# Gems & Gemology

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# New and Old Novelty Styles of Brilliant Cutting

By ROBERT M. SHIPLEY
*Executive Director, Gemological Institute of America*

The variation or modification of the standard 58-facet brilliant which, until recently, has attracted the attention of gemologists, was known in America as the Twentieth Century cut, and seems to have been known in England as the Jubilee cut[1]. It appeared about the beginning of this century, and in England its name honored Queen Victoria's Jubilee, which in 1897 commemorated the 60th year of her reign.

The Twentieth Century design made possible the preservation of more of the original weight from certain rough stones and increased the number of facets. Both the culet and table were eliminated. The most novel modification was the substitution, in place of the table, of eight inclined triangular facets meeting at an apex, as seen in Figures 1 and 2. The facets totaled 88 in number, as shown in Figures 1, 2, and 3. The style differs from the standard 58-facet brilliant cutting by the addition of 16 facets on the crown and 16 on the pavilion. Sometimes only eight additional facets were placed upon the crown, making a total of 80 facets.

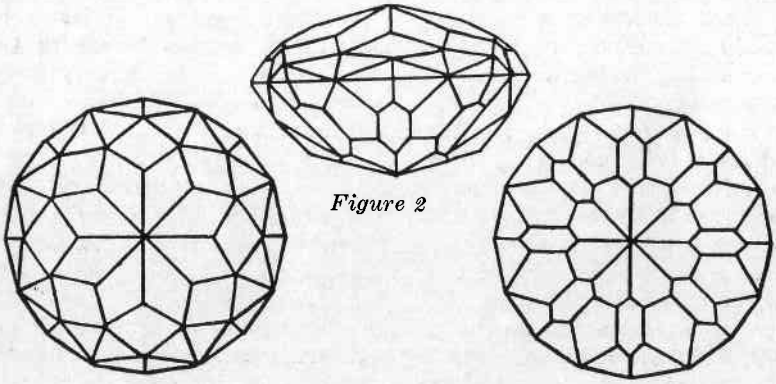


*Figure 1* *Figure 2* *Figure 3*

*The Jubilee or Twentieth Century Cut.*

Cattelle states[2] that this cutting was patented by a New York importer. It created considerable inter-

(1) G. F. Herbert Smith, *Gemstones*, 1940 ; Bauer's *Edelsteinkunde*, Schlossmacher's translation, 1932; W. F. Eppler, *Der Diamant und Seine Bearbeitung*, 1933.
(2) W. R. Cattelle. *The Diamond*, 1911, p. 129.

est and a certain amount of excitement, but by 1911 Cattelle recorded that "it has not proved popular." The style was used almost entirely for diamonds. Few Twentieth Century cut diamonds are in existence today as most of them have been refashioned into standard 58-facet brilliant-cut diamonds.

A less notable variation of the 58-facet brilliant was that in which at least eight extra facets were placed on the crown, necessitating a very small and much higher table. Described by G. F. Herbert Smith and Schlossmacher as the "American-brilliant" cut or style, and by Eppler as the "old American cut"[1], this style seems to be unfamiliar to the contemporary American diamond trade. What popularity it may have enjoyed must have been superseded by that of the standard 58-facet brilliant cut. Illustrations in Smith, Schlossmacher and Eppler show this so-called American cut with sixteen extra facets on the crown, although Smith and Schlossmacher specify only eight extra facets.

**Brilliants with Polished Girdles**

A modification or variation of the 58-facet brilliant cutting which appeared at about the time the Twentieth Century cut was introduced, was Ernest G. H. Schenck's addition of a "circular polished girdle facet" to the standard 58-facet brilliant in 1906. In that year, Mr. Schenck, who is still active in the firm of Schenck and Van Haalen of New York City, obtained a patent on the style said to have been sponsored and introduced by William S. Hedges & Company, of New York.

Stones processed under this now-expired patent possessed a continuous circularly polished girdle, i.e., one facet entirely around the stone. An occasional small extra facet or facets were often placed in an inconspicuous part of this cylindrical girdle, mainly to adjust the line of the circle. However, it has been said that the presence of too many such small facets was not considered desirable because the continuous girdle facet had been designed to eliminate "an old custom of placing a multiplicity of straight facets around the girdle." Apropos of the latter subject, Wade stated[3], in 1916, that "of the stones with polished girdles some have a curved polished surface and some have a series of tiny facets polished on them."

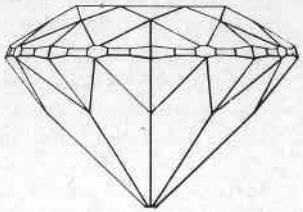
Mr. Schenck's patent covered both a flat polished and a curved polished facet. It claimed that the curved polished facet avoided, to a great extent, the liability of chipping. The patent application also stated that the invention *might* also add to the brilliancy of the stone.

**Polished Girdles Reintroduced**

No polished girdle with any *specific number* of flat polishings or facets seems to have been introduced, or at least featured, until 1944, when Edward Goldstein of Brookline, Massachusetts, obtained a patent on a 58-facet brilliant cutting with 40 flat polishings or facets on the girdle. Specifications for the Goldstein patent include the polishing, upon the girdle, of such facets (a) in a position vertical to the plane of the table, and (b) in a position "which slopes upwardly and inwardly." The inclination of the sloping girdle facets is specified as between "10°

(3) F. B. Wade, *Diamonds*, 1916, p. 81.

and 30°" from the perpendicular to the plane of the girdle. Diamonds finished under specification (a) have appeared in the trade under the name of "Multi-facet" diamonds, advertised as 98-facet diamonds. Apparently the sketch shown in Figure 4 (reproduced from the patent papers) is intended to illustrate these diamonds, although in those seen by the writer, the girdles were not as symmetrically placed.



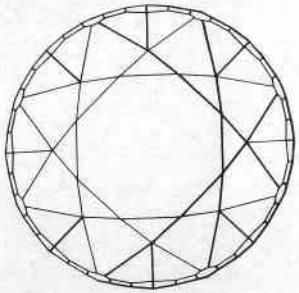
*Reproduced from diagrams published with patent papers*

*Figure 4*

*Side view of polished-girdle brilliant cut with 40 flat polishings or facets on girdle.*

So far as is known to the writer, no diamonds have appeared in the trade which have been processed under the exact provisions of the patent which describe sloping girdle facets (b), all of which would be "visible from above the stone as a distinct scintillating border for the crown" as indicated in Figure 5. The specifications also provide that the polished girdle does not tend to collect dirt as does the unpolished girdle; that a firm grip is provided for the setting; and that rotation of the stone in the setting is resisted.

