

Gems & Gemology

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SOUTH AFRICAN EMERALDS*

by

J. M. LaGRANGE

Johannesburg, South Africa

Shortly after its discovery, I was at one time, through the Beryl Mining Company, connected with the first exploited occurrence of emeralds in the southern part of Africa. Emerald of very good quality has been found at this and other later discoveries in the vicinity. The proportion of really good class of gem material to the less valuable and worthless material was not very high, but this was, of course, to be expected, especially in view of the superficial nature of the workings.

The best gem material, as commonly found elsewhere, was often flawed, but the color was a fine, pure, deep emerald green. The inclusions, if any, usually consist of small biotite flakes, while in many cases a cloudy development, probably of kaolinite, was present. I am referring more particularly to the uncut crystals. A large proportion of the crystals consisted of pale and clouded greens which, I believe, were also polished, but in the cabochon form.

Some of the cut stones are reported by the press to have averaged up to \$600 a carat, but this may have been exceeded in some rare instances. One crystal of 130 carats, flawed of course, is reputed to have given pieces of which one stone realized \$4,000 when cut. Another $\frac{3}{4}$ gem realized \$400 a carat.

In the early stages (1928-29) a good deal of the cutting was done locally, but later most of the cutting was given to overseas firms, probably in London. The better stones were, of course, table cut, but the poorer quality was turned out as cabochons, and these latter also found a ready market.

The uncut crystals from one locality showed a marked zony tendency. These zones were mostly recognizable by the fact that the coloring in some were of lesser or greater intensity than in the adjoining zones. I have been assured, but have not been able to verify the fact, that such zoning is not common at the other localities.

In size, such crystals as I saw ranged from microscopic up to possibly 4 inches in length, though I suppose crystal prisms $\frac{1}{4}$ inch to 1 or 2 inches with proportionate diameters were perhaps most common. One unusual crystal measuring $4\frac{1}{4}$ inches by $2\frac{1}{4}$ inches and reputed to be "2,200 carats, or very nearly one pound" in weight, was reported. Unfortunately, it turned out to be disappointing when opened up.

At present, I believe that regular marketing of its product is being effected by only one mine, the so-called Cobra Emeralds, Limited. In 1935 I visited an occurrence of emeralds at Poona in West Australia. The mine had been, and still was, closed down. The occurrence is very similar to the South African one which I have described. I saw one or two crystals from this mine which happened to be of a fine deep emerald green color, but I suspect these were rather rare.

*G.I.A. Research Service.

The Westward Course of Zircon*

by

C. A. ALLEN, J.G.
Cranbury, N. J.

So much has recently been written about the characteristics of the zircon as to be sufficient evidence, if any were required, that that gem continues to be of absorbing interest to the investigator.

Several years ago, the principal sources of the Siamese rough were the districts of which Chantaburi and Pailin are the trading centers, and Muang Kao. Chantaburi is reached by both rail and steamer from Bangkok, and is situated a few miles up a small river emptying into the Gulf of Siam, not far from the southeastern border. Pailin is about thirty miles northeast of Chantaburi, in Cambodia. Muang Kao, like Pailin, is located in territory which, formerly belonging to Siam, was ceded to France at the turn of the century, and lies on the Meh Khong River, slightly southeast of Ubol Rajdhani, a large village in the extreme eastern part of Siam.

The sources around Chantaburi are now, in a commercial sense, exhausted. Pailin continues to produce small quantities; while Muang Kao, which, by the way, produced rough that furnished the finest colorless stones, appears to yield less and less annually.

The chief source, today, is in the province of Annam, French Indo-China, about half way between Veun Kham, on the Meh Khong River, and Kontoum, to the east and slightly north.

All the actual digging is performed by people, both men and women, belonging to the hill tribes.

They live in bamboo huts on the site. Usually from three to five people work together and share the proceeds. There is no system as to where they shall dig, but pits are made here and there, as fancy dictates, provided other diggings are respected. A pit is seldom dug more than eight feet for, with no restriction, it is easier to commence anew than to go too deep. The earth is lifted up in bamboo baskets and later sifted or "pawed-over" for the pebbles.

