Gems & Gemology

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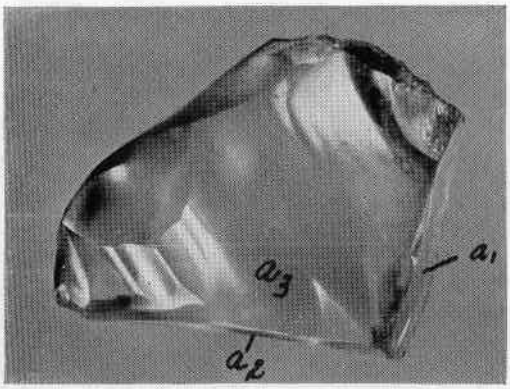
Three Large Brazilian Diamonds*

Summarized by
ESMARALDO REIS
Rio de Janeiro

Study of the Diamond "Presidente Vargas" [1]

Study made by Prof. Victor Leinz, technician of the Department of Agriculture, with Mr. Godofredo Filgueiras Filho, of the Mint Gem Appraising and Classifying Bureau, acting as expert appraiser.

The diamond "Presidente Vargas" shows a flattened shape with dimensions as follows: maximum length, 52.2 millimeters; maximum width, 24.4 millimeters. The two faces, A_2 and A_3 (see figure 1) correspond to the directions of the rhombic dodecahedron, this being inferred from their orientation with regard to the octahedral cleavage. At least one of those faces (A_3) must have constituted a real rhombic-dodecahedral face, because there are still recognizable thereon 3 parallel groupings of non-determinable faces, which afford proof that said face A_3 lost but little by rolling. The rhombic-dodecahedral habit is precisely one characteristic of Brazilian diamonds, attention to this fact being called by Fersman and Goldschmidt. The edges of those neighboring faces run parallel to the octahedral edges.



The President Vargas Diamond

The third main face (A_1) is comparatively recent, for it is still bounded by strongly marked edges, has adamantine luster, and shows no traces of rolling. As for the other faces, they present a darkish appearance.

The original size of the diamond cannot be even approximately inferred.

The coloring is that of pure water;

*G.I.A. Research Service

only on two edges is a slight yellowish coloration apparent, penetrating down to 5mm., possibly originated by secondary infiltrations in the cleavages.

The diamond shows a violet-blue luminescence under the quartz coating.

The diamond "Presidente Vargas" was found in Santo Antonio River, Municipality of Coromandel, State of Minas-Geraes.

Study of the Diamond "Darcy Vargas" [2]

Study made by Professor Dr. Othon Henry Leonardos and Dr. Reynaldo Saldanha da Cama, the former, of the National Museum, and the latter, of the Rio de Janeiro Faculty of Science and Philosophy, acting with them as expert technical appraiser, Mr. Esmeraldino Reis, of the Mint Appraising and Classifying Bureau.

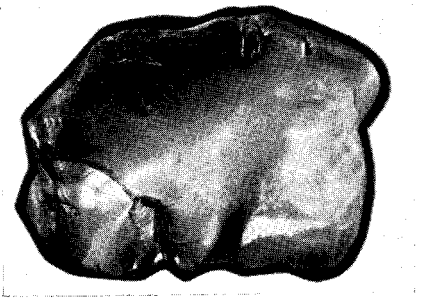
Habit: The diamond presents an octahedral habit with strong deformation and accentuated rounding (see figure 2). Under certain angles it has the aspect of a shapeless mineral; under others, it shows marked furrows and re-enterings.

Morphology: The existence is verified of a growth of parallel individuals with a predominance of octahedron faces (111), out of which no more than one, in a certain corner of the specimen, is perfectly plane. Between this and that individual there are still to be noted small cube faces (100) and faces of a triakistetrahedron. It was impossible to obtain goniometric measurements.

Corrosion: Tiny corrosion figures are to be observed on the curved and deformed surfaces, only a very few of them permitting to see, by means of a lens, their triangular contours, mostly ill-defined. The large quantity of these figures give the specimen its rugose appearance. A beautiful microphotograph was obtained of a large number of neatly outlined, typically triangular figures on the small, flat octahedral face.

Coloring: The diamond is perfectly transparent and of a marked chestnut hue. Exposed to ultra-violet rays it shows no appreciable luminescence.

Specific Gravity: It was determined at 21° C., and found to be 3.517, after applying correction for 4° C.



