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 II | WINTER, 1937 | NUMBER 8

In This Issue:

Published by

THE AMERICAN GEM SOCIETY

555 South Alexandria | Los Angeles, California

STAR CHRYSOBERYL*

A cabochon-cut dark greenish-gray specimen of chrysoberyl which shows a six-rayed star, was recently received at the G.I.A. laboratory. Though the specimen is undoubtedly star chrysoberyl and may be entered in the gemological records as such, the star is not very distinct except in sunlight or a bright concentrated artificial light. An interesting point in connection with this stone is that the rays are not evenly spaced as they are in star ruby and sapphire, but two of the three streaks which make up the six-rayed star are noticeably closer to one another than either one to the third streak, thus producing a somewhat unsymmetrical star.

DRY ICE TESTING*

For some time Dr. Samuel Gordon, leader of the Philadelphia Study Group, and several of the students of this group have been experimenting with the use of dry ice for distinguishing between crystalline and non-crystalline gem materials and substitutes. The results which have been obtained have shown that crystalline substances will cause a distinct "squeaking" noise to be heard when brought into contact with dry ice while amorphous materials do not have this effect. This information has been released to the general public, through the *American Weekly* which is incorporated in the Sunday edition of Hearst newspapers. Experiments in the laboratory of the G.I.A. confirm the fact that this will distinguish between most crystalline and amorphous substances. It is the opinion of the staff of the G.I.A. laboratory that the test may prove a dangerous one and might result in the breakage of some gems thus tested due to the rapid transfer of heat from the stone to the dry ice. Students are advised not to use this test with valuable stones until more definite information regarding its safety can be released in *Gems & Gemology.*

SAPPHIRES*

Sydney H. Ball reports 1,075,000 carats of sapphires produced in Kashmir in 1934, and 800,000 carats in 1935. The statement that the supply is limited, which occurs in various texts prepared or printed before that time is, therefore, subject to correction.

GREEN DIAMONDS TESTED

Through the courtesy of the DeBeers Consolidated Mines of South Africa, the Gemological Institute has received two natural green diamonds. A test proved that neither of these affects a photographic plate; green diamonds artificially colored by radium make a self-exposure on a plate. This tends to confirm the effectiveness of the self-exposure method as a test between natural and artificially produced green diamonds.

*A.G.S. Research Service.

NEW SYNTHETIC EMERALD DEVELOPMENTS*

The appearance of synthetic emerald (concerning which *Gems & Gemology* carried its first report in July-August, 1935, issue) is apparently becoming more of a possibility in the trade with improvement of the manufacturing processes employed in the factory of the I. G. Farbenindustrie of Germany. The attention of both the trade and public was called to this fact in a recent release by the Associated Press, reporting a specimen just placed on display at the American Museum of Natural History. In this report, Dr. Pough, of the Museum, was quoted as saying that experts might be deceived by stones cut from the synthetic material.

As quoted in the Associated Press story, Dr. Pough refers to a newer type of synthetic emerald than that reported in the July-August, 1935, issue of *Gems & Gemology*. The synthetic emerald reported in 1935 had the form of a long hexagonal prism, in the center of which were attached a number of tiny hexagonal crystals. The newer material lacks the cluster of tiny attached prisms and, therefore, it perhaps is more adaptable to fashioning. The new type is, however, no less distinguishable from the genuine emerald. A specimen reported to be of the newer type synthetic emerald has just been thoroughly tested in the laboratory of the Gemological Institute of America. Like the specimens tested in 1935, it corresponds in appearance with a cheaper quality of genuine emerald, lacking a truly fine color, and containing a mass of inclusions. In the G.I.A. laboratory tests, comparisons were made with genuine emeralds of a similar quality, with which this synthetic stone might possibly be confused. (A glance, of course, would show it was not a fine gem quality emerald.)

Various internationally known gemological authorities have suggested distinguishing features useful in detecting the synthetic emerald. These include lower refractive index and specific gravity than genuine emerald, stronger dichroism, stronger fluorescence, a different absorption spectrum and characteristic inclusions. Of these, research in the laboratory of the Gemological Institute of America indicates that the most reliable tests for the newer type of synthetic emerald are observation of inclusions, the use of a spectroscope, and the checking of fluorescence. It is true, moreover, of the five specimens of synthetic emeralds which thus far have been tested in the laboratory, that the refractive index is measurably low, none of these synthetics reading higher than 1.565 under any condition, whereas no specimen of genuine emerald yet tested in this laboratory has ever given a reading lower than 1.57. This .005 difference of refractive index is, of course, distinguishable with a reasonably well-adjusted gemological refractometer.

