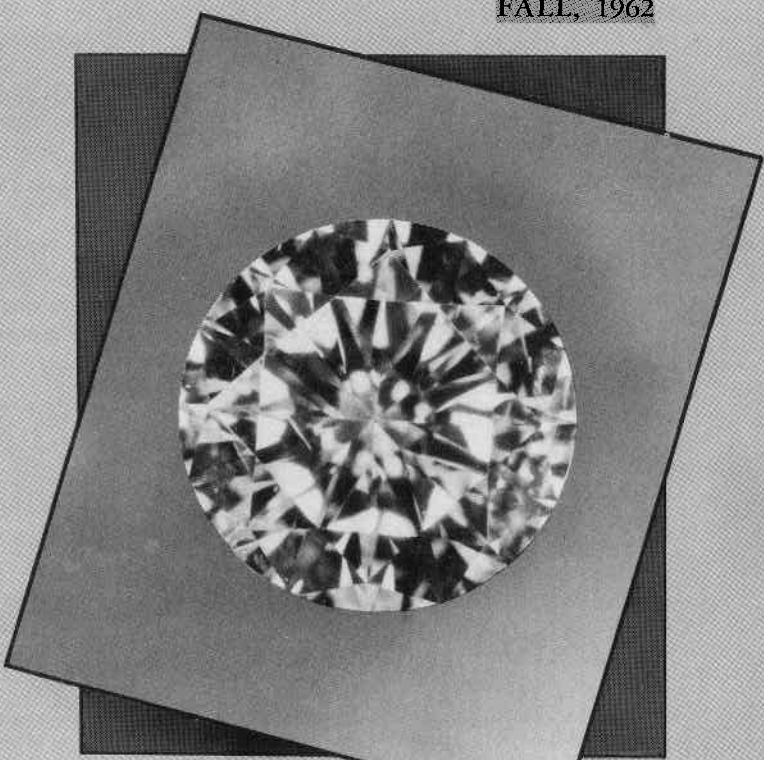
Gems and Gemology

FALL, 1962



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Rapid Sight Estimates of Diamond-Cutting Quality

Part I

by

Richard T. Liddicoat, Jr.

Most gemologists look at diamonds every day. How much of what we see conveys a message? Each diamond brilliant reveals its character at a glance, if the everpresent clues are noted and appreciated.

Large numbers of diamonds are quality graded in the GIA Laboratories each year. In the process of selecting brilliants that met certain preset standards, characteristics associated with particular sets of proportions and facet angles began to become obvious. After further study, it was apparent that pavilion and crown angles and proportions could be judged within very narrow tolerances by examining the stone face up under 10x. To be able to do this is often important to a diamond man, both for selecting goods and for appraising; therefore, becoming familiar with the key characteristics described in this article is a worthwhile pursuit.

The facet angles and proportions of a diamond brilliant determine the percentage of light impinging on the crown that will be reflected as white light or prismatic fire. In its recent courses, the GIA utilizes a method by which proportions may be used to judge accurately the degree to which excess weight has been retained in cutting from the usual octahedral rough. This information is used in a system that determines accurately the price of the stone. By utilizing the methods outlined herein, it is possible to determine the key proportion characteristics of a diamond brilliant quickly without resorting to measurements.

So-called ideal figures for a diamond brilliant are those worked out a number of years ago by an English mathematician, Marcel Tolkowsky, to yield maximum brilliancy consistent with a high degree of fire for light impinging on the crown from all angles; the key angles and proportions of this cut are

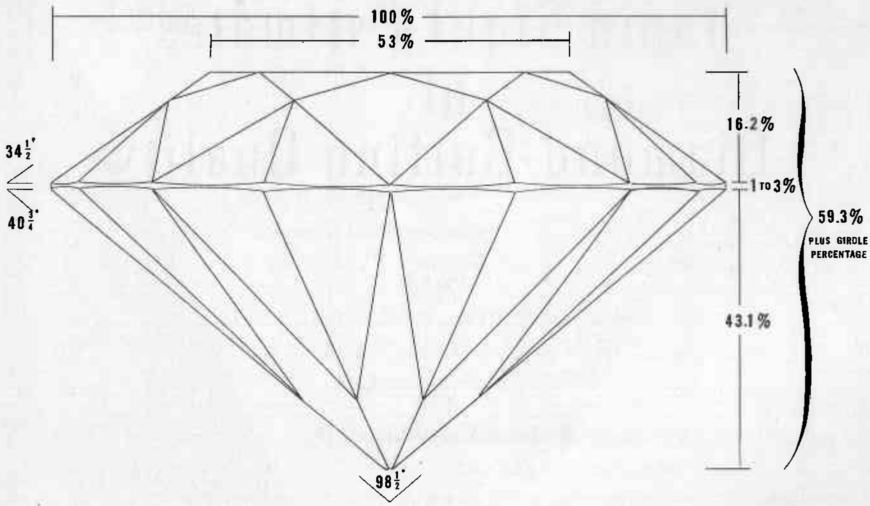


Figure 1a

shown in *Figure 1 a.* Although few stones are cut to these proportions today, many cutters continue to use the angles shown when beauty is their goal. Few ever use a 53% table today, but a number use a 55% to 58% figure, thereby very slightly thinning the crown from the Tolkowsky recommended proportions. Most cutters are using proportions yielding a 60-70% crown.

The ideal cut makes an excellent comparison against which value can be measured, since it provides the least weight yield of any commonly encountered kind of cutting from octahedral rough. An octahedron is the most common diamond crystal form *(Figure 1 b)*. Although many octahedra are modified by forms with more faces than the octahedron, most diamond crystals are basically octahedral in outline.

Departures from Tolkowsky's figures are made to save weight, making possible lower per-carat prices. However, any significant departure is made at the expense of brilliancy or fire or both — and thus, at the expense of beauty. The departures from an ideal shape seen most commonly today are those that make the crown thinner and the table wider. More and more often the pavilion is made deeper. Another common departure is one that leaves unnecessary thickness in the girdle.

The characteristics that identify various proportions and cutting angles can be seen through the table or crown of a diamond under low magnification. Experienced cutters are aware that some brilliants look blackish from above and others watery. Some of them may associate these two characteristics with deep pavilions and very flat pavilions, respectively. However, these features and the characteristics of the many pavilion angles between those so flat they cause a "fisheye" and those so steep they cause a black center have never been recorded.

A view through the table of a diamond shows a mirror image of the facets of the crown on the pavilion facets. The portion of this crown reflection that is visible depends on the height of the crown and on the angle of the main pavilion facets to the girdle plane. Looking through the table, the mirrored reflection of the crown is imperfectly shown, because of the many planes represented by the different facets of the pavilion. At the center, surrounding the culet in a well-made diamond, is the reflected image of the table. This is surrounded by black images of the star facets, and these, in turn, by less easily identifiable reflections of the near-table portions of the bezel facets. *Figure 2* is a dark-field photograph focused on the reflections of the crown in the pavilion, as seen through the table. The table reflection occupies over 50% of the table diameter and is seen to be roughly octagonal in shape. It is surrounded by dark reflections that are basically triangular in outline, which represent the star facets. Between the stars, toward the edge of the table, are

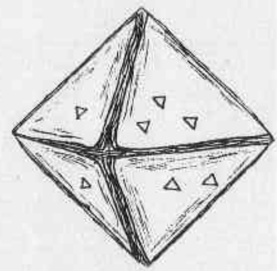
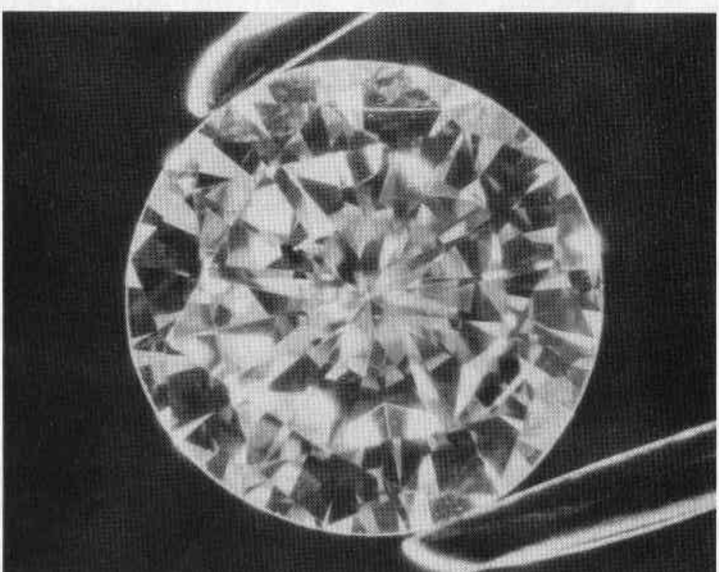