During late 1944 and early 1945 the 58-facet brilliant cutting with circularly polished girdle was reintroduced in the United States under the trade-marked names of the "Circle of Light" and the "Magic Circle," and in Canada under the name of the "Halo Cut." More recently they have appeared under the name "Brilliant Circle" and will probably be sold under other names, for most of which trade-marks will be applied for. So far as is known to the writer, these polished girdles do not differ, to any great extent, from those which were covered by the Schenck patent.



*Reproduced from diagrams published with patent papers*

*Figure 5*

*Polished-girdle brilliant cut with 40 sloping facets or flat polishings; viewed from above.*

For almost forty years the term *polished girdle* has been applied both to the circularly polished girdle consisting of but one continuous polished facet and to girdles with any multiple of flat polishings or facets. During the early years of this century, polished-girdle diamonds were featured and sold by several of the finest retail stores in America. However, no continued demand was established for these stones, although according to hearsay, one such retail firm held that a diamond, to be called "perfect," must possess a polished girdle.

**New Styles with Additional Facets on Crown and Pavilion**

During late 1944 and early 1945, patent papers were issued for several styles of cutting which varied from the standard 58-facet brilliant by the addition of facets to the crown and pavilion. All of these styles incorporate the standard unpolished girdle, but differ from the Twentieth Century and the so-called "old American cut" by preserving the large table facet of the standard brilliant.

One of these styles has appeared under the name of "King-cut." It differs from the standard brilliant by the addition of facets in a manner which produces a 12-fold (dodecagonal) symmetry, instead of the 8-fold (hexagonal) symmetry of the standard brilliant. As seen in Figures 6, 7, and 8, this is accomplished by adding to the crown 4 star, 4 bezel, and 8 break facets, resulting in a total of 49 facets on the crown, including the table. To the pavilion are added 4 pavilion facets and 8 break facets, making a total of 37 facets, including the culet. Thus this new cutting comprises a grand total of 86 facets, which are featured by the distributors as "constantly active facets." A patent for this style of cutting has been issued to Max Suderov, of New York, and is assigned to Patented Diamond, Inc.

Also patented by Suderov, and assigned to the same corporation is a style which incorporates additional facets in a manner to produce a 16-fold (sextodecagonal) symmetry, as illustrated in Figures 9, 10, and 11. In this style 8 star, 8 bezel, and 16 break facets have been added to the crown, making a total of 65 facets on the crown, including the table. On the pavilion 8 pavilion and 16 break facets have been added, making a total of 49, including the culet. This style comprises a grand total of 114 facets. It will be seen that the total number of facets, excepting the table and crown, are just

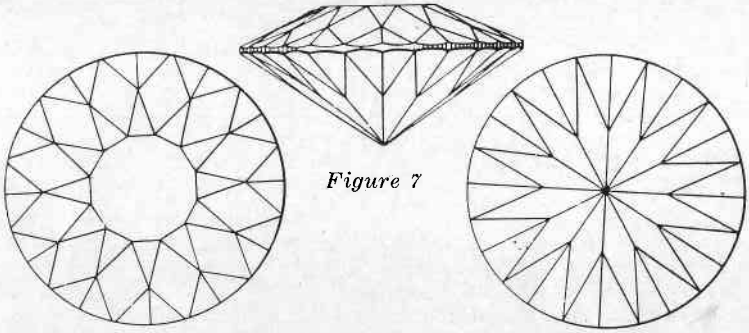


*Figure 7*

*Reproduced from diagrams published with patent papers*

*Figure 6* *Figure 8*

*Modified brilliant cut with 12-fold symmetry. Note especially that proportions shown in side view are reproduced from diagrams published with patent papers.*

double those of the standard 58-facet brilliant. Apparently this style has not yet been processed commercially, or at least has not yet appeared in the trade.

The most recent variation of the standard brilliant cut to appear is the 102-facet cut patented by George Fine, of New York City. This style, illustrated in Figures 12, 13, and 14, consists of 60 facets and a table on the crown, and 40 facets and a culet on the pavilion, or a total of 102 facets. This style of cutting is 10-fold (decagonal). It also replaces each of the usual bezel facets by two triangular facets, and places an additional break facet between each of the usual pairs of break facets. Thus on the crown are 10 star, 20 bezel and 30 top break facets; on the pavilion are 10 pavilion facets and 30 break facets. The processors have trade-marked the name "Magna-Cut" for this style of cutting.

**Comparative Desirability**

All other factors of value being equal—such as polish, symmetry of general design and of size and placement of facets, proportion of mass above and below the girdle, narrowness of girdle, clarity of material, etc.—polished-girdle diamonds have in the past been accepted as somewhat more desirable than diamonds with unpolished girdles. However, *all such factors being equal,* they have been more expensive per carat, and with few exceptions, the retailer or his customer have seemed unwilling to pay the difference.

It is unknown whether wartime conditions have been responsible for the appearance of the large percentage of polished-girdle diamonds possessing much wider girdles than would be considered desirable in a standard-cut brilliant. Too-wide girdles increase the weight per spread and may, in polished-girdle diamonds, seem to increase the cost per

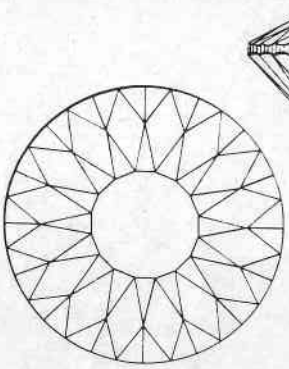


*Figure 9*

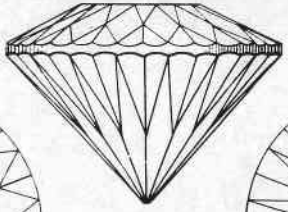
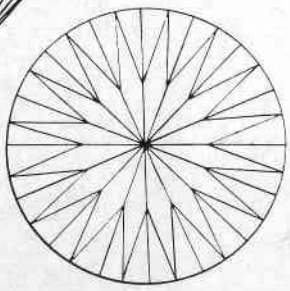


*Figure 10*



*Reproduced from diagrams published with patent papers*

*Figure 11*

*Modified brilliant cut with 16-fold symmetry. Note especially that proportions shown in side view are reproduced from diagrams published with patent papers.*

spread without a corresponding increase in desirability.