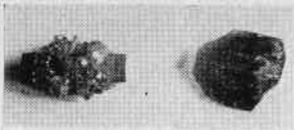


Figure 1.
Left, Older Form; Right, Newer Form of Synthetic Emerald.
(Actual Size.)

Concerning the use of specific

*G.I.A. Research Service.

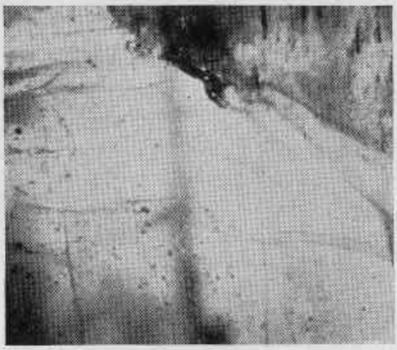


Figure 2.
Synthetic Emerald,
Showing Crack-like Markings.
× *18¼.*

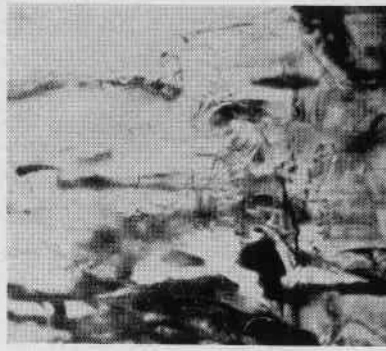


Figure 3.
Colombian Emerald,
Showing Liquid Inclusions and
Fractures. ×*18¼.*

gravity, it is doubtful in our minds that this test can be used effectively for distinguishing the present synthetic emeralds from genuine. In an experiment performed, 16 Colombian emeralds, 3 Uralian emeralds, 3 synthetic emeralds of the earlier type and one synthetic emerald of the new type were checked by immersion. Of these, in a solution made up to keep the synthetic emeralds exactly suspended, 3 Colombian emeralds floated, while 12 of the Colombian emeralds and 3 Uralian emeralds sank. The remaining Colombian emerald and the four synthetic emeralds were in suspension, indicating that these five specimens all were of exactly the same specific gravity. As all of the material used was of approximately the same quality, this obviously makes the specific gravity test no more than a fair indication, especially considering the fact that 25% of the Colombian emeralds thus tested were of the same specific gravity or lower than the synthetics.

The dichroism of the synthetic emerald, which has been suggested by several experimenters as being a valuable means of differentiating between synthetic and genuine emerald, is believed by the Gemological Institute of America to be of doubtful value as a test. Of the four synthetic emeralds mentioned above, a cut stone of the older type and a rough specimen of the new type—when tested under conditions available to the average jeweler—showed dichroic colors of bluish-green and light yellowish-green, too closely similar to those of many genuine emeralds to be of determinative value. Two of the older type synthetic emeralds do, however, show stronger dichroism and, therefore, different dichroic colors than have ever been observed by this laboratory in a genuine emerald. The dichroic colors exhibited by these stones are rather dark blue-green and a light, brownish, yellow-green.

The fact that the synthetic emerald fluoresces distinctly reddish in the ultra-violet light produced by a carbon arc filtered through a Woods' filter, while specimens of genuine emerald show negative results, was first reported by the Gemological Institute of America in 1935. This test separates the new type synthetic

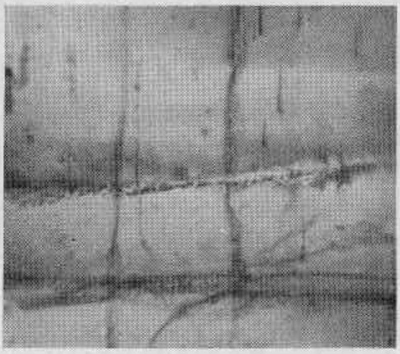


Figure 4.
Synthetic Emerald,
Crack-like Markings,
× 50.

Figure 5.
Colombian Emerald,
Liquid Inclusions and Irregular
Fractures. × 50.

emerald, though the new type does not show quite the intensity of red fluorescence which the older specimens did.

B. W. Anderson of the London Laboratory reported as early as May, 1935, that the spectrum of the synthetic emerald shows a marked difference from that of the genuine stone in that two absorption bands observed at 6060 and 5940 Angstrom units are present in the synthetic stones, absent in genuine emeralds. These bands, as Dr. Anderson pointed out, are especially strong when the synthetic emerald is so placed with respect to a polarizer that only the extraordinary ray of its two doubly refractive rays is allowed to pass. Recent experiments in the Gemological Institute of America laboratory show that if the present characteristics of the synthetic emerald are not greatly changed, this characteristic will permit a rapid and simple check on the inclusions. When the synthetic emerald and the spectroscope are set up in such a way that a polarizer can be rotated (either between the emerald and the light source, between the emerald and the spectroscope, or even between the spectroscope and the eye of the observer), a very definite appearance and disappearance of the bands in the orange-yellow part of the spectrum occurs as the polarizer is rotated. Though similar rotation of a polarizer when a genuine emerald is being tested causes variations in the bands of the *red* portion of the spectrum, the marked change in the *orange-yellow* occurs only with the synthetic stone.

