Gems and Gemology

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IN THIS ISSUE

On the Cover

Clusters of diamonds tuft the gnarled branches of the dwarf bonsai tree in this unique pin designed by Lindemann Jewelry Co., San Francisco, California. Trunk and branches are of textured platinum and 14-karat yellow gold.

Photo Courtesy N. W. Ayer & Son, Inc. New York City

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Developments and Highlights

at the

GEM TRADE LAB

in New York

by

G. Robert Crowningshield

Director of Eastern Headquarters

Fresh-Water Pearl

Perhaps the most unusual item submitted to the Laboratory in recent months was a 48.12-grain spherical fresh-water pearl that was found in the spring of 1960 by 17-year-old Marvin Haenni, Sterling, Illinois. He discovered a large fresh-water clam while wading in the Rock River, a broad but shallow stream near his home. He was advised that the market for such a find was in New York and the pearl was sent to a relative in New City, N.Y. It was advised that the pearl should be X-rayed, probably because its perfection made it resemble an imitation pearl. It was as nearly spherical as any pearl we have measured, varying only between 11.88 mm. and 11.91 mm. Very close examination of the surface revealed only the most insignificant blemish. The pearl was white with just a faint tint of pink, the depth of which varied with the type of light. Unfortunately, the shell from which the pearl was taken was not available, so it was impossible to determine the species. *Figure 1* is a photograph of the pearl, and *Figure 2* is a photograph of a lot of baroque fresh-water pearls. The latter are also unique since they were fished this summer from the Mississippi River Valley.

Pink Topaz

Figure 3 illustrates a handsome carved pink topaz in a jeweled pin.

Figure 1

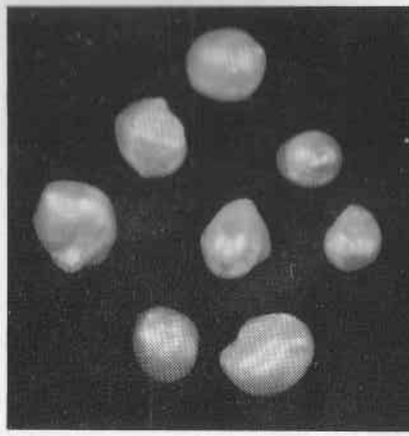


Figure 2

The reason for illustrating this piece is that very few tests could be made to establish its identity. Since the carved surface had a frosted finish, no refractive index could be taken. The double refraction could be observed in the polariscope but it was impossible to resolve an interference figure, since the optic axes paralleled the girdle of the stone and were thus hidden by the setting. In the spectroscope, a suggestion of chromium absorption lines could be seen. However, the identifying test was observation of the stone in a dark room using short-wave ultraviolet light. The muddy-green fluores-

Figure 3

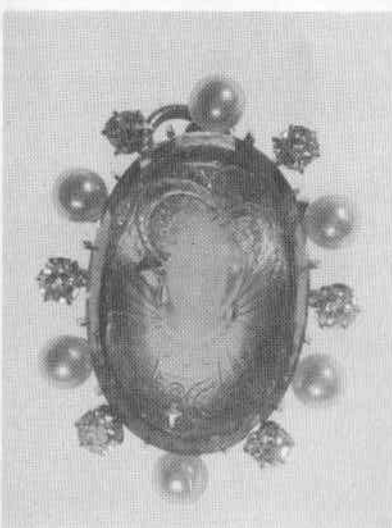
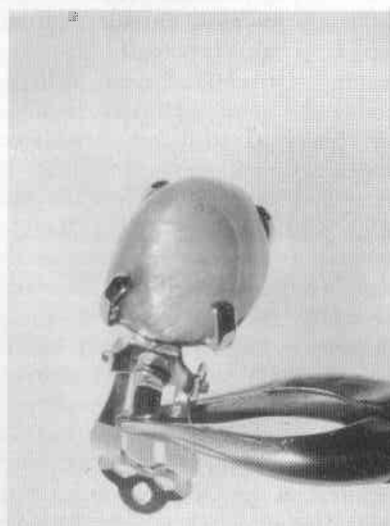


Figure 4



cence thus produced separated it from other pink stones.

Cat's-Eye Blue Topaz

Although cat's-eye blue topaz has been mentioned as a collector's curiosity, until recently we had never seen it used in jewelry. *Figure 4* is a photograph of such a stone mounted in an earring. It was one of many similar stones set in matching earrings, necklace and pin.