These hill people, at least in certain seasons of the year, work hard, but like so many others are at the mercy of unscrupulous rough stone dealers, who arrive at the mines from Bangkok, drive the hardest bargain they can, and return to Bangkok, generally with the most extravagant demands for the material.

When business is good, these demands are usually insisted on and only by long persistence can be overcome, but no small part of the frequent high prices can be accounted for by the dealers making more frequent journeys than necessary between the mines and Bangkok, and carrying but small amounts of material, rather than transporting a man's-size load, in attempts to turn their money over more quickly. Three years ago, 24 dealers at most were working between the two places; last year, there were 120.

Yet, whatever the demands of these dealers, I have learned that with proper bargaining zircon rough can be purchased in Bangkok from

*G.I.A. Research Service.

these same dealers cheaper than by sending an experienced man to buy it at the mines. For several months I had a man make monthly trips to Annam, purchase the rough from the diggers, if possible or, if not, through a middleman, and it usually cost me more than obtaining it in Bangkok at the right times and storing it against high prices and scarcity.

During the past year, several papers have been written giving valuable suggestions on the heat treatment of this rough. As pointed out some time ago,* it has been my observation that methods differing in detail produce identical results; but nevertheless it is unfortunate that probably none of these recent papers reach the eyes of those who have spent years in the practical demonstration that heat, applied in a simple manner, will alter the color in different ways. And it is to be regretted that someone possessing the proper qualifications could not reside in Bangkok long enough to obtain material from known sources and to experiment with it in cooperation with those having this practical knowledge of heating large quantities of rough without any thought of scientific procedure. Such cooperation might prove invaluable in arriving at an explanation of some of the "mysteries" of the zircon.

Returning to Bangkok a few months ago after an absence of nearly five years, I found exactly the same methods in use now as then, and as were used as long ago as 1922, when I first went out there to make it my home. These methods were described in a previous paper.* In the intervening years, no knowledge has been gained out there as

to a way to fix the color in a stone, or to produce stones of uniform color. This remains in the lap of the gods.

But while the process remains the same, the gem districts of Bangkok have undergone a remarkable change. Five years ago, small shops were congregated in only two sections of the city, Watkoh and Samyak. Today—I am speaking of September, 1937—not only have these centers been greatly enlarged by the addition of scores of other shops, but in various other sections of the city, in Talat Noi, on Siphya Road, and in lanes so hidden by tiny huts and rank growth as to be non-existent to all but those who know their way, have risen more scores of shops, each with a few cutting wheels, from which the shrill hum of the stone on metal may be heard for hundreds of feet.

From shop to shop, such as these, the rough stone dealers move, carrying their stones in a cloth tied by the corners, and displaying them on the floors, generally the center of lively scenes of bargaining. They naturally go to the large shops first, where they may dispose of their entire load if they are fortunate. If this cannot be done, they must peddle their stones around among the smaller shops and dispose of them in small lots; but as this requires time, and they desire to return to the mines for more as quickly as possible, the larger dealer has a decided advantage and can usually obtain better prices than his smaller competitor. The rough is sold by the catty, one catty representing a pound and a third. Sometimes conditions may seem to warrant storing large stocks when the material appears of good quality and is low priced. This is tempting to wealthy speculators, both native and European.

**The Heat Treatment of Siamese Zircons*, C. A. Allen, p. 341, Nov.-Dec., 1935.

(To be concluded)

New Trade Practice Rules*

by

ROBERT M. SHIPLEY

*President, Gemological Institute of America,
Los Angeles*

New Trade Practice Rules for Wholesale Jewelry Industry have been approved by the Federal Trade Commission and promulgated (released) on March 18, 1938. The F.T.C. states that these Rules supersede those of July 10, 1931, and I am advised by Judge McCorkle, Director Trade Practice Conferences, that all branches of the industry should obey these Rules.