Many research workers who have made a thorough study of the new synthetics seem to be of the opinion that the inclusions in the synthetic will prove to be the most valuable method of identifying this new substitute. The particular type of inclusion which serves to distinguish these stones is illustrated in Figures 2 & 4. Figures 5 & 7 were purposely taken of inclusions in genuine stones which are as nearly as possible like those of synthetic emeralds. Though there is a certain similarity in the general appearance of these inclusions and the curling fracture-like inclusions of the synthetic stone, it will be seen after brief study that the synthetic

Figure 6.
Synthetic Emerald,
Small Portion of Stone Lacking
Crack-like Markings. × 18¼.

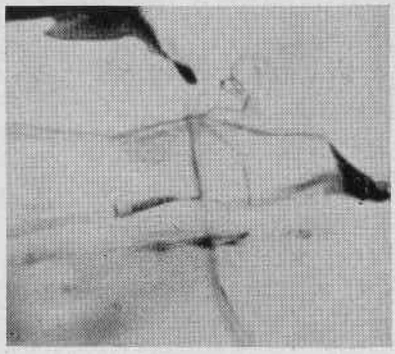


Figure 7.
Genuine Emerald,
Fracture and Liquid
Inclusions. × 50.

inclusions are entirely characteristic of this material and those of the genuine are quite dissimilar. These wisp-like markings are present in profusion in all of the synthetic emeralds so far observed in the G.I.A. laboratory. Prof. Dr. Karl Schlossmacher of the University of Konigsberg, Prussia, who has had opportunity to study a considerable number of synthetic emeralds, reports that these inclusions are invariably present in this material. Of course, in our research on this newer type synthetic emerald we have given, as usual, most attention to tests which can be put to practical use by gemologists in laboratories in their own stores.

The possibility that improvements in the manufacture of the synthetic emerald may make it very difficult to identify, in our opinion, is of little importance. After nearly thirty years of manufacture, the synthetic sapphire is far from a degree of perfection which would render *it* indistinguishable from the genuine stone. Despite all efforts of manufacturers to improve the product, gemological technique has been developed to detect the cleverest synthetic sapphire. We see no reason to believe that synthetic emerald can be brought to a degree of perfection which will make it indistinguishable from the genuine.

The G.I.A. has been keeping in close contact with developments in the synthetic emerald and has learned, through reliable sources, that the I. G. Farbenindustrie is feeling its way toward placing these stones on the market. So far as can be learned no "Igmeralds," as these synthetic stones are called, have yet been released for sale in the jewelry trade.

Reports continue to be received that they will command a relatively high price in relation with prices of the genuine. However, it is possible that the material may be released generally. If so, warning of its possible appearance in the trade may or may not be possible. We will, of course, keep in closest touch possible with the situation and with any possible improvements in the material which may occur. We will keep Members and Readers of *Gems & Gemology* advised of our activities and observations.

BOOK REVIEWS

Gemmologist's Pocket Compendium, **by Robert Webster, F.G.A., N. A. G. Press, London, 1937. Price $1.75 in United States. May be obtained from the G.I.A. Book Department.**

This is a small, pocket-size volume containing 143 pages of useful text, in addition to its some 50 pages of advertisements. The book is primarily a collection of tables and of brief instructions for gem-testing. As a reference book for a trained gemologist, it should prove of great value, though the average jeweler who does not have close acquaintance with gemology will probably find it quite baffling. The Pocket Compendium contains a short 53-page Glossary which, however, covers the majority of important terms with which the gemologist must be familiar. It briefly describes crystal systems and lists the gems falling in each system.

The hardness table in the Compendium is well prepared, the degrees of hardness being set down, and opposite them are listed the several gems which fall under each degree. Methods of determining specific gravity, including the use of heavy liquids, are briefly described, and in the table which follows this description the specific gravities of the various heavy liquids are inserted between the values for the various gem stones. Methods of determining refractive index are likewise described and an example is given of the method of refractive index determination by measurement of minimum deviation on the goniometer.