The addition of facets increases the number of points of light-reflection which can be observed as the stone is moved about. This applies even to the polished-girdle diamonds with one continuous circularly polished girdle facet, mentioned above (except when no portion of the girdle facet can be seen when the diamond is observed from directly above). Therefore, the Bausch & Lomb optical company have been quoted by one producer as stating that the polished-girdle diamonds of that producer showed more life than brilliant-cut diamonds with unpolished girdles. *As a general rule,* increasing the number of facets would increase the number of these light reflections. This rule would apply more especially to styles with additional facets on the crown.

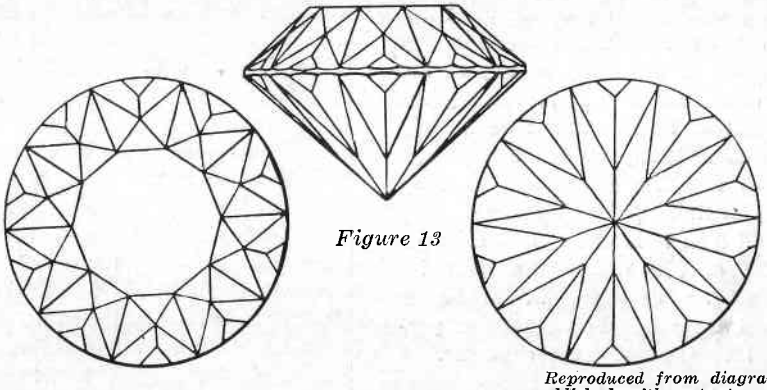


*Figure 12* *Figure 13* *Figure 14*

*Reproduced from diagrams published with patent papers*

*The 102-facet Brilliant Cut.*

### Comparative Brilliancy

On the other hand, claims that the addition of facets, including the single continuous circularly polished girdle facet, is productive of additional brilliancy have not been generally accepted, although one commercial laboratory in New York City[4] has reported an increase in the amount of light reflected from (1) brilliant-cut diamonds with one continuous girdle facet, and (2) brilliant-cut diamonds with a series of 40 girdle facets, in comparison with the same diamonds before the girdles were polished.

It was interesting to note that in the test of stones processed as in (1), this laboratory reported *no increase when the stone was observed directly from above;* an increase of from 0.91 to 0.93 at 22.5°; and an increase of 0.79 to 0.81 at 45°. In these tests the laboratory apparently defines brilliancy as it is defined in American gemology, i.e., the total amount of light reflected. However, it is the opinion of the writer that the equipment and methods used by this laboratory (and another which

(4) The Electrical Testing Laboratory.

***See correction on other side, bottom of page.***

has tested the brilliancy of standard-girdle diamonds in comparison with polished-girdle diamonds) are not adequate to measure accurately the comparative brilliancy of diamonds. This opinion is shared by several authorities on optical physics, who also believe that the development of equipment and methods which would be adequate to measure, consistently, very small differences, is an enormous, if not impossible, task.

A great majority of diamond authorities agree that if there is any increase in brilliancy in any of the above-described stones, it is not great enough to be recognized accurately and consistently by the human eye alone, and the report of the commercial laboratory just mentioned would tend to bear this out. It is the belief of the writer that any increase or decrease in brilliancy would, therefore, be a matter of personal opinion of each observer.

### The Future Popularity of These Styles

The decrease in popularity of the Twentieth Century cut and of polished-girdle diamonds earlier in the century does not necessarily imply that the recently announced novelty styles of brilliant cut will not achieve and maintain popularity. These have been generously publicized by advertising in trade papers and, in the case of some styles, by advertisements in popular national magazines. In most cases an appeal has been made to the retail jeweler on the basis of confining the sale of one of these styles, for a period of time, to him in his area. Much more pressure has been used and may be expected to be used in popularizing these styles than was the case with earlier novelty styles of brilliant-cut diamonds which appeared at the beginning of the century.

However, one can question the advisability of representing these styles as being *more brilliant* than ideally fashioned standard 58-facet brilliants, or than one another, at least until more scientific proof has been offered which can be accepted by the jewelry industry or by a disinterested jury of responsible physicists. Eighty-five per cent of the Registered Jeweler firms of the American Gem Society in voting on this subject have established a ruling (May, 1945) which will prohibit any Registered Jeweler of the Society from representing any of these novelty styles as being more brilliant than ideally fashioned brilliants.

### Novelty Brilliant Cuts with Less Than 58 Facets

Patents have also been issued recently on what might be termed a 12-fold (dodecagonal) Swiss cut, and for styles which combine the crown or pavilion of such a cut with pavilions or crowns of other brilliant styles.

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***Correction to line 18, Page 216, Orloff definition, in Diamond Glossary: Substitute word "cut" for "rough."***

# EDWARD WIGGLESWORTH

With the death in Boston, May 6, of Edward Wigglesworth, gemology has lost a man whose work is known, and whose personality was felt, throughout the United States and Canada.

His passing brings profound grief to hundreds of gemological students and to jewelers who knew his warm personality. His death is an indirect loss to every member of the jewelry industry, which profited by his outstanding contribution to gemological education.

Kaiden-Keystone

As president of the Gemological Institute of America for the past four years, and director of the Institute's Eastern Laboratory since its founding, he was known to his colleagues and his students as quietly influential and deeply interested in the educational program for gemologists. In his capacity as the Institute's Laboratory director, he had devoted his last five years, without financial recompense, to the furtherance of gemology.

Humility tempered his own estimation of his many accomplishments and of his fund of gemological and mineralogical knowledge. He was an excellent instructor, understanding and painstaking in his development of the subject matter at hand. His gemology students felt for him the deepest respect and sincerest affection.

Boston Study Group, the New England Chapter of the American Gem Society, had known his guidance since its organization in 1935 during the time he was director of the Boston Society of Natural History. He was the popular and effective leader of their educational meetings which were held at the museum until after the establishment of the eastern headquarters of the G.I.A. under his direction.

As leader of these meetings he became interested in the courses of the G.I.A., and enrolling in them in the manner of any other student, he became a Graduate Member of the

American Gem Society and in 1939 a Certified Gemologist. He was a familiar figure at A.G.S. conclaves, where he lectured, and with Robert M. Shipley, Jr., directed all instrument instruction and demonstration. He only recently had assisted R. M. Shipley, Sr., in compiling a dictionary of gems and gemology.

He had served for several years as chairman of the G.I.A. Educational Advisory Board, and a secretary of the Graduates' Committee of the A.G.S. At the time of his death he had for six years held the important position of secretary to the Institute's Examinations Board.