Below are quoted only the new Rules which affect present practices in the sale or representation of diamonds and jewelry (not watches). The "comments" which appear after several of these Rules refer only to changes from the former Rules, and there I incorporate my personal interpretation of them, only in an effort to assist the jeweler who wishes to avoid any possible violation of them. Such Rules, like laws, are often subject to different interpretation and the Commission itself, as the occasion arises, may, of course, place a different interpretation upon them.

Rule 2—It is an unfair trade practice to use the word "perfect," or any other word, expression, or representation of similar import, as descriptive of any diamond, ruby, sapphire, emerald, or other gem stone, which discloses flaws, cracks, carbon spots, clouds, or other blemishes or imper-

fections of any sort when examined by a trained eye under a diamond eye loupe or other magnifier of not less than ten power, with the tendency and capacity or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public.

Comment: Previous Rules for the use of perfect referred only to diamonds; it is rarely used for "colored stones," and as absence of flaws is less important in them it is to be hoped that this Rule will not stimulate their sale as perfect or imperfect.

Previous Rules specified a "normal" eye. The Retail Jewelry Code specified a loupe of not less than 7 power, but the F.T.C. Rules of July 10, 1931, again became operative when the N.R.A. ceased to function. The 1931 Rules specified an "ordinary diamond loupe" (which made possible the use of loupes as low as three power). This new Rule 2 does not specify a 10x loupe corrected for chromatic and spherical aberration as does the definition of the American Gem Society for *flawless* diamonds which was recommended by its Diamond Terminology Committee and voted for adoption by its Registered Jewelers in October, 1937. This A.G.S. definition follows:

"The term 'Flawless' shall be used to describe a diamond which is free from all internal

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and external blemishes or faults of every description under skilled observation in normal natural or artificial light with a ten-power loupe, corrected for chromatic and spherical aberration. This shall be a 'Standard of the American Gem Society'."

As there is a greater possibility of overlooking small imperfections under examination by an uncorrected loupe, and as the A.G.S. specifies "skilled" observation and "stringent lighting" conditions and the Trade Practice Rules do not, a diamond graded as flawless under the A.G.S. Standard will remain a higher grade stone than a perfect stone under these new F.T.C. Rules. (Unless the F.T.C. Rule should be interpreted to mean that the Rule is violated if flaws, etc., can be disclosed under any 10x magnifier and under any method of examination.)

Rule 3—It is an unfair trade practice to use the terms "perfect cut," "perfectly cut," "eye perfect," "commercially perfect," or "commercially white," or any other terms, expressions, or representations of similar import, in advertising, labeling, representing, or describing any diamond, when such terms are so used for the purpose or with the capacity and tendency or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public.

Comment: This Rule does not specifically prohibit the use of the terms "clean," "sound," and "eye-clean" as does the A.G.S. Rule governing the practice of Registered Jewelers and Graduate Members (wholesalers) which follows:

"Resolved that because of the misuse intentionally or otherwise of certain terms commonly used in describing diamond qualities, which result in public confusion, abuse and are misleading and deceptive, the following terms be discontinued: clean, sound, eye-clean, eye-perfect, commercially white, commercially perfect, perfect cut and perfectly cut."

Rule 4—It is an unfair trade practice to use the word "pearl," or the word "diamond," "ruby," "sapphire," "emerald," "topaz," or the name of any gem stone, in such manner as to mislead or deceive purchasers, prospective purchasers, or the consuming public into the erroneous belief that the product is a genuine pearl, diamond, ruby, sapphire, emerald, topaz, or other gem stone.

Comment: This means that greater care should now be exercised in the manner in which synthetic or imitation stones and cultured pearls are represented. Cultured pearls cannot be sold as Japanese Pearls, etc. This Rule also includes definitions of pearls, diamonds, rubies, sapphires, emeralds and topaz, which seem to make very clear that the representation of other genuine gems under these names is prohibited. The sale of green corundum as "Oriental emerald," red spinel as "Spinel Ruby," quartz as "Quartz Topaz" (or as Topaz), etc., etc., may be interpreted as violation of this Rule. Some of the definitions follow:

Ruby: The name "ruby" is given to the transparent to translucent variety of the mineral corundum. Its

color is red with only limited traces of other tints or hues. The color is due to the presence of minute quantities of metallic oxides in the alumina. Its hardness is about 9, and its specific gravity varies from 3.94 to 4.10. The variety of ruby which exhibits a six-rayed star is known as the "Star Ruby."