Pisolites

Figure 5 is a radiograph of two pisolites; i.e., concretionary calcium carbonate. The concentric nature of these specimens was also seen in one that the client had broken open. They were found on a beach in Florida. Pisolites have been called "cave pearls" because of their presence in limestone caves. At the center of each one in the X-radiograph may be seen a darker spot, which is a single calcite crystal. The surrounding layers are composed of minutely crystalline calcite. If all pisolites have such centers, X-rays would be helpful in identifying cultured pearls made with a pisolite as the "bead."

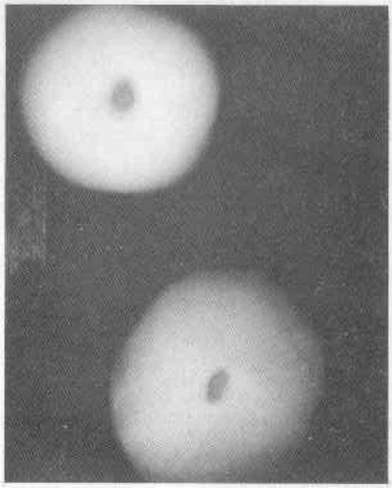


Figure 5

Beryl-and-Beryl Triplet

A most unusual green emerald-cut beryl-and-beryl triplet was identified in the Laboratory after it had been sold as a natural emerald. The unusual feature was the fact that the stone was obviously originally a single emerald-cut greenish beryl sawed at the girdle and rejoined with green cement. Fingerprint inclusions and color bands therefore appeared to stretch from top to bottom without interruption, and the polariscope reaction was that of a single crystal. The importance of magnification in identification was stressed in the last issue.

Green Diamond

A large green diamond in an old ring was determined to be radium treated. The determination was based upon a blotchy color on the surface of most facets and upon the self-photograph after the stone was left on an X-ray film for 60 hours. The stone brings to mind an unanswered question posed to us once regarding the legal liability of a jeweler who resells such a stone. Although we have yet to hear of serious trouble brought about from wearing a radioactive diamond, we have record of a stone that caused the wearer's finger bone to become radioactive (*Gems & Gemology, Summer, 1949*). However, that stone was so highly radioactive that it took an excellent autophotograph in less than three hours exposure to a film. We indicate on reports of radium-treated stones that they are potentially dan-

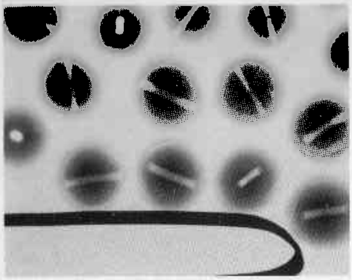


Figure 6

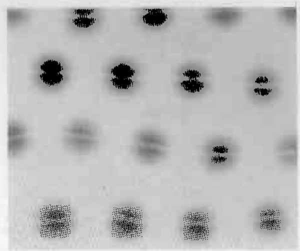


Figure 7

gerous to wear. This radioactivity occurs only in radium-treated diamonds, a type of treatment seldom, if ever, used today.

Emeralds

Occasionally, we have noticed on the surface of emeralds in older jewelry a peculiarity that may be likened in appearance to the iridescent oxidation seen on some glass. Often the stone appears badly scratched, but light polishing with rouge or cerium oxide removes the "oxidation" along with the scratches. We are wondering if others have made this observation, or if research has been done that might shed light on the cause of the phenomenon.

Fresh-Water Cultured Pearls

Figure 6 is a radiograph of a group of fresh-water cultured pearls whose nuclei were all drilled prior to being used. There would be no advantage in so doing, other than possibly the low cost of reject nuclei from salt-water culture stations. Since the spot where the drill hole is next to the nacre is not always determinable, the pearls offered considerable difficulty in drilling and setting.

Cultured Pearls

Figure 7 is a radiograph of part of a four-strand necklace of 250 ordinary cultured pearls, with the exception of one that is indistinguishable by eye but that shows a typical "reversal" pattern. This pattern is associated usually with black-dyed pearls in which some metallic dye is deposited around the nucleus. We could not determine why this lone white cultured pearl showed such a pattern, nor were we able to obtain it for further study.