Figure 1b

Figure 2



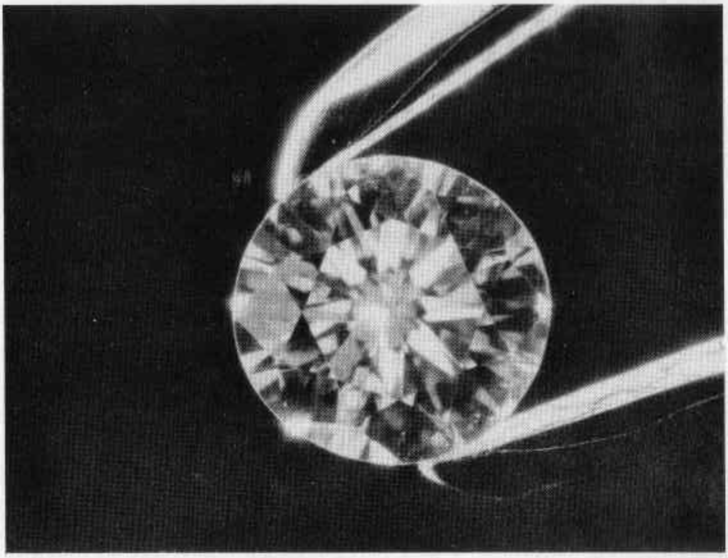


Figure 3

seen brighter reflections of the bezel facets. This photograph was chosen because it shows rather well the distinct table and star reflections. Actually, this stone is somewhat too deep in the pavilion, as is indicated by the large size of the table reflection in relation to the 66% table.

Variations in angles and proportions increase or decrease the area of the reflected crown that is visible through the table and also change the intensity of reflected light. Although these variables and others are interrelated, there are enough differences in the characteristics of different proportions to make it possible to make accurate estimations of any brilliant examined. To an experienced eye, the size, color and position of the table reflection and the evenness of the symmetry are very revealing. If a diamond has a pavilion angle near the ideal 40¾ to 41°, there should be a gray reflection of the table in the center of the pavilion. *Figures 3 and 4,* which will be explained more fully later, show table reflections in brilliants with ideal pavilion angles. The reflections differ somewhat in size because of the height of their respective crowns.

The important factors in visual proportion analysis are: (1) the size of the table reflection, (2) its lightness or darkness (i.e., its position on a white-to-black scale), (3) its position, (4) how much of the crown is reflected in the pavilion when looking through the table, and (5) the position of bright reflections. An explanation of these points and their relationship to a diamond's appearance through the table is the subject of the remainder of this article.

Perhaps the key characteristic is the

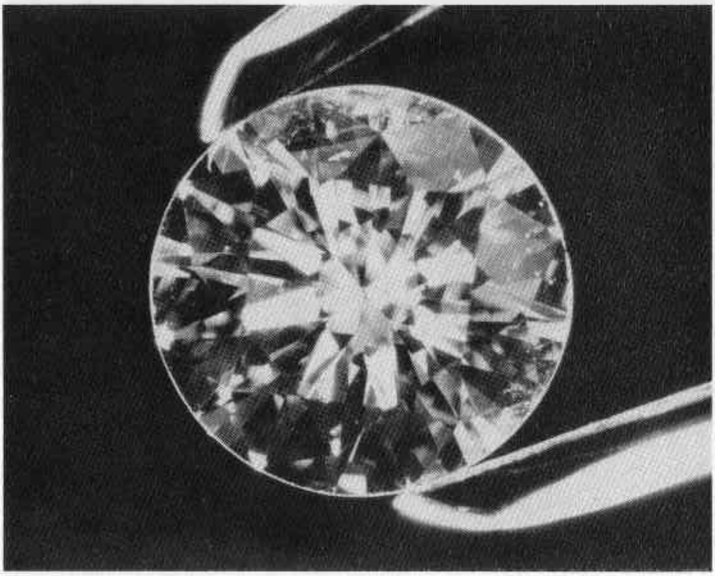


Figure 4

size of the table reflection. It depends on three elements: (1) the size of the table itself, (2) the angle of the pavilion facets to the plane of the girdle, and (3) the distance from the table to its reflection in the pavilion, again relative to girdle diameter.

The size of the table is the first item that is noticed when one looks at the crown from above. If the table is exceedingly large, one can be almost certain that the crown is thin; if it is small, usually the crown is much thicker, and the angles are likely to approach or exceed the ideal 34 to 34½°. Relative crown thickness may be assessed roughly by examining the diamond in a direction parallel to the girdle.

Obviously, the larger the table, other factors being equal, the larger will be its reflection on the pavilion, as seen through the table. More important in judging proportions is the angle of the pavilion facets to the plane of the girdle: other factors being equal, the steeper the pavilion angle, the larger will be the table reflection through the table.

The third important factor is the combination of crown thickness and girdle thickness, which together determine the relative distance of the table reflection from the table itself. The higher the crown, the smaller will be the table reflection on the pavilion facets. Usually, the larger the table, the thinner the crown; and when the crown is thin, the table reflection is relatively close to the table itself, unless the girdle is exceptionally thick. The closer the reflection is to the table, the larger its relative size, other factors being equal.

Since the size of the table reflection in the pavilion depends on more than

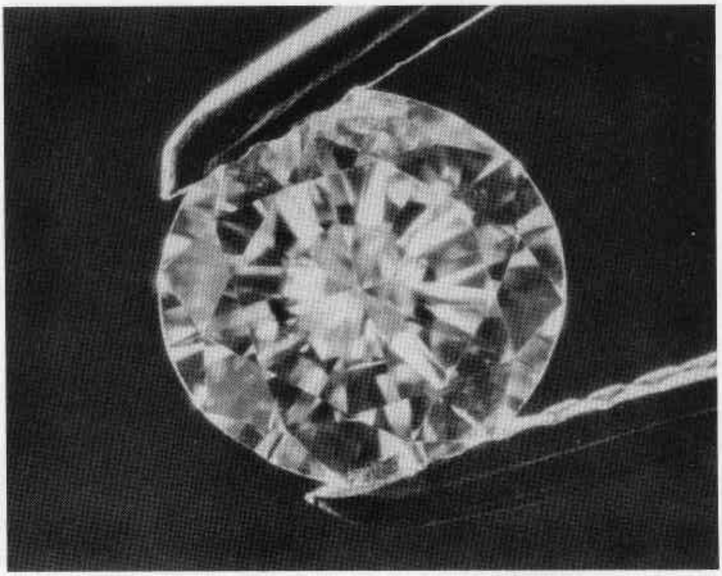


Figure 5

one variable, it might seem at first that it would be difficult to use it in judging proportions; however, there are other related characterictics that help to resolve this problem. It was stated earlier that the steeper the pavilion angle in relation to the plane of the girdle, the larger is the table reflection. Related to this is the fact that, in addition to increasing in size relative to the table size itself, the table reflection darkens with increasing steepness of pavilion angle. When the pavilion angle is very flat, it may be impossible to see a table reflection directly through the table. As long as a table reflection is visible, the lesser the pavilion angle (i.e., the shallower the pavilion), the whiter and brighter will be its reflection. With increasing angle, the table reflection grows larger and darker until, at approximately a 45° pavilion angle, it is completely black. Unless the crown is high, which would tend to make the table smaller, the table reflection covers the whole table when the pavilion angle approaches 45°. Most of these conditions are best described not in words but by photographs that show the conditions as they are seen in diamond brilliants.

(The photographs were taken at 12.5x by Jeanne G. M. Martin, using a special dark-field illuminator and an Exakta 35mm. single-lens reflex camera.)

