# Gems & Gemology

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VOLUME IV WINTER, 1943 NUMBER 8

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*Published by*

THE GEMOLOGICAL INSTITUTE OF AMERICA

541 South Alexandria Ave. Los Angeles 5, California

# Survey of the Genesis of Gem Stones*

*by*

EDWARD GÜBELIN, Ph.D., C.G.
*Lucerne, Switzerland*

The study of the origin of gem stones is an important part of the science of gemology and is interesting to everyone dealing in precious stones. It clears many a problem and fosters the understanding of the individuality of each stone. Yet geology and the theory of deposits is often obscure to the student of gem stones.

Well-constructed graphs may be of considerable help toward the understanding of the theory of deposits and the genesis of gem stones. Necessarily they will always have to be schematized and they will never give full account of this complicated subject. They represent the main facts sufficiently, however, and may be useful as starting points or as a helpful summary to those interested in this study.

The graph (Figure 1) indicates the principal deposits which are especially important in mining gem stones and the genesis of such stones in connection with the deposits. The following may be distinguished:

A. Primary formation of minerals by originally ascending solutions, i. e., magmatic in a broader sense:

(a) Liquid Magmatic.

(b) Pneumatolytic and pegmatitic.

(c) Hydrothermal and volcanic exhalative.

B. Secondary growth of minerals: Concentration of elements during processes such as decomposition, deposition of sediments and metamorphism.

(d) Chemical sediments—originating from atmosphere or hydrosphere.

(e) Residual deposits originating from residues of decomposition and of metamorphism.

(f) Mechanically concentrated sediments (especially in alluvial deposits).

*Explanation of graph.* The nature of those deposits, the knowledge of which is particularly important for the exploitation of gem materials, is indicated outside the circle, the gems occurring therein are inserted within the respective sectors inside the circle. Where processes of concentration of different kinds appear to be especially important, their gem products figure naturally in various corresponding sectors.

To simplify the chart I have inserted across the dividing line the

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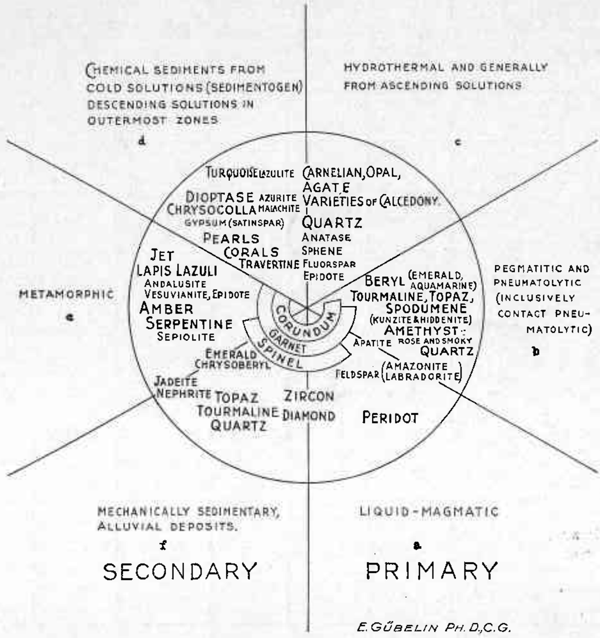


*Figure 1*

name of such gem stones as may occur simultaneously in two deposits of different nature. Corundum (sapphires and rubies), spinel and garnet may occur in several kinds of deposits, therefore their names overlap several sectors in the center of the figure.

It seemed expedient to make the definition so that amber and jet are referred to as metamorphic formations, the same as carbon and oil. For the same reason pearls and corals are classed among the chemical sediments. Of course, correctly, they are of organic nature, having been formed by living organisms. The purely genetic relations are ignored, as less important deposits have not been considered in the chart.

This may, however, suffice for the practical exploitation of gem deposits and for understanding the mineralogical and chemical arrangement of gem materials. Species of minerals that are closely related to each other by paragenesis or chemically are grouped in the graph. The more important gems are emphasized by stronger characters.