Optic character is also described, and in the table of refractive indices the birefringence, optic character, and optic sign are listed in addition to the refractive index for each gem. In this table also, the refractive indices of the various liquids sometimes used in refractive index determination are inserted at their proper places among the gem stones. In addition to the refraction and specific gravity tables, the Compendium contains tables on pleochroic colors, absorption spectrums (some of which are perhaps open to question), and colors seen through the emerald filter.

A table listing gem stones by colors is also included and brief explanations are given on synthetic stones and glass, artificial coloration, styles of cutting, acid tests for metals, and the base system of pearl evaluation.

A table for converting pennyweights and grains to troy ounces is given, and specific gravities of both water and tolulol for varying temperatures are listed. The book closes with tables on the atomic weights of the chemical elements and a periodic classification table for elements, the last two tables being of doubtful value to the practical gemologist.

The *Gemmologist's Pocket Compendium* is recommended to gemologists who wish a handy compilation of tables, especially for use in identification of unknown stones.

SELECTED BIBLIOGRAPHY

(Continued from last issue)

Mastin, J.
The Ancient Mining of Gold, Silver and Precious Stones. Simpkin, Marshall, 1913.
The Chemistry, Properties and Tests of Precious Stones. Lon., Spon, 1911.

Meirs, H. A.
Precious Stones. (Cantor Lectures) London, 1896.

Meisner, M.
Precious Stones in World Economics. (Die Weltwirtschoftlicke Bedeutung der Edelsteine.) Internationale Bergwirtschaft, v. 3, No. 11, Nov., 1928.

Merrill, G. P., assisted by M. W. Moodey and E. T. Wherry
Handbook and Descriptive Catalogue of the Collections of Gems and Precious Stones in the United States National Museum. Washington Gov. Print. Off., 1922.

Merrill, G. P.
Minerals from Earth and Sky. Part I. The Story of Meteorites, . . . Part II. See Foshag, W. F. Gems and Gem Minerals. [N.Y., Pub. by Smithsonian Institution Scientific Series, v. 3. 1929.]

Michel, H.
Die Kunstlichen Edelsteine; eine zusammenfassende darstellung ihrer erzeugung, ihrer unterscheidung von den natürlichen steinen und ihrer stellung im handel, mit je einens abschnitte über verfälschungen der edelsteine und uber perlen. Leipzig, W. Diebener. 1926.

Mineral Resources of U. S. (Precious Stones)
In annual volumes of Mineral Resources of U. S. issued by U. S. Geol. Survey, 1896-1917. On July 1, 1925, division of mineral resources was transferred from the Dept. of Interior (Geol. Sur.) to the Dept. of Commerce (Bureau of Mines). All material of special or permanent interest is listed by us under author. Other matter is largely statistical and is not noted.

Morgenthau, M. L.
Minerals and Cut Stones; reference book containing condensed and simplified descriptions from standard works on mineralogy. N. Y., 1923.

Northrup, H. D.
Beautiful Gems. 1890.

Orpen,G.
Stories about Famous Precious Stones. 1890.

Pachinger, A. M.
Glaube und Aberglaube im Steinreich. Munchen (Munich). H. Wiffenbock. 1912.

Pavitt, W. T.
Birthstones and Their Talismanic Virtues. Philosopher. v. 5 (Jan.-May, pp. 1-13). 1927.
The Book of Talismans, Amulets and Zodiacal Gems. Phila. McKay. 1922.

Petrie, E. E. Company
Gems, Their Lure and Lore, Indianapolis, 1934.

Pratt, J. H.
Gems and Gem Materials of North Carolina. (Am. Minerals, v. 18, 1933, pp. 148-159.)

Precious Stones of the Bible; descriptive and symbolical. 1878.

(To be continued)

The Australian Black Opal

by

JOHN DUPRÉ

Sydney, Australia

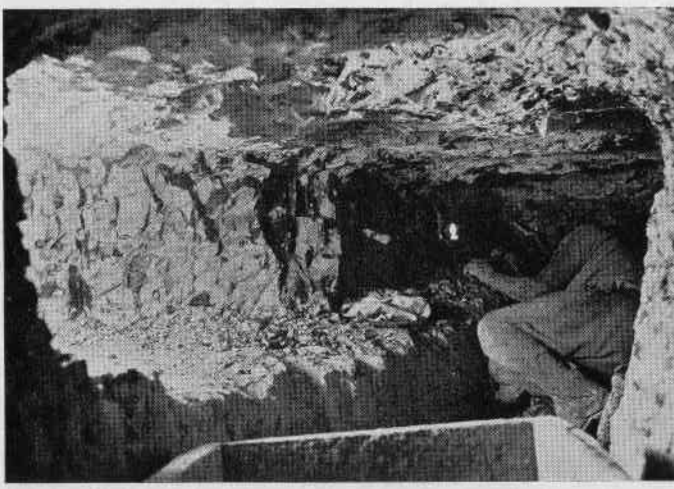
Opals have been found in several countries, including Czechoslovakia, Mexico, the United States and Australia.