Comment: Corundum of a hue which is more purplish than red, cannot now be represented as a ruby.

The sale of purple and violet star corundum as star ruby is apparently prohibited. All colors except "red with limited traces of other tints or hues" should be sold as sapphire.

Emerald: A deep green to light grass green transparent to translucent variety of the mineral beryl which crystallized in the hexagonal system. Its color is due to the presence of chromium. Its hardness ranges from $7\frac{1}{2}$ to 8, and its specific gravity from 2.67 to 2.75. The still lighter green varieties of beryl are correctly known as either green beryl or aquamarine and should not be confused with emerald.

Comment: A very light green beryl should not be sold as emerald. Unless some color standard can be established to divide "light green" from "very light green" and "pink" from "red," the exact dividing lines between emerald and green beryl and between ruby and pink sapphire will remain largely a matter of personal opinion. However, these definitions should greatly assist in prohibiting misrepresentation.

Topaz: A mineral consisting essentially of aluminum fluosilicate crystallized in the orthorhombic system. Its characteristic color is yellow, varying from canary to deep orange, but it is also white, greenish, bluish,

pink, rose, red, etc. Its hardness is 8 and its specific gravity varies from about 3.4 to 3.6. This mineral, known in the trade as precious topaz, should not be confused with a yellow to brown variety of quartz (silica) generally known as topaz quartz, citrine quartz, or citrine.

Comment: This states that citrine (also known as citrine quartz or topaz quartz) is not topaz. It seems apparent that the rather common practice of selling citrine as topaz is now prohibited.

I have omitted the Rule's definitions of pearl, diamond and sapphire.

Rule 5—*It is an unfair trade practice to use the word "real," "genuine," or "natural," or any other word, expression, or representation of similar import, in any way as descriptive of any article or articles which are manufactured or produced synthetically or artificially, or which are artificially cultured or cultivated, or which are a simulation or imitation of or substitute for any precious or semi-precious stones, or pearls, with the tendency and capacity or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public.*

Comment: This Rule makes it apparent that the greatest care should be exercised in the sale or description of cultured pearls or of imitation or synthetic stones, including those sold under trade-marked names. "Cultured pearls (*genuine*)," "Real Zirc-tone" and similar expressions would seem to be prohibited.

Rule 6—(a) *It is an unfair trade practice to use the term "blue white" or any other term, expression, or representation of similar import, as descriptive of any diamond which shows any color or any trace of any color other than blue or bluish, with the tendency and capacity or effect*

of misleading or deceiving purchasers, prospective purchasers, or the consuming public.

(b) *The practice of tinting a diamond a bluish white or any other color for the purpose or with the tendency and capacity or effect of thereby misleading or deceiving purchasers, prospective purchasers, or the consuming public as to the natural color, tint, or condition of such diamond, is an unfair trade practice.*

Comment: This differs from the 1931 Trade Practice Rules, which referred to the presence of color when stone was "viewed from the front." Rule 6 apparently prohibits the representation of any stone as blue-white which shows traces of any color other than blue when examined *by transmitted light*. Diamonds containing traces of yellow when viewed from the front under a blue sky can be made to show traces of no other except blue or bluish. Therefore, this Rule seems a great improvement in protection to buyers. But it is possible to more or less eliminate traces of yellow by certain methods, even when diamonds are examined by transmitted light and fuller protection to the buyer is probably impossible until more detailed specifications governing the *methods* for examination can be established.

Rule 11—Applying the term "synthetic" to gem stones other than those produced by artificial means and having essentially the same phy-

sical, chemical, and optical properties as the genuine or natural gem stones which such synthetic products simulate, with the tendency and capacity or effect of misleading or deceiving purchasers, prospective purchasers, or the consuming public, is an unfair trade practice.