Born in 1886, the son of the late Edward and Sara Willard Wigglesworth of Boston, he was of pioneer New England stock, and the seventh successive member of the family to bear his name. In Harvard he majored in mineralogy, graduating with the class of 1908, taking his Master's degree in 1909, and when an instructor in geology there received the degree of Doctor of Philosophy in 1917.

From the office of Honorary Custodian of Mineralogy and Geology for the Boston Society of Natural History in 1914, he went on to the chairmanship of the Executive Committee in 1916, and became full director of the Society (New England Museum of Natural History) in 1919. In that post until 1940 his record for innovations included development of one of New England's finest collections of minerals and gemstones and inauguration of annual gem shows in cooperation with Boston's Registered Jewelers. It was during the latter years of this directorship that his gemological interests grew which led to his association with the Gemological Institute of America.

His agricultural interests led him from the role of hobbyist into a leadership in that field. He developed his home in Topsfield as a model farm. He had been for the past twenty years president of the Essex Agricultural Society, and developed Topsfield Fair's famed Guernsey show.

He was high in the regard of the mineralogical fraternity and served for a term as vice-president of the Mineralogical Society of America. He held membership in the American Association for the Advancement of Science, the Seismological Society of America and the American Ornithological Union.

He was a member of the venerable Union Club of Boston.

He is survived by four daughters, the Misses Jane, Sarah, Mary and Anne; two sons, Captain Thomas, director of air intelligence for the First and Ninth Armies, now in Germany, and Lieutenant Edward, Jr. There are two grandchildren.

The Board of Governors of the Gemological Institute of America has not yet chosen his successor.

## Diamond Mine May Reopen

A notice in the April issue of *The Journal of Gemmology* (London) states that the Premier Diamond Mine may reopen. It is said that two years may be consumed in reconstruction work before production in the mine, now closed for 13 years, may be resumed. The mine is a subsidiary of De Beer's Consolidated Mines, and was once considered richest in the world. The Premier Mine was the site of discovery of the famous Cullinan Diamond.

# Gemstones and the Spectroscope*

## Absorption Spectra Due to Chromium

*The Second in a Series by*

B. W. ANDERSON, B.Sc., F.G.A.

*(Continued from last issue)*

When the stone is on the microscope stage, using the technique recommended in my introductory paper, the bright line effect can be obtained simply by tilting the microscope mirror slightly to one side: by manipulating the mirror with one's eye still looking through the spectroscope the flickering transition from the absorption to the emission effect and vice versa can be followed, and is an interesting sight. In pale specimens it is difficult to see the doublet as a dark band at all, the emission effect being so readily produced and the absorption here being so relatively faint.

*Emission doublet of ruby at full brilliance, by scattered light.*

Fluorescence is the cause of this striking phenomenon. If the spectroscope be directed at a ruby glowing red under ultra-violet light, the bright doublet can be clearly seen, together with several other of the "hair lines" which are also reversible in the same way, though the doublet is so incomparably the most intense that it may be the only one noticed. There can be no doubt that part of the beauty of a fine ruby in strong daylight or artificial light is due to the fluorescence it is emitting, in a similar way that the "blue-white" effect given by many diamonds having no trace of blue in their body-colour (as proved colorimetrically by Shipley) is due to their blue fluorescence.

We are accustomed to thinking that ultra-violet or cathode rays are necessary to stimulate fluorescence, whereas visible light usually has the same action, provided that it is of shorter wave length than that of the fluorescent radiation. It has been stated that as little as one thousandth of one per cent of chromic oxide in corundum is sufficient to cause the red fluorescence, and indeed the bright doublet may often be seen in apparently colourless sapphires and in blue sapphires which contain the merest trace of chromium.

As will be described later, pure red and more particularly, pink spinel also displays "fluorescence lines" in its spectrum when powerfully illuminated and viewed by scattered light.

*G.I.A. Research Service.

But with spinel there is a group of five feeble bands which appear together, giving quite a different appearance (quite apart from a difference in wave length) from the intense doublet of ruby. Nobody who has once seen and compared the two effects should have any doubt about being able to distinguish them.

The fluorescence doublet is not the only distinctive feature in ruby; the group of narrow lines in the blue "window" of the spectrum is also unique. There are two strong lines forming a doublet, and a third strong line some seventy angstroms further towards the violet. In the photographs shown, taken with a small grating camera, the main features mentioned can be seen: the strong doublet, both under fluorescing and absorbing conditions, the general absorption of the yellow and green and of the violet, leaving a transmission "window" in the blue in which the three narrow bands (looking here like only two, as the doublet appears as one line), and in one photograph, (b), a further narrow band in the orange-red. The wave-length measurements, accurate, in the case of the narrow bands, to within a few angstroms, are as follow:

6942 } very strong doublet
6928 } (fluorescent).
6590 mod. strong, narrow.
6000 to 5000 approx. v. strong, broad.
4765 }
4750 } strong doublet, narrow.
4685 very strong, narrow.
4600 onwards, general absorption.

The broad absorption band varies in width with crystal direction, as noted above, and with the proportion of chromic oxide present. Synthetics are wont to contain more chromium than natural rubies, and this band is apt to be broader and the narrow bands more intense in synthetic stones, though, personally, I should not like to base a decision on this in discriminating natural from synthetic. In most other coloured synthetic stones, including spinels, the spectroscope can provide very definite evidence, as I hope to describe in later articles. General absorption of the blue and violet sets in just below the 4685 band: in very chrome-rich specimens the blue "window" is practically blotted out, giving continuous absorption from 6100 onwards.

In my next article I hope to deal with the absorption spectra of red spinel and pyrope garnet.

## Certified Gemologists

*NEW CERTIFIED GEMOLOGISTS. The following have recently passed the three final examinations of the mail courses of the Gemological Institute of America and have been Registered by the American Gem Society as Certified Gemologists.*

F. B. HAWLEY, Registered Jeweler of Bridgeport, Connecticut, May 9, 1945.

HARRY L. WOODRUFF, 3429 Highwood Drive, S.E., Washington, D. C., May 9, 1945.

# Gemstone Inclusions

*Photomicrographs arranged as an aid to identification of gem species and of the differences between genuine and synthetic sapphires, rubies and emeralds. All illustrations from kodachrome transparencies by Dr. E. Gübelin, C.G., of Lucerne, Switzerland. Research Member, G.I.A.*

Of absorbing interest to jewelers and gemologists is the study of inclusions in diamonds, in which variety of material compensates for limitations in color and design.