It is only in the latter country, however, that the most beautiful of all, the fine black opal occurs. Also, although opals are found in a number of widely separated places in Australia, it is only at one field—Lightning Ridge, in Northern New South Wales—that the true black opal is found.

The field was discovered in the nineties, but was not extensively opened up until about ten years later. As its name implies, it is a low ridge. It is surrounded by black soil plains, but water and vegetation are scarce.

The opal area extends for several miles, and the stones are found embedded in a layer of clay underlying a sandstone belt. The clay bed lies at depths of from 15 to 75 feet from the surface.

The diggings and the miners' camps are spread out over the area and abandoned diggings are seen everywhere. The small township consisting of a hotel, post office, stores and a few dwellings, presents an unusual appearance owing to the entire lack of vegetation.



Lightning Ridge Opal Miner at Work.

The opals are distributed at random throughout the clay band and do not often occur in large batches or pockets. Finding them is a matter of trial and error. A vertical shaft is run down through the sandstone to the clay, then one or more horizontal shafts are made, using the sandstone as a ceiling. The waste material removed from the vertical and first horizontal shafts is removed by windlass and bucket. The clay from each succeeding horizontal shaft is then stowed in the preceding one. The miners usually work in pairs, but some of them work alone, requiring assistance only when removing earth or clay to the surface.

In the early days of the fields, large numbers of valuable black opals were found. However, now the area has become almost worked out, and a very limited number are found each year. The average yearly return to a miner is small. Nevertheless, the freedom of the life and the chance of making a valuable find offer a strong appeal.

The opal clay, which is of the consistency of cheese, is dug away with a small pick, by light supplied by a candle. The miner usually works in a very confined space. The pick is wielded very gently so as not to break any opal encountered. When any hard object is encountered, it is carefully removed, and if the miner finds it to be opal material he sets it aside for examination when he gets to the surface. There the irregular shaped piece of opal is "snipped" to determine its value. Many of the pieces upon being broken into have no color present.

If the piece shows good color it is ground down and shaped on an abrasive wheel and the surface is polished. This leaves a roughly shaped lump from which the buyer can get a very good idea of the quality of the specimens. The quality of the black opal can vary tremendously, and the more beautiful pieces are of very great value. The best black opal is of dark body color, brilliant from all angles, with large color pattern and showing an appreciable amount of red.

OPALS PRESENTED TO G.I.A.

The G.I.A. is indebted to Mr. John Dupré, both for first-hand information furnished concerning the opal deposits of New South Wales and for two very fine black opal doublets which he presented to the Institute's collection. Despite being assembled stones, these gems show play of color as beautiful as that of many fine opals seen on the American market.

BLACK OPAL

Reports in the trade indicate a renewal of importations of Black Opal from the Lightning Ridge district of Australia. For a considerable period of time this source of the world's finest black opals was reported as apparently exhausted and statements to that effect were contained in the American gemological courses and in text books which accompany them.

A GEMOLOGICAL ENCYCLOPEDIA

(Continued from last issue)

HENRY E. BRIGGS, Ph.D.

Of diamonds of commercial quality, the carbonado, of Bahia province in Brazil, will surpass all other diamonds and substances for hardness and toughness, the carbonado of Bahia being the hardest and toughest known substance.

Diamonds were first discovered in India, and the mines of Golconda were long preëminent. These mines produced some of the finest, as well as some of the most celebrated, large gems. The Kohinoor and the Great Mogul are from the mines of India. Later, diamonds were found in Borneo, Brazil, Russia, Ireland, Arabia, Algiers, America, Australia, South Africa, Java and British Guiana. Africa and Brazil are the most important producers of gem diamonds, and Brazil is the most important producer of black diamonds. In a recent letter to the author, the American Consular at Bahia gave the production of gem diamonds in the Bahia section as 20,000 carats, and valued at $500,000 yearly. This is indeed very small in comparison with the tremendous production of the South African mines, but it will be noted that these figures are for the Bahia section only. Minas Geraes, in Brazil, is also an important producer of gem and commercial diamonds.

It is not the purpose of the author to go into the history of the gems, nor the processes used in mining them. Consequently, we will not discuss these subjects further than the mention already made.

A partial list of the famous diamonds and important data is as follows:

Cullinan. Weight in rough, 3,106 carats; color, fine white; locality, Premier Mines, South Africa; owner, British Crown.