Comment: Apparently prohibits the representation as synthetics, of doublets, glass, bakelite or other products which merely simulate the appearance of the stone they represent; also the sale of synthetic corundum or spinel as "synthetic garnet," "synthetic topaz," etc., etc.

The F.T.C. has accomplished a vast improvement over the former Rules. The influence of the gemological movement seems distinctly apparent in them; one of the numerous indications of that improvement upon the trade. Legitimate jewelers may, of course, refer to their Better Business Bureaus, or to the F.T.C. itself, violations of these Rules by competitors. The Rules state, in part, that . . . "appropriate proceeding in the public interest will be taken by the Commission to prevent the use of such unlawful practices. . . ." These Rules should prevent much intentional misrepresentation and, because they are the first of these Rules which make a knowledge of fundamental gemology necessary for those who wish to avoid violations, they should reduce unintentional misrepresentation.

GEMOLOGICAL GLOSSARY

(Continued from last issue)

(With phonetic pronunciation system.)

Terms in quotation marks are considered incorrect.

- "Montana Ruby." A term incorrectly applied to some red garnets.
- Montana Sapphire. A sapphire from Montana. Many fancy colors in addition to blue stones have been produced in this state. As a trade grade it refers to the sapphire, no matter where found, possessing a comparatively light and comparatively grayish-blue color called electric blue, or steel blue. Stones of this grade from Montana have a slightly metallic-appearing luster.
- "Mont Blanc Ruby." A reddish quartz.
- Moonstone. A term used correctly or incorrectly to refer to certain varieties of Orthoclase (feldspar), Albite (feldspar), Scapolite and Corundum. The name should probably be confined to Precious Moonstone, a variety of the mineral "Adularia," a type of Orthoclase, exhibiting adularescence. See also adularescence.
- "Moonstone." White chalcedony. When certain specimens are cut en cabachon, exhibits white moving light which, however, differs from true adularescence.
- Morallion. Term used in Colombia for poorer grades of emeralds used as gems.
- Morganite (more'ga-nite). A light red-purple to purplish red variety of beryl.
- Morion (moe'ri-on). Deep-black, almost opaque, smoky quartz.
- Moroxite (moe-rok'site). A blue to greenish-blue variety of apatite.
- Moss Agate. Agate with green moss-like inclusions. See agate.
- Moss Jasper. Opaque and translucent chalcedony crowded full with moss-like markings.
- Moss Opal. Milky opal with black moss-like (tree-like) inclusions.
- Mossy. If crystals are fine and soft like moss. Also term applied to emeralds clouded by fissures or fractures.
- "Mother of Emerald." Green fluorite, also prase (quartz).
- Mother of Pearl. Lining of the shell of any pearl-bearing mollusc. It is of the same composition and quality as the pearls produced by each particular mollusc.
- Mother Rock. See Matrix.
- Mottled. Having spots or irregular patches as of color or shading.
- Mountain Mahogany (ma-hog'a-ni). Obsidian.
- Mounted Stones. Fixed in a setting; or also, according to Kraus, description of stones covered upon the back by foil, enamel or other substances.
- Muddy. Lacking brilliancy from the interior, due usually to cloudiness of the stone.
- Muller's Glass. See Hyalite.
- Multi-colored. Having many colors.
- Multiple. Price of pearls subject to the multiple of weight.
- Muscle Pearls. Small pearls found in the muscular tissue near its attachment to the shell.