Brown Scheelite

Of the rare gemstones identified in the Laboratory since the last issue, perhaps the most striking was a 12-carat round brilliant-cut brown scheelite. In appearance, it greatly resembled a yellow-brown diamond in incandescent light but changed to a distinct greenish yellow in daylight. The absorption spectrum was as distinct as any we have ever seen. According to B. W. Anderson, the British gemologist, in his exhaustive series of articles in *The Gemmologist,* many calcium minerals may show an absorption spectrum due to rare-earth metals, usually lumped together as didymium, since that metal may replace calcium in the crystallization process. The spectrum due to didymium is usually diagnostic and varies little regardless

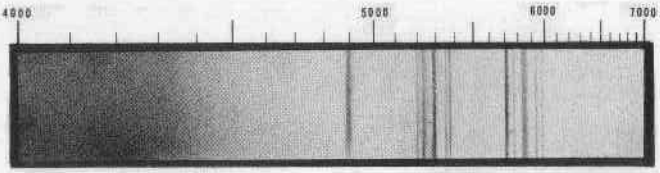


Figure 8

of the host mineral, except for the strength, which until now we have always considered strongest in yellow apatite. By coincidence, at the time we had a 26-carat, beautifully cut yellow apatite to study and compare with the scheelite. The absorption spectrum of the latter was incomparably stronger. *Figure 8* shows this remarkable spectrum.

Azurite

Figure 9 shows the absorption spectrum of a rare transparent emerald-cut azurite that was submitted for identification. We have not seen any discussion of azurite's absorption spectrum in the literature.

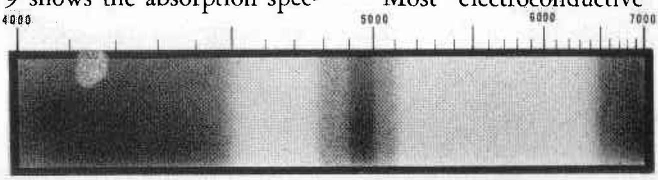


Figure 9

Pink Danburite

Another rare mineral identified recently in the Laboratory was light-pink danburite, one emerald-cut stone and a large crystal. None of our references mentions danburite occurring in this color, but a check with the American Museum of Natural History gave us the information that the San Luis Potosi, Mexico, source has produced it. Both the crystal and the cut stone showed the presence of calcite; on the former it occurred as crystals on the surface, and on the latter as rhombohedral inclusions. The Mexican locality is known for its calcite-coated danburite crystals.

Other rare stones

A rare colorless crystal of the strongly birefringent mineral hambergite was examined, together with faceted scapolite, dioptase, sphene, iolite and andalusite.

Grayish-Yellow Diamond

Most electroconductive diamonds reported have been blue, although other colors have also been found to be electroconductive. It is assumed that all such diamonds are type IIb diamonds. We examined a 17-carat marquise diamond of a nondescript grayish-yellow color and found it to be highly conductive. Under immersion, it was found to be highly laminated and in places the laminations were blue. Other properties, such as X-ray phosphorescence, checked for type IIb diamonds.

Purple Star Spinel

We identified a handsome specimen of the rare purple star spinel. The stone had an exceptionally sharp six-rayed star and, as expected, four- and six-

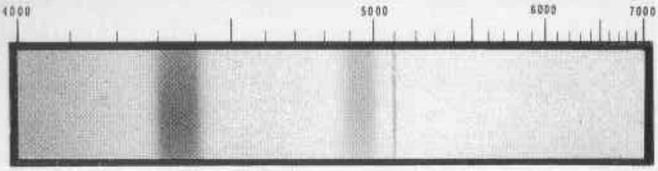


Figure 10

rayed stars alternated around the girdle.

Star Moonstones

A matched pair of moonstones with excellent four-rayed stars were also among the unique stones seen recently.

Marble Cameos

By coinicidence, during the past few months on different occasions we have identified cameos of statuary marble. One was solid black and the other solid white.

Hessonite Garnet

A very brilliant cushion antique hessonite garnet weighing 19.65 carats resembled the large spessartite garnets that have recently been available in the trade. The stone had been mistaken for spessartite, but the specific gravity of 3.64 and the refractive index of 1.745 definitely established its identity. However, an unusual absorption spectrum (illustrated in *Figure 10*) was seen. Heretofore, we have never seen any lines in hessonite, although B. W. Anderson mentions the possibility of their having traces of both the almandite and spessartite absorption pattern.