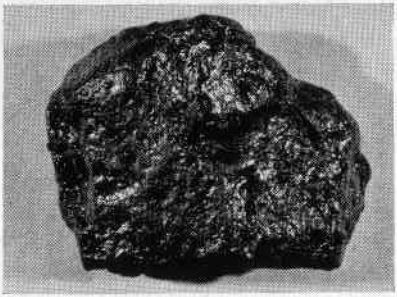
The Darcy Vargas Diamond.

Dimensions: Measurements taken in the position shown by fig. 1 gave the following results: Length, 53 mm.; width, 39.9 mm.; height, 25.6 mm.

Weight: The weight of the specimen is 460.00 metric carats. The diamond "Darcy Vargas" was discovered about two kilometres from the place where the "Presidente Vargas" diamond was found, in the Municipality of Coromandel, State of Minas-Geraes.

Carbonado (Black Diamond)

Study made by Dr. Armando Wohlers, assistant professor of the Rio de Janeiro Faculty of Science and Philosophy, and Esmeraldino Reis, assistant technician of the Mint Gem Appraising and Classifying Bureau,



268-Carat Carbonado from Brazil.

who also acted as expert technical appraiser.

The specimen to be estimated offers a rugose surface, where brilliancy is less intense than on other surfaces; we could classify it as submetallic luster. One of the surfaces appears plane, without rugosities, but with small orifices outlined by edges, not sharp, but rounded. The other surfaces are irregularly scabrous with some portions salient and others definite. Yet, in this portion, the lustre appears metallic, notwithstanding that the surface is not polished. This projection stands on the portion above referred to, which gives us the impression of a fractured part. Therefore, it is to be supposed that the size of the specimen must have been much larger than it now is, and there is a possibility of later coming across the portion that was, as we surmise, severed by the fracture.

Dimensions: The dimensions are as follows: L., 41.5 mm.; W., 21 mm.; H., 39 mm., in the position shown by fig. 3.

Specific Gravity: Determined at the temperature of 23° C., was found to be 3.48, after applying correction for 4° C.

Weight: The Carbonado under consideration weighs 53.506 grams (267,53 metric carats).

Origin: The specimen in question was found in the Pontesinha diamond bed, District of Western Rosario, at a distance of twenty-six leagues from Cuiaba, State of Mato-Grosso.

[1] Astract of the paper published in the *Mining and Metallurgy Magazine*, Vol. No. 3, Issue No. 21, Sept. and Oct., 1939.

[2] Abstract of the paper published in the *Mineralogy Bulletin of the Science Faculty in S. Paulo University*, No. 3, 1939.

Recent Developments in the Diamond Industry*

by
SYDNEY H. BALL, Ph.D.
A paper read at the Newark Conclave, 1940

I am a little embarrassed, as a mere mining engineer, to address an assembly so learned in the science of gems. But the reply to a question, in a recent examination of one of the local groups, reassures me a bit: Question 10, "What is the largest diamond?" Blithely and rapidly came the reply: "The ace."

Let me, next, seriously pay a short tribute to the Gemological Institute of America and its affiliate, the American Gem Society. Due to the personality, the energy and the ability of Mr. Shipley and his associates, the Institute is, in my opinion, one of the most successful instruments of specialized education in this country.

The diamond industry, at present, is in fair shape, much better than one would expect of an industry which, through excessive taxation and war, has lost practically all of its markets except those of the United States, India and Latin America. The widespread use of small diamonds in pavé jewelry and the tremendous increase of the use of diamonds in industry may well sustain the industry at its present level, and if we had a series of good business years in this country, with the founding of a new brood of fortunes—and the war may bring this about—this level might well be raised. A further encouraging feature is the reversal of the industry in its attitude toward the public. Instead of a haughty "We have diamonds and, if properly approached, we will consent to sell them to you," its present attitude is "The diamond is the most desirable of luxuries, and the most valuable of heirlooms. We should be most pleased to supply your needs or to be of any service possible in this connection." The gorgeous gem exhibits at the New York World's Fair and the advertising campaign of DeBeers are indicative of the change of viewpoint. May the old, self-complacent, supine attitude of the industry, which has cost it one-half of that part of the luxury dollar it had 25 years ago, never return.