The table (Figure 2) somewhat more in detail. It is based on chemical elements, showing not only the important gem minerals and their deposits, but also their main elements in relation to those deposits. In addition, there is a column for the more or less residual deposits of the weathered zones (residues, products of oxidation and eventual cementation ores).

| Element | Important Minerals | MAGMATIC | | | SEDIMENTARY | | | |
|---|---|---|---|---|---|---|---|---|
| | | liquid magmatic | pegm. pneumat. | hydrothermal | residual decay | mechanical sed. | chemical sed. | Metamorphic |
| Li | 1. Spodumene<br>2. Tourmaline | | 1, 2 | | | 2 | | |
| Be | 1. Beryl<br>2. Chrysoberyl | | 1, 2 | | | 2 | | 1 |
| Mg | 1. Serpentine<br>2. Sepiolite<br>3. Mg-Tourmaline | | 3 | | | 3 | | 1, 2 often metasomatic |
| Ca | 1. Calcite<br>2. Gypsum | | | | | | 1, 2 | |
| Al | *<br>1. Andalusite<br>2. Corundum | 2 | 2 | | | 2 | 1, 2 | |
| C | **<br>1. Graphite<br>2. Diamond<br>3. Jet<br>4. Amber | 2 | 1, 2 | | | 2 | 1-4 | |
| Si | ***<br>1. Quartz<br>2. Opal<br>3. Silicates (Garnet, Topaz, Feldspar, etc.) | 1-3 | 1-3 | 1-3 | 1-3 | 1-3 | 1-3 | 1-3 |
| Ti | †<br>1. Rutile<br>2. Sphene | | 1 | 2 | | 1 | 2 | |
| P | 1. Turquoise<br>2. Apatite | 2 | 2 | | | 2 | 1, 2 | |
| Zr | †<br>Zircon | x | x | | | x | | |
| S | 1. Pyrite<br>2. Sphalerite | 1 | 1, 2 | 1, 2 | | | | 1 |
| Cr | ††<br>Cr-Spinel | x | | | | | | |
| F | Fluorite mostly as gangue | | x | x | | | x | |
| Cu | 1. Copper<br>2. Malachite-Azurite | | 1 | 2 | | | 1 volcanic | |
| Ag | Silver | | | x cementation | | | | |
| Au | Gold | | x | x | | x alluvial deposits | | |
| Zn | 1. Sphalerite<br>2. Smithsonite<br>3. Zn-Spinel, Franklinite | | 1 | 1, 2 | | | | 3 metasomatic |
| Pb | 1. Galena<br>2. Cerussite | | 1 | 1 | 2 oxidation zones | | | |

| Element | Important Minerals | MAGMATIC | | | SEDIMENTARY | | | |
|---|---|---|---|---|---|---|---|---|
| | | liquid magmatic | pegm. pneu-mat. | hydro-thermal | resid-ual decay | mechan-ical sed. | chemi-cal sed. | Meta-mor-phic |
| Sn | Cassiterite | | x | | | x | | |
| Mn | 1. Franklinite (Mn-Spinel) 2. Rhodonite 3. Rhodochrosite | | 1 | 2 | 2 | | | 1 |
| Fe | Hematite | | x | x | x | | x | x |
| Pt | ††† Platinum (exploitation on secondary deposits only) | x | | x | x | | | |

*The decay of $Al_2O_3$ silicates on the surface of the earth yields residues which are abundant in aluminum. Al-silicates, corundum and other Al-minerals are then reformed through metamorphism.

**Prevalent participation of C of the atmosphere in forming carbonates and organic products of life organisms. Fossilization and metamorphism.

***Most widely distributed element next to O.

†Relatively early magmatic extrusion and secondary lodgement on alluvial deposits.

††Extruded from basic igneous rocks in particular.

†††Extrusions from basic igneous rocks, hence exploitation on secondary deposits.

*Figure 2*

Rare elements forced me to name also rare gems, though several are still left out, lest the table become too extensive; hence naming of the stones is not complete.

Both graph and table condense present knowledge of the main features of the theory of deposits and they are, I hope, a starting point for many towards more detailed study.

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Erratum: Fall 1943 issue of GEMS & GEMOLOGY, p. 101, paragraph 3—Delhi was looted in 1749, not 1849.

