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SUMMER, 1963

See Inside Cover

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IN THIS ISSUE

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Massive Grossularite

by
Robert Webster, FGA

For some forty years a green massive grossularite garnet has been known, which, because of its resemblance to jade and because it is found in the Transvaal, has been miscalled "Transvaal jade" or "South African jade." Quite recently, this material has appeared in a number of different shades of green and many other colors, particularly pink, red, yellow, off white and brown. Much is variegated and some contains dendritic inclusions, similar to that in moss agate.

The first time the writer encountered massive grossularite in colors other than green was in 1956, when some polished plates of a pinkish material were identified and reported on[1]. During this investigation, a reference was found to an original article on the grossularite of the Transvaal, by A. L. Hall[2], in which it was mentioned that some was pink, grayish or bluish.

The massive grossularite reported on by Hall is found on the Buffelsfontein and Turfontein farms, which lie some forty miles due west of Pretoria. I am indebted to Mr. Lécolle-Brown, of Johannesburg, for advising me that these "farm" names, which are repeatedly quoted in official publications, are somewhat academic divisions that now have no significance, since they have long been divided into dozens, or even hundreds, of smaller sections. It is only in the northern parts of the area that grossularite is found, the diggings being adjacent to the chrome horizon near the small village of Brits and only a few yards from abandoned chrome mines. Hall states that the local country is almost featureless and belongs to the norite margin of the Bushveld. The grossularite is in association with bands of chrome iron ore.

The best material, according to Hall, is the Buffelsfontein occurrence, which lies 2.7 miles west of Wolhuter's Kop store and about 1½ miles north of the Rustenburg main road. In general appearance, the grossularite seems to be a homogeneous compact rock in which no minerals are recognizable. The texture is horny and the fracture somewhat conchoidal and splintery. It has a waxy luster and included black specks, which may be magnetite but most probably chromite. The color of the green material is said to be caused by chromium and the pink by manganese.

At the time of Hall's investigation, there were three main workings: one that produced the best green material; one that produced a green of paler color; and a third that produced some green but also pink and gray, including a delicate mother-of-pearl shade. The green and pure pink material are said to be nearly pure garnet, but the gray contains up to 25% zoisite. Hall infers that the origin of the rock is not certain, but that there is some basis for regarding the rock as xenoliths of garnet hornstone, derived from an original aluminous calcareous sediment by contact metamorphism combined with metasomatism.

During the closing months of 1962, the writer had the opportunity to examine some rough, massive grossularite that ranged in color from yellow to pale green, apple green, pink and red. Later, two cabochons of this material, one yellow and the other pink, were purchased. Cabochons in various colors were then being offered on the London market.

In May, 1963, Mr. Lécolle-Brown kindly sent over some parcels consisting of thirty tumbled pieces that showed the range of colors. Also included was a sawn slab that was banded in different colors; these colors, which graded into one another, were various light tones of pink, reddish, greenish and yellow.

There was a considerable variation in the transparency of the various pieces; most were translucent and a few were opaque. An examination was made of a number of these stones, and the data obtained correlated with the records of earlier investigations on massive grossularite.

The refractive index, insofar as the indistinct shadow edges could be measured, varied between 1.72 and 1.73. The density obtained by determinations on over fifty specimens, is tabulated below; it is somewhat greater than that usually given in gemological literature.

It will be seen that the green-colored material has, in general, the higher range of density and the red and pink has the lower values, but that no well-defined density grouping by color could be assumed. The high densities of the last two specimens can be accounted for by the fact that they were interbanded with seams of chromite; this particular material, which has some resemblance to the jadelike mineral called smaragdite, comes from areas adjacent to chrome seams. The other exception, the specimen with the very low density, was less easy to explain. To ensure that there was no error, two separate determinations were made; these gave values of 3.060 and 3.059, so that was not the answer. It must be assumed, therefore, that there was some impurity in this piece that caused the lower value.

Color	Weight carats	Density
Mixed light and dark green	14.90	3.06
Surface white	22.02	3.24
Pink	5.46	3.30
Mixed green	6.32	3.30
Beef-steak red	6.37	3.30
Red	7.32	3.31
Mixed green (variegated)	55.22	3.32
Mutton-fat yellow	2.66	3.34
Chocolate brown (rare)	40.71	3.35
Pale green	0.75	3.36
Pink	32.35	3.36
Apple green	4.47	3.36
Pink	2.20	3.36
Pink	33.05	3.37
Pink	69.35	3.39
Pink	68.58	3.39
Dull sea green	11.79	3.39
Pink	29.36	3.40
Pink	9.17	3.40
Pink	74.36	3.40
Mutton-fat yellow	6.40	3.41
Olive green	6.46	3.41
Pink	30.77	3.41
Dull white	15.80	3.42
Sea green	18.67	3.42
Green	0.61	3.42
Translucent pink	17.78	3.43
Green	2.42	3.44
Green	116.81	3.46
Green	61.03	3.46
Green	2.22	3.47
Green	—	3.47
Green	—	3.47
Green	—	3.48
Green	8.94	3.48
Mixed green (variegated)	11.57	3.48
Bright apple green	8.26	3.48
Green	2.24	3.51
Green	7.29	3.51
Green	—	3.52
Peachy cream	9.61	3.52
Deep green	7.24	3.54
Vivid dark green (opaque)	6.39	3.55
Green	—	3.55
Light green	13.52	3.57
Green	7.32	3.57
Mixed green (variegated)	6.72	3.60
Green & black (chromite seams)	32.32	3.62
Green & black (chromite seams)	14.38	3.66

Microscopic examination of the structure of the pieces (immersion in monobromonaphthalene being used to enable better inspection of the interior) showed the material to be fairly fine grained, but that the color, particularly the green, was often patchy and somewhat reminiscent of masses of cotton wool; i.e., raw cotton. Some material, particularly the red and pink showed unoriented swathes of color, but in no way were the structures characteristic. The black specks previously referred to were probably chromite. The specks were usually irregular in outline but sometimes showed the square outline of the cube or octahedron; they were fairly conspicuous in the green material but much sparser in the reddish and yellowish kinds. Viewed between crossed Polaroid plates, no additional information of value was gained.

The absorption spectrum varied to some extent with the color. The green material showed in varying strength, a band about 400 Å broad, centered at 6000 Å. There may have been faint lines in the red part of the spectrum, but they were too ill defined to be measured. The blue and violet spectral regions were largely absorbed. The yellow and greenish-yellow grossularite was characterized by a moderate absorption band at 4635 Å; it was seen dimly in the obscurity of the blue-violet in some green stones, but was not seen clearly in the pink and red material.

Under radiation from either the long-wave ultraviolet lamp (3650 Å

Continued on page 61

Developments and Highlights

at the

GEM TRADE LAB

in New York

by

Robert Crowningshield

Prehnite

A mineral that we seldom encounter in jewelry but that is occasionally cut for collectors may resemble, and has many of the properties of, nephrite; this mineral is prehnite. Usually, it is a light yellowish-green stone and perhaps too translucent to resemble the same color of nephrite. We have noticed that, with care, one can see a weak absorption band at approximately 4300 Å with the hand spectroscope. In its position and strength, the band resembles that of the reflected-light absorption spectrum of turquois; no such line has been reported in nephrite. *Figure 1* is a drawing of the absorption spectrum of prehnite.