The producers did not foresee the European war and, in consequence, output in 1939 was almost as great as that in 1938, some 11,200,000 carats, as opposed to 11,703,000, or a decrease of some 4%. Expressed in tons, worth at the mine in the rough, say, $19,000,000 (gold is worth a little over $1,000,000 a ton), the 1938 production was 2⅓ and that of 1939, 2¼ tons. Don't forget that this is the work of some 100,000 miners, each of whom produced in the year about 112 carats of diamonds of all grades, equivalent to about 15 carats of cut of all grades and sizes, but of this only 1.5 carats would be good cut of one carat or more.

*A.G.S. Research Service

As to the value of the 1939 production, it was worth at the mine perhaps $39,000,000, or 6% less than that of 1938, due to smaller production in the alluvial mines of South Africa, Southwest Africa and Sierra Leone, all producers of fine stones. Of the other producers, Brazil, the South African pipe mines and the new fields of the French African colonies increased their production, while the Gold Coast markedly cut production. As is usual, the Belgian Congo, by weight, accounted for some 65% of the output, although in value a much less percentage (16%).

The Diamond Corporation, which buys 95% of the world's production and sells it to brokers and cutters through its subsidiary, the Diamond Trading Company, inaugurated a new sales policy. Sights are now held at fortnightly intervals and are no longer open only to a small group of big brokers, but to the little man as well. Its sales were about £5,900,000, or 60% better than in 1938. Notwithstanding this improvement, stocks in the hands of the corporation and in those of the producers increased.

As you know, imports into the United States in 1939 were large, over $35,000,000, or almost as large as those of 1937. The imports are, however, misleading, since, as you know, retail sales were only about 10% above those of 1938; some of the stones were sent over here for safekeeping, and certain of our wholesalers built up their stocks.

In short, stocks of the Corporation, producers and wholesalers are ample; stocks of some retailers, who got panicky when war was declared, may also be large. Stocks of cut and rough in the hands of Belgian and Dutch cutters are, on the other hand, small, as are stocks of cut in the hands of most retailers throughout the world. Stocks in Italy, Hungary and some of the Balkan states are non-existent.

Prices of rough were firm with an upward trend until September 3. When war was declared, the Corporation stated that all future quotations would be in pounds sterling at $4.68 per pound. At the first sight after the war, prices were up somewhat, and in addition some 10% was tacked on for additional war taxes and increased insurance. By the year-end, small rough in cutting centers was up from 25% to 40%.

Prices of cut were firm till war was declared. At that time, due in part to higher prices for rough, in part to speculation, and in part to fear of further supplies being cut off, prices rose in Europe from 25% to 30% and in America from 15% to 25%. Further increases are likely, particularly in small sizes and in brilliants of from one to five carats weight. The first, many of which were formerly cut in Germany, because of increased cutters' wages, and the second due to an actual scarcity of large, fine rough and a certain demand for investment purposes.

A GEMOLOGICAL ENCYCLOPEDIA

(Continued from last issue)

by HENRY E. BRIGGS, Ph.D.

QUARTZ (Continued)

Tiger-eye is a name applied to a quartz which is pseudomorphous after asbestos. The mineral usually retains faithfully the structure of the asbestos, but the color is usually brown or yellowish due to iron. In the variety replacing crocidolite we find bands of bluish or greenish color. Since this variety retains a part of the color of the mineral it is often sold in jewelry as crocidolite. True crocidolite is much too soft and fragile to cut into a gem. Both of the above varieties of quartz show a silky chatoyancy when cut en cabochon and are much used in cheaper jewelry and for ornamental objects such as paperweights. The principal locality for this mineral is Griqualand, West Africa.

Cat's-eye quartz is chatoyant and of greyish, brownish or greenish color. The chatoyancy is due to inclusions of parallel fibers of asbestos. The mineral resembles, occasionally, the true cat's-eye or chrysoberyl. The principal localities are Ceylon, Bavaria and Brazil.

Cryptocrystalline varieties: Agate is perhaps one of the most popular of the cryptocrystalline quartzes. There are many different types of agate, all of which are merely a chalcedony with bands or patchy color or with dendritic inclusions of manganese dioxide. Banded agates have parallel wavy bands of color of uniform or varying widths. Eye agates have concentric rings of color, or with the color occurring in rings of various geometrical shapes. Clouded agates are just what the name implies, clouded with various foreign matter. Moss agates are those which show a mass of dendritic inclusions of various matter which resembles moss or trees. Agatized wood is agate pseudomorphous after wood and may be colored beautifully or may be cloudy agate. Agate also occurs pseudomorphous after shells, bones and other such material. Agate is very widely distributed and hardly a state in the Union is without its own deposit of agate of one kind or another. A few principal commercial deposits are found in Oregon, Montana, Arizona, California, Brazil, Ceylon and Germany.