Black Coral

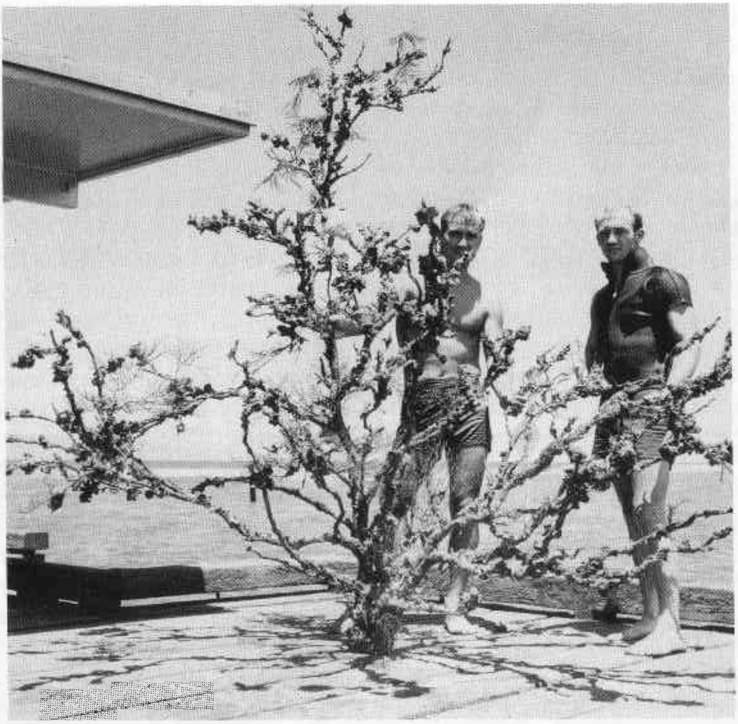
We are indebted to GIA gradua Nick Siderides of Union, New Jersey for several specimens of both polished and unpolished black coral from Hawaii. Readers may recall that this material was discussed at some length in the Los Angeles Lab Column in the Fall, 1959, issue of *Gems & Gemology.* At that time there was no distribution of the new material on the mainland, and the divers were not finding any material. Mr. Siderides, now associated with Esmé Designs, Inc., arranged for the first showing of black-coral jewelry to the American jewelers at the recent Retail Jewelers of America Convention in New York City. *Figures 11* and *12* are photos of two pieces of jewelry combining polished transverse tablets of black coral and cultured pearls. Other jewelry was made of slightly worked protuberances that have a white calcareous material in addition to openings and hollow spaces. These were made into attractive baroque beads. *Figure 13* is a photograph of a

Figure 13

Figure 11

Figure 12

Figure 14



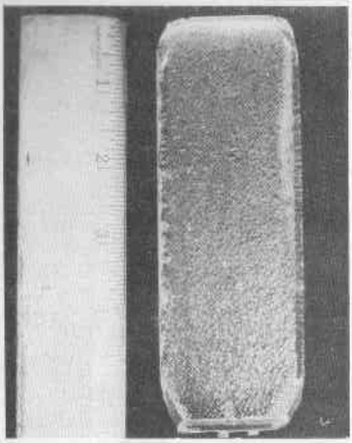


Figure 15

carving measuring 16 inches in length that was made from the base structure (the "trunk") of a black-coral "tree." *Figure 14* is a photograph taken on the dock at Lahaina, Maui, of Jack Ackerman and Harry Windley of Maui Divers, Inc., holding a giant black-coral structure, one of the 150 recognized species of Antipatharian, or horny, corals. The specimen in the photo was brought up from a depth of 200 feet off the west coast of Maui, Hawaii. It is the plan of Esmé Designs, Inc., to popularize black coral in well-made jewelry items and offer them, together with their regular line of costume jewelry, to retail jewelers.

Pink Diamond

A highly laminated pink diamond was examined and found to be without any absorption characteristics and fluorescent only under long-wave ultraviolet light and X-rays. Following exposure to the latter, it lost the pink color and became light brown. This reaction was expected. Following a few minutes exposure to a strong light, the former fine pink color returned. This reaction of some pink natural-color diamonds has been noted by B. W. Anderson, and Dr. Edward J. Gubelin; it had also been observed by Dr. J. F. H. Custers of the Diamond Research Laboratory, in Johannesburg.