Figures 3 and 4 show table reflections seen through the table; in this case, both pavilion angles are ideal. The distinct difference in size of the reflections relative to table size is accounted for by the higher crown of the diamond pictured in *Figure 3.* The thin crown of the brilliant in *Figure 4* increases the

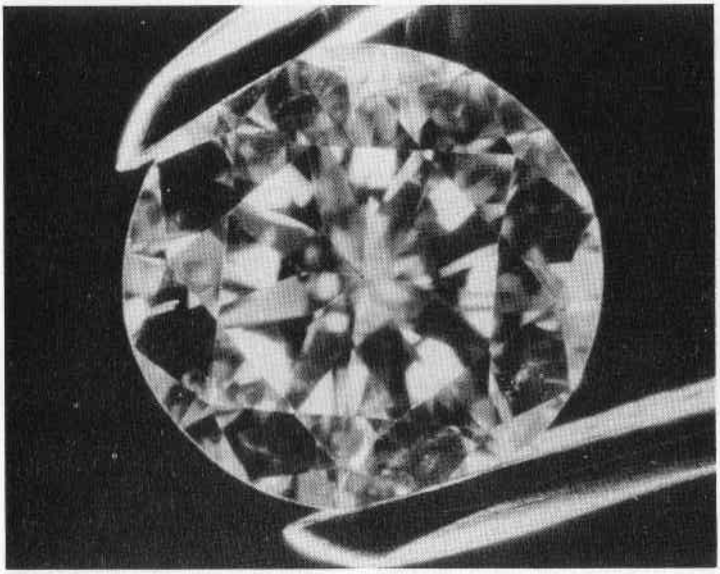


Figure 6

size of the table reflection. In *Figure 5,* the table reflection is distinctly larger; this brilliant has a flat crown and a pavilion angle near 42°. In general, *Figures 5 through 10* show a progression in depth of the pavilion; that is, an increasing angle of the pavilion main facets to the girdle. They trend toward a darkening of the table reflection and an increase in its size relative to the size of the table. *Figure 6* shows a pavilion that is only very slightly too deep, so the table reflection is neither very large nor very dark. In *Figure 7,* the table reflection is dark gray, and in *Figure 8* it is very dark. *Figure 7* has a larger table and thinner crown, so its table reflection is larger but only very slightly darker; its pavilion angle is only a fraction of a degree greater than that in *Figure 6*. In *Figure 8,* the diamond pictured has a distinctly deeper pavilion; the angle is near 42½°, instead of the ideal 40¾ to 41°. Note that the table reflection in *Figure 8* is large, covering much of the table, and that the area around it is bright. *Figure 9* shows a diamond with a larger table reflection, the center of which is dark. The large table reflection is caused by the combination of a large table, a thin crown and a deep pavilion. In this case, the proportions are approximately as follows: a 11% crown, a 46% pavilion and a 2% girdle. The crown angle is flattened to near 31° and the pavilion angle is deepened to 42½°. The diamond shown in *Figure 10* has a slightly deeper pavilion (43°); the total depth is 61%. The table reflection extends almost to the edge of the table. The diameter of the table is 61% and the crown is thin, but not as thin as that in *Figure 9*. The larger table reflection