Chalcedony is a transparent or translucent form of quartz usually light in color. It occurs in colorless, whitish, greyish, yellowish, brownish and bluish to a distinct blue. Principal localities are Brazil, Uruguay, California, and Montana.

Carnelian and Sard are yellowish to reddish chalcedonies. The color is due to ferric oxide, and although some samples are semi-transparent, yet there is no sign of dichroism. They are very widely distributed.

Chrysoprase is a variety of chalcedony with an apple-green color due to the presence of nickel. It was much prized about the eighteenth century

and to it was ascribed many talismanic virtues. It lost a part of its favor but is again coming back into good demand. The deposits of fine chrysoprase are not plentiful nor extensive. The yield of the mines being much of it poor color or quality. The principal localities for fine material are Germany and California. However, most of the chrysoprase coming from Germany at the present time is nothing more than dyed chalcedony. The off-color chrysoprase is often offered under the name of "prase." However, much of this material again is nothing but a dyed chalcedony artificially made up.

Heliotrope, or bloodstone, is a dark green chalcedony with spots of red jasper scattered through it. It was highly valued in early times, and more especially as a stone for engraving. It was held to be a sacred stone by the early church. A legend tells us that the blood of the Saviour as He hung on the cross fell upon green chalcedony, staining it red in spots. Hence the stone was regarded as sacred in the past. Bloodstone is usually cut en cabochon and fine gems of it are strikingly beautiful. Important localities are India, Siberia and California.

Plasma is a variety of chalcedony with a greenish color and is irregularly streaked and spotted with white or yellowish.

Onyx is very much the same as agate, except that the bands of color are even and flat. The color is usually black and white and the stone is used principally for engraving of cameos.

Sardonyx is an onyx in which the colors are reddish and white or black.

Jasper is an opaque, yellow, red, brown, green, grey, black, blue or other colored cryptocrystalline quartz. The gravity of jasper is usually different than that of quartz, as it is very impure. Jaspers are variously named according to their marking, much the same as agates are so named.

Flint is another variety of opaque to translucent quartz. It is found in many colors, including brown, gray, bluish gray, and black. It usually occurs in nodules with a whitish crust or coating in alluvial soils and in limestones. It found its principal use in making instruments and tools of the ancients. It is little used today either as an ornamental stone or as a gem stone except as it is found in arrowheads, etc., which are used for adornment.

Hornstone and chert are impure varieties of quartz and are little used as an ornamental stone.

Touchstone or basanite is a velvet-black variety of quartz used as a touchstone in testing precious metals.

(To be continued)

Differentiation Between Russian and Colombian Emeralds*

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

The difference between Burma and Siam rubies having been dealt with in a preceding paper, it may be interesting to discuss the means of accurate discrimination between emeralds from the Ural Mountains and emeralds from Colombia. It is well known that a distinct difference of color exists between both occurrences, but it is not seldom, especially so in small sizes, that Ural emeralds display the velvety green of a Colombian emerald and, vice versa, Colombian emeralds the more yellowish tints of the Russian occurrences. Thus, it is difficult for the unaided eye to recognize the provenience of a given emerald and for the beginner in the trade, whose eyes are not experienced, it has hitherto meant an absolute impossibility.

The difference of color absorption as seen through various filters is one of the characteristics to discriminate the two occurrences. As shown in Table No. 1.

Yet, the use of filters demands a long training and a sensitive eye, for the slightest differences in tone and hue, and even then if no material for comparing is available, a precise determination is almost impossible.

Though the origin may be detected by various methods of examination and with various instruments, none of them is sufficiently accurate or objective to be used as proof of one's assertion. So, I wondered whether the microscope could not be of valuable help as it proved to be for the determination of rubies from Siam and Burma.