Dark-Greenish-Brown Diamond

Figure 2 is the absorption spectrum of an unusual dark-greenish-brown diamond. We could detect no absorption bands but the bright line at almost 6300 Å is a fluorescent band, which is undoubtedly related to the stone's intense-orange fluorescence under short-wave ultraviolet.

Unusual Jadeite Inclusion

Figure 3 shows a most unusual inclusion that was seen in each of thirty translucent jadeite beads in a necklace. Around each included crystal, presumed to be chromite, radiated an intense green "stain." We have never encountered this phenomenon before.

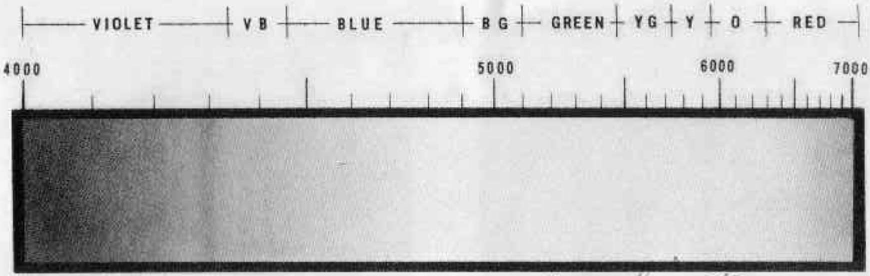


Figure 1

prehnite

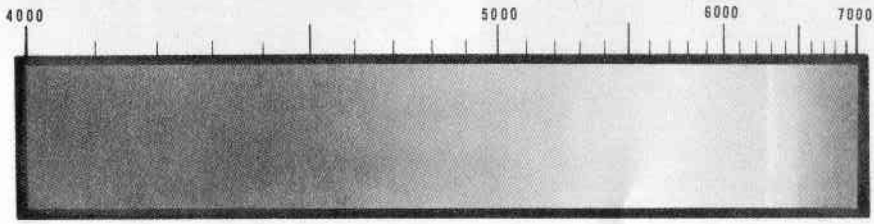


Figure 2

diamond (dark greenish brown)

Figure 3

Figure 4

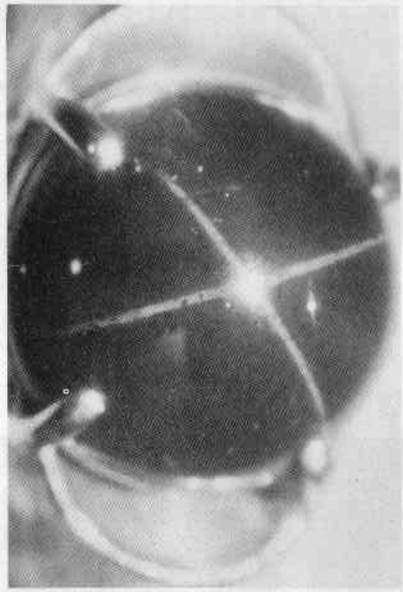


Figure 5

Nautilus-Shell Earrings

Figure 4 is a picture of a front and a back view of a pair of earrings, showing an elaborate setting for sections of the grayish nautilus shell that is often incorrectly represented and sold as "gray pearls." In this case, the backs of the shell sections were finished with similar-appearing shell.

Star Almandite

Figure 5 is a photograph of an unusually sharp star in almandite garnet. Under 60x magnification, the needles causing the star were not visible, but an unusual distribution of black, stubby crystals was seen *(Figure 6)*.

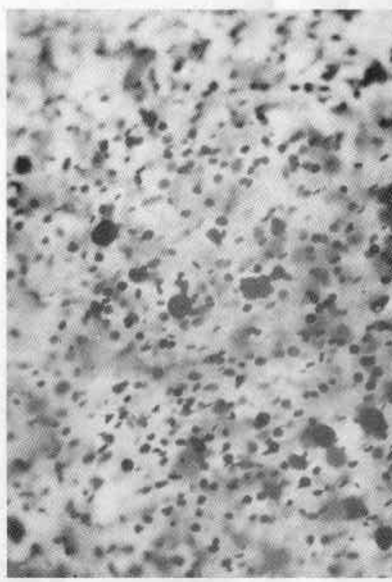


Figure 6

Bull's-Eye Effect in Star Ruby

Occasionally we are asked why a star

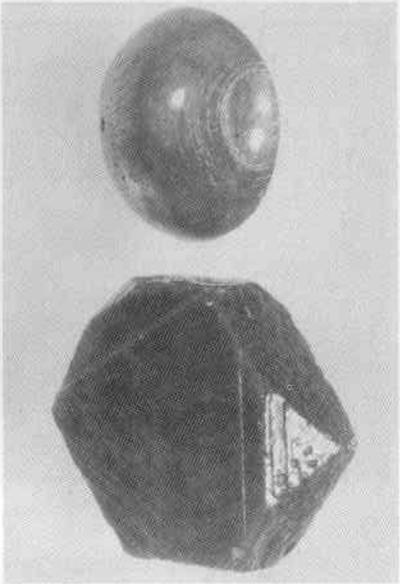


Figure 7

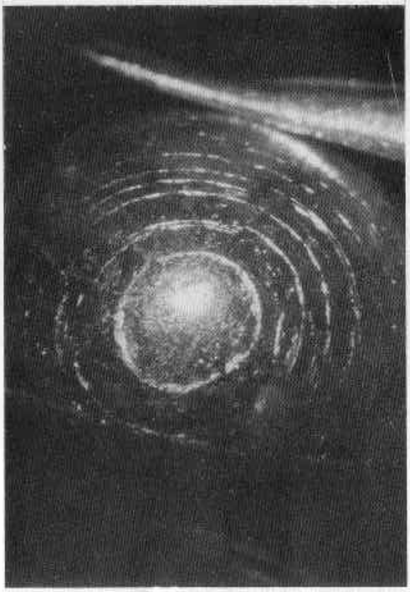


Figure 8

ruby has a bull's-eye. *Figure 7* is a photograph of a dark-purple-red star corundum, probably Mysore material, in which this effect could be seen in two positions. It occurred to the writer that readers of *Gems & Gemology* may have seen such stones and might appreciate an explanation. Although the bull's-eye effect seems to be most prominent in this dark-purple-red material, it may occur in other colors of cabochon-cut corundum. In the Mysore material, there are usually two well-developed rhombohedral faces on flat, more or less tabular hexagonal crystals. Parallel with these two dominant rhombohedral faces are well-developed repeated-twinning lines. Since the material has a well-developed parting along these twinning lines, false-cleavage surfaces appear as the cabochon is polished. *Figure 8* is a photograph of a Mysore crystal with the rhombohedral face tilted toward the lens. Below the crystal is a star stone cut from similar material, showing the bull's-eye reflections from the false-cleavage planes that correspond to the reflection on the rhombohedral face of the crystal.

Salt-Water Clam Pearl

Figure 9 illustrates an unusual "craters-of-the-moon" appearance on the surface of a large salt-water clam pearl. Usually, the surface of these concretions is quite smooth and lustrous.