In his recent exhaustive study "The Inclusions in Gemstones," of which his illustrative Kodachrome slides were a gift to G.I.A., Dr. Edward Gübelin, Lucerne C.G., remarks of black-looking inclusions in diamonds:

"Viewed under the ingenious dark-field illumination of the G.I.A. Diamondscope the majority . . . are seen to be comparatively transparent crystals, with distinct idiomorphic forms or rounded outlines."

His remarks corroborate observations made over a period of four or five years in G.I.A.'s laboratories, published in previous issues of *Gems & Gemology* and incorporated in subsequent editions of their courses and books.

Minerals, cracks and fissures are revealed in the following illustrations which comprise our fourth presentation from Dr. Gübelin's study.

*Figure 39*
*Included diamond crystal, the octahedral habit of which is distinctly seen, in a diamond. G.I.A. Diamondscope. 100x.*

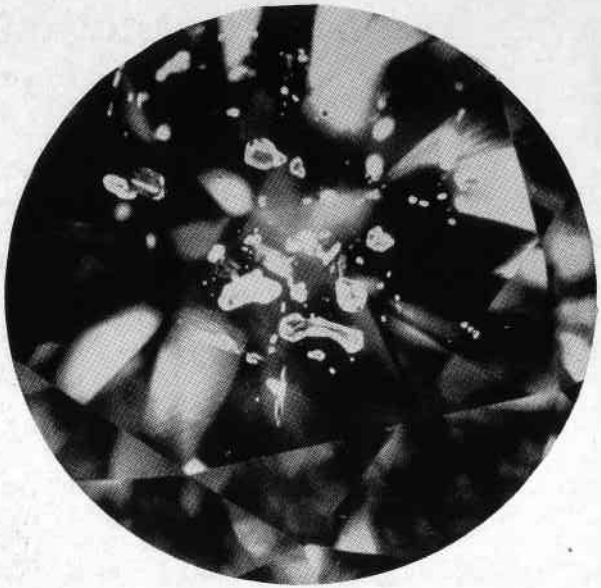

*Figure 40*
*Group of rounded grains, probably of zircon crystals, included in a diamond. G.I.A. Diamondscope. 60x.*

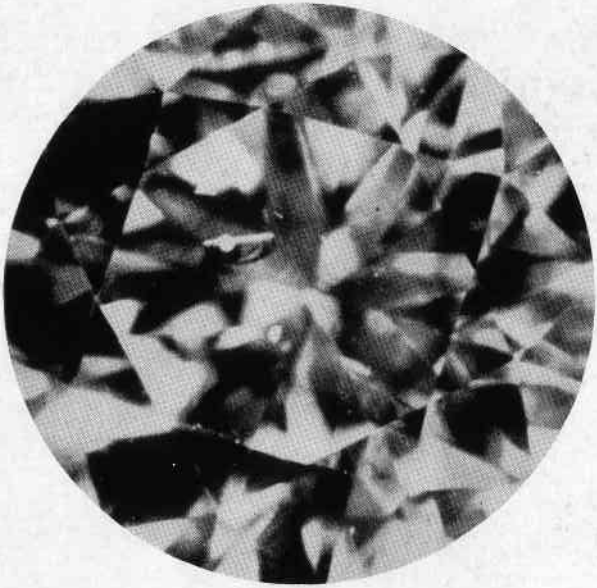

*Figure 41*
*Small cleavage separation radiating from an included crystal, in a diamond. G.I.A. Diamondscope. 10x.*

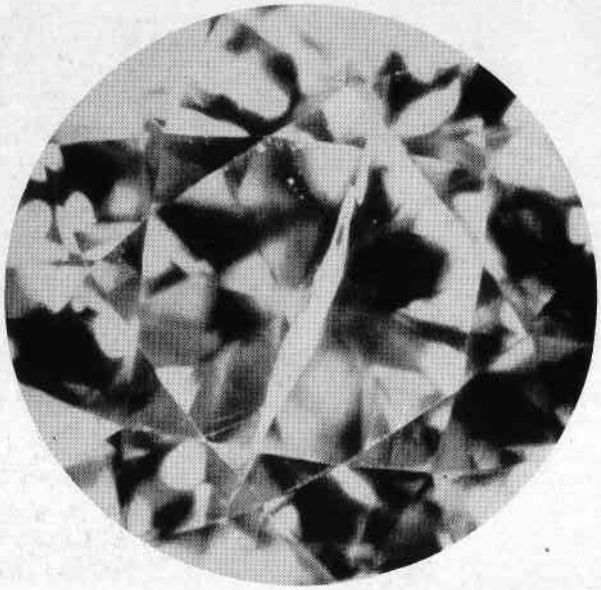

*Figure 42*
*Long and deep cleavage crack traversing the whole table of a diamond. G.I.A. Diamondscope. 10x.*

*Figure 43*
*Individual zircon crystal with well-developed crystal faces, enclosed in a diamond. G.I.A. Diamondscope. 100x.*

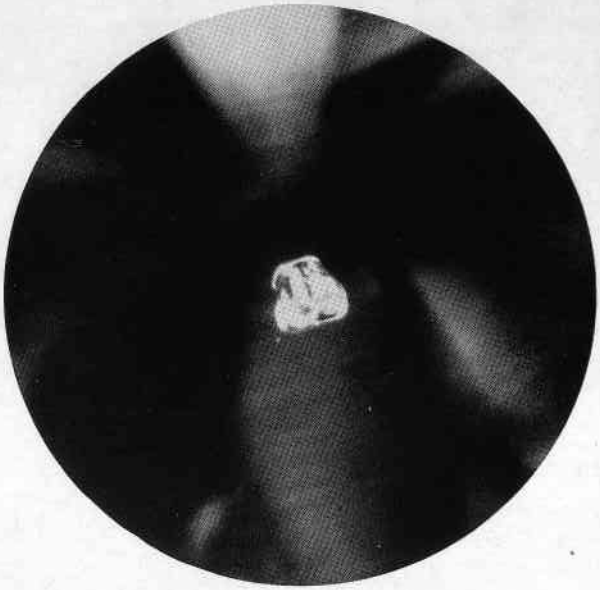

*Figure 44*
*A diamond crystal of less symmetrical form than that in Figure 39, enclosed in a diamond. G.I.A. Diamondscope. 100x.*