Acknowledgements

We wish to thank Mr. Eric Engle, New York mineral dealer, for specimens of an unusual green chrome-bearing aventurine quartz and several attractive sphene crystals.

We wish to thank Mr. Harold Tritt, specialist in black pearls, for a selection of black pearls and a rare pinna pearl that shows the structure illustrated on page 52 of Summer, 1960 *Gems & Gemology.*

We are happy to receive from graduate Max Gersiek, New York City, a man's ring set with a dyed-green calcite that, in his pre-GIA days, he accepted as jade. It will make a handsome addition to our gem-display case.

We are fortunate in receiving a considerable collection of many types of stones from John A. Hardy of New York and Connecticut. These stones, including some rare ones such as cut sphalerite, will be very useful in the Institute's expanding program of making stone sets available to correspondence-course students.

Figure 15 is a photograph of a large synthetic quartz crystal measuring 5¼" x ¾" and weighing precisely 10 ounces. It is a recent gift to the GIA from the Western Electric Company, Inc., North Andover, Mass. The crystal will be valuable for study and display purposes.

Continued on page 92

Developments and Highlights

at the GEM TRADE LAB in Los Angeles

by

Lester B. Benson, Jr.
Director of Research and Laboratories

Further Notes on Black-Treated Pearls

A recent report issued by the Los Angeles Laboratory on several large black-treated cultured pearls brought up a question concerning the terminology used to designate the method of treatment. The report had been requested by a retail jeweler who was considering the purchase of the pearls. Because a slight discoloration was obtained by the solvent test described in the previous issue of *Gems & Gemology,* the pearls were merely listed as dyed. It was noted, however, that the reaction was not strong and that a faint-white fluorescence, which is common to center-treated pearls, was present. Therefore, these were assumed to be center treated also and the slight residual coloration on the surface was not considered important, since it is expected in some center-treated specimens. However, the wholesale firm offering the pearls for sale questioned our use of the term dye, in view of the eventual bleaching, or color alteration, that is common to most dyes. The wholesaler had been representing the pearls as having color permanency and stated that the color was not the result of dye but of a chemical treatment, which alters certain constituents. Reference was made by the dealer to a report issued to the firm in 1956 by the New York Gem Trade Laboratory

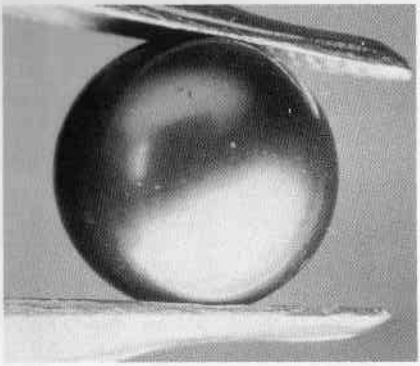


Figure 1

describing a number of tests, including immersion of similar center-treated pearls in such reagents as hydrogen peroxide, household detergents, ammonia and boiling water for periods of approximately one-half hour each. The conclusion of the report was that the coloring agent was distributed throughout the pearl, not merely confined to its surface, and that the color was not affected by solutions to which a pearl might be subjected during the course of normal wear. This original report did not discuss the cause of the color or the question of terminology; however, it had apparently been interpreted by the wholesaler as ruling out the possibility of a dye as the coloring agent.

Because of this apparent discrepancy in terminology, it was requested by the wholesaler that further tests be made to confirm the claim that dye was not being used and that a current report describing the degree of color permanency be issued. Two specimens were submitted to the Lab and permission was given to subject them to any kind of tests required to obtain the necessary information. One of the pearls tested is illustrated in *Figure 1.* It possessed a high degree of luster, a reasonably good orient and a grayish-black body color with a slight purplish overtone. The near-surface nacreous layers were highly translucent. An excessive darkening was present at the edges of the drill hole, in addition to concentrations of a soft black residue on the inside of the drill hole. This showed clearly that the specimen had been treated *after* drilling, a fact that contradicted statements heard to the effect that the treatment was performed *prior* to processing the pearls; i.e., while they were still in the water. Magnification revealed concentrations of a dense material throughout the nacreous layers. These were basically of a reddish-brown color, as observed in strong incident light, and often were concentrated in the form of circular patterns below the surface. Such colored concentrations had been observed previously in black-treated pearls, but usually they were assumed to be the result of irregular dye penetration. *Figure 2* shows the somewhat patchy orientation of this colored material as observed in strong incident light under 30x.