# Synthetic Diamond Question Reopened by London Investigations*

*Opinions of Dean Kraus and Dr. Ball*

As a result of the recent reports from London reopening and tending to confirm the claims of successful synthesis of diamond in the 19th Century, the G.I.A. solicited and received the following opinions from two distinguished members of its Educational Advisory Boards.

From Dean Edward H. Kraus, University of Michigan, co-author of "Gems and Gem Materials" and the text book "Mineralogy":

"The article 'An X-ray Study of Diamonds Artificially Prepared by J. B. Hannay in 1880' by F. A. Bannister and K. Lonsdale, which appeared in the June, 1943, number of the *Mineralogical Magazine*, London, has reopened the question as to whether or not the diamond has ever been successfully produced in the laboratory.

"In studying the specimens alleged to have been produced by Hannay, Mr. Bannister and Mrs. Lonsdale used modern X-ray methods and found that the specimens possessed the properties of the diamond. The results of this study by these competent investigators is not to be questioned. However, there still remains considerable doubt as to the authenticity of the specimens. Not until the methods used by Hannay over sixty years ago are repeated with success can this doubt be entirely removed."

*A.G.S. Research Service.

From Sidney H. Ball, Ph. D., author of internationally recognized annual reviews of the diamond industry:

"I have read the article by Dr. Bannister and Dr. Lonsdale as it originally appeared in the *Mineralogical Magazine* of London. Their work is, as was to be expected, a most excellent piece of scientific research, the accuracy of which cannot be doubted.

"However, Mr. Hannay's work was done some two generations ago, during which long period it is possible that the labels may have been displaced and hence the brilliant scientific work of Drs. Bannister and Lonsdale may possibly have been done on material which was not the result of Mr. Hannay's work. Their results, however, clearly indicate that Mr. Hannay's experiments should be repeated under the most rigid control which science can offer."

### Resume of Preceding Experiments and Investigations

Among the many attempts to produce diamonds synthetically were those of a Glasgow chemist, J. B. Hannay, in 1880.

Beginning with the idea that carbon, if brought into solution with a gas under pressure, then cooled, might crystallize as diamond, Hannay embarked upon a series of experiments fraught with excessive difficulties.

Into a wrought iron tube employing the gun-barrel principle were placed mixtures of metallic lithium, light paraffins, rectified bone oil. A period of fourteen hours' heating in a reverberatory furnace was followed by one of slow cooling—results of the experiments were preponderately discouraging.

Of thirty-four trials in a final series, only four yielded condensed matter. The resultant hard, smooth, black masses were chiseled from the tube sides, and powdered in a mortar. By this operation some extremely hard transparent pieces, assumed to be crystallized carbon, were freed from the black mass.

Hannay's report was that the transparent pieces were diamond because they (1) were as hard as diamond; (2) showed no trace of dissolving in hydrofluoric acid; (3) burned leaving no residue; (4) did not affect polarized light; (5) turned black upon being heated in an electric furnace.

Sir Charles Parsons attempted to reproduce the tests, but was unsuccessful. Present-day optical tests were not available at that time. However, with the development of such tests for the identification of minerals, interest has been renewed in the experiments of Moissan, and Parsons, and of others whose experimental specimens have been difficult to locate.

And thus the matter stood until recently when twelve minute specimens, found in the mineral collection of the British Museum on a slide labelled to indicate that they were diamond synthesized by Hannay, were subjected to X-ray investigations by F. A. Bannister and Mrs. K. Lonsdale.

The first method of investigation applied to the twelve specimens was that of the rotation photograph. One specimen proved conclusively not to be diamond. The second test, applied to the largest of the other eleven specimens, was that of the Laué diagram.

Other details of the tests and further claims for their results are to be found in the report of Bannister and Lonsdale, which first appeared as a paper read early in the year before the Mineralogical Society and was later carried in the June issue of the London *Mineralogical Magazine.*

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## NOTES ON THE DIAMOND MINES OF INDIA

Correspondence growing out of a request from Reverend Frank Kurtz, of Kalamazoo, Michigan, for a copy of "The Story of Diamonds" brought the following interesting remarks from the former missionary:

"I found your book very interesting, as I lived for forty years close by the Parteal diamond mines in India. So far as I know I was the second American to visit the old mines. I first visited them in 1903 and often travelled over that territory. The third American to see them was Charles S. Crossman, diamond dealer of New York City.