Since all emeralds contain long and large cracks in greater or smaller quantities, and since they seem to resemble each other much

TABLE I

Number of Filter	*Color of Filter*	*Emerald from Colombia*	*Emerald from Russia*
1	dirty yellow	Same as filter with slightly reddish hues	Same as filter, with pronounced reddish to red hues.
2	purple	Dark purple. Dark green stones display more reddish hues.	Same as filter. Thicker stones bluish.
3	bluish red	Same color as stone, dark stones more red.	Same as filter.
4	pale blue	Same color as stone.	Same as filter.
5	white	Same color as stone.	Same color as stone.

*G.I.A. Research Service

more than those in rubies do, it was no easy task to recognize the matter of difference which should be looked for. It was just that seeming resemblance which stimulated me to search the difference within the cracks and misty inclusions. Analyzing a great number of emeralds which the sources were known of (some were entrusted to me by the Colombian Consulate in Paris), I discovered a better, more accurate and absolutely incontestable way to discriminate objectively between Russian and Colombian emeralds.

It is not the great mass of very visible inclusions or cracks, but rather the most subtle and most minute kind of liquid inclusions which hide the secret.

Thus, it showed that the Colombian emeralds contain scattered and irregular groups of almost invisible liquid inclusions which are remarkable for their tail-like forms. See Figure 1. The refractive index seems to be lower than the one of the host-substance, but, however, close to it, for the line of demarcation is very delicate—nearly invisible. It was impossible for me to exactly determine the composition of these liquids, however, after their behaviour, when artificially heated, and considering the facts of genesis it may be concluded that they consist of water. (As mentioned in "The Gemmologist," January, 1940, page 69.) These formations do not seem to obey any certain crystallographic direction of the mother-mineral, but they, rather, seem to be distributed in an irregular manner throughout the whole stone. Though combined to groups, the single inclusions are always separated from each other and they never connect.

As revealed by Figures 1, 2, 3, and 4, the most interesting and most important feature is the presence of one very small *cubic crystal* of other mineral in almost every single liquid inclusion. Generally, but not always, the cubic crystal touches on either side a round gas bubble with a dark border. This gas bubble probably contains gaseous carbon dioxide. So the same cavity contains the three phases of matter at once.

The straight lines of demarcation between the cubic crystal and the fluid are most thin and no distinct differentiation of refractive index is

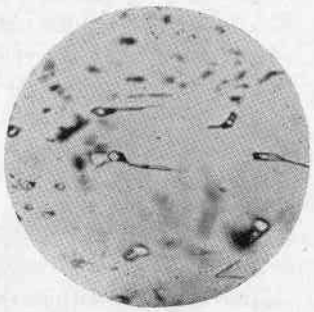


Figure 1
Inclusions in Colombian Emerald.

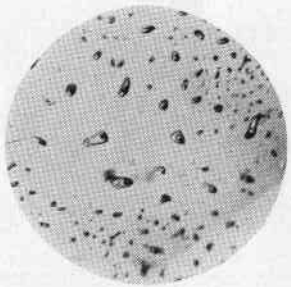


Figure 2.
Inclusions in Colombian Emerald.

seen when raising or lowering the tube of the microscope.

These inclusions and the presence of the three phases of matter are typical in Colombian emeralds, but the most important and most characteristic part of the whole is the

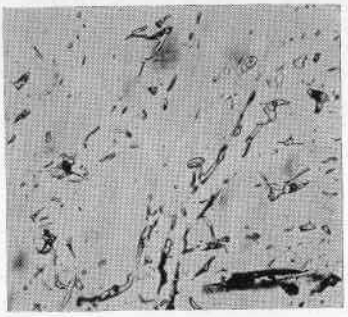


Figure 3
Inclusions in Colombian Emerald.

cubic crystal shape of the included foreign minerals. I lack knowledge as to the nature of these cubic crystals—maybe they are of the same substance as the gas bubbles, but more likely they are something else, which still has to be explored by future researches.

Though the three phases of matter are also found within the Russian emeralds, distribution, kind and shape of their inclusions are different, and while the typical liquid inclusions within Colombian emeralds are rarely bound to cracks and moss-like impurities this property can not be applied to the characteristic inclusions of Russian emeralds. (Their distribution is undetermined and the shapes are most irregular.) See Figures 5 and 6. The tail-like formations are absent.