Petrified Dinosaur Bone

An intriguing material that is used

Figure 9

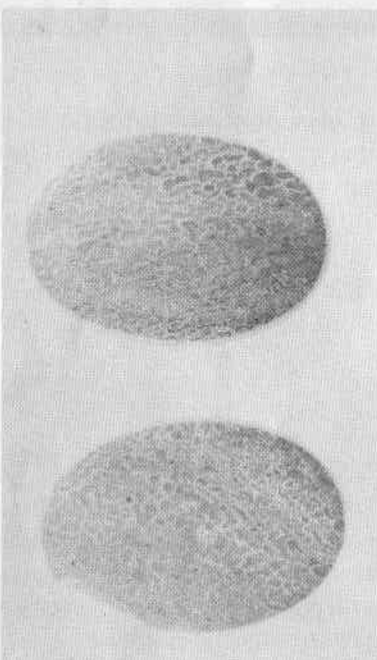


Figure 10

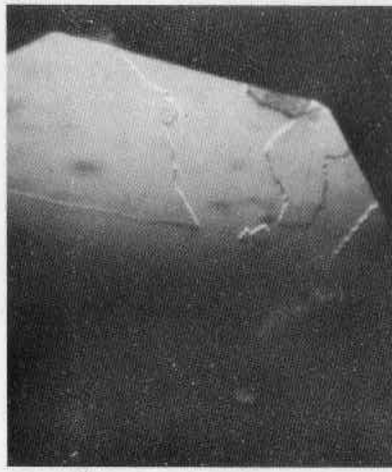


Figure 11

Figure 12

mostly by amateur lapidaries is petrified dinosaur bone, which is found in several localities in the Western part of our country. *Figure 10* shows two stones that were said to be cut from this material. They have a mosaic structure of reddish to yellow chalcedony, surrounded by some form of calcium car-

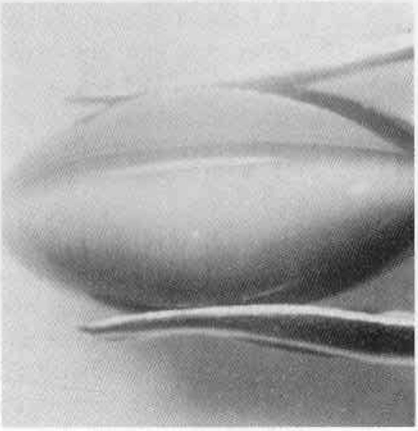


Figure 13

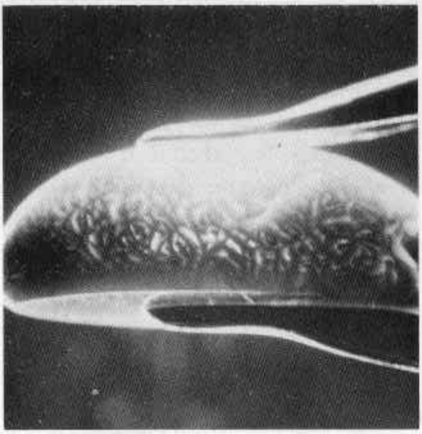


Figure 14

bonate. They were brought to the Lab by a New York jeweler whose work we have been admiring for several years because of her ingenuity in using unusual but inexpensive materials in her designs. Because of the calcium carbonate "binder," in these stones, they are much more fragile than specimens in which solid chalcedony has replaced the bone completely.

Knots and Dragmarks on Diamond

An unusually fine-color diamond that was submitted to determine the origin of its flaws proved to be one of the most highly "knotted" stones we have ever seen. On virtually every facet, knots could be detected. *Figure 11* shows a portion of the table with the very prominent plateaus of the knots. *Figure 12* proves that the major fracture was present when the stone was last polished, since the dragmarks originate at the crack and pull out to the left.

Quartz Cat's-Eye

Figure 13 shows a grayish-white quartz cat's-eye with the fibrous structure just apparent under 10x. *Figure 14* shows that the fibers from the side are aligned in vermiform (wormlike) bundles, unlike any we have encountered before.

Banding in Synthetic Emerald

Figure 15 illustrates some unusual angular color banding in a synthetic emerald of excellent color.

Figure 15

"The Patient Died"

Figure 16 shows the result of a very successful test—but, the "patient died." A client had placed concentrated hydrochloric acid on the apex of a mabe pearl, believing that if it were unaffected it would be natural. Instead, the acid ate completely through the "shell," exposing the colored-plastic inner coating.

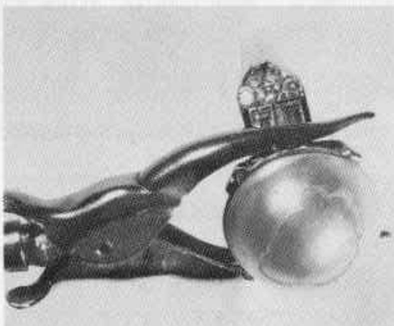


Figure 16

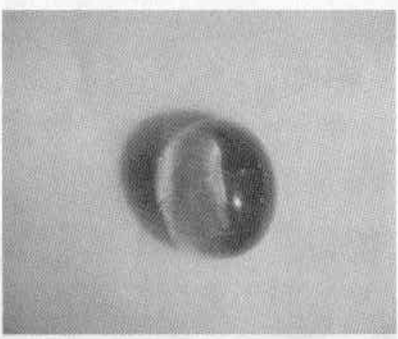


Figure 17

Yellow Cat's-Eye Apatite

One of the most unusual stones that we have identified in recent months proved to be a 20-carat yellow cat's-eye apatite with the "milk-and-honey" effect of a chrysoberyl cat's-eye *(Figure 17)*. Its color was not the typical greenish yellow of the Mexican material but more the characteristic yellow of much Brazilian chrysoberyl. We do not know its locality.

Stained Lapis-Lazuli

The appearance on the market in increasing quantities of stained lapis-lazuli has been suspected for some time, and the staff recently determined that one easy test is to use a cotton swab moistened in a fingernail-polish remover: the color comes off on the cotton without damaging the stone. Dyes so far discovered in this manner have been impervious to the same test with acids.

Unusual Stones

Unusual materials we have seen since the last issue include a faceted, colorless petalite; several rough and cut diopside cat's-eyes, several with spectroscopic evidence of chromium; a large gray-blue gahnospinel; dyed gypsum; and the rare mineral, strontianite.

We Appreciate

We wish to thank **Mr. Frank Lane,** of Eldot Company, Lapidaries, New York City, for a fine selection of synthetic rutile that will be used to great advantage in our expanding Colored-Stone Identification Course.

From **Mr. William Baum,** S. Joseph & Sons, Des Moines, we received an unusual specimen of garnet that will be valuable for inclusion study.

Diamond Mining in Brazil

by
Thomas Draper

Continued from Spring, 1963

Diamantina still produces its monthly quota of diamonds, which varies according to the season, recovered by *garimpeiros* and is now being materially increased by the Maria Nunes Mine, belonging to Mineração Machado. Maria Nunes has not only survived its long spell of losses, but has even assumed the lead in the production of diamonds in the region. Originally, it formed part of the Cascalho Syndicate, which the Syndicate itself did not have the opportunity of exploiting because of its failure, during the first World War, to acquire the dredge recommended by Christie Spangler. Spangler's intimate knowledge of the river was fully verified by his personal success at a later date, when he recovered 11,000 carats of diamonds and 67 kilos of gold from a stretch of the Jequitinhonha River that was previously under option to the Cascalho Syndicate.