Great Mogul. Weight in rough, 787 carats; color, white; locality, Golconda Mines, India; last mentioned by Tavernier of France.

Jubilee. Weight cut, 245 carats; color, white; from Jagersfontein Mine, South Africa; owner not known.

Orloff. Weight cut, 194.8 carats; color, fine white; locality, said to have been stolen from an idol in a temple in Mysore; last known owner, Russian Crown.

Kohinoor. Weight cut, 106.10 carats; color, fine white; locality, Golconda Mines, India; present owner, British Crown.

Regent, or Pitt. Weight cut, 136.90 carats; color, the very finest white and of the finest water; locality, Puteal, India; last known owner, French Crown.

Florentine. Weight cut, 133.20 carats; color, yellowish tint, very brilliant; locality and history clouded with mystery; last heard of in the Austrian jewels.

Tiffany. Weight, 128.50 carats; color, deep yellow, brilliant but lacks prismatic play because of its deep tint; locality, Kimberley Mine, South Africa; present owner, Tiffany & Co.

Star of the South. Weight cut, 125.50 carats; color, white; locality, Bogageno River, Brazil; present owner, Gaekwar of Baroda.

Hope. Weight cut, 44.50 carats; color, sapphire blue, steel-like tint; claimed to be the largest blue diamond known; this stone formed a part of the Hope collection, is now owned by Mrs. Edward McLean of Washington.

Dresden. Weight cut, 40 carats; color, apple green.

Stewart, 120 carats; Nassak, 89.5 carats; Dresden (English), 76.50 carats; Empress Eugenie, 51 carats; Star of South Africa, 46.50 carats; Polar Star, 40 carats; Pasha of Egypt, 40 carats.

Braganza. Weight 1,680 carats; color, fine white; locality, Brazil; owned by the Portuguese Crown, but believed to be a colorless topaz.

COMMERCIAL DIAMONDS

Ballas are a type of commercial diamond so called because of their peculiar spherical form. It is due to concentric arrangement of very small diamond crystals which make up the nodule. Because of this structure it is extremely hard and tough and is well suited for commercial purposes.

Bortz is the name applied to several different commercial diamonds ranging from translucent to dark opaque masses of crystals. The structure of these is often fiberous and radial. Bortz are used for making drills, etc. Small fragments and dust of diamond are sometimes called bort also.

The carbonado, found in Brazil, is by far the most important of all commercial diamonds. It is the hardest and toughest known substance and is, consequently, of great importance in industry wherever an abrasive of this nature is required. The specific gravity of this exceedingly hard substance is less than that of the gem diamond.

EMERALD

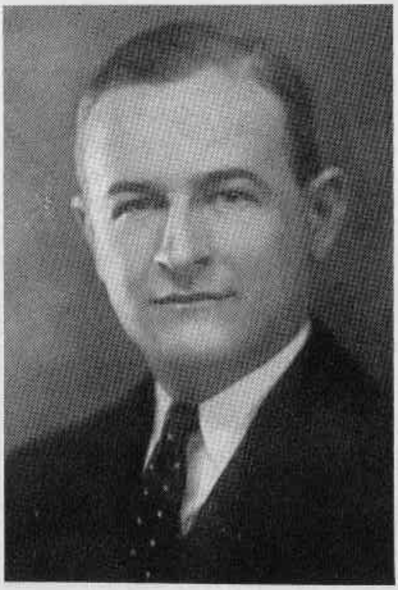
Emerald is in reality a vivid green variety of beryl and for years has been the most costly of all gems. It is one of the most rare in perfection and is much sought after by connoisseurs. However, today almost anything of a green color is sold as emerald. Sometimes a qualifying name is added and sometimes not. The author has met with ordinary glass recently, of a green color, being offered by a reliable dealer as "genuine Emerald." In this case the dealer had been "hoodwinked" by taking someone's word for granted, and it is deplorable that such a condition should exist. It is not altogether a surprising fact, however, that such a thing should occur when many of our museums will recognize several kinds of semi-precious stones as "emerald" of one kind or another. It is the honest opinion of the author that as long as the name "emerald" is accepted as a universal name for the vivid green variety of beryl, that any offering of other mineral of similar color by this name is absolutely misleading. If the words "emerald green" are used to describe a stone, it could probably be overlooked, although it is not advisable to use the name of a precious gem in describing a semi-precious one, lest the buyer be misled.

(To be continued)

WARREN R. LARTER, CERTIFIED GEMOLOGIST

Through the death of Warren R. Larter, of a streptococcus infection, on January 7th, the gemological movement lost one of its most valuable friends and supporters. Mr. Larter, who in 1931 had succeeded to the presidency of Larter & Sons, well-known manufacturing jewelers in Newark, New Jersey, died at his home in South Orange, New Jersey.