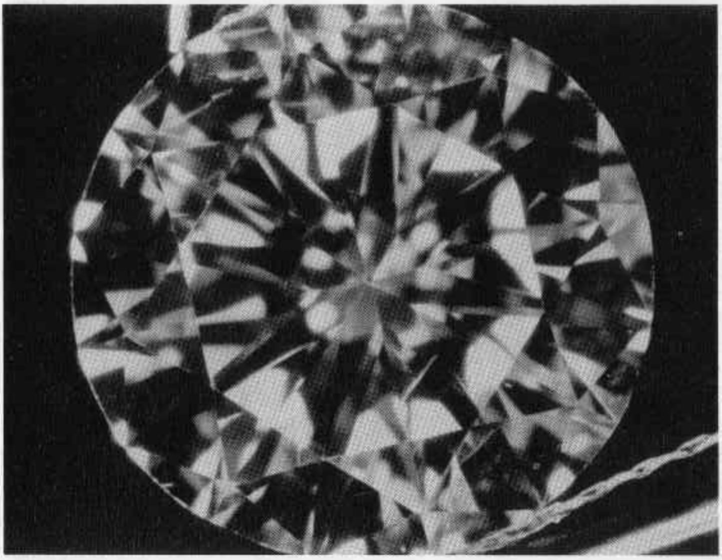


Figure 7

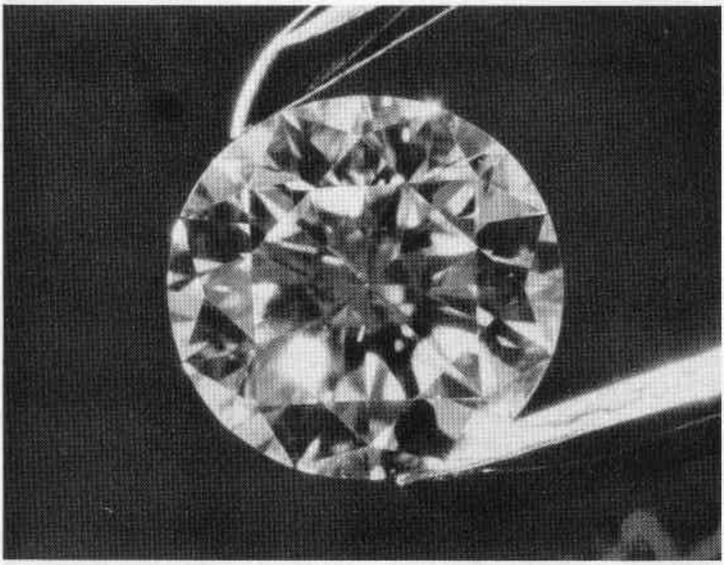


Figure 8

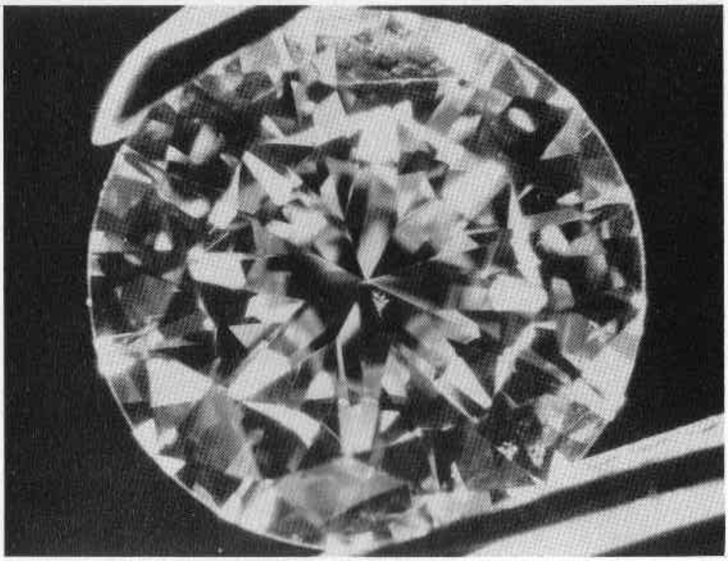


Figure 9

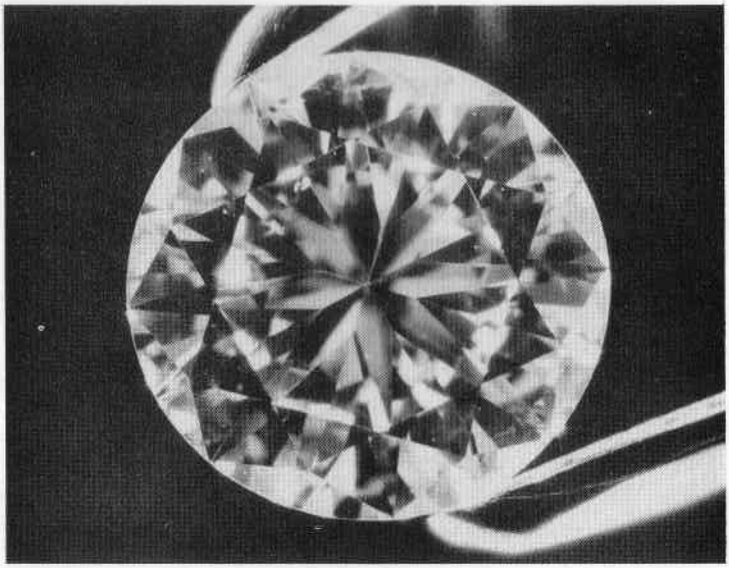


Figure 10

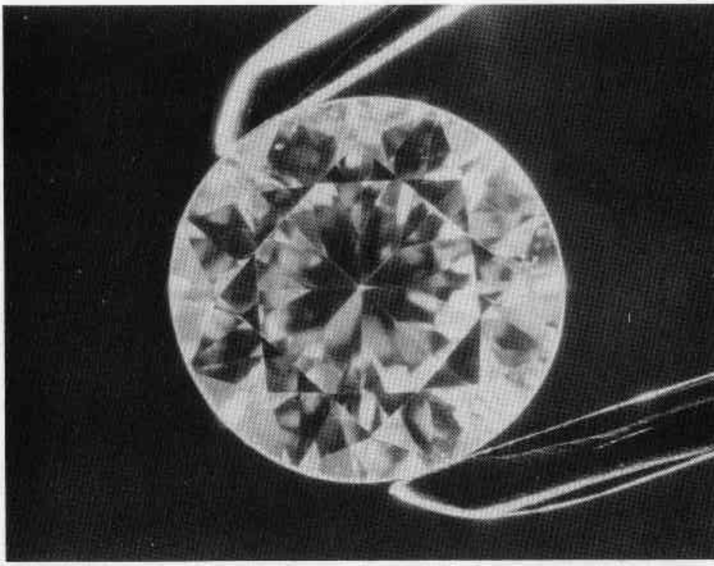


Figure 11

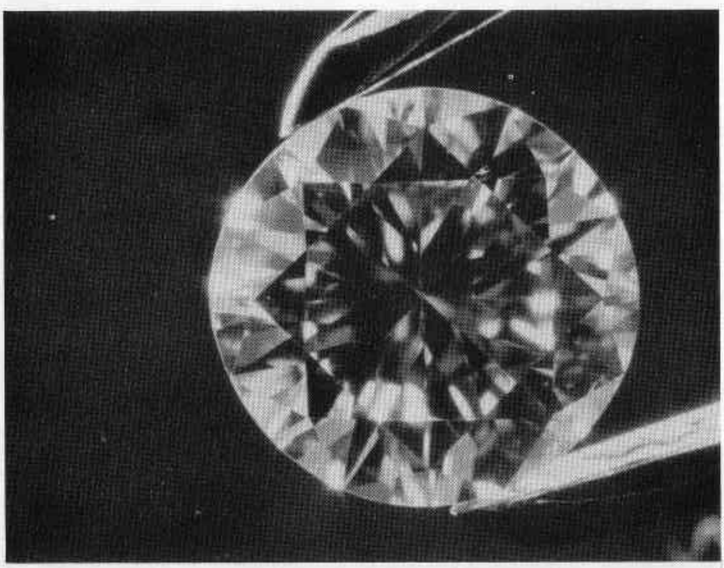


Figure 12

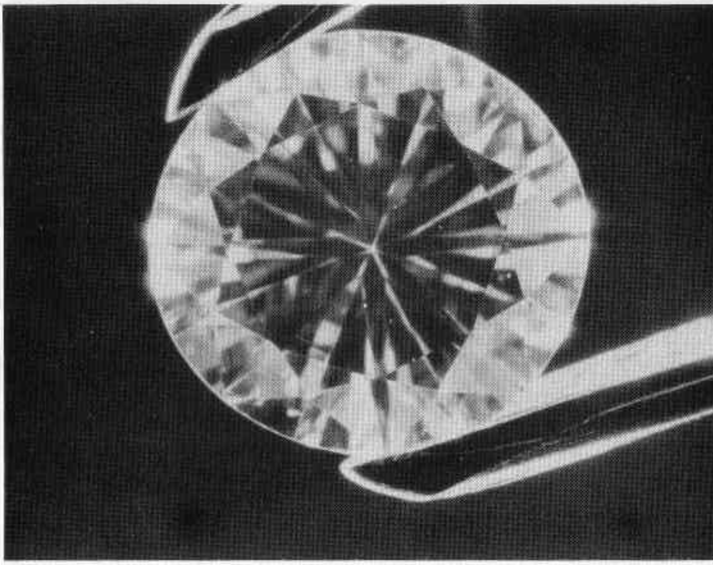


Figure 13

is caused by the deeper pavilion.

In *Figure 11,* the whole area under the center of the table is black, with the exception of a few bright reflections at the edge. This pavilion angle is slightly greater than that in *Figure 10* but the crown is thicker, reducing the size of the table reflection to comparable size in relation to the width of the table. The total depth of the stone is greater: 63% of the girdle diameter. With the exception of a few bright reflections along one side, the black table reflection in *Figure 12* covers the whole table. Despite the fact that the pavilion angle is 43° +, its total depth (62.7%) is slightly less than that of the preceding figure, because the crown angles are slightly flatter. The complete table area of *Figure 13* is covered by black reflection of the table, so that no other crown-facet reflections are seen through the table; in addition, the crown is very flat. In this case, the pavilion angle is 45½° and the bezel angle is 30°. To summarize, *Figures 4 through 13* show various steps in a deepening pavilion; however, those from *Figure 5 through Figure 8* show very gradual changes from the ideal figure. *Figures 9, 10 and 11* are all significantly overdeep in the pavilion and are on the borderline of being black centered. *Figures 12, 13 and 16* are examples of stones that face up with a black center, reducing the appearance of brilliancy materially. This is easily seen by the unaided eye, whether the diamond is mounted or loose.

Diagnosis of the table reflection is made easily on mounted as well as loose goods. The diamond in *Figure 14* has an enormous 71% table and the crown angle is flat, as well. The gray-table

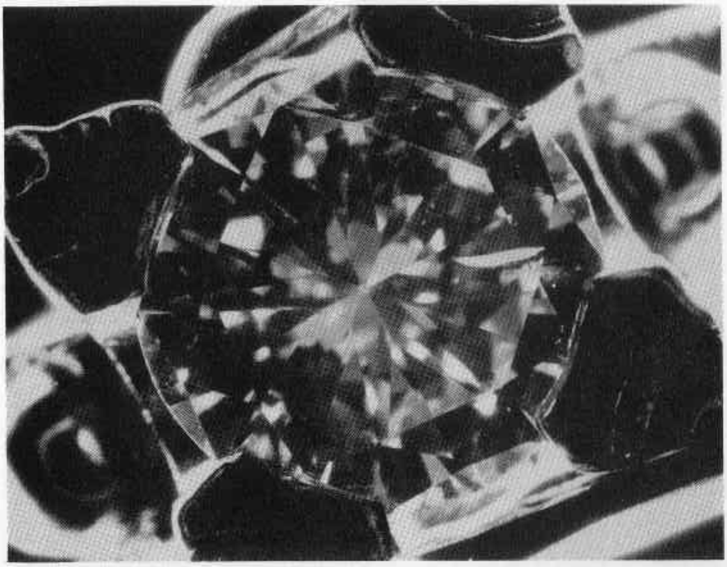


Figure 14

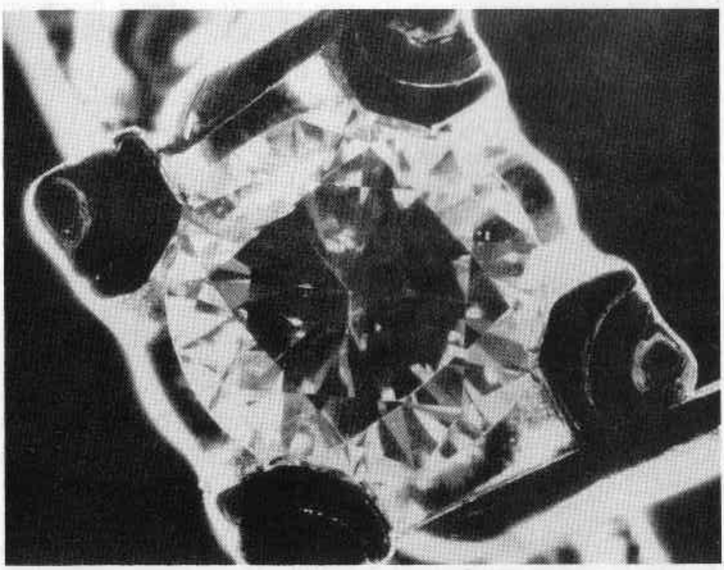


Figure 15

reflection suggests that the pavilion angle is close to the ideal 41°. Although the total depth of the stone is near 54%, the thickness of the thin crown, plus a thick girdle, totals only 11%.

Even though the diamond in *Figure 15* is mounted, it is obvious that it has a black center; its depth is 67%, despite a 64% table and a thin crown. This condition, as in *Figures 12 and 13,* is clearly evident to the unaided eye.

In order to gain first-hand familiarity with the effects on appearance caused by differences in angles and proportions, many diamonds should be examined. In addition to the direction through the table, they should be viewed parallel to the girdle, to check girdle thickness and crown angle. In the beginning, diameter and depth measurements should be made as a confirmation of visual findings. An alternative is to utilize a Proportion Viewing Screen for initial confirmation of interpretations of appearances seen through the table.

Once the diamond man becomes familiar with the effects of minor variations, measurements will be unnecessary.

If the pavilion angle is so flat that no table reflection is visible directly through the table, the area under the table may appear dark, but a reflection of the girdle is visible at the edges of the table. This will be pictured and discussed in a continuation of this article in the Winter, 1962, issue, which will consider the effects of flat pavilions, poor symmetry and other conditions.