For many years Maria Nunes operated at a loss; it ran heavily into debt before it succeeded in getting a power quota and financing its installation. Even average values of a quarter carat in diamonds and 2½ grams of gold per cubic meter did not suffice to cover costs until its present owner, Sr. Carlos Olivé de Souza, tried a new system by which he turned over the mine to his employees on a royalty basis according to the size and quality of the diamonds; his only obligation now is to keep the pit dry and to strip off the overburden. A couple of shallow cement tanks enable the miners to wash their gravel on the floor of the pit itself. Each party, individual or collective, is given a *frente* (face of a pit) and can work it according to the operator's own ideas, provided he washes his gravel in the cement tanks and turns out his sieve in the presence of an overseer seated at the head of a long sorting table. The undersize diamonds and the gold that passes through the fine sieve do not enter into the royalty agreement and are treated by the plant at intervals.

The Maria Nunes Mine, because it comprises part of the original bed of the Jequitinhonha, constitutes an en-

Author's last camp on the Jequitinhoha River

couraging example to the Tijucana and Dragagem Fluvial companies that were formed to dredge the river. A comprehensive drilling and pitting program, carried out by the Pacific Tin Company on the Tijucana section of the Jequitinhonha, has finally convinced the directors of the company that they are fully justified in taking up their option. According to the latest information, Pacific Tin will combine with the Magalhães-Thurman group, owners of the Dragagem de Ouro dredge on the Rio das Velhas, to acquire an 18-cubic-foot dredge of the latest type.

The Dragagem Fluvial, financed by the late Mr. William Ewart McGregor, who died in 1961, imported a 16-inch suction dredge from California, which has locally been enlarged to accommodate four Yuba jigs, shaking screens and accessories; it was recently launched on the river and is now being tuned up for action. If this dredge proves to be successful, credit should be given to Mr. McGregor for his altruistic attitude in trying "to do something for Brazil," by putting the Jequitinhonha River back on the map, after the terrible beating it has taken from the fly-by-night promoters who were more interested in fleecing their fellow countrymen than in making honest attempts to provide adequate machinery and competent administration. At the moment, the writer is confronted by a melancholy list of over forty companies that have been formed to mine for diamonds and gold in this field. Of these, some 26 were formed in the States with capital representing many thousands of dollars provided by the gullible citizens of Chicago, Boston, Oil City, Milwaukee, Wellsville, New York, and other cities. Only two of these enterprises, the Pittsburgh Brazilian Dredging and Diamond King companies, ever justified their promises of providing plants that were put into operation on the river, but were found inadequate for their

One of the pictographs along the Jequitinhoha River

intended use. The fate of the Diamond King was told in the previous contributions, and that of the Pittsburgh Brazilian Dredging Company is even more interesting. Its plant, although small, appears to have been reasonably adequate for the purpose, but the administration, even to this day, is spoken of with bated breath in Diamantina. Its manager, George Mayer, according to an article that appeared in the public press a few months ago, never gave a tip of less than 100 *milreis* in value, which in those days was equivalent to a local worker's monthly wage. He was said to have promised to move the city, at his own expense, from its present hillside slope to a more suitable locality; promised *mundos e fundos* (practically everything) and ended by being accused of misappropriation of funds, from which charge, however, he was cleared.

Another company, formed in the States, held a concession on the entire length of the Macaubas River and on the Jequitinhonha from the mouth of the Macaubas to Acaba Saco, near the source of the Jequitinhonha itself. Its engineers wrote an enthusiastic report but nothing else seems to have happened.

The Diamond King, it should be mentioned, is the owner of 26,000 acres of diamondiferous alluvials for which it has no representative either in Brazil or in the States. Repeated letters to Wellsville, New York, have failed to bring a reply.

Undismayed by the impressive, and oppressive, list of abortive attempts, the writer, a prophet crying in the wilderness, has for many years struggled to draw attention to the vast field open to dredging companies in Brazil, including the majority of its rivers in which both gold and diamonds occur, with the possibility that either one or other of these minerals will cover working costs.

An instructive example of the value of the old production records is furnished by the following figures, in which values are reduced to a common factor by ascribing U.S. $1 per gram to gold and U.S. $30 per carat to diamonds, regardless of size, quality or color. The production refers to 13 properties on the Jequitinhonha River between its source and the Caethémirim River:

	Cubic Meters	*Cost of Production (grams)*	*Gold in Grams*	*Diamonds in Carats*
Totals	6,626,115	2,664,237	388,030	218,182

Diamonds — 218,182 carats at $30 per carat . . . . U.S. $6,545,400
Gold — 388,030 grams at $1 per gram . . . . U.S. $ 388,030
Total yield U.S. $6,933,430

Yield per cubic meter:

Diamonds . . . . $\frac{\$6,545,400}{6,626,115} = \$0.98$)

Gold . . . . $\frac{388,030}{6,626,115} = \$0.06$)

Ratio of diamonds to gold: *16 units to 1*

A number of other examples maintain practically the same ratio, and no more convincing argument than this need be given to show the overwhelming preponderance of diamond values over those of gold in these river workings.

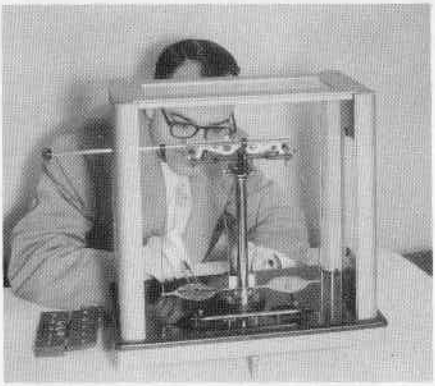
Acaba Mundo ("End of the World"), mentioned in the first series, where João Fernandes de Oliveira lost seventy slaves because his flume collapsed at the critical moment when his gravel lay exposed "with diamonds scintillating in it like stars in the sky," has apparently been rediscovered at last. Despite the legend that João Fernandes and his immediate successors had given the locality a wide berth after this disaster, it was found to have been stripped down to bedrock. It took the Ribas brothers three seasons and a considerable expenditure of money to get to the bottom of the deepest pit hitherto found in the Jequitinhonha. Only on the third attempt did they succeed, but in the end were confronted by human bones, clay pipes, and fragments of waterwheels that had drifted down from some similar disaster further upstream. Dame Fortune, however, smiled on three novices in river mining from behind the Iron Curtain, who recovered 6,000 carats of diamonds from a *restinga* (left over) of the Bandeirante miners. This is only one example of many such bonanzas that have been found in the rivers of the region.