Enrolling in the Certified Gemologist course of the Gemological Institute of America in February, 1936, Mr. Larter completed the entire C.G. course by May, 1937, and had finished part of his C.G. examinations. He was making plans for completing his examinations when, in August, he was attacked by the streptococcus infection which finally took his life.



Warren Larter's direct assistance to the gemological movement was of greatest value. He was a Member of the National Certification Board of the American Gem Society, and his firm was elected as Sustaining Members of the Gemological Institute of America. He was directly responsible for interesting a great many members in the jewelry trade in preparing for Registered Jeweler and Certified Gemologist titles. Furthermore, he criticized and re-wrote the greater part of the assignments on *Jewelry* which are included in the R.J. and C.G. courses.

In order to help other students, as much as a check on gem purchases by his firm, he was installing a complete gemological laboratory, and, at the time he was taken sick, was helping several eastern students prepare for their C.G. stone examinations. In view of the excellent work which Warren Larter had done on his courses and the ability which he showed in the identification of unknown gems, both at the Chicago Conclave in May, 1937, and by his helping other students with this important subject, he has posthumously been awarded the title of CERTIFIED GEMOLOGIST, becoming the thirty-third to win this honor. Shortly before his death a scroll signed by George Brock, Chairman of the Board of Governors of the G.I.A., and Robert M. Shipley, President, was awarded to him for the most valuable assistance to the gemological profession during 1936 and 1937. Warren Larter's death is a great loss to the numerous friends he made in the profession; we shall all miss his advice and counsel.

LIEUT. COLONEL J. F. HALFORD-WATKINS, V.D.

On November 9th, 1938, Lieutenant Colonel J. F. Halford-Watkins died at Mogok, Upper Burma. Lieut. Col. Halford-Watkins was a Member of the Students' Advisory Board of the Gemological Institute of America, and in this capacity gave much valuable assistance to the preparation of the courses of the G.I.A. He was formerly Deputy Agent of the Burma Ruby Mines, and later was a Director of Ruby Mines, Ltd., Mogok, until the activities of this firm were suspended. His knowledge of gems, especially ruby and sapphire, was vast, and—a fact which made his advice of greatest value—his knowledge was practical. Much of the material incorporated in the G.I.A. assignments on ruby and sapphire, and even parts of the assignments on emerald and zircon, are largely due to the information contributed by him. At the time of his death, Lieut. Col. Halford-Watkins was completing a book on Gemology. It is hoped that the publisher, who now has the first draft of this manuscript, will see fit to have it completed and published. We were fortunate enough to be sent several sections of Lieut. Col. Halford-Watkins' book by him, and each of these is of great value, containing many points never before brought out concerning the gems which it covers.

J. R. SUTTON, Sc.D.

Dr. Sutton, who formerly was with DeBeers Consolidated Mines in Kimberley, South Africa, in the Sorting Rooms, was also a Member of the Students' Advisory Board of the Gemological Institute of America. Of late years he had been living in Oaklands, Binfield, Berk., England, where he died on the 11th of October, 1937. Dr. Sutton greatly assisted the Institute during the preparation of the G.I.A. Course (No. 2) on Diamond. His advice and corrections helped to decide between many conflicting statements of other authors and to eliminate many misconceptions prevalent in the trade. Perhaps because of his work in the Sorting Rooms, Dr. Sutton was particularly interested in the crystallography of diamond. Readers will recall his notes concerning the crystallography of the Jonker Diamond, especially the one published in the May-June, 1934, issue of *Gems & Gemology*. Dr. Sutton's book, "Diamond—A Descriptive Treatise," is well known among gemologists for its brief and lucid manner.

A GEMOLOGICAL GLOSSARY

(Continued from last issue)

(With phonetic pronunciation system.)

Terms in quotation marks are considered incorrect.

Menilite (men'i-lite). Grayish-brown banded opal. See also Liver Opal.

Metallic Luster (me-tal'ik). Having the surface sheen of a metal; with a metal-like reflection.

Metalloidal Luster (met"al-oy'dal). Reflecting light somewhat like a metal.

Metallurgy (met"al-ur'ji). Separation of metals from their ores or from impurities.

Metamorphic (met"a-more'fik) of, pertaining to, produced by, or exhibiting metamorphism (Webster). See Metamorphism.

Metamorphism (met"a-more'fism). The alteration of the chemical composition or the structure of any rock or mineral by the natural agents of heat, pressure or gases.

Meteorite (mee'tee-or-ite"). A mass of stone or metal that has fallen to the earth from outer space.