*(Continued on Page 117)*

# Industrial Diamonds and the Jeweler

*by*

DORUS VAN ITALLIE

***President, J. K. Smit & Sons, Inc.***

On frequent occasions we have been approached by jewelers from various parts of the country with requests for representation of our firm. Many jewelers, not knowing the industrial diamond business as it has developed, quite logically reason that the knowledge of gem diamonds should make it possible for them to add the industrial diamond line to their business. Having had many opportunities to set this misconception straight in individual instances, I feel that it may be helpful if I contribute a few words here in the way of general information.

In a large sense, the industrial diamond business has changed from the supply of loose diamonds to diamond tools, and the variety of tools is so vast and complicated at the present time that even the most expert diamond tool maker with the best supply of available material has a constant problem in the way of obtaining both the right material for the tools he needs and the mechanics who are trained to read blueprints and understand the purpose for which they are to make the equipment.

Twenty-five years ago neither the dealers in industrial diamonds nor the users knew a great deal about the intrinsic potentialities of the material in which they dealt. The knowledge involved in the pursuit of this business was based largely on the individual experience of the seller who had built up an understanding of the various types of diamonds which were then available but which were, at that time, not used in the many varied manufacturing processes which developed together with high speed and high production manufacturing methods.

A prospective industrial diamond dealer who would now attempt to sell diamonds as his predecessors did twenty-five years ago would soon realize that he was a very helpless person. The up-to-date industrial diamond man must be able to go into a factory and, after having studied the work and the equipment available, as well as the specific problems involved, must be able to make recommendations and discuss involved tools with highly trained mechanics.

He has to have a general knowledge of grinding, boring and turning, and must know the limitations as well as the possibilities of any given diamond tool on any specific job. He must come back to his own plant able to transmit his understanding of the problem to those who are to make the tool. These tools have to be serviced subsequently, and all in all, the present-day industrial diamond tool manufacturer is continually involved in discussions on highly technical problems, which make necessary technical experts and engineers, who now have become an integral part of the diamond tool world.

In the past it was possible for an industrial diamond house to appoint agents in various parts of the world who, with a smattering of superficial knowledge of tools, could successfully represent their principals. This, too, has become impossible with the exception of a possible small line of standard diamond tools for wheel dressing. Outside of that, it would not be possible for an inexperienced man to discuss diamond wheels, diamond core bits, boring or turning tools, or gear-grinding or thread-grinding tools unless he had a store of experience in these specific fields, as well as in the general way of diamond tool making.

For all these reasons, it has become obvious that it would be a big step indeed from the gem diamond to the industrial diamond. In fact, a machine tool specialist would be much closer to the industrial diamond tool field than would a jeweler.

The jeweler, however, does have an important relation to the industrial diamond business. Gem diamonds and the industrials come from the same mines and fields. You cannot mine industrials alone to meet an increased demand. You have to mine diamonds of all kinds and then sort the industrials out of whatever the earth may yield. Because of the price commanded by the beauty and rarity of the gems the jeweler sells, it has been possible to obtain the industrial stones needed for war work in uninterrupted supply within price ceiling limits. In that way, the work of the jeweler has contributed much to war production.

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## NOTES ON THE DIAMOND MINES OF INDIA

*(Continued from Page 115)*

"The Indians abandoned the mines long ago. When I first saw them a German mining company was removing their machinery, on the Parteal side of the Kistna River.

"Many of the closed mines, levelled off, are used as fields by local farmers. One near Parteal, where we have a church, is used as the church baptistry. Many are still filled with water.

"I believe that diamonds are still found occasionally in that region. Several times I met natives who had diamonds, regarded by the Government as *treasure-trove* and liable to confiscation if the police discover them.

"It is interesting to note that all the mining area on the Parteal side of the Kistna, although surrounded on all sides by the British-controlled territory, was retained by the Hyderabad State when the boundaries were made, and that that State many years ago assigned the area to one of the nawabs, or Mohammedan nobles."

# "Indian Emeralds"*

There were recently sent to the Eastern Laboratory, by a Sustaining Member of the Institute, two large beads of a material which had been purchased as "Indian Emeralds."