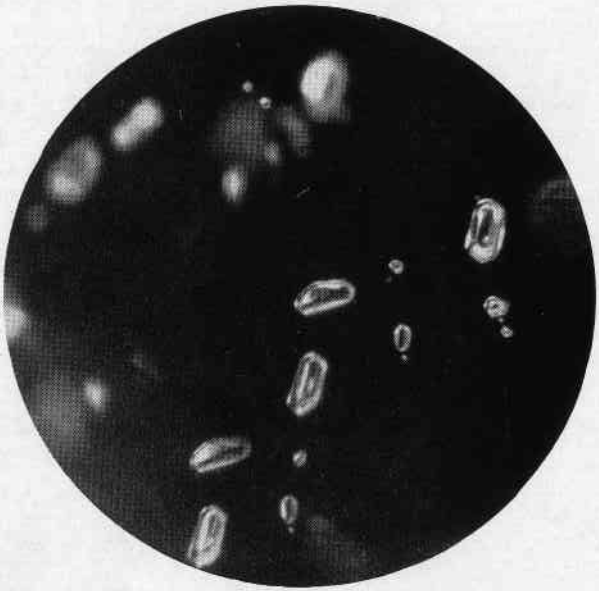

*Figure 45*
*Partly idiomorphic and partly xenomorphic zircon crystals in a diamond. G.I.A. Diamondscope. 60x.*

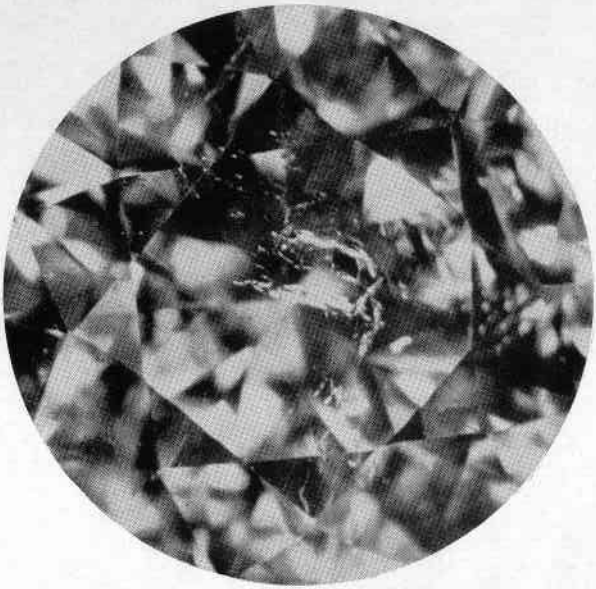

*Figure 46*
*Irregular cracks and fractures below the table of a diamond. G.I.A. Diamondscope. 22x.*

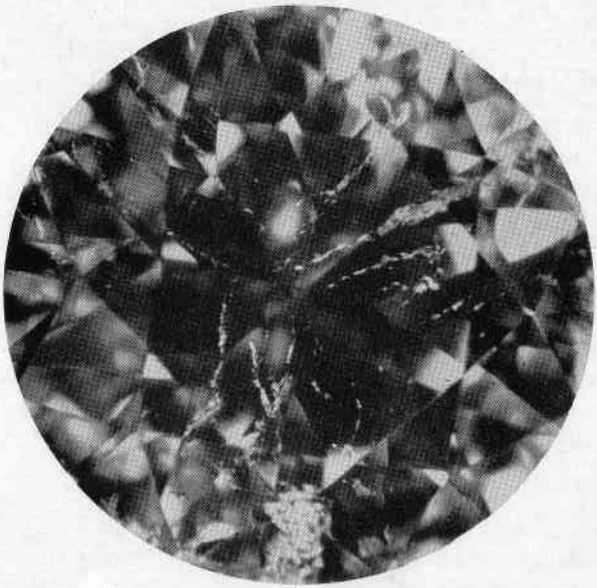

*Figure 47*
*Assemblage of fine cleavage cracks running from the girdle towards the center of the table in a diamond. G.I.A. Diamondscope. 10x.*

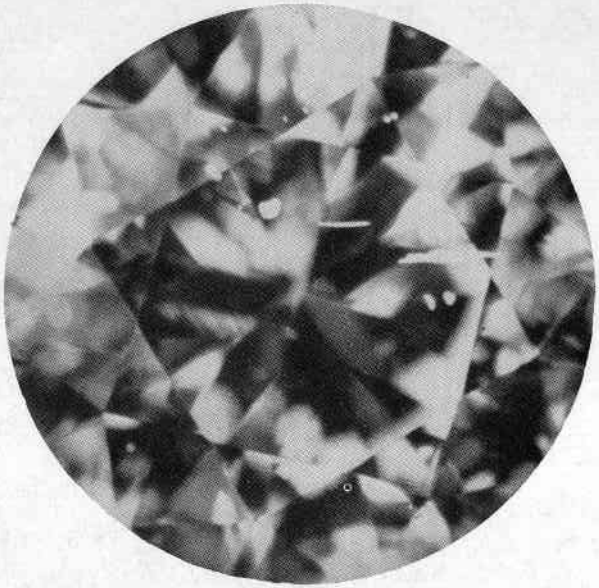

*Figure 48*

*Included grains of foreign minerals and two fissures in a diamond. The grains would appear black and would be called carbon spots if examined under an eye loupe under ordinary lighting conditions. The fissures in the surface are along cleavage planes. G.I.A. Diamondscope. 10x.*

## Revolutionary Improvement in Diamond Cutting (?)

The Associated Press on May 15th reported the discovery, by staff members of the Bureau of Standards, of a method of greatly accelerating the cutting rate for diamonds. The practical application of such a discovery might result in considerably reduced costs of cutting.

# The G.I.A. Monochromatic Unit

*By* JOHN T. SHANNON, E.E., M.E.

The new G.I.A. Monochromatic Unit consists of a sodium lamp and a transformer, each designed especially for use with gemological refractometers. With them it is used in the same manner as the sodium flame produced by burning sodium chloride with the bunsen burner, except that the greater intrinsic brilliancy is much more advantageous, as it is twenty-five to thirty times as bright as the sodium flame.

Like the sodium flame, it produces upon the scale of the refractometer a shadow with a very sharp edge, in contrast to the shadow with an edge consisting of a narrow spectrum which is produced when white light is used. As every refractometer user knows, it was often difficult, if not impossible, to distinguish the greenish yellow line of such spectrum, which was necessary for accurate readings. It has been found that with some stones this monochromatic unit also produces shadows on the refractometer scale when ordinary white light will not produce a shadow of sufficient intensity to be distinguishable.