An interesting sequel to the discovery of diamonds in Brazil by Bernardo Fonseca Lobo, in 1721, is shown in the accompanying photograph, which shows modern garimpeiros at work on a rich alluvial patch, discovered in 1956, on the only level piece of ground on which Lobo's camp could have stood. It will be remembered from previous contributions that the actual identification of the bright pebbles used by Lobo's gold miners as chips in card games was made in 1721 by a priest who had been to Golconda. Later re-

Modern garimpeiros at work on a rich patch of alluvial diamonds that was discovered in 1956

search, however, revealed that in 1714 a woman, Dona Violante Machado, was the first to suspect that similar pebbles found during her husband's gold-mining operations might be diamonds. She is said to have proved it by submitting them to the anvil test and by distributing a number to officials in the region. These officials, for obvious reasons, failed to reveal the news to the court in Lisbon until obliged to do so by the fact that they themselves were responsible for saturating the Lisbon market with contraband diamonds.

Developments and Highlights



at the

GEM TRADE LAB

in Los Angeles

by

Richard T. Liddicoat, Jr.

Exceptional Diamonds

Since the last issue of *Gems & Gemology,* we have had numerous diamonds for color analysis and many others for complete grading; among them have been some exceptional stones. One, a lovely 16-carat stone, had a color better than grade "D," which represents the top of our colorless-to-yellow scale. Also, it was cut in an unusual manner; viz., the corners of the emerald cut had three sets of facets, instead of the usual one. *Figure 1* shows one corner (crown and pavilion) of this style of cutting. Another was a 40-carat stone with a rich-yellow color, resulting from irradiation and heat treatment.

Recutting Old-Miners or Old-European Cuts

To one who enjoys the beauty of fire in a diamond, the usual stone recut today is likely to be a real disappointment. To them, when a lovely diamond that was cut many years ago is seen before and after recutting, the appearance of the recut stone may be an unhappy sight. By removing more weight than necessary, the recutter has been able to fashion the stone into a thin-crowned, huge-tabled travesty. If a round-girdled, high-crowned old stone with a 41° pavilion is recut at all, the major task is to bring the lower-girdle facets closer to the culet. We question that the crown

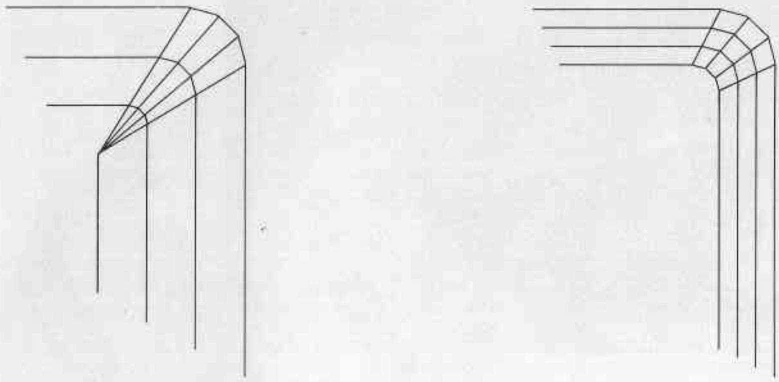
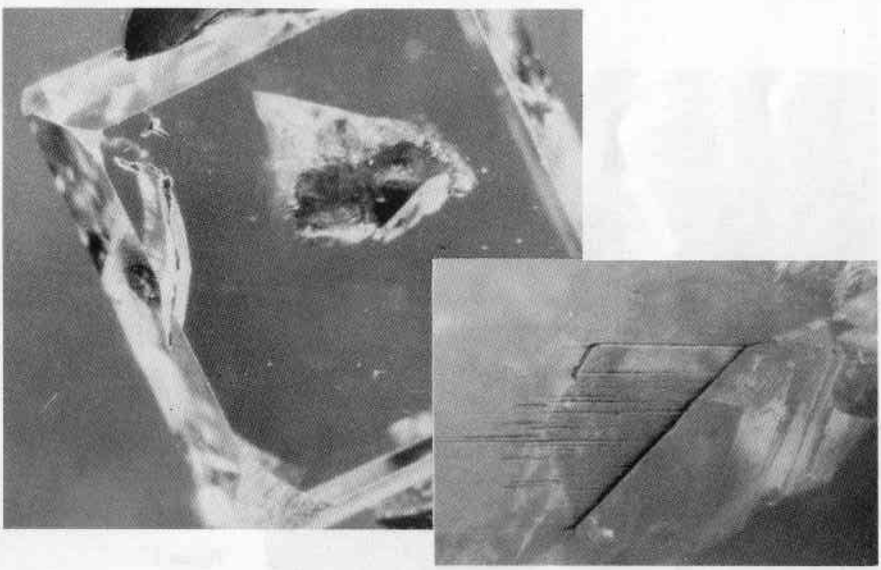


Figure 1



Figures 2 and 3

should be recut, unless the bezel angle is well over 34° or the table under 50%. There are still many who appreciate the fire made possible by good angles on a high crown — enough to make such stones readily saleable.

Diamond Inclusions

Figure 2 shows a diamond plate with a fissure on the left and a huge included crystal on the right. *Figure 3* is an enlargement of the point at which the included crystal reaches the surface,

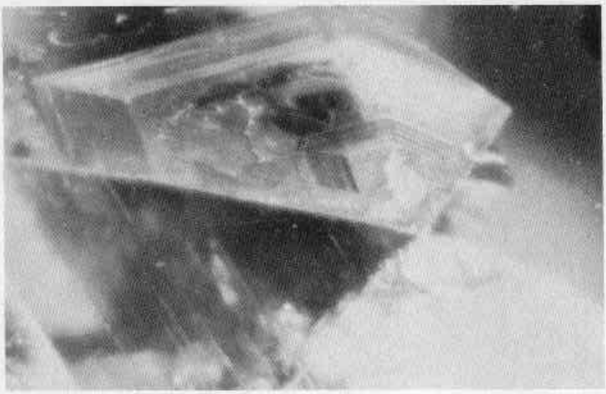
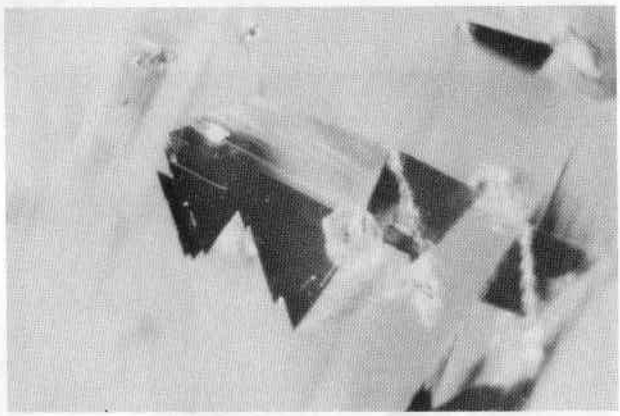