To obtain further information on the distribution and nature of this colored matter, the pearl was cracked and the nucleous removed intact. One section of the nacre was then divided, to provide thin sections of nacre at different levels within the layer. These sections were checked for fluorescence under X-rays, as well as ultraviolet and visible light, and were also examined under 30x and 60x. What had appeared to be dark-reddish-brown concentrations,

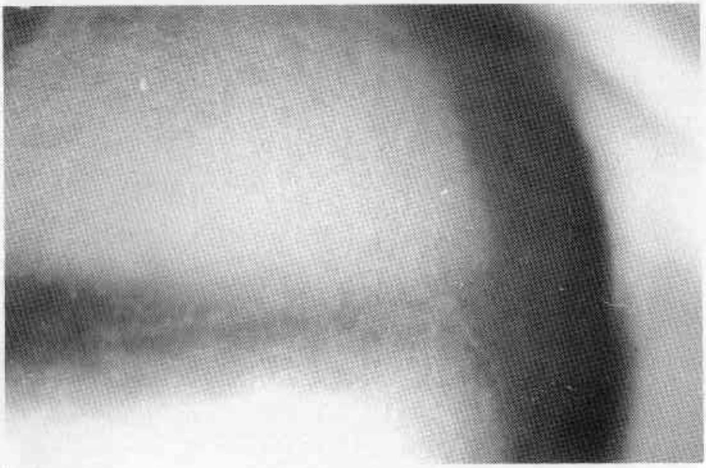


Figure 2

or particles of matter, became dark red by transmitted light. The quantity of particles generally decreased from the inner layers toward the surface, but were nevertheless distributed throughout the nacreous layer and in varying concentrations. Where the material was exposed on the inner surface of the nacreous layer (i.e., in contact with the nucleus), it was almost black, similar to the soft residue on the inside of the drill hole mentioned previously. *Figure 3* shows the appearance in transmitted light of the thin section of nacre that was taken from a position approximately midway within the total nacreous layer. The circular deposits observed near the surface were more readily apparent in transmitted light than in reflected light; it was these deposits, together with the other numerous dark particles throughout the nacre, that caused the dark coloration. All of the nacre surrounding the dark concentrations was nearly transparent. It was interesting to note that the nacreous layers were inert to X-rays, ultraviolet radiation or visible light, with the exception of a very faint fluorescence under a combination of ultraviolet and low-wavelength visible radiation.

In an effort to establish the nature of this colored material, several white cultured pearls were similarly sectioned and portions of the nacreous layers examined by the same method. Almost identical concentrations were observed in the white pearls; however, the material was white rather than dark. Under a combination of ultraviolet and low-wavelength visible light, the larger concentrations of material, as well as the minute white particles distributed throughout the nacre, fluoresced a vivid bluish-white color; however, as nearly as could be observed, the surrounding nacre itself did not fluoresce. This difference between the fluorescent nature of nacre and the concentrations

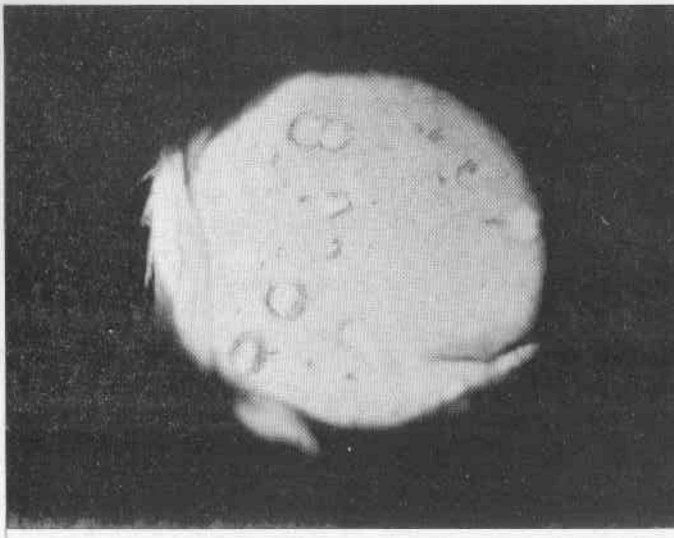


Figure 3

of conchiolin becomes apparent only under high magnification, in this case 60x.