Methylene Iodide (meth'i-lene eye'oe-dide). A liquid of high fractive index (1.74) and high specific gravity (3.32).

"Mexican Diamond." Rock crystal (quartz).

Mexican Opal. Opal from Mexico with white or light body color. Much *fire opal* is also found in Mexico.

"Mexican Onyx" (mek'si-kan). Banded mottled, or clouded travertine (calcite).

Mexican Turquoise. Light blue to greenish-blue and bluish-green turquoise from Mexico or from New Mexico (U.S.).

Mica (mei'ka). A group of minerals, including as gem or ornamental varieties *Muscovite* (Fuchsite or Verdite), R. I. 1.57, Sp. Gr. 2.9, H. 2-2½, color green, and *Lepidolite*, R. I. 1.59, Sp. Gr. 2.85, H. 2½-4, color light violet-red to light red and light yellow, and white.

Micaceous (mei-kae'shee-us). Composed of thin plates or scales, or, like mica, capable of being easily split into thin sheets.

Mica Schist (shist). Schist composed largely of mica.

Micarta. A product similar to Bakelite.

Microcline (mei'kroe-kline). Potash feldspars in the triclinic system; aluminum and potassium silicate. See also Feldspar.

Microscope (mei'kroe-skope). An instrument affording magnification of small objects such as inclusions in gems. *Polarizing* —, a microscope equipped with accessories to provide polarized light, useful for determining double refraction and optic character.

Mikimoto Pearls. A trade term for cultured or cultivated pearls whose formation is artificially propagated and scientifically controlled by Dr. Mikimoto, a Japanese scientist.

Milk Opal. A translucent, milky-appearing variety of common opal. Rarely exhibits play of color.

Milky Quartz. A translucent to nearly opaque white variety of crystalline quartz. When containing small particles of gold is known as *gold quartz.*

Mimetite (mim'e-tite or mei'me-tite). Yellow to brown or colorless mineral. Lead arsenate and lead chloride crystallized in hexagonal system. S. G. 7.0; R. I. 2.1; Hardness 3½.

Mimicry. Imitations of crystal forms of higher symmetry by those of lower grade of symmetry, usually the result of twinning.

Minas Geraes (mee'nash zhae'rishe). Important gem-bearing state or territory of Brazil.

Mineral (min'er-al). A chemical element or compound occurring as a result of an inorganic process. Usually crystalline, resulting in definite properties, but occasionally amorphous.

Mineralogy (min"er-al'oe-ji). The science of minerals.

Mixed Cut. A style of fashioning with 58-facet type of brilliant cutting above the girdle and step cutting below.

Mocha Stone (moe'ka). Variety of quartz. See Tree Agate, tree stone.

Moderne Cut (moe-dern'). Any modification or combination of table cut, step cut and brilliant, used especially in connection with diamond. Includes emerald cut, baguette, triangle, keystones, half moon, etc.

Moe Gauge (moe). A diamond weight calculator which estimates to within a few hundredths the weights of brilliant cut diamonds only, by measurements of width and depth of both set or unset diamonds.

"Mohave Moonstone" (moe-ha'vae). Translucent, lilac-tinted chalcedony from the Mohave Desert, California.

Mohs Scale (moze). The most commonly used scale of hardness—Diamond 10, Corundum 9, Topaz 8, Quartz 7, Orthoclase Feldspar 6, Apatite 5, Fluorite 4, Calcite 3, Gypsum 2, Talc 1. Divisions are not equal, minerals representing various hardnesses having been chosen arbitrarily by the mineralogist F. Mohs.

Mojave (moe-ha'vae). Same as Mohave.

Moldavite (mol'da-vite). Green obsidian.

Molecule (mol'ee-kule or moe'lee-kule). The molecule is usually defined from a chemical standpoint as the smallest part that exists free in the gaseous form of a substance, when a solid or liquid is heated. A molecule represents the smallest unit of a substance of which the chemical properties are wholly retained. Molecules may consist of more than one element and, therefore, of more than one atom. See Atom.

Mollusc (mol'usk). A soft-bodied non-segmented invertebrate animal which typically possesses a hard shell. This shell may be univalve as in the snail, or, bivalve, as in the oyster, cockle, and mussel.

Monochromatic (mon"oe-kroe-mat'-ik). Having or consisting of, one color; presenting rays of one color only.

Monoclinic (mon"oe-klin'ik). A crystallographic system; has three axes, two of which are unequal in length but at right angles to one another, the third also of unequal length and not at right angles to the plane of the other two.

"Montana Jet" (mon-ta'na, or tan'a). Obsidian, from Yellowstone Park.

(To be continued)