- Mussel-Egg. Name given to freshwater pearls by Tennesseans.
- Mussel Pearls. Pearls from true mussels are usually dark and dirty in color and possess little, if any, luster. See also Trematode.
- Muzo (moo'soe). A town in Colombia near which is the principal source of fine emeralds.
- Myrickite. Local trade-name for a variety of chalcedony from San Bernardino County, California. It shows red spots on a gray ground and resembles "St. Stephen's Stone."
- Naaf. Thin, flat diamond crystals.
- Nacre (nae'ker). Mother of Pearl. The lining of the shell of the pearl-bearing mollusk.
- Nacreous (nae'kree-us). Possessing a coating of nacre, or the appearance thereof.
- Nacroscope. An instrument containing a strong light through which the nature of the nucleus of a pearl is observed.
- Naif (see Nyf).
- Napoleonite (na-poe'lee-on-ite). An obsolete synonym of orthoclase.
- Natal Stones (nae'tal). Birthstones.
- Naturals. Unpolished spots on girdle of a diamond.
- Natural Glasses. Natural amorphous substances, such as obsidian.
- Navette (nave-et'). Same as Marquise.
- Needle Stone. Sagenite (quartz).
- Negative Crystals. (a) in a mineral or cut gem stone, a cavity having the form of a crystal. (b) a crystal exhibiting negative double refraction. (See also Positive Crystal.)
- Nephrite (nef'rite). A compact, translucent gem variety of actinolite. Semi-transparent to opaque, green, gray, white, brown, reddish, bluish, lavender, yellow. Hardness, 6 to 7; Specific Gravity, 3.3 to 3.5; Refractive Index, 1.60-1.63. Both Nephrite and Jadeite are known as Jade. See *Jade*, *Jadeite*.
- Nephelite (nef'e-lite). A mineral used rarely as a gem stone. Translucent, white, red, green, blue. Hardness, 5½ to 6; Specific Gravity, 2.6; Refractive Index, 1.53-1.54.
- "Nevada Diamond." Obsidian artificially decolorized.
- Newton Scale. A type of specific gravity scale.
- New Zealand Jade. Nephrite (Jade) from New Zealand. Also a term sometimes applied in the trade to all spinach-green nephrite, regardless of its actual source.
- "New Zealand Greenstone." Serpentine; also, nephrite from New Zealand.
- Niagara Spar. A colorless to white translucent variety of gypsum sold to tourists at Niagara Falls. See also *Satin Spar*, *Gypsum*.
- Nicks. Very small fractures along the girdle or facet junctions of a cut stone. See also *Pits*.
- Nicol Prism (nik'ul). A calcite prism sawed through and recemented in such a fashion as to pass only the extraordinary ray of the two doubly refracted rays, thus producing polarized light.
- Nicolo (nik'oe-loe). Onyx with a black or brown base and a bluish-white top layer.
- "Night Emerald." Same as "Evening Emerald."
- "Nixonoid." A type of celluloid.
- Noble (as a prefix). The word "noble" is used in mineralogy to express superiority or purity, e.g. Noble Opal, Noble Tourmaline, etc., as contrasted with inferior qualities of the same species. See also Oriental.

(To be continued)

A GEMOLOGICAL ENCYCLOPEDIA

(Continued from last issue)

HENRY E. BRIGGS, Ph.D.

EMERALD (Cont.)

The only true emerald is the deep, vivid-green beryl. It is found principally in Colombia and the Ural mountains, although some few small stones have been mined in North Carolina and in the Tyrol. In Egypt are old mines from which the ancients, no doubt, obtained their emeralds, and even today a few are found there.

BERYL

Beryl crystallizes in the hexagonal system and the prism faces are often deeply striated vertically. The hardness of this mineral will vary from 7.5 to 8; specific gravity will vary from 2.6 to 2.8; fracture is uneven to conchoidal; cleavage indistinct; luster vitreous to resinous; optically uniaxial negative; index of refraction 1.58; dispersion .014. Beryl is found in the following colors: Green, bluish-green, blue, pink, golden yellow, red, and colorless. The vivid green is called emerald, the greenish-blue to blue is called aquamarine, the pink and reddish,morganite; the yellow, golden beryl, and the colorless, goshenite. The composition of beryl is beryllium-aluminum silicate; the formula $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$ is usually used to express beryl. However, in some varieties part of the beryllium may be replaced by some other element, such as calcium. The author has also found sodium, lithium, magnesium and iron in samples of beryl examined.