It became evident that the only difference between these treated and nontreated pearls was in alteration of the particles and concentrations of what was presumed to be conchiolin. Further, the more nearly pure nacreous areas (i.e., those with little or no conchiolin) either did not fluoresce or fluoresced only weakly, whereas the conchiolin itself fluoresced very strongly; the latter accounts for the strong bluish fluorescence of white pearls. The chemical treatment, which obviously penetrated the pearl, altering the conchiolin to a dark substance, neutralized the fluorescence but did not affect the translucency of the more nearly pure nacre.

Assuming that at least a trace of conchiolin is present in nearly all areas of the nacre, it follows that the weak whitish fluorescence previously associated with center-treated pearls is merely the result of the chemical treatment failing to alter the minute traces of conchiolin in the nacre, due to lack of complete penetration; but it does affect the larger concentrations, which, in turn, are sufficient to change the body color of the pearl.

Examination of several hundred white pearls under 60x while they were fluorescing strongly revealed a wide range in the nature of distribution of these conchiolin concentrations within the nacreous layers. In many instances, what appeared to the unaided eye to be a very fine pearl showed heavy concentrations of the fluorescing conchiolin deposited irregularly throughout the nacre, often extending to the surface. In others, tiny particles of conchiolin were evenly

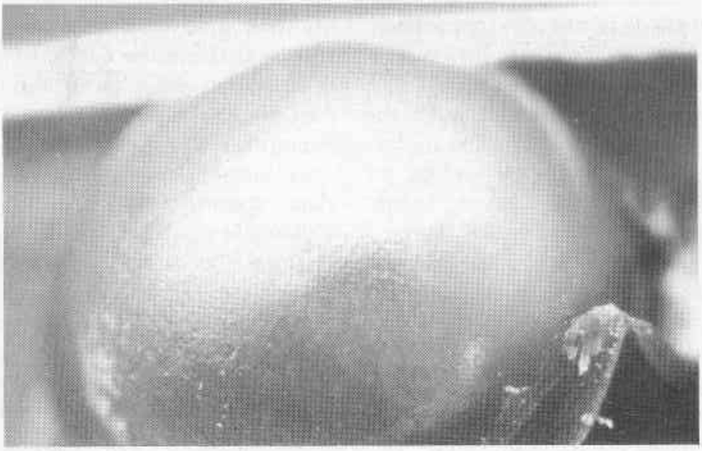


Figure 4

distributed throughout the nacre. It became evident that this would be at least one method of ascertaining whether such treatment would impart even coloration to a pearl. Subsequent tests, using potassium permanganate to treat pearls up to a period of six hours, resulted only in an alteration of the concentrations of fluorescent conchiolin. The potassium permanganate did not duplicate the coloration of the pearls submitted for testing. However, the fact that such a solution will alter and darken the conchiolin and neutralize its fluorescence without affecting the translucency of the associated nacre indicates the basic method used to treat these pearls and explains the absence of dye, as claimed by the distributors.

Tests were continued to establish the relative permanency of color brought about by the alteration of the conchiolin, in addition to those previously conducted by the New York Gem Trade Laboratory. The most important test involved exposure to unfiltered sunlight for a total period of fourteen hours. To provide a suitable control, one of the specimens was imbedded in an opaque holder, so that only one-half was exposed to the sunlight. As with the sectioned specimen, this one also possessed a very slight purplish overtone, and after a four-hour exposure it was noticed that the purplish overtone had started to bleach. After eight hours, it was almost totally gone. This did not result in an obvious change in appearance, since the overtone was very slight originally and the pearl, after exposure, still had the same grayish-black body color. It is possible that exposure over a period of weeks or months to sunlight would cause some bleaching of the body color, but such a test would not duplicate normal wearing conditions.

To summarize the results of this test, it was concluded that exposure to sunlight, even for a relatively short period, may alter the color overtones displayed by pearls of the type tested; however, study indicated that the body color would be permanent. The bleaching of the overtone may be related to the degree of alteration undergone by the conchiolin, depending on its location within the nacreous layers. As mentioned previously, the conchiolin exposed at the drill hole in large quantities was obviously subjected to a more vigorous treatment than that contained within the nacreous layers. The result