Figure 4

Figure 5



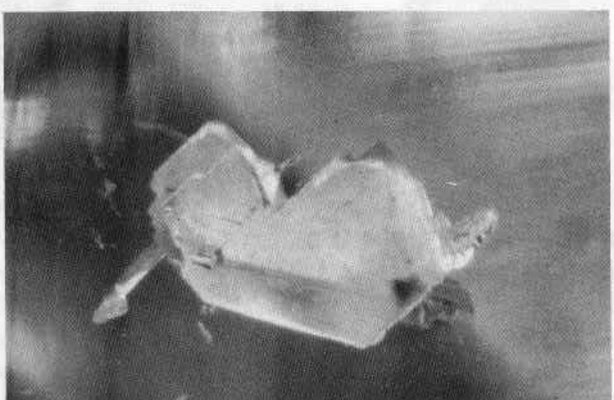


Figure 6

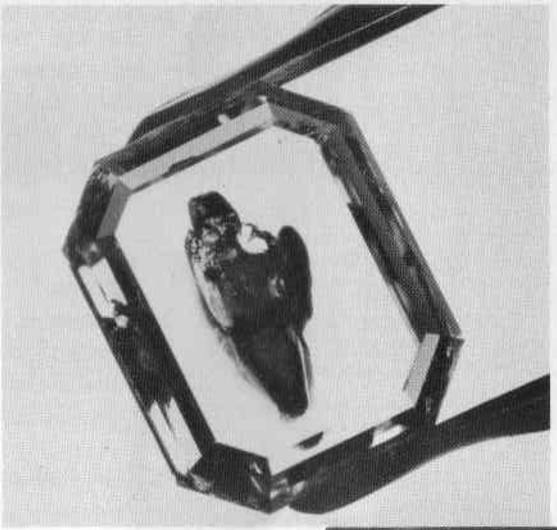


Figure 7

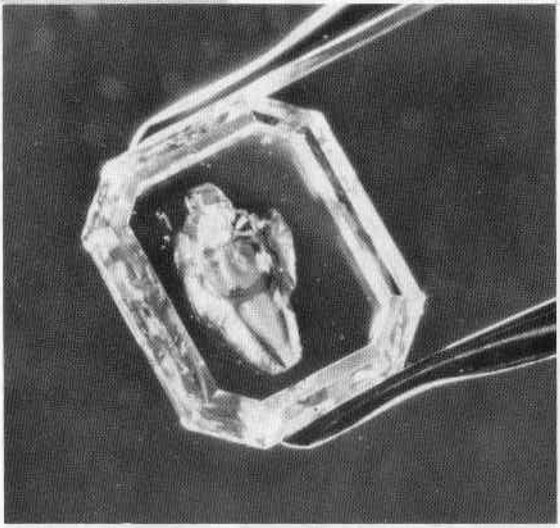


Figure 8

showing a clear outline of a knot, resulting from the difference in hardness between the polishing grain of the host crystal and that of the differently oriented included crystal. *Figure 4* is an enlargement of the knot, focused slightly below the surface to show growth markings on the included crystal. *Figures 5 and 6* are two views of some huge negative crystals in a diamond. In the first view, they appear to be actual crystals, but the second view shows that they are large cavities. *Figures 7 and 8* show a small diamond

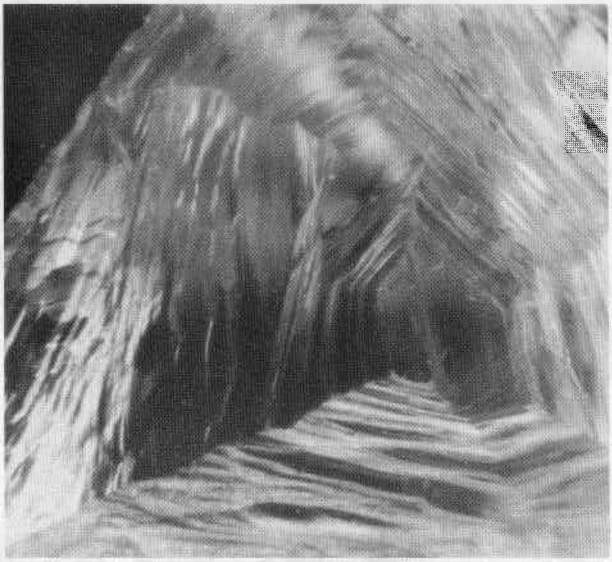


Figure 9

section that was cut to remove a large flaw from a crystal and then it was faceted at the edges. This "portrait" stone could only be called "Santa Claus." *Figure 9* was taken normal (perpendicular) to an octahedral face of a diamond crystal. The striations in three directions around the face represent rhombic-dodecahedral directions. This shot shows very well the typical growth marks associated with the rhombodedral face on diamond crystals.

(*Figures 2 through 9* are photos that were taken by Jeanne Martin of a portion of an interesting collection belonging to the J. C. Keppie Company, Clark Building, Pittsburgh, Penn.)

"Doubting Diamond Digger"

Somewhat hesitantly, we must report that the information on a recent Laboratory report was declared insufficient by the recipient. He had sent us a piece sawed from a larger piece of massive rock crystal quartz that was readily identifiable by specific gravity, the typical bull's-eye interference figure and other properties. However, the identification failed to satisfy the owner, who *knew* he had a new diamond find. He wanted a complete report on every property, from chemical composition to dielectric constant. Included among the determinations requested for this colorless material was pleochroism!

Imperial Jadeite

After a prolonged period of seeing mostly medium- to low-quality jadeite, we recently had several opportunities to examine a fine Imperial quality — stones so transparent that they resembled emerald more than the usual green jadeite. This, accompanied by an intense, rich-green color, makes the Imperial quality particularly attractive, desirable and valuable.

Overevaluation

Frequently, laymen send stones to the Laboratory for identification, and sometimes the evaluation placed on the parcel is highly exaggerated. It is not difficult to understand a tendency to overvalue items that have been inherited, but sometimes the extent of such overevaluation is astounding. If a large synthetic ruby were insured in the mails for $50,000 or $100,000, on the assumption that it was a natural, it would not be difficult to understand. What is surprising is to receive a stone that is devoid of any attribute commonly accepted as beauty but that is valued at some preposterous figure. As a case in point, we received a black, nearly spherical object of about 13 millimeters that was identified as black glass. The owner, thinking it to be a black pearl, had insured it for $10,000. Even if the object had been a concretion from a mollusc, its lack of pearly luster and orient would have made it almost valueless.

Utilizing the Plato Method

While testing a natural ruby, we had occasion to utilize the Plato method as a check test. Although the effect was appreciably different from that expected of a synthetic ruby, a single, distinct set of parallel lines was sufficiently similar to the pattern seen in synthetic corundum to be somewhat disturbing. Admittedly, there were not three sets of lines at 60° to one another, but in some cases, all three sets of lines are very difficult to resolve on synthetics, as well.

Unusual Stones

We recently tested a most unusual group of rare stones. In contrast to many of the collector's items, that are cut merely to add new species to the materials already fashioned as gemstones, many of these stones were particularly lovely. One of the outstanding stones was lazulite; when transparent, it has a rich greenish-blue color that is unique among gemstones. There was also a blue apatite with a very attractive color, not too different from the lazulite. The finest benitoite we have seen in years, a four-and-one-half-carat emerald cut, was also in the group, together with a colorless benitoite that although not exceptionally attractive, was very unusual.

Another rarity was a chrome-green sphene, one of the better greens we have seen in this gem material. A chrome-green idocrase was by far the most attractive gemstone of this species we have encountered. Others were a faceted transparent rhodochrosite in its typical pink color; a violetish-pink, emerald-cut tremolite; a brownish-red feldspar; a yellow zoisite; a colorless amblygonite; a datolite; and an epidote.