One of these beads had been placed in the sunlight for a month and was somewhat lighter in color than the other, which was kept in a paper, although they were said to have been the same color originally. The paler bead had been sawed and tests were made on this piece to determine the true nature of the material. Both beads, which had been drilled, were a mottled green color and semi-transparent, with a vitreous luster.

A refractive index of 1.55 was obtained on the flat surface of the sawed bead, but the reading was not very sharp. No dichroism could be seen, and likewise it could not be determined to be doubly refractive. The specific gravity obtained, using the diamond scales, was 2.64.

The stone had a distinct "crackled" structure, with some larger cracks. The green color appeared to be in both the "crackles" and the cracks. The center of the stone, which was easy to observe on account of its having been sawed, was lighter colored than the outside, and the drill hole showed artificial coloring matter on the walls. This color turned a yellowish brown on application of hydrochloric acid and apparently dissolved. The whole stone gave the effect of mossy chalcedony. Fractures had a glassy luster.

*A.G.S. Research Service.

These tests indicate that the beads are dyed crackled quartz—a far cry from emerald. Another case of a fancy name for an ordinary, inexpensive material, doubtless for the purpose of getting an extra price.

EDWARD WIGGLESWORTH,
Ph.D., C.G. *Director*
*Eastern Laboratory, G.I.A.*

Translucent emeralds, which these dyed stones most nearly imitate, are sometimes fashioned into cabochons, ring stones and beads for necklaces.

These dyed crackled quartz beads are about three fourths of an inch in diameter. While their artificial color is a fair emerald color, their structure or body appearance in the full beads more closely approaches that of a mediocre quality of chrysoprase. In thinner sections, such as the sawed half, the appearance is more that of heavily veined moss agate.

The quartz used for these stones is apparently colorless to almost colorless before crackling. The crackling has probably been accomplished by an artificial process. The process of crackling, and the appearance of the material before dyeing differ distinctly from that of Blued Quartz (colorless quartz coated with blue plastic) which recently appeared in the gem markets.

Crackled quartz dyed to represent gems other than emerald, and colorless quartz coated with plastics colored to represent gems other than sapphires, may also be appearing in the market.

ROBERT M. SHIPLEY,
*Executive Director, American Gem Society.*

# DIAMOND GLOSSARY

*(Continued from p. 108, last issue)*

**Koffeyfontein Mine.** Third largest diamond pipe in the Union of South Africa and one of the earliest discoveries in the Orange Free State. Formerly an important producer. Between Kimberley and Jagersfontein Mines.

**Koffeyfontein Mines.** In addition to the Koffeyfontein Mine four other less important pipes were discovered in the Orange Free State near Koffeyfontein: Astoria Mine, twelve miles northeast; Ebenhaezer, or Ebenezer, Klipfontein and Panfontein, all three near Koffeyfontein. In addition eleven unimportant diamond-bearing mines were discovered in this area.

**Kohinoor.** "Mountain of Light". An Indian diamond; most famous diamond in the world. Weight in the rough, unknown. Weight of stone in original cut, 186 carats. Weight when recut in England, 108.93 m.c. Reputed value, $700,000. In crown of the Queen of England.

**Kollur Mines.** Old diamond mines in the Golconda district of India. The Orloff diamond is thought to have been found in these mines.

**Kopje.** A South African word meaning a small hill.

**Koppiesfontein Mine.** See Jagersfontein Mines.

**Kraal.** South African word for a hut or group of huts for native miners.

**Kraus, Edward Henry, 1875—.** Dean of the College of Literature, Science and the Arts, and Professor of Crystallography and Mineralogy, University of Michigan. B.S., M.S., LL.D. (Syracuse); Ph.D. (Munich). Honorary Member and Member Examinations Standards Board, Gemological Institute of America; Fellow Geological Society of America; A.A.A.S.; Mineralogical Society of America (Pres., 1926); Honorary Member German Mineralogical Society; Member American Chemical Society; Optical Society of America; American Institute of Mining and Metallurgy; Engineering and other scientific associations; Phi Kappa Psi; Phi Beta Kappa; Sigma Xi; Phi Kappa Phi; Phi Delta Kappa; Rho Chi. Author of "Mineralogy" with Walter F. Hunt and Lewis S. Ramsdell; "Tables for the Determination of Minerals" with Walter F. Hunt; "Gems and Gem Materials" with Chester B. Slawson; "Chemical and Physical Crystallography", and "Optical Constants of Crystals at Varying Temperature."