The cavities of Russian emeralds

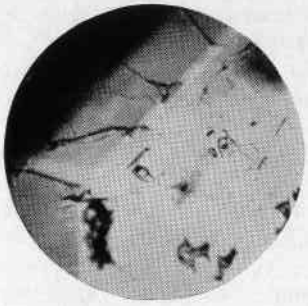


Figure 4
Inclusions in Colombian Emerald.

seem to be filled with the same fluid of very low refractive index, and it is noticeable that generally the three phases of matter are also present here, i.e., the cavities contain liquid substance, one bubble or two of CO_2 gas and a solid, crystallized substance of unknown chemical composition. But here is the basis of differenciation: The crystal-form of the foreign mineral enclosed in Uralian emeralds displays the distinct figure of a lozenge. The cubic crystals which are so frequent in Colombian emeralds are never found in Russian emeralds. Maybe the included crystal does not, under all circumstances, show the shape of a very geometrically pronounced rhomb lozenge, but it is always easy to distinguish it from the clearly rectangular outline of the included crystals in Colombian emeralds.

So we are able to discriminate between Colombian and Russian emeralds. Just keep in mind the initials of provenience:

*C*olombian emeralds comprise cubic crystals;

*R*ussian emeralds comprise *r*hombic (lozenge-shaped) crystals.

And, in order to have a proof on

hand, take a photomicrograph—it is easy and pleases the customer.

A further and practical advantage is: you may detect these peculiarities

Figure 5
Inclusions in Uralian Emerald.

under your diamondscope, which is less time-consuming and easier in use than a microscope.

You may object that it makes no difference where emeralds come from as long as they display the finest of vivid green color. This may be true concerning the financial value of a given stone. It certainly will give a customer more satisfaction and more pleasure if he learns that his emerald originates from the famous mines of Colombia. On the other hand, if it is found out that a beautiful emerald of vivid proper green color originally came from the Ural Mountains it certainly will not diminish the value and inner worth of this stone, but

Figure 6
Inclusions in Uralian Emerald.

its owner may rather appreciate it more highly for the rarity of its color beauty so seldom found in the Ural Mountains.

GEMOLOGICAL GLOSSARY

(Continued from last issue)

(With phonetic pronunciation system.)

Terms in quotation marks are considered incorrect.

Stellate (stel'ate). Radiating so as to produce star-like forms.

Step Cut. A basic style of cutting, in which all facets are four-sided and parallel to the girdle. The emerald-cut and the square-cut are two types of step cutting.

Stilbite (stil'bite). A mineral which often forms cross-shaped twin crystals, occasionally used as ornaments.

Strass (stras). A type of lead glass often used for imitations. Typical properties: refractive index 1.63, specific gravity 3.6, hardness 5.

Strata (strae'ta). Layers or beds of some ancient sea, lake or stream.

Strawberry-Pearls. Large, pink, iridescent and lustrous baroques, fairly regular in shape, with the appearance of being thickly sanded under the nacre.

Streak. Color of fine powder of a mineral; used in identification.

Stria (strye'a). A line, especially one of a series of parallel lines.

Striae (strye'ee). Plural of stria.

Striations (strye-ae'shuns). Lines usually parallel, on the faces of crystals.

Sub-adamantine. Imperfect adamantine luster.

Sublimate (sub'li-mate). A solid formed by the direct solidification of a vapor.

Submetallic Luster. Like metallic, but somewhat dulled.

Substitute. A general term used to describe the use of any material in place of another. As the use of imitations, assembled stones, reproductions, and even other genuine stones resembling a different material the place of which they are intended to fill.

Sub-translucent. Same as semi-translucent.

Sub-transparent. Same as semi-transparent.

Sub-vitreous. An imperfect vitreous luster.

Succinite (suk'si-nite). A fossil resin, furnishing the majority of the amber of the trade. See also Burmite, Gedanite, Rumanite, Simetite.

"Succinite." A yellowish brown variety of grossularite.

Sulphur (sul'fur). A chemical element, forming a part of the composition of several gem-species. Pure sulphur is a yellow, crystalline substance.

"Sulphur Diamond." Pyrite.

Sulphur Stone. Pyrite.

Sunstone (sun'stone). A translucent white to gray variety of oligoclase (feldspar) containing numerous inclusions of reddish hematite.

Sweet-water Pearls. Pearls from fresh water.

"Swiss Lapis" (swis). Chalcedony or jasper artificially dyed blue. Genuine lapis is also dyed to improve its color.