Developments and Highlights

at the GEM TRADE LAB in New York

by

Robert Crowningshield

Turquois Substitute

With turquois in strong demand for the past five or six years, efforts to meet it are continuing to be made. Good-quality untreated material is virtually nonexistent, and this column has reported many different treatments for improving poor-quality stones.

At the moment we are examining three separate specimens, all reputed to be "compressed" turquois from different sources. By ordinary gem-testing methods, we are unable to detect the presence of turquois and are having X-ray diffraction tests made to determine if, in fact, any is present. One wonders just what category of gem material is used for such a stone, assuming only a token amount of turquois is present.

Since all the specimens are very soft and rather porous, they are really not as durable as ordinary glass imitations. The same can be said for stained howlite, which has been reported as a turquois substitute but which we have not yet examined. *Figure 1* illustrates one of the specimens, in which tiny colorless, brown and yellow fragments are held in a blue opaque groundmass, the whole resembling terazzo.

Black-Treated Opal

Since the last issue of *Gems & Gemology,* we have been asked by several clients to examine specimens of what was represented to them as Australian black opal. Because of the high value placed on the material, our first clients refused to allow any destructive tests.

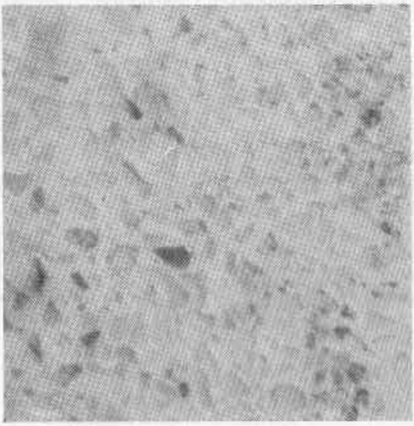


Figure 1

When it was learned that several thousands of carats were involved, one client permitted us to make the necessary tests, which proved that the black color was caused by an artificial treatment.

Initial magnification disclosed a peculiar appearance unlike any opal that we had ever examined. The material appeared to be made up of innumerable granules in a mosaic structure, and the black color seemed to be confined to the spaces between the granules. A cross section clearly revealed that most of the black coloration was confined to a thin band at the surface, although in places the color penetrated deeper along cracks.

Scraped with a razor blade or a knife, one could quickly remove all the black, revealing a gray, granular substratum. A drop of water placed on the scraped area (or on a freshly sawed section) was quickly absorbed. The unusual porosity probably accounts for the low specific gravity of 2.00. *Figure 2* shows the removal of the black material in a scraped area.

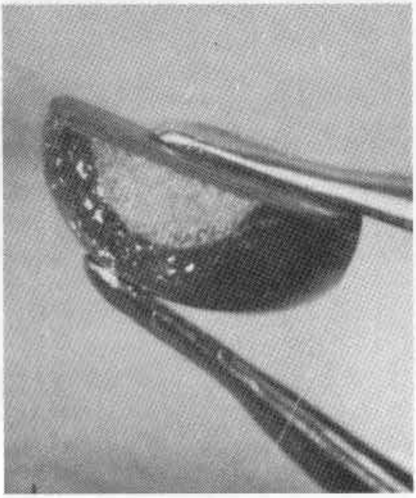


Figure 2

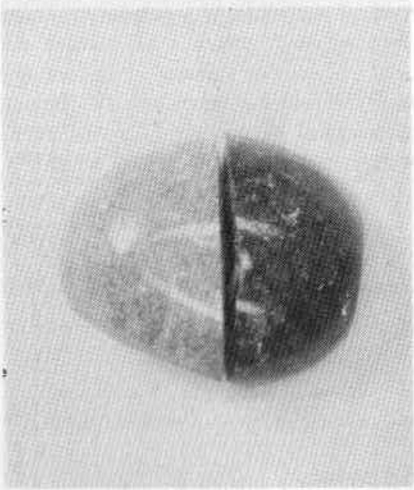


Figure 3

The black substance was not attacked by any common reagent; however, it was quickly removed by warm sulphuric acid. *Figure 3* illustrates the effect of acid on one-half of a stone; *Figure 4* shows its friable, granular structure.

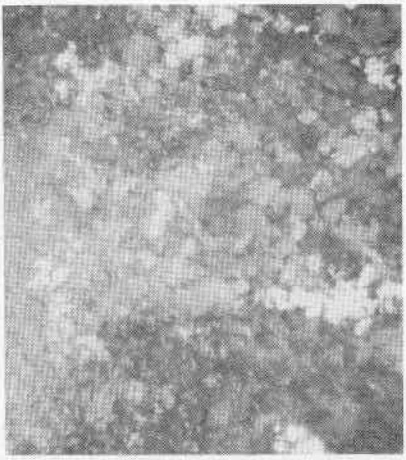


Figure 4

Apparently unsuccessful in selling it to the local trade, it is possible that the importer will attempt to market the opal in Japan or Europe; therefore, the trade should be wary of any offering of material of this kind, regardless of source, unless it is offered for what it is.

"Synthetic Cat's-Eye"

Figure 5 illustrates a large lump of greenish-brown, partly devitrified glass from which the small imitation cat's-eye on the left was cut. The material had been imported as "synthetic cat's-eye," along with some green glass labeled "synthetic jade." Because the devitrified areas of the chatoyant glass arise from many centers, only small stones can be cut to show good chatoyancy.

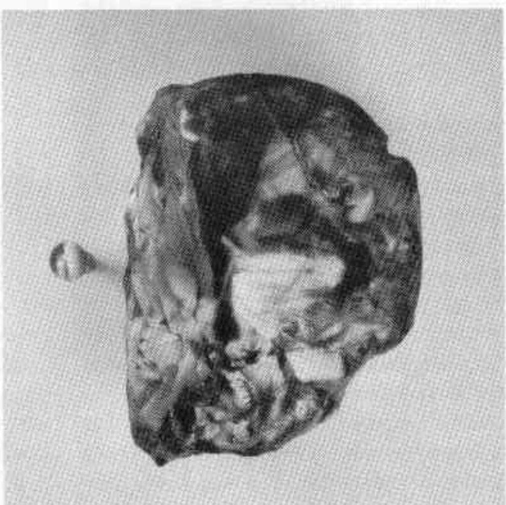
Unusual Diamond Spectrum

Figure 6 illustrates an unusual spectrum of a bright-yellow, natural-color diamond that fluoresced an intense yellow-green. The bright line at approximately 5040 Å is undoubtedly due to the unusual fluorescence.

Willemite

We recently identified the finest cut willemite we have ever seen. A cushion brilliant-cut stone (the kind of cut that one associates with glass or synthetics), it resembled a very bright, precious

Figure 5



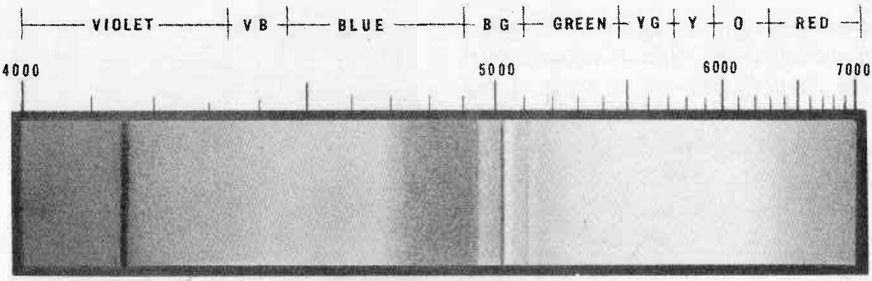


Figure 6

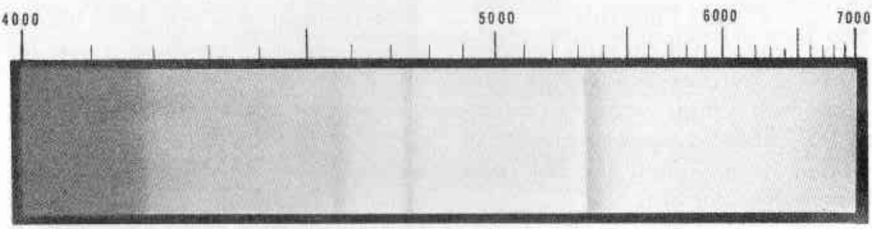


Figure 7

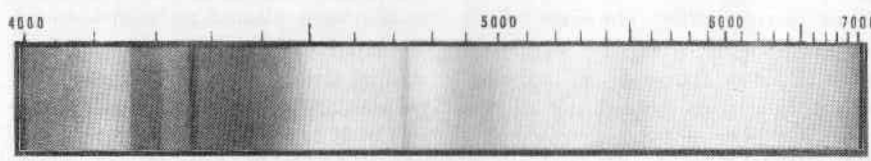


Figure 8

topaz. We recorded the absorption spectrum *(Figure 7)* and found it to be unlike that of the impure willemite cat's-eye we recorded for the spectroscope assignment of the Gem-Identification Course *(Figure 8)*.