**Kunz, George Frederick.** Mineralogist and gem expert. B. N. Y. 1856, d. N. Y. 1932. Educated public schools and Cooper Union, N.Y.; Honorary A.M., Columbia;

Ph.D., University of Marburg; Vice-President of Tiffany and Company; special agent, U.S. Geological Survey 1883-1903 Pres. American Metric Assoc.; Honorary Curator, precious stones, American Museum of Natural History. He assembled several important collections of gems for J. Pierpont Morgan which were exhibited at World's Fairs and then presented to museums, most important of which is the Morgan collection in the American Museum of Natural History, N.Y. A noted collector of rare books, pamphlets, etc., on precious stones. Author of "Curious Lore of Precious Stones"; "Magic of Jewels and Charms"; "Rings"; "The Book of the Pearl" with Charles Hugh Stevenson; "Ivory and the Elephant". His scientific works included "Gems and Precious Stones of North America" and "California Gems". Kunzite, a variety of Spodumene, was named in his honor.

**Lace, or Crown Mine.** Diamond pipe about 100 miles south of Johannesburg in the Kroonstad District, Orange Free State, South Africa.

**Lagging.** Heavy planks or timbers to support roof of a mine.

**"Lake George Diamond."** Colorless quartz crystal; a term applied by amateur mineralogists to certain doubly terminated crystals, such as those found near Herkimer, N. Y.

**Lambreu.** A Brazilian term for bright irregular fragments of diamonds.

**Lamellae.** Thin plates or layers. See Laminae.

**Laminae.** Thin plates or layers; usually, but not always, of repeated or polysynthetic twinning. Said by some authorities to occur in diamond. See Repeated Twinning.

**Lamps, daylight.** Lamps employing the use of various types of electric bulbs or tubes, either with or without use of filter. These more closely approach daylight than ordinary electric lamps, but none have the identical spectrum of daylight and therefore do not duplicate it. The so-called fluorescent tubes are well known as daylight lamps and were used in the Da Grade diamond lamp. They are not as accurate for diamond color grading as the Diamolite, which employs an ordinary frosted electric lamp and a special filter.

**Lamps, Diamond.** See Diamond Lamp.

**Lap.** A flat, horizontal wheel which revolves about a vertical shaft, and upon which gems are polished. Wheels of various materials are used for polishing colored stones, but diamond laps are of soft iron, 1 to 1½ feet in diameter, are impregnated with diamond dust, and maintain high operating speeds.

**Lapidarian.** Rare. See Lapidary.

**Lapidarist.** Obsolete; rare. A connoisseur of gems and precious stones, and the art of cutting and mounting them.

**Lapidary.** A cutter, grinder and polisher of colored stones. In the trade a lapidary is not necessarily an engraver of gems, this being considered a specialized art. Also a cutter and polisher of diamonds classed as a diamond cutter, as distinguished from a gem cutter or lapidist. (At one time a reference book on gems was known as a lapidary.)

**Lapidist.** Same as lapidary.

**Lapland.** A few small diamonds of fine color, though badly flawed, were found in Lapland.

**Lapper, or Blocker.** A diamond cutter who specializes in placing the eighteen facets on a brilliant. On the crown he places the table and eight bezel facets (or the four bezel and four top corner facets); on the pavilion he places the culet and the eight pavilion facets (or the four pavilion and four bottom corner facets). See also Brillianteerer.

**Lapping.** The process of placing the first eighteen facets on a diamond brilliant by a lapper. Also known as blocking. See Lapper.

**Lasarev Diamond.** Same as the Orloff or Orlov. See Orloff.

**Lask.** See Lasque.

**Lasque.** A thin, flat diamond with a simple facet at the side. Apparently an East Indian term for a portrait stone.

**Lath.** A board or plank sharpened at one end, like sheet piling, used in roofing levels or in protecting the sides of a shaft through a stratum of unstable earth.

**Lathe.** A machine in which a piece of wood, metal or other substance is held and rotated while a tool is pressed against it for the purpose of shaping or rounding up the substance. Diamonds are thus held and "rounded up" with a cutting tool in which another called a "sharp" is held in a mounting called a "stick."