Synthetic Emerald. A synthetic green beryl produced by the I. G. Farbenindustrie of Germany. A

few only have been released, under the trade-name *Igmerald.*

"Synthetic Emerald." Term sometimes used for so-called "Emerald Triplet"; also less often for glass imitation. See also "Smaragdolin."

Synthetic Stones. Reproductions of stones which have the same chemical composition, hardness, specific gravity, refractive power, dichroism, etc., as have the genuine gems which they reproduce.

"Synthetic Turquoise." A material once believed a true reproduction of turquoise. Now thought to be simply an amorphous imitation.

Syntholite (sin'thoe-lite). Trademarked name for a synthetic "alexandrite" sapphire, green changing to purplish.

Syrian Garnet (sir'i-an). Almandine garnet.

Tabasher, Tabasheer, or Tabashir (tab"a-sheer' or tub"a-sheer'). Variety of common opal. Amorphous and opal-like silica deposited in the joints of bamboo and used in the native jewelry in the Orient. It becomes transparent in water.

Table Cut. An octahedron with table and culet facets. Other natural sides only polished.

Table-Stone. Diamond or other gem cut in the table-cut style (see above). Perhaps the first form in which diamonds were fashioned.

Tabular. In broad, flat crystals or masses.

Tailings. The part of the washed gem ground which is thrown behind the tail of the washing apparatus to be again washed or to be thrown out.

Taille en seize (Fr.). Faceting in sixteen facets, plus table and culet. See Single Cut.

Talc. Steatite.

Talisman (tal'is-man). A charm which produces extraordinary effects.

Tallow Top. A cabochon stone with a low, convex surface.

Tantalum (tan'ta-lum). A metallic chemical element.

Tarnish. In minerals, a thin film formed on the surface when exposed to air and different in color from that of the fresh fracture. On silver, a film of silver sulphide.

Tauridan Topaz (to-rud'i-an). Very pale-blue topaz.

"Tecla Emerald." A false triplet.

"Tecla Pearls." Trade-marked name for both solid and wax imitation beads.

Templet (tem'plet). Same as bezel facet.

Tenacity (tee'nas'i-ti). The degree or character of cohesion.

Termination. The faces on the end of a crystal.

Test Stone. Basanite. Used for testing streak of precious metals.

Tetragonal (tet-rag'oe-nal). A system in crystallography which has three axes, two of equal length perpendicular to one another, the third of a different length, perpendicular to the plane of the other two.

Tetrahedral (tet"ra-hee'dral). Pertaining to the tetrahedron, a four-sided form of the cubic system.

Texas Agate (tek-sas). Agate jasper from Texas.

Thallium. A rare metallic chemical element, somewhat similar to lead in certain properties.

Thallium Glass. Thallium is substituted for potash in some finer glasses to increase dispersive power.

Thallium Malonate (thal'i-um). Clericis' solution, of great value in determining the specific gravity of very small gems or fragments.

The heaviest concentration of thallium malonate as a liquid has a specific gravity of approximately 4.10, which may be reduced to any desired value by addition of water.

Thetis Hairstone (thee'tis). Sagenite.

Thomsonite (tom'son-ite). A mineral sometimes used as a gem. Translucent to opaque, red, yellow, green, white, with circular spots of varying color. Orthorhombic. Refractive index 1.51-1.54, specific gravity 2.3, hardness 5-5½.

Thulite (thue'lite). A light red to purplish red variety of zoisite.

Tibet Stone (ti-bet' or tib'et). (Also Thibet.) A variety of quartz containing small jagged porphyritic inclusions of minerals.

Tiffanyite (tif'a-ni-ite). A term suggested by Kunz for the tiny inclusions which he held responsible for phosphorescence and perhaps for fluorescence.

Tigerite (tye'ger-ite). Same as Tiger-eye.

Tiger-Eye. A variety of quartz with many silky inclusions. Indistinctly chatoyant.

"Tin Cut." A peculiarly distorted trade term meaning any glass imitation of Rock Crystal. Beads of glass when polished on tip-laps are known as tin *polished* or often, incorrectly, as "Tin Cut," although they are not cut by tin.

Tincture (tink-ture). Same as Foiling. See Foiling.

Tin Stone. Cassiterite.

Tint. An attribute of a color, specifically (1) a tendency toward or slight admixture of a different hue; (2) a light tone of any hue made by diluting it with white; (3) any variety of color; hue itself, especially when of light tone.