Unusual Stones

In addition to the willemite, we have seen several other rare stones. Among these were two faceted zincites; a colorless brazilianite; a large, brilliant-yellow tourmaline; and a boracite dodecahedron.

A most unusual cushion-antique red stone, which everyone pronounced a fine ruby, proved to be a chrome-pyrope garnet of approximately 16 carats. The refractive index was 1.73 in sodium light, and the stone exhibited rather pronounced chromium bands in the spectroscope. It did not, however, fluoresce under ultraviolet.

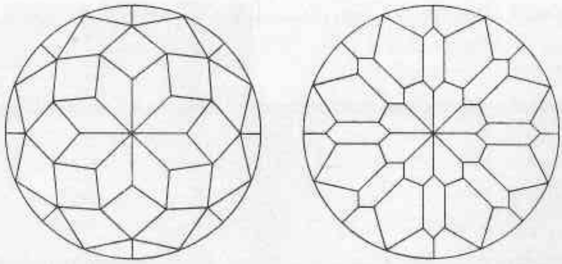


Figure 9

Coated Emeralds

Two pear-shaped emeralds mounted in basket settings as earrings were backed with a thick green plastic coating that enhanced the color greatly; in addition, it reinforced the red color through the color filter.

Twentieth-Century Cut

We examined an especially attractive Twentieth-Century-cut diamond weighing approximately 2.75 carats. We had the opportunity to grade it both in and out of the ring setting. The color, which appeared superb when the stone was mounted, was found to be approximately H-I when graded out of the ring. We have noted previously this ability of the Twentieth-Century cut to mask slight tints of color.

In attempting to obtain more information about this rare cut for our client, we were told that the man who was considered responsible for its development, and whose small shop on Pearl Street, N.Y.C., produced most of the stones, was Mr. David Delara. He came to this country from Holland in the 1890's. The first Twentieth-Century-cut stones made their appearance about 1900; hence, the name. They were made from single crystals, and the bulk of them were cut between 1905 and 1914. Following World War I, few, if any, were cut; the main reason for this, of course, was the acceptance of sawing as the most economical means of preparing diamond crystals for fashioning. Today, it is an oddity and might better be considered a collector's item than an old-style cut, whose value is obtained by figuring its recut weight. *Figure 9* is an idealized drawing of this style of fashioning.

Odd-Color Sapphires and Rubies

We were pleased to be able to examine a lot of large, faceted, peculiarly colored sapphires and rubies from Tanganyika, Africa, through the courtesy of Dr. A. Alexander, New York gem consultant and National Jeweler columnist. The transparent sapphires were a pale blue to green, both colors showing even when the stones were oriented with the optic axis at right angles to the table facet. Most of the rubies were a light orange-brown, not unlike pale hessonites. The similarity was even stronger than mere color due to the submicroscopic and microscopic inclusions of low relief, much as one expects to see in hessonite. Other stones would more properly be classed as pink sapphires than rubies, although the color contained more orange than violet.

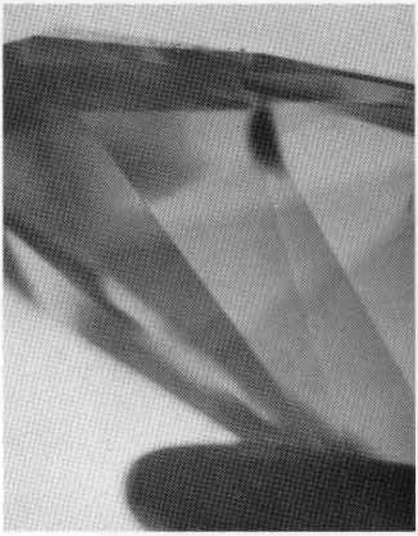


Figure 10

Unusual Yellow Diamond

Figure 10 illustrates an unusual splotch of green color just below the girdle of a 2.21-carat yellow marquise diamond. We have seen such splotches before in green to yellow diamonds, sometimes on the culet, and they have always been confined to natural stones. In addition, this stone had a long bar of green approximately 1 mm. inside and parallel to the girdle. It showed no reaction to a film when left on it for 48 hours, so we assume it to be a natural phenomenon.

Gray Diamond

A very shallow, gray marquise diamond in a platinum engagement ring came to our attention when several department stores refused to appraise it because its appearance strongly suggested a coated stone and because it was mounted in such a manner that without special equipment the appraisers could not measure the depth. We noted the same grayish appearance we have associated with coated diamonds, but the stone phosphoresced bright blue after being exposed to short-wave ultraviolet light and showed pronounced lamination, or growth zoning, under magnification.. In addition, it was strongly conductive to electricity, so we had to conclude that it was a rare type II b diamond and that the color, though not blue as one would expect, was nevertheless natural. (Boiling in sulphuric acid subsequently confirmed this.) However, with special gauges we were able to obtain the depth and estimated the stone to be approximately 1½ carats below the weight represented to the client.

Acknowledgements

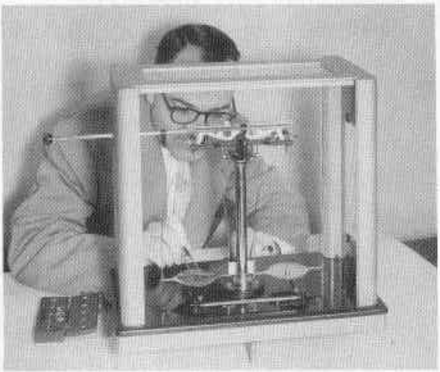
We wish to acknowledge with thanks the gift of a pleasing cabochon of azur-malachite from **Mr. William Baum,** of S. Joseph & Sons, Des Moines.

From **Mr. Bill Ilfeld,** Santa Fe, New Mexico, we received a nice selection of rough turquois and similar material after various kinds of treatments. The specimens will be valuable for our research into this continuing problem.

From student, **Joseph Smith,** precious-stone dealer, New York City, we received a selection of several dozen natural and synthetic stones to be added to study sets.

From GIA Graduate **Louis Kuhn,** in our building, we received an assortment of broken opals for study purposes, as well as samples of recently mined Mexican opal.

Developments and Highlights



at the

GEM TRADE LAB

in Los Angeles

by

Richard T. Liddicoat, Jr.

Serpentine

Certain kinds of identifications seem to arrive in groups. Very few stones of given species will be encountered over a period of many months, and then a number of specimens of that stone will come in within a few days. Serpentine, for example, in the form of both beads and carvings, seems to be on a rising curve. Each year, for the last several, we have identified more serpentine than in the previous year. The stones have varied from greenish yellow to a deep and fairly attractive yellow-green. Deep-green dyed stones are also beginning to be seen more often. One of the more interesting pieces tested last month is illustrated in *Figure 1*. It is approximately six inches high.

Amber Imitations

Another material that has been seen with increasing frequency is plastic. Transparent reddish-brown material, sometimes called "Chinese amber," continues to be prevalent; it is seen in both small and large carvings and in beads, but a variety of more conventional plastics imitating amber and other materials are also seen.

One-Stop Service

Recently, we examined a white-gold ring from which the diamond solitaire had been removed. It was brought to the Institute by an insurance company in an attempt to verify the insured's odd story that the ring had been lying on a bureau in a hotel room while the owner was showering, and that when

Figure 1

she reentered the room it was still there but without the diamond. It seemed strange to the adjuster that the stone would be removed on the spot, rather than just taking the ring to remove the stone at leisure. Marks on the shank suggested that the ring had been held in ordinary pliers and that a pair of wire cutters was used to cut through the prongs.

Treated Turquois

Almost all of the turquois examined in recent months has undergone some type of color-improvement treatment. Sometimes, not all of the beads in a strand have been subjected to the same type of treatment. With the availability today of plastic-impregnation equipment, it is surprising how many of these stones are still merely oiled or paraffin treated. Quite frequently, altered stones will not respond satisfactorily to the hot point, suggesting that they have been treated with sodium silicate ("water glass") or a similar inorganic substance. This kind of treatment has been evident in fractures showing incomplete penetration of the color-alteration material.