**Lathe Tools.** Tools used in connection with lathes. Many such tools contain industrial diamonds, which, because of their outstanding hardness, are exceptionally useful for cutting or shaping up metals and other hard substances.

**Lattice.** See Space Lattice.

**Laué Diagram.** A now almost obsolete type of X-ray picture, although the present X-ray photographic method used in pearl testing is essentially the same. Invented by the German, Laué in 1912, Laué photographs are obtained by passing an X-ray beam through a properly oriented crystal which is placed before a photographic film. The rays are deflected in passing through the crystal and the film indicates the pattern or arrangement of the stones, i.e., the type of crystal structure or symmetry. Laué diagrams are still used. The Laué method formed the basis of the present determination of the location and pattern of atoms in crystals, by methods such as the powder method. See Powder.

**Lava.** The molten material which flows from a volcano or other volcanic vents or fissures. Also the igneous rock resulting from the solidification of this molten material.

**Lava Flows.** Solidified streams or flows of lava which have overflowed onto the earth's surface from volcanos or volcanic fissures.

**Lax Diamond.** A little-used term for a fashioned diamond which is low in dispersive qualities (fire) and otherwise lifeless.

**Lead Glass.** Glass containing a large percentage of lead. The comparatively high refractive index of lead produces a glass of high refractive index, which more closely resembles diamond than ordinary glass, and is therefore used in imitations of diamond.

**Leakage (of light).** The escape of light from an optically denser substance (as a diamond or other gem) into air. Opposed to total reflection.

**"Lean Pipes."** South African diamond pipes that cannot be profitably worked.

**Leather Lap.** A disk covered with leather used for polishing many gem stones other than diamonds.

**Lens.** See Loupe.

**Lesser Namaqualand.** See Namaqualand, Little.

**Leveridge Gauge.** An instrument designed by A. D. Leveridge for measuring fashioned diamonds and estimating their weight. More accurate than the Moe gauge. See also Millimeter Screw Micrometer, and Moe Gauge.

**Lewis, Henry Carvill.** 1853 to 1888. Professor of Mineralogy, Academy of Natural Sciences, Philadelphia. M. A., F. G. S. Author of Papers and Notes on the Genesis and Matrix of the Diamond, published posthumously in 1897. In this he suggested a theory that the diamond had formed near the surface when the volcanic lavas had penetrated and acted upon the carboniferous shales, which often lie near the surface in Africa. Temporarily accepted by many scientists, this theory is now obsolete.

**Liberia.** Southwest (Guinea coast) of Africa. In 1910 diamonds were found in alluvial sands along the Joblong and Boa rivers, about 30 miles inland from the capital, Monrovia. Probably not more than 100 carats have been recovered from the stratum which is about six feet thick. However, many stones are colorless and free from flaws. Most of the stones are small, the largest being 4.8 carats.

**Lichtenburg (South Africa).** Diamond fields discovered in 1925; important producers until 1929. The deposits were apparently the beds of rivers in an old system now high above the present rivers. Production was largely cleavage and other stones not of gem quality.

**Light (polarized).** Light in which the vibrations are in one plane. See Polarized Light.

**Light Brown Cleavage.** A term defined by Herbert-Smith as a classification of rough diamonds at the mines lying between fine cleavage and rejection cleavage. The present classification of the De Beers group of mines includes only Best Cleavage, Inferior Cleavage and Brown Cleavage, in that order of desirability.

**Light Brown Diamonds.** A trade grade usually placed between crystals and top capes. Shows a very light brownish tinge rather than the yellowish tinge common to the color grades known as crystals and capes.

**Light Cape.** A trade term sometimes used in North America in place of top or silver cape. English authorities define it as a trade grade *between* silver cape and cape.

**Light Off-colored.** A color classification of rough diamonds at the De Beers group of mines; a color better than off-color, but inferior to second Bye.

**Light Yellow.** A North American color classification of fashioned diamonds, between cape and yellow classifications. Also according to Herbert-Smith, a color classification, at the mines, of rough diamonds of the "close-goods" lying between the off-color and yellow classification. Apparently not now used at De Beers group of mines.