While beryl is only weakly birefringent, yet the dichroism is marked and can often be detected by the unaided eye by orienting the crystal. This property should make it possible to distinguish it from the paste imitations and from the green colored spinels which are flooding the markets. Emerald green tourmaline often very closely resembles the emerald in color, but with the aid of the dichroscope it is possible to easily tell them apart, for the true emerald shows a deep green and a medium to light green through the dichroscope, while the tourmaline will show a fine vivid but light green and a deep blue-green when viewed through this instrument. There are many so-called "emerald testers" offered on the market, but the author has not yet met with one which is infallible, consequently it is safest to use the tests outlined in the fore part of this volume.

Emerald is very seldom found in perfection or near-perfection, and a perfect emerald of any size above a carat will bring a fancy price. Those of large size and fine quality have frequently brought as much as \$10,000 per carat, and even more. The usual run of emerald-colored beryl crystals are full of fissures, cracks and inclusions of tiny particles of foreign matter. These cause the cloudiness so frequently met with in these gems. It seems

strange indeed that the grass green variety of this mineral should be so rare, while some of the other varieties are found in plenty and in large and wonderfully transparent crystals.

Emeralds are cut with a view to showing off the glorious color and dichroism of the mineral, and hence some small stones which might lack depth of color if cut in some plain fashion, are brilliant cut. The larger, and especially the more perfect, stones are cut on the pattern known as the emerald cut, which consists of 50 facets, 25 above the girdle and 25 below the girdle, including the table and culet. This style of cut is one of the step cuts and is often used on diamond. Of late years many other cuts have been employed. Because of the extremely high cost of emerald it rarely falls into the hands of any except the best of lapidaries, and hence the greater share of emeralds on the American market are very well cut and done in fine proportion.

By far the finest emeralds produced are those mined in South America, and especially in the locality of Muzo, Colombia.

CORUNDUM

The corundum group embraces two of the precious gems, the ruby and the sapphire. All of the gems in this group are essentially the same in composition except for the very slight amount of matter which gives the color to the mineral. The characteristics are essentially the same, and for this reason we will discuss these gems together rather than separately.

Corundum crystallizes in the hexagonal system, and the ruby is usually found in nodules or prisms, while the sapphire is usually found either in rolled nodules, bipyramids or in pyramids. The range of color in this mineral is great. Gem varieties occur in red, yellow, blue, green, violet, pink and colorless. In the commercial varieties the mineral runs through the grays to brown and black.

Corundum has no real cleavage, but it often shows parting on the basal plane. The fracture is conchoidal and the luster is vitreous to dull in the natural state and usually adamantine when cut. Corundum is extremely durable, its hardness is 9, which is next to diamond, and it is very tough. Being crystallized in the hexagonal system it is uniaxial, and it is negative in character. The mean index of refraction is 1.76 and the dispersion is weak (0.018) consequently there can be little fire to this gem and a colorless sapphire is easily distinguished from the diamond by a mere glance of the experienced eye. Some of the varieties are strongly dichroic, and while double refraction is low the stone will often show this property to a marked degree. It is especially noticeable in the deep blues and in the violet stones. The ruby also often shows fair dichroism, although the twin colors of the ruby are not so easily seen by the amateur as they are both reds, and the untrained eye might overlook the difference in the shades. However, in the blue and violet sapphires the twin colors are entirely different colors so that even the novice cannot overlook the difference. Pure corundum is composed of aluminum oxide (Al_2O_3), although the absolutely pure stones are not met with in nature. (*To be continued*)

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THE BOMBAY PEARL MARKET

A Summary of a Report

by

T. J. HOHENTHAL, *American Vice Consul, Bombay, India*

Released through the courtesy of the U. S. Bureau of Mines

For centuries the pearls of India, chiefly secured at the fisheries of the Bahrein Islands, have been known to the western world. Bombay is the center of this trade, and one of the leading pearl markets of the world.

In recent years the demand for genuine pearls has fallen, while that for American slugs and Japanese cultured pearls is growing. The trade is concentrated in the hands of a few wealthy merchants, and the artisans who shape, grind, drill, string and otherwise prepare the pearls for sale are generally members of certain families.