Unusual Stones

A large number of stones sent in as a group contained some surprises. Two colorless transparent stones, which were singly refractive and gave a white-light refractive-index reading of approximately 1.52, were suspected of being glass imitations, until an examination under magnification disclosed natural inclusions. The 1.518 refractive index and 2.94 specific gravity, plus the orientation of the inclusions, led to an identification of the rare pollucite. After this surprise, the remaining stones in the lot were examined with greater enthusiasm. Others identified were cassiterite, datolite, diopside, sinhalite and beryllonite.

Another unusual stone recently submitted to the laboratory was a very dark feldspar cat's-eye.

Determining Origin of Color in Diamonds

A magnificent diamond-platinum brooch, in which the large number of diamonds represented almost as many different colors, was examined to determine the origin of color of the stones. Although it is now possible to make positive identifications of the origin of color in yellow diamonds, not enough green diamonds have been examined to make definite statements about them. The principal reason for this is that we have been unable to obtain enough natural-green diamonds to be sure that the properties we have encountered in every stone are always present. In the spectroscope, every natural-green diamond we have studied has shown a prominent 5040 Å line; a 4980 line is usually present as well, but the former is much the stronger of the two. Although diamonds irradiated either in a nuclear reactor or cyclotron usually have these two lines also, treated greens show the 5040 as either weaker than the 4980 or equal in strength, at best. In all naturals observed to date, the 5040 is either the only line visible or it is much stronger than the 4980.

Damaged Black Star Sapphire

A black star sapphire was examined to determine the reason for its badly damaged condition. Although the Laboratory is frequently asked to issue reports on damaged star sapphires and rubies, it seldom has occasion to analyze black stars for this purpose. Undoubtedly their lower value is one reason, but the major one, in our opinion, is the relative rarity of damage to these stones compared to blue, gray and red star corundum. Although repeated twinning is even better developed and common in blacks than in the other varieties of this mineral, they seem to take the punishment imposed on a man's ring very well. Black stars sometimes cause a setter difficulty; once securely set, however, they are quite tough.

Mistaken Identity

Cases of mistaken identity in a gemstone are exceedingly common; however, rarely does a mistake of this kind occur when a jeweler sends a customer to a laboratory for verification of identity. Recently, a new brooch set with a ruby was examined at the suggestion of a jeweler and proved to be synthetic. The customer was startled, but not as much as the jeweler. Apparently, the jeweler had obtained the stone from an estate and had it recut on the assumption that it was natural. He replaced the synthetic with a stone that later was confirmed by the Institute to be a genuine ruby.

Red Spinel

We had a dark-red stone labeled ruby sent in recently with a request to determine whether it had the properties of a Siam ruby. It was found to be a particularly interesting spinel. The R.I., 1.728, was very high for red spinel;

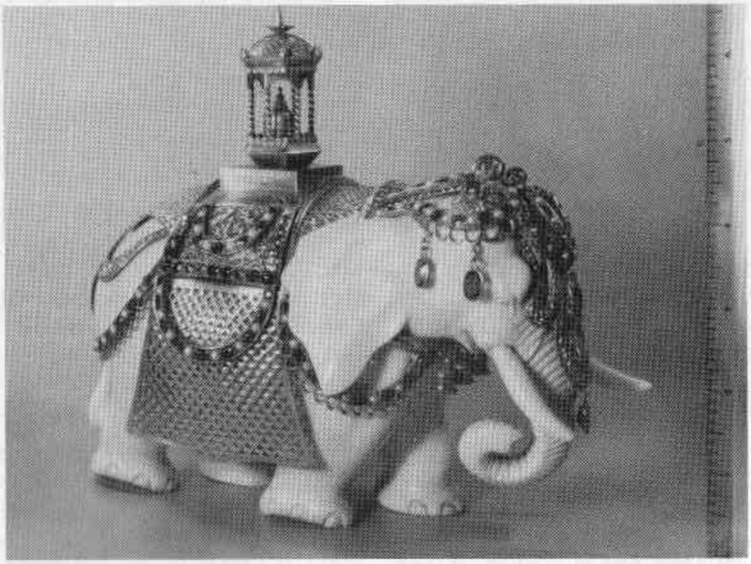


Figure 2

however, the S.G. was 3.604. Inclusions were typical spinel octahedra, arranged both in fingerprint patterns and individually. Its absorption spectrum also was typical for a garnet-red spinel.

Pearls with Dandruff

We had occasion to examine a strand of 10 to 15 mm. cultured pearls to determine whether they were scaling off. The owner had reported to the seller that she had been able to peel the surface with a fingernail. Under magnification, a number of the pearls showed raised areas on the surface that could be chipped off with the fingernail, as she had said. However, the material was colorless and transparent and did not effervesce in hydrochloric acid, as nacre would do. It was apparent that hair-setting spray or some other similar material had adhered to some of the pearls. It was easy to prove beyond question that the nacre was not spalling away. With the advent of hair-setting spray, this condition is likely to occur with increasing frequency.

Jeweled Ivory Elephant

Figure 2 shows a remarkable gold-and-jewel-encrusted ivory elephant over six inches in length that was carved from a section of a huge tusk. We had occasion to examine this attractive carving recently, which dates from about 1840 and was formerly owned by one of the lesser maharajahs of Ceylon. It is now the property of Mr. Fred May. The ceremonial trappings and the *howdah* are 22-karat gold filigree and are encrusted with a total of 244 gemstones and pearls, as follows:

One star ruby, two star sapphires, ninety-five pearls, one-hundred and fifteen rubies, one cat's-eye, four emeralds, one hessonite garnet, eight dark-blue sapphires, one peridot, one citrine, two topazes, three pink sapphires, three purple sapphires, one colorless sapphire, two rhodolite garnets, and two light-blue sapphires.

Sight Identification

Occasionally, we are told that a reputable laboratory has erred on an identification. The reasoning is usually awesome. A dealer pointed out unequivocally, but incorrectly, that another laboratory had misidentified an epidote as a tourmaline. We stated that this was unbelievable, since there was no resemblance between the properties of the two species; in addition, the laboratory mentioned was in competent, experienced hands. In view of the close resemblance between green tourmaline and epidote in the rough, it was interesting to learn that the dealer had identified the rough, as epidote, by sight.

Another fact of interest was that the man had a number of materials with him that he or a supplier had also classified by sight. They were not all correctly identified.

Acknowledgements

We greatly appreciate the selection of tourmaline cat's-eye in lovely colors of red, green, light brown and blue, donated by **Francisco Muller Bastos,** Minas Gerais, Brazil. The stones came from the northwestern area of Minas Gerais.

From GIA student, **John Krzton,** Chicago collector, we received a faceted blue iolite, which was a welcome addition to the GIA's gemstone collection.

Various types of doublets and numerous colors of glass were gratefully received from the **Linz Brothers,** Dallas, Texas.

Peoria Diamond Evaluation Class

Members of the Peoria, Illinois, Diamond Evaluation Class that met September 10th through September 14th. Standing left to right: **William B. Eaton, Jr.**, Normal, Illinois; **Jerry Dawson**, Canton, Illinois; **John Verl Lutz**, Macomb, Illinois; **Jack Liberstein**, East St. Louis, Illinois; **C. R. Duncan**, Aledo, Illinois; **Bert Krashes**, GIA instructor; **Alice Brooks**, Peoria; **Joseph E. Foster**, Washington, Illinois; **MacKenzie L. Preston**, Pekin, Illinois; **Orville R. Jones**, Pekin, Illinois; **Jack Lewis**, Bloomington, Illinois; and **Max Gill**, Springfield, Illinois. Seated left to right: **Marvin G. Dunlap**, Chillicothe, Illinois; **R. J. Elliott**, Waukon, Iowa; **Ernest J. Bremer**, Peoria; **Jerry Garrott**, Peoria; **John O. Kromhowshki**, Peru, Illinois; **Louis Jordon**, Peru, Illinois; and **David M. Zolot**, Chicago, Illinois.

Chicago Gem Identification Class

Members of the Chicago Gem Identification Class that met September 17th through September 21st. Seated left to right: **Eugene D. Skinner**, Milwaukee, Wisconsin; **Mrs. C. A. Jensen**, La Salle, Illinois; **Mrs. Phyllis Brantley**, Dixon, Illinois; **Charles F. Barnes**, St. Johns, Michigan; **Ben Overstreet**, Danville, Illinois; **Leonard H. Wood**, Gary, Indiana; and **John Gulbranson**, Lindstrom, Minnesota. Standing left to right: **Bert Krashes**, GIA instructor; **C. Pilet**, New York City; **David M. Zolot**, Chicago; **Clifford G. Falkenhayn**, Skokie, Illinois; **Archie Murie**, Madison, Wisconsin; **B. Miller Siegel**, Grand Rapids, Michigan; **C. Russel Luke**, Goshen, Indiana; **John Rauschert**, Elgin, Illinois; and **Willis Norden**, Wadena, Minnesota.