**Limonite.** One of the principal minerals found in the Kimberlite of the South African diamond pipes. A brown, hydrous oxide of iron.

**Limpid; limpidity.** Refers to relative transparency, especially of diamonds. Limpidity or transparency of a diamond as compared with pure water resulted in the use of terms such as "first water," etc., which in the United States are not used in the trade, but appear sometimes in literary compositions, as, "Diamonds of the first water."

**Liquid Inclusions.** Inclusions of liquids within a mineral, which occur in rock crystal and other gems, including synthetics, but which apparently are absent from diamond because of the great temperature which existed during its genesis. See Inclusion.

**Lisbon Cut.** A double brilliant cut, with 74 facets. See Double-cut Brilliant.

**Litkie Diamond.** A 205½-carat diamond crystal recorded by A. F. Williams as being found in 1891 in the Good Hope diggings in the Vaal River.

**Little Namaqualand.** See Namaqualand, Little.

**"Load."** Term used in mines in South Africa for 16 cubic feet of blue ground, weight about four fifths of a ton.

**Lodewyk.** See Berquem, Louis de.

**Loop.** An undesirable variation in spelling of the word *loupe*. See Loupe.

**Looped.** See Louped.

**Loose Diamonds.** Unset diamonds; a trade term used to distinguish fashioned diamonds not set in jewelry from those which are so set.

**Lopper.** Same as lapper or blocker. See Lapper.

**Lopping.** See Lapping.

**Loss of Color.** The change, in tone, of a color which makes that color less desirable. Loss of color may be due to fading, light or dark discoloration resulting from chemical action, coating or impregnation with oils, or a change in the character of the light which falls upon the stone. The latter loss of color is the only one which occurs in diamonds, unless they have been artifically colored green by radium.

**Lots.** A term applied to groupings of diamonds offered for sale by Diamond Trading Company. Lots include both good material and bad. The diamond merchants who buy these lots must plan to dispose of the poor material as well as the good. The term *lot* is also applied by diamond merchants to regroupings of these diamonds which they make according to color, make and comparative freedom from imperfections. Brokers may further regroup these diamonds into lots. The retailer buys entire lots or often selects individual stones from such lots.

**Loup.** See Loupe.

**Loupe.** Also spelled loup, loop, lupe. The French spelling *loupe* is accepted in English-speaking nations as correct. Any small magnifying glass for use in the hand as a hand loupe, or mounted so that it can be held in the eye socket as an eye loupe. Loupes are of various magnifying powers, ranging in commercial usage from 2 to 20 power. In the examinations of diamonds for the detection of imperfections the U. S. Federal Trade Commission requires the use of a loupe of 10 power or more, or its equivalent. Loupes may consist of a single lens or a system of lenses. See Triplet, and Loupe, Corrected.

**Loupe, Corrected.** A loupe in which the lens or lenses have been corrected for either spherical or chromatic aberration, thus reducing the possibility of errors in decisions made regarding the qualities of diamonds. The American Gem Society requires that its members use a 10 power loupe corrected for both types of aberrations, or its equivalent, in grading. See Aberration; Aplanatic Triplet.

**"Loupe-clean."** Diamonds are sometimes represented as "loupe-clean," meaning clean or free from imperfections when examined by a loupe. As the magnification of the loupe used for the examination is not indicated by the term, the American Gem Society prohibits use of the term among its members.

**Louped.** Also looped. A trade term meaning that a diamond or other gem stone has been examined and probably graded by a loupe, or loop.

**Lower Break, Cross, Girdle, Half or Skill Facets.** The 16 triangular facets adjoining the girdle on the pavilion of a brilliant-cut gem. See Break Facets, Girdle Facets, etc.

**Lozenge.** A modern style of diamond cutting the outline of which is similar to that of the diamond on playing cards.

**Luderitz.** A bay in Greater Namaqualand, Southwest Africa, near which diamonds were discovered in 1908. The deposits were in alluvial ocean-built terraces and also in wind-eroded valleys one to eight miles from the coast.

**Luminescence.** A general term used to describe the emission of light by a substance when excited by light (particularly ultra-violet or X-rays), electrical discharge, heat, friction, or a similar agency.

*(To Be Continued)*