. The chief locality is the valley of the Hukong River, in the Jadeite locality. This amber is usually full of cracks and often the cracks are filled with calcite, giving the amber a streaked appearance. Burmite, as this is called, is slightly harder than the Baltic amber of succinite. Little Burmese amber is on the American markets.

Rumanian Amber. This amber is called rumanite. It is usually of darker color than the Burmese material, being brownish yellow to brown and very rarely of yellow color. It is usually filled with cracks, but does not seem to part on the cracks readily. It is transparent to opaque. Rumanite is somewhat more brittle than the Baltic variety.

Sicilian Amber. Simetite is the name applied to Sicilian amber and it is so called after the Simeto River, which is near the deposits. It is darker than succinite, running more to the reds and reddish browns or reddish yellows. This amber is quite tough and is somewhat easier to work without chipping, at least in the hand of an unskilled workman.

AMBER (Continued)

Danish Amber is very similar to the amber from Germany.

Substitutions. Copal gum is often substituted for amber in cheap jewelry and ornaments. It may be easily detected, however, since amber is not dissolved by sulphuric ether, while copal is. However, in appearance, copal is very similar to amber and it is best not to depend on tests of refractive index, as they, too, are sometimes misleading. A cloth moistened with sulphuric ether, when rubbed upon copal, will attack it, while amber will be unaffected. This test also may be applied with some results on certain pressed amber. Occasionally, pressed amber will be dulled by the application of this ether, but not always, there being some pressed goods which will not respond to it.

Imitations. Bakelite is used to imitate amber, but it is easily detected by its higher index of refraction and by its greater specific gravity. Glass is also used as an imitation amber, but only in the very cheap goods. Amber will float upon salt brine, while both glass and bakelite will sink. Celluloid is occasionally used as an imitation, but it may be easily detected by merely rubbing it vigorously, when, if celluloid, it will give off an odor of camphor.

Conclusion