Figures 10 through 13 portray the

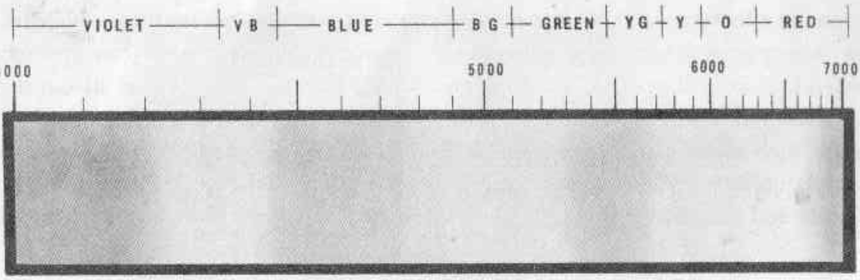


Figure 10 (Rhodochrosite)

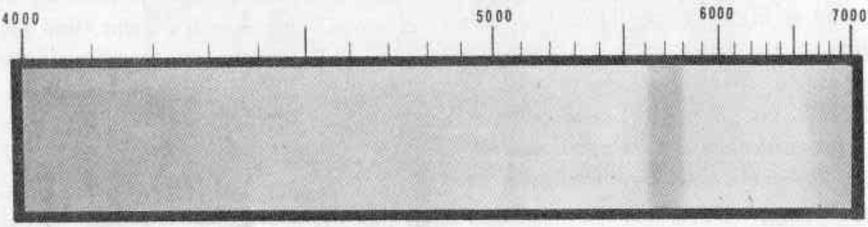


Figure 11 (Feldspar)

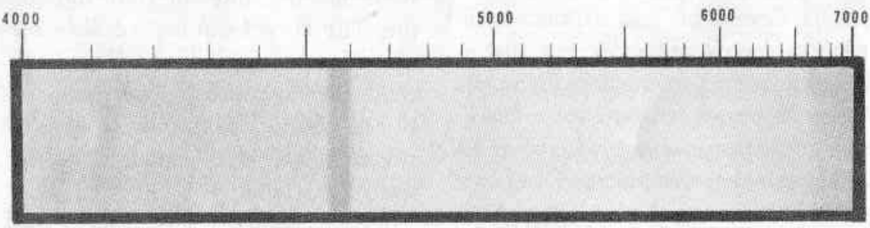


Figure 12 (Zoisite)

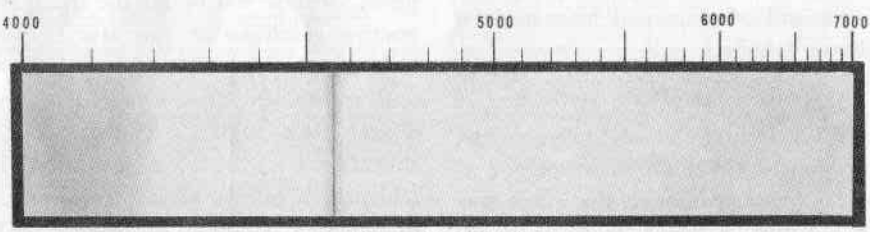


Figure 13 (Epidote)

absorption spectra of particular interest from this group of stones.

We Appreciate

Our thanks to GIA student **Eugene Smith,** Piedmont, California, for the fractured, 1.39-carat diamond. It is a welcome addition to our practice-stone sets.

We are indebted to **Fred Fisher,** Tucson, Arizona, for a selection of stones that were given to the GIA during his recent attendance at the Los Angeles Diamond Evaluation Class. They will be used to advantage in both our practice-stone sets and our display.

Los Angeles Diamond Evaluation Class

Members of the Los Angeles Diamond Evaluation Class that met July 8th through July 12th, 1963. Front row left to right: **Mrs. Clarona Carr,** Pasadena, California; **Willa May Darr,** Los Angeles; **Mrs. Willa McEwen,** San Diego, California; **W. C. Nicoll,** Los Angeles; **Milt Jaffee,** Los Angeles; **H. R. Sandler,** Houston, Texas; **Joel Bobo,** Houston, Texas; **Lois Bobo,** Houston Texas. Back row left to right: **Roberta Asbury,** Phoenix, Arizona; **R. J. McGrane,** Japan; **Frederick Fisher,** Tucson, Arizona; GIA instructor **Glenn Nord; Lois Franke,** Los Angeles; **Owen Leon,** Los Angeles; **Don Harris,** Riverside, California; **Harry Schiffman,** Greensboro, North Carolina; **Patricia Mauser,** Studio City, California; and GIA Director **Richard T. Liddicoat, Jr.**

The Lizzadro Museum of Lapidary Art

Wilder Park, Elmhurst, Illinois

by
Russ Kemp

The Lizzadro Museum of Lapidary Art, located in Wilder Park, Elmhurst, Illinois, is a public museum founded to house and display gems, gem materials and objects of art made from gem materials. The museum was officially opened November, 1962, with this dedication statement by Joseph Lizzadro:

> *To share with others our enjoyment of the eternal beauty in gemstones and our appreciation of the art with which man has complimented the works of nature.*

The Museum owes its existence to the generous desire of the Joseph Lizzadro family, who wished to create an institution to act as a center for the rapidly growing interest in the lapidary fields. In addition to the well-organized and educational displays, a complete lapidary and jewelry-making workshop is available, where these subjects are taught by the Curator, Mr. Dan Antolik, and a competent staff of instructors. Precious and semiprecious rough gem materials can be obtained here from which to fashion cut-and-polished stones.

When you visit the museum, you will notice the fine examples of nearly every known gem species and variety, from fossil amber to sapphires, rubies and emeralds. Mr. Antolik and the Lizzadros have arranged these gems in specially designed and lighted cases, to show to their best advantages the interesting points of each. No case is crowded, and diorama-type displays are used frequently.

The Museum is open every day except Monday; tours can be arranged for visiting groups. The main exhibit hall houses the display cases that contain the properly labeled finished gemstones and the rough gem materials or

Lizzadro Museum of Lapidary Art

The main exhibit hall of the Museum

crystals from which the stones were fashioned. Here you will also view one of the outstanding collections of Oriental lapidary art on display in this country.

The dioramas are contained in recesses in the walls. In them, executed to scale by craftsman of Idar-Oberstein, Germany, are exhibited lifelike animals made of gem materials and shown in their natural habitat. They include dinosaurs and other prehistoric animals carved of agate and jasper, as well as a tiger carved of golden tiger's-eye, an eagle of blue tiger's-eye and a gorilla of obsidian. Farm scenes and woodland and desert animals are beautifully carved and displayed.

The cases of gemstones are arranged in family groups, beginning with quartz, showing a transparent crystal from the Hot Springs, Arkansas, area: citrine, smoky quartz and amethyst specimens from Brazil; and cairngorm from Scotland. Faceted examples of each are displayed in many sizes and varieties of cuts, showing the viewer their hidden beauty.

The exhibit of sapphires, rubies and garnets, displaying cabochons of natural

Beryl display consists of emerald, aquamarine, morganite, green and golden beryl

A 60-pound light-blue topaz crystal

star material and the crystals from which they have been cut and polished, has been evaluated at more than $40,000. Visitors are amazed at the variety of color of star sapphires, ranging from shades of blue through plum, gray and black. Few people realize that garnet can vary in color from green through the dark red. In a nearby case is the moonstone and cat's-eye display.