Titanite (tye'tan-ite). Sphene.

Toluene (tol'ue-ene). A hydrocarbon of the aromatic series, homolgous with benzine, and obtained as light mobile liquid by distilling balsam, coal, tar, etc.

Toluol (tol'ue-ol). Toluene.

Tone. An attribute of color, determining position in a scale from light to dark. Tone is lightened by adding white pigment, darkened by adding black.

Topaz (toe'paz). A gem stone in the orthorhombic system. A fluosilicate of aluminum. Occurs colorless and in all hues, but usually in light tones. It is sometimes, especially in the yellow and brown varieties, distinguished from topaz quartz by the term Precious Topaz. Refractive index 1.62-1.63, specific gravity 3.53, hardness 8.

"Topaz Cat's-Eye." Chatoyant yellow corundum.

Topazolite (toe-paz'o-lite). A yellow to yellow-brown variety of andradite (garnet).

Topaz Quartz. Citrine, yellow transparent quartz.

Topaz Saffronite. See Saffronite.

Top Cape. A color grade of diamond, not so yellow as Cape, but inferior to crystal.

Top Crystal. A color grade of diamond just below Wesselton in color. A slight amount of yellow may be detected by the experienced eye.

Top Wesselton. A color grade of diamond, the finest of the Wesselton quality, but inferior to River or Jager.

Touchstone (tuch'stone"). See Test Stone, Basanite.

Tough (tuf). Not easily broken, bent, or cut.

Toughness (tuf'nes). The resistance which a gem offers to breakage, or to other change of form.

Tourmaline (toor'ma-line or tur'ma-line). A gem species which occurs in every color of the spectrum. Hexagonal system. Transparent to translucent and opaque. Refractive index 1.63-1.65, specific gravity 3.1, hardness 7-7½. A cat's-eye variety also occurs.

Trainite (trane'ite). Impure banded variscite.

Translucency (trans-lue'sen-si). State of being translucent.

Translucent (trans-lue'sent). Passing light imperfectly. A translucent material transmits light, but objects cannot be resolved through it.

Transparency (trans-par'en-si). State of being transparent.

Transparent (trans-par'ent). Passing light perfectly. A transparent material transmits light, and objects can be seen clearly even through a considerable thickness.

"Transvaal Jade" (trans-val'). Green grossularite (garnet).

Trap Cut. Same as Step Cut.

Trapeze (tra-peze'). A type of step cut in which the girdle outline and the table have the shape of the trapezoid or truncated triangle.

Trap Rock. A dark, basic heavy igneous rock, fine-grained or dense in texture.

Travertine (trav'er-tin). A water-deposited calcite, often colored. Sometimes used as an ornamental material.

Treated Stones. Stones treated by heat, chemical action or dyes to change their color or to remove blemishes.

Treating. Changing color by heating, dyeing, or coating.

Tree Agate. Mocha Stone.

Tree Stone. Mocha Stone.

Trematode (trem'a-tode or tree'ma-tode). A flat worm which is parasitic either externally or internally. One species causes pearl formation in the edible marine mussel. See also Mussel Pearls.

"Trenton Diamond" (tren'tun). Quartz crystal from Herkimer County, New York.

Triangle (trye'an"g'l). A style of cutting.

Triboluminescence (trib"oe-lue-mines'-ens). Luminescence produced by rubbing.

Trichroism (trye'kroe-ism). Quality of exhibiting three different colors by transmitted light when observed along the three crystallographic axes. See also Dichroism, Pleochroism.

Triclinic (trye-klin'ik). A system in crystallography based on three axes, no two of which are of equal length and no two of which are perpendicular to one another.

Trilling (tril'ing). A symmetrical attachment or intergrowth of three crystals.

Trimorphism (trye-mor'fism). See polymorphism.

Triphane (trye'fane). Spodumene.

Triplet. An assembled stone of two main parts bound together by a layer of thin material, which is usually of deeper color.

Tripletine (trip'le-tin). Same as "Emerald Triplet."

Tripoli (trip'oe-li). See Rottenstone.

Tripolite (trip'oe-lite). A form of silica made up of the shells of diatoms. Used as a polishing or scouring agent.

True Pearls. Pearls whose surface is formed from nacre, as distinguished from similar formations which are not nacreous.

Turkis (tur'kis). Turquoise. (Obsolete or rare.)

(To be continued)