An additional advantage is the use of this light in connection with the refractometer in the determination of birefringence, or the strength of double refraction of a gem. With this monochromatic unit most doubly refractive stones will show two shadow edges instead of one on the

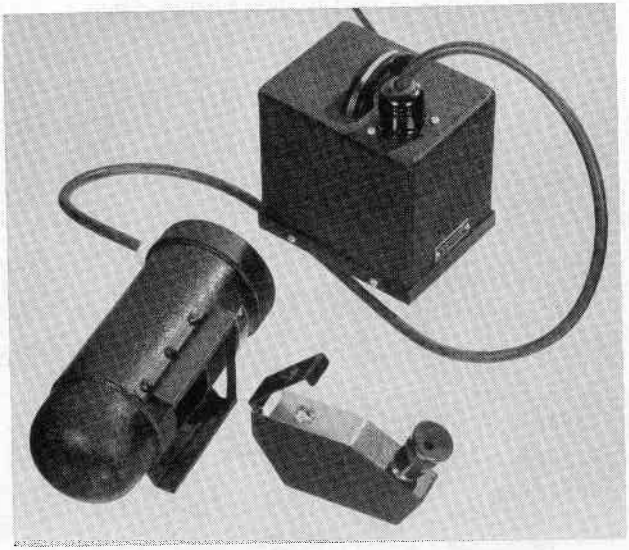

*Figure 1*
*G.I.A. Monochromatic Unit set up with Rayner Refractometer in foreground. Portable transformer in background.*

refractometer. As the stone is rotated on the dense glass hemisphere it can be noticed that in certain positions the edges attain maximum and minimum positions. These readings indicate the minimum and maximum indices for the stone. If the minimum reading be subtracted from the maximum reading, the difference is the birefringence, or the amount of double refraction, for the stone.

The unit consists of a control ballast transformer for use on alternating current, 6cy, 115v, and its operation is automatic. A specially designed unit can be supplied for direct current. Its use on alternating current is recommended where possible, due to better performance and longer bulb life. The transformer has separate low voltage taps for preheating the filament cathodes (2¼v-3Amp).

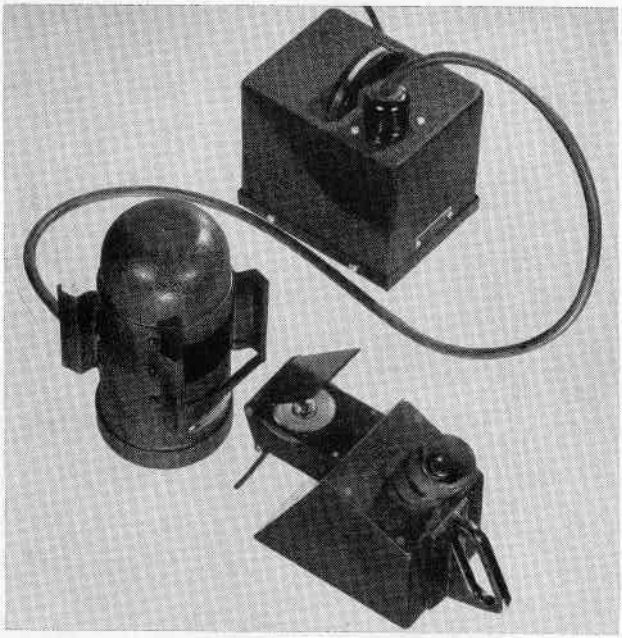

*Figure 2*

*G.I.A. Monochromatic Unit set up with Tully Refractometer in foreground. Cord connecting portable transformer (in background), and lamp, is of sufficient length to permit placing transformer on floor and lamp on laboratory or diamond table, or on jeweler's showcase.*

The electric cord between the transformer and lamp is provided so that only the lamp need be placed on a table or jewelers' showcase,

*(Continued on Page 214)*

# GEMOLOGICAL DIGESTS

## Hemetine Not Friable

In our last Gemological Digest (on page 185, of Winter 1944-1945 issue) a statement appeared which we believe was very ambiguous and may have been misunderstood by some of our readers.

Our article did not state, or mean to imply, that hemetine was more brittle or more easily broken than genuine hematite, that it was inferior to hematite in any of its properties, nor that it was friable in its finished condition.

As to the durability and wearing qualities; reports from users of hemetine and from tests made on three specimens by a laboratory affiliated with G.I.A. indicate that the toughness of most hemetine stones may be equal to or greater than hematite. Tests on these specimens indicate a greater hardness.

## Brazilianite—a New Gemstone!

A new mineral has been found recently in Brazil. It crystallizes in the monoclinic system. Its chemical composition is reported as $Na_2O,3Al_2O_3,2P_2O_5,4H_2O$. It is transparent to translucent. Its color is chartreuse yellow (light, slightly greenish yellow). Hardness 5½; specific gravity 2.94; refractive index 1.598-1.617 (Alpha 1.598, Beta 1.605, Gamma 1.617).

At least two gemstones have been fashioned from this mineral. One is a 23-carat emerald cut. Another is a 19-carat oval brilliant now in the Natural History Museum of New York. *E. H.*

## 770-Carat Diamond Found in Sierra Leone

A Reuter's dispatch of May 14 stated that the world's largest uncut diamond had arrived in Britain, brought from the colony of Sierra Leone, West Africa. The gem was stated to have been found by a native workman in January. Its weight was given as 770 carats, and its size was compared to that of a chicken's egg. The owners are named as the Sierra Leone Selection Trust. The Cullinan and Excelsior were larger when in the rough; the President Vargas and Jonker smaller.

## 120-Carat Diamond Found in East Africa

According to the British Colonial Office, the largest diamond ever discovered in East Africa was found recently in the Shinyanga district of Tanganyika. It weighs about 120 carats and is valued at $60,000 in its raw state.

# The G.I.A. Monochromatic Unit

*(Continued from Page 212)*

while the transformer may be mounted beneath the table. The cord should not be altered.

The lamp is designed for convenient use with any of the gemological refractometers. For use with the Rayner and Smith refractometers the lamp is used in the horizontal position as shown in Figure 1. It is used in the vertical position with the Tully refractometer as shown in Figure 2.

The lamp itself consists of a specially shaped hard glass bulb containing two activated* (and preheated) cathodes which are directly connected to the heater windings of the transformer. The bulb contains an amount of metallic sodium and a modicum of argon gas which acts as a carrier gas.

In operation the main line current is turned on and at once the filaments begin to heat, giving off the purple-violet color of the argon gas. In a few minutes the sodium color begins to appear as the heat of the cathodes begins to volatilize a portion of the sodium. The lamp now begins to glow with the characteristic sodium color (yellow) although for fifteen to twenty minutes the color of the argon spectrum can still be noted. At the end of twenty minutes to one-half hour the bulb should attain its maximum brightness and the argon gas color will have practically disappeared.