The beryl display, in all known forms and colors, includes a faceted aquamarine weighing 250 carats and a gigantic emerald crystal ornamented with gold figurines. Examples of kunzite (spodumene) in the rough, as well as a 150-carat faceted stone, are shown. The case of topaz is outstanding, the delicate shades ranging from yellow and peach through the blue and whites that are generally associated with topaz; one gem-quality crystal weighs slightly more than 60 pounds. It would be impossible in this short article to describe all that can be seen here or to describe each and every type of material on exhibit.

The Lizzadro Foundation has spared no expense in acquiring and displaying fine examples of each gem species from all over the world. This may well be the only museum in existence that is dedicated completely to gem collectors and lovers of the lapidary arts.

Other displays feature turquois, opal, coral and the previously mentioned amber. Malachite and jade are well represented in exquisite Oriental carvings, as well as in cut and polished stones in jewelry. Jade in all hues of the rainbow is present. Included in this display is a jade boulder weighing 1300 pounds from the Frazer River area of British Columbia and an 80-pound elephant censer that was used in temple ceremonies of past centuries in the Orient.

Separate cases have been devoted to agate from Brazil, Montana, Wyoming, Lake Superior and other areas. Other cases have polished slabs and specimens of obsidian and petrified wood, and spheres of agate and rock crystal.

Artwork used as a background for these displays depicts either the native area in which the material is found or a map showing its general location. The choice of both material and background is important in proper display techniques, and Mr. Antolik and the museum staff have given their attention to this fact.

Gem materials have long been used for religious art objects; fine examples of Oriental carvings of religious significance can be seen. For the Christian viewer, a Madonna carved of smoky quartz set in a base of quartz crystals is prominent. A 19-century carving of the Lord's Last Supper, superbly executed in ivory, is one of the most popular of the religious objects in this display.

On the lower level of this modern building, Mr. Lizzadro has provided a meeting room for educational programs and a complete lapidary workshop. The walls of the meeting room are lined with recessed cases in which the gem and mineral societies of the Chicago area display their handiwork. Educational programs on the cutting, polishing and collecting of gem materials are given periodically. To aid in these programs, a closed-circuit TV setup has been installed, so that demonstrations can be given to large groups.

The Curator and his staff extend a cordial invitation to everyone interested in the lapidary arts to visit the Museum.

(Continued from page 37)

radiation) or from the Mineralite short-wave ultraviolet lamp (2537 Å radiation), no distinctive reaction could be seen. During research on the luminescence of gemstones carried out by the writer, it was found that the green grossularite fluoresced orange when irradiated with X-rays[3]. Examination of other colors also showed this orange glow to be quite strong, and in only a few cases was none observed. These included the high-density, chromite-banded specimens; two that were variegated green; the chocolate-colored stone and, not surprising, the low-density specimen.

Massive grossularite garnet takes a good polish and is a durable stone. The green material may resemble nephrite closely, since some nephrite, particularly that from Rhodesia, contains black specks. Other greens make a good substitute for jadeite, as do some of the other colors. Red grossularite, especially when it contains black inclusions, makes a fairly good substitute for rhodonite. We now have from this South African grossularite source an attractive addition to the range of ornamental minerals.

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Gemological Digests

Rough-Diamond Sales Rise Again

Sales of rough diamonds for the second quarter of 1963 totaled $82,968,-905, a new high for diamond sales in a single quarter, according to the Central Selling Organization of London. This is the second time this year that the CSO has reported record-breaking quarterly-sales figures. Those for the first quarter of 1963 were higher than for any quarter previous to that time. Both gem and industrial-quality diamonds were included in the report by CSO. Although the U.S.A. is the chief consumer of diamonds, the increased sales reflect greater purchases of diamonds, in Western Europe.

Diamond sales for the first two quarters of 1963, a total of $159,796,134, exceeds the sales of any previous six-month period.

First European Plant for Synthetic Diamonds

Europe's first plant for the production of synthetic diamonds was announced recently by the Belgo-American Development Corporation. The installation, located in the industrial zone of the Shannon, Ireland, airport, is fully automated. A 15-minute production cycle is made possible by highly specialized equipment, including 24 hydraulic presses weighing 500 tons each and exerting pressures of 4,500 pounds per square inch.

The estimated value of the 750,000-carat annual-production capacity has been placed at $2,100,000.

Initial investment in plant and equipment totals $1,400,000; in its final stage, the investment is expected to reach $5,600,000. Construction was undertaken by Ultrahigh Pressure Units, Ltd., of Ireland, which is associated with a South African company of the same name. Capital in these two firms is held jointly by De Beers Consolidated Mines, Ltd., and Société d'Entreprise et d'Investissements du Bécéka (Sibéka). (Sibéka is a member of the Société Genérale de Belgique group of companies.)

Diamond Knife

It has been reported that a natural-diamond knife, capable of cutting any solid into slices as thin as 50-100 Angstrom Units, thinner than any obtained previously, has been developed by Professor H. Fernandez-Moran of the University of Chicago.

It can section metals, such as germanium and uranium for atomic- and molecular-structure study, and also has great potential as an industrial cutting tool, capable of producing atomically-uniform superfinishes on a piece of work at one pass, without further grinding or polishing.

South Africa

It has been reported that what may

well be the biggest nonalluvial diamond find in South Africa, since the discovery of the Premier Mine at the beginning of the century, has been acquired by De Beers. Since last August, intensive prospecting of a diamond-bearing kimberlite pipe in the Postmasburg district, some 100 miles west of Kimberley, has been carried out by De Beers under an agreement with Finsch Diamonds (company formed by A. T. Fincham and W. H. Schwabel), who discovered the pipe.

The drilling done to date has indicated that the find is likely to be a large-scale, long-life operation that may outlast the group's existing Kimberley mines. The diamonds consist mainly of small gems and industrial stones.

Book Review

HANDWROUGHT JEWELRY, by Lois E. Franke, with photography by William L. Udell. Published by McKnight & McKnight Publishing Company, Bloomington, Illinois. 213 pages, 7½ x 10¼". Over 500 black-and-white illustrations, 22 color plates, and numerous line drawings, glossary, nine tables, appendix. Price $7.95.

This book holds much of interest for the amateur who has discovered the fascinating hobby of creating handwrought jewelry. It contains practical information, presented in an easy-to-understand style, that will prove interesting to the hobbyist and also to those who have no previous understanding of jewelry manufacture.

HANDWROUGHT JEWELRY includes chapters on tools and materials, soldering and annealing, forging, polishing, surface textures and stonesetting. Various phases of jewelry making, from the wire stage to the finished product, are covered. The chapter on forging is excellent, and it should prove interesting to even the more experienced craftsman. The book is well illustrated by line drawings and photographs. Outstanding work by craftsmen other than those designed and executed by the author are featured. The only criticism would be that the book is written for amateurs by an amateur, and the usual limitations of this type of publication are present.

HANDWROUGHT JEWELRY should be a welcome addition to any jeweler's library.