Book Reviews

GEMS: THEIR SOURCES, DESCRIPTIONS AND IDENTIFICATION, by Robert Webster, FGA. Published by Butterworth & Co., Ltd., London, England. Two volumes, 20 color plates, numerous black-and-white illustrations. 792 pages. Price: $32.50.

Gems is a new work of tremendous scope by Robert Webster, the well-known colleague of Basil Anderson, of the London Laboratory. The completion of the two-volume set was a task that engaged Webster for many years. By the time it was finished, it proved too big for most publishers to consider; however, Butterworth's, an English firm with branches in several countries, including the United States, accepted the undertaking.

The two volumes are divided into one that is primarily descriptions of the important and unimportant gem materials and substitutes, plus chapters on styles of cutting, how gems are cut and polished, and weights and measurements. With the exception of the identification of pearls, which is included in Volume I, identification is confined to the second volume.

Many of Webster's discussions are more thorough than those in any other text. Prepared by his many years of intensive work in the London Laboratory, he is one of the few persons in the world who is thoroughly qualified to write such a text based on practical experience. His extensive knowledge of the subject is apparent throughout the book.

Gems is an outstanding contribution to the field of gemology, and one for which Robert Webster deserves the thanks of everyone in this science. It is an exceedingly expensive pair of books at $32.50, yet, in our opinion, it is a "must" for anyone who wants a reasonably complete gemological library.

THE ART OF THE LAPIDARY, by Francis J. Sperisen. Published by the Bruce Publishing Company, Milwaukee, Wisconsin, 1961. 390 pages, 400 photographs and line drawings. Price: $8.

This is a revised edition of one of the most popular handbooks on the lapidary art. Sperisen, a well-known lapidary on the west coast, has devoted more than 52 years to the art.

The Art of the Lapidary includes chapters on precious stones; classification of gems; tools and equipment; sawing, specimen grinding and polishing; engraving, carving and sculpturing; and information on gemstones and their modern use in social living and industry as well as on their physical qualities. Various phases of gem cutting, from the rough stage to the finished product, are presented. Illustrations include not only outstanding work of the artists of the past and present, but also many original pieces that were designed and executed by the author. In addition, various tools pictured are of the author's design, having been developed to meet the immediate needs of the expert craftsman.

Book Reviews

An extensive glossary and seven reference tables complete the book.

The revised edition of the *Art of the Lapidary* retains all the important features of the original plus numerous additions. It has been carefully written and will furnish an exciting introduction to this fascinating field for the novice and a challenge to the more experienced lapidary.

A TREASURY OF JEWELS & GEMS, by Mona Curran. Emerson Books, Inc., New York. 152 pages, 5⅜ x 8", 32 photographs, index. Price: $4.50.

For those who have little or no knowledge of gems and jewelry but who wish to acquire a general understanding of the subject without the study required by most gemological texts, this book should prove enlightening and helpful. The accent is on entertaining reading, unhampered by the technical aspects of the science of gemology.

This book discusses the history and background of famous stones, and traces the development of various styles and articles of jewelry (rings, bracelets, necklaces, earrings, brooches, clips, tiaras, etc.). There are chapters on cutting and setting gems, birthstones, the British Crown Jewels and other royal gems, period jewelry, choosing jewelry, and how to care for jewelry. Other chapters describe briefly some of the more commonly encountered gemstones.

A Treasury of Jewels & Gems is written in lively and colorful style. It contains many fascinating stories about gems, as well as practical information for all who want to be sufficiently well informed to be able to choose them intelligently and to appreciate their true worth and beauty.

ILLUSTRATED PROFESSIONAL DICTIONARY OF HOROLOGY, by G. A. Berner. Printed in Switzerland and distributed by the Watchmakers of Switzerland Information Center, Inc., New York City. 912 pages, illustrated. Price: $10.

Although there are a number of dictionaries and glossaries in the field of horology, this one is unique, since it is written in English, French, German and Spanish. For this reason, and because it is an accurate and exceedingly comprehensive presentation of a vast and complex subject, it should fill a long-felt need in horological circles.

As a basis for this monumental project, the author accumulated a systematically classified body of documentary material during his twenty-five years of teaching horological subjects that encompassed every department of watch manufacturing. The finished book comprises watchmaking terminology proper, which includes watch and clock parts, the tools and machines used to make them, machining and manufacturing processes, etc., as well as the traditional terms used by the craftsman. The work also gives elementary definitions of a certain number of technical terms that belong to other fields of activity, such as engineering, physics, electricity, electronics and astronomy.

The *Dictionary* is arranged in four columns, in such a way that all French terms and their equivalents in other languages can be found opposite one another, at the same height on the page. The first column gives the French text, and the second, third and fourth columns are reserved for the German, English and Spanish translations, respectively. The terms in columns 1 and 3 (French and English) are numbered; those numbers that are underlined refer to the illustrations at the top of the page.

French-speaking readers will have no difficulty in finding any definition, since the terms in this language are given alphabetically in the first column of each left-hand page. Readers whose mother tongue is German, English or Spanish will find it almost as simple to find the term they want, for there is an alphabetical index that includes all the terms used in each of these languages; this index is at the end of the volume.

The above-mentioned numbering system facilitates reference to the *Dictionary* itself; in other words, each word included in the alphabetical index is numbered in the same manner in the body of the book.

THE FACET-CUTTERS' HANDBOOK, by Edward J. Soukup, GG, FGA. Published by Gembooks, Mentone, California. 64 pages. Price $2.

The new edition of this popular book has been expanded to include the contents of the author's original *Elementary Facet Cutting* and the first edition of *Facet-Cutters' Handbook*. It is obvious that every effort has been made to make the present revision a complete, detailed primer for the beginning faceter.

In addition to its primary function as a book for the novice, intermediate and advanced faceters will find much of interest and value, too. There are more than one hundred diagrams and pictures; a table of facet-cutting angles that covers thirty-nine gem species; diagrams for twenty-five cuts, most of which are not available in other books; and complete, step-by-step instructions for the basic styles of cutting.

The *Facet-Cutters' Handbook* should be of inestimable value to every person who intends to pursue this fascinating hobby.

Gemological Digests

Diamond Sales Remain High

Sales of diamonds in the first nine months of 1962 were higher than in comparable periods of 1960 and 1961. Sales of rough made through the Central Selling Organization, in London, totaled $199,640,716. Total rough-diamond sales, including gem-quality and industrial diamonds, for the same period in 1961 amounted to $194,095,078; and for the same period in 1960, $185,626,064.

U. S. Jewelry Exports

The Consumer Durables Division, Business and Defense Services Administration, U.S. Department of Commerce, reports that exports of jewelry and jewelry parts from the U.S. were in excess of seven and one-half million dollars in the first quarter of 1962, a 22 percent increase over the level of a year ago. Substantial exports go to Switzerland, Canada and Israel; the latter has a growing jewelry industry.

South West Africa

A project to recover diamonds from the seabed off the coast of South West Africa, initiated last fall by the Marine Diamond Corporation, is now in full operation and the initial results have proven satisfactory. Up to the end of August, 4485 stones, weighing 2116 carats and having a value of approximately $80,000, had been registered. Work is currently confined to a five-by-one-half-mile section of the seabed and is directed from a specially equipped barge that is anchored at the field.

Two and One-Half-Pound Sapphire

The largest sapphire found so far in Ceylon, weighing two and one-half pounds, was found by villagers in Ratnapura. It was purchased by Mr. A. R. M. Mukthar, a colored-stone dealer, for 2 lakhs and 83 thousand ($59,430). It is expected to produce 1500 carats. The first pieces of the giant find were being cut and polished at the time our informant, Dr. Edward Gubelin, Lucerne, Switzerland, was making this report. In one month alone, the gemstones found in Ratnapura were estimated at over $420,000.

Diamond and Gem Industries in Israel

The idea of fostering a gem-cutting industry in Israel came from the Controller of Diamonds of the Ministry of Trade and Industry, in Tel-Aviv, about two and one-half years ago. Processing colored stones is regarded as a natural supplement to the already developed diamond-polishing industry of that country, which presently employs about 6000 cutters and is second on Israel's export list. Gem Industries, Ltd., began training workers in the lapidary arts about two years ago. Today, a number of the trainees who received this specialized instruction are owners of small enterprises in Tel-Aviv, Nazareth, and other cities. A plan is presently under way to establish an artists' quarter in Jerusalem near the larger tourist hotels, where painters, jewelers and lapidaries may display and sell their crafts. (Report from Israel, by Z. Lubinsky.)