Though in the past few years the pearl trade has diminished due to world economic conditions, Bombay has continued as the distributing center, though the port of Karachi is growing in importance due to the shipments by air mail of pearls to this locality. The Oriental pearls come from the Bahrein Islands, Mas-kat and ports of the Persian Gulf. They are also bought from Arab and Persian merchants who generally visit Bombay twice a year, during August and October and January and March. Occasionally parties of Bombay merchants visit the Persian Gulf fisheries to make purchases on the spot. Pearls from the fisheries of Tuticorin (South India) and of Ceylon also reach Bombay occasionally.

The pearls are cleaned, sorted, pierced and strung at Bombay and are divided into lots according to size, color, shape and luster. The piercing and drilling is a delicate

job, done by skilled workmen known as "vindharas." After this they are strung by another class of workers called "paronigars."

In addition to the large export pearl trade from Bombay, there is also much domestic demand for pearls and for precious stones as well. Ruling Princes of India and other wealthy Indians are reputed to possess valuable collections of pearls. Those with more moderate means buy cheaper qualities according to their financial situation.

The most inferior pearls are bought by the masses, and those which are unsuitable for ornamentation are used as medicine. The poorer classes generally buy American slugs for making of ornaments and for use in combination with other beads in necklaces and bracelets. About half a dozen large distributors control the entire Bombay market.

During recent years the demand by the United States and Europe for fine Oriental pearls has declined, and in the Indian market cheaper pearls are being sold where better qualities were sold formerly. Though the market is slowly reviving, the improvement is not keeping pace with that noted in the case of precious stones, especially diamonds. This increasing preference for diamonds indicates a very noticeable change in the buying habits of the public. Trade estimates of the value of the annual importations of pearls into Bombay range from \$5,000,000 to \$6,000,000; American slugs about \$50,000, and

cultured pearls from \$50,000 to \$60,000.

In order to buy pearls in the Bombay market, a person must possess unusual tact, patience, and bargaining ability, as there is a tendency to state an exaggerated price from which reductions are gained only after protracted bargaining. The value of a given pearl is arrived through a rather complicated system. The unit of weight is the "rati" (.00605 of an ounce). Twenty-four ratis are known as a "tank" (.145 oz.); 2 tanks and 14 ratis (62 ratis) equal 1 tola, 1 tola equals about $\frac{3}{8}$ ounce. To evaluate the pearls a base known as the "chow" is applied. The following table is used:

1 pearl	of 1 tank	=	330 chows
2 pearls	of 1 tank	=	165 chows each
5 pearls	of 1 tank	=	66 chows each
10 pearls	of 1 tank	=	33 chows each

At the present time medium quality pearls range in value from \$18.75 to \$37.50 per chow, while better qualities range from \$75.00 per chow up. Pearls inferior to those recognized as of medium quality range from \$1.87 to \$18.75 per chow.

In order to be sure of the weight and genuineness of a pearl, a buyer may have it tested at the "Moti Jhaverno Dharamno Kanto" in the

center of the pearl market, where X-ray methods are used. The fee for this examination, however, is somewhat high and dealers resort to it only rarely. The Oriental pearl trade has undoubtedly been adversely affected by the Japanese cultured pearl. These are now often sold to buyers who in the past could purchase genuine pearls only of inferior qualities.

There is a fairly good demand for American fresh water pearls, and it is estimated that about 10,000 ounces of these, to the value of about \$50,000, are imported annually. The better grades of these are purchased by poorer people for making ornaments of various descriptions, those unsuitable for such purposes being used for medicines. The trade in American pearls enjoys a somewhat unique position as it is not affected by the cultured pearl except to a very limited extent. Furthermore, the reduced price of Oriental pearls has not injured this trade as the American pearls are used by a class of people who have not the means to buy Oriental pearls and are sentimentally averse to cultured pearls. Selected lots of American pearls are sold in the local market at from \$3.00 to \$5.62 per tola.