The life of gaseous conductor light sources of this character is rated more upon the number of starts and stops than upon the number of hours of continuous burning. This is due to the loss of the activating material on the cathodes during the warm-up period.

For ordinary use in gem testing, a filter is unnecessary, and none is shown in the illustrations, or supplied with the unit. However, for accurate research work or disputable gem identifications, the filter is recommended. Therefore, a lamp housing is designed to take the standard 3⅛" square filter and any of the following are recommended: Corning No. 4, or Wratten Filters No. 67 and No. 23 in series.

For all practical purposes this G.I.A. monochromator is almost completely monochromatic with its two very bright lines at 5890 Angstrom units and 5896 Angstrom units. The only interference is from a few very low intensity lines which may be screened out by the use of filters as above described**.

The total current consumption is less than 75 watts. Owing to danger of fire, care must be taken when destroying burned-out bulbs, that the sodium does not come in contact with water or dampness.

*The filament cathodes are coated with a metallic oxide (of the rare metals such as barium, thorium, and others) which, when heated, gives off a stream of electrons.

**The D sodium line is given in many texts as 5893 Angstrom units, but recent practice is to mention two sodium lines, $D_1$ at 5890A and $D_2$ at 5896A.

# DIAMOND GLOSSARY

*(Continued from p. 192, last issue)*

**onca** (Portuguese). The Portuguese ounce, equivalent of 1.0148 avoirdupois ounce. See **onza.**

**One Hundred and Two Facet Diamond** (102-Facet Diamond). The name used to describe a modification of the 58-facet brilliant. It has 60 facets and a table on the crown, and 40 facets and a culet on the pavilion. Its symmetry is ten-fold (decagonal) instead of the eight-fold (hexagonal) symmetry of the 58-facet brilliant. The four-sided bezel facets of the latter are each replaced by two triangular facets and an additional break facet is placed between every pair of break facets, resulting in 10 star facets, 20 bezel facets, 30 top break facets, 30 bottom break facets and 10 pavilion facets.

**onza** (Spanish). The Spanish (Castillian) ounce. Equals 442.72 grains avoirdupois. **Onza para diamantes** (the diamond ounce) is defined by one lexicographer as 431.42 English grains, but may be metric grains.

**opening a diamond.** In the diamond-cutting industry, a trade term used to describe the operation which consists of polishing parallel facets on a heavily coated rough diamond so that a clear view of the interior of the stone can be seen by the cutter before he proceeds with the work.

**Oppenheimer, Sir Ernest.** (1880-??.) Chairman, Anglo-American Corporation of South Africa, Ltd., 1917-??; Chairman DeBeers Consolidated Mines, Ltd., 1929-??; Deputy Chairman Rhokana Corporation; Chairman, Consolidated Diamond Mines of S.W.A., Ltd., The Diamond Corporation, Ltd., and the Premier (Transvaal) Diamond Mining Co., Ltd. Director of many other companies.

**optical anomaly.** An irregularity in optical properties or unusual phenomenon such as anomalous double refraction in a diamond or other singly refractive mineral. See **strain.**

**orange diamonds.** Diamonds of a distinctly orangy color or tint, and not diamonds from the Orange River Valley, although most diamonds of this color are found in South Africa. Many of them are reddish orange-brown, somewhat similar in color to reddish orange-brown zircons; others are of the more vivid reddish orange color of flame spinels or garnets, while some vivid deep orange diamonds have been found in the Wesselton Mine (S. H. Ball). Few of these diamonds reach the North American trade.

**Orange Free State.** A province of the Union of South Africa, south of the Transvaal. Formerly a practically independent colony of Boers. Some important diamond mines, such as Jagersfontein and Koffeyfontein, are located in this province.

**Orange River.** A river in South Africa; an important alluvial mining district. The first large white diamond, the Star of South Africa, or Dudley, weighing 83.5

carats (uncut) was found near the Orange River on the Zendfontein farm. The diamondiferous deposits of the Orange River near Hope Town are also known as Orange River Valley deposits. These are chiefly of historical interest, for it was here, on the farm of De-Kalk, that the first diamond discovered in South Africa was picked up, in 1866. There were several other finds during the following year. See **O'Reilly Diamond.**

**orange Tiffany.** same as **Tiffany yellow.**

**O'Reilly Diamond.** A 21¼-carat stone (in the rough) discovered by Erasmus Stephanus Jacobs, in 1866, on the DeKalk farm, near Hope Town on the south bank of the Orange River. In 1867 the diamond came into the possession of John O'Reilly, a traveling trader. Later Dr. Atherstone of Grahamstown first identified it as a diamond and valued it at $2500. The diamond is of historical interest, as it is the first South African diamond recorded, and one of two whose discovery precipitated diamond prospecting in Africa. The diamond was eventually purchased by Sir William Wodehouse, the governor of the Cape, at the price mentioned, and exhibited at the Paris Exhibition of 1867-8. See **Star of South Africa.**

**Oregon diamond.** Any diamond found in the state of Oregon. Extremely rare and associated with platinum. Probably from the same source as California diamond.

**oriental diamond** (obsolete). A term once used to distinguish diamonds from India from the diamonds from Brazil after the discovery of Brazilian diamonds and while Indian diamonds were still a factor in the market. Murray stated that the term was also used for the "finest and hardest gems" whether from India or Brazil.

**origin** (of diamond). See **genesis.**

**original lot.** A term used in the diamond trade to mean unbroken parcels of rough diamonds sold by the Diamond Trading Co., just as they were graded and sorted at the mines.

**Orinoor** or **"Sun of Light."** A name given by Mr. Samuel W. Dewey to a well-known Virginia diamond, although it has been more generally known as the Dewey Diamond. A later name is the Morrissey Diamond. See **Dewey Diamond.** (Kunz)

**Orloff Diamond.** Also known as the Orlov, Orlow, Amsterdam or Lasarev Diamond, it was discovered in the 17th Century (Schlossmacher states 1680), probably in the Kollur mines of Golconda. Dr. Fersman, who considers it the best of all Indian diamonds, is convinced that it is identical with the Great Mogul and the Deryanoor. He has also reconstructed its original rough form as that of a rounded octahedron of about 450 carats, from which a large portion had been cleaved before its discovery, leaving a large cleavage plane which is now the base of the cut stone. The rough stone weighs 199.6 m.c. and was, when last reported, still set in the Russian Imperial sceptre, which, together with other crown jewels of the Czars, was placed in the Treasury of the U.S.S.R. in the Kremlin, Moscow. Its dimensions are: Height, ⅞ inches; width, 1¼

*(To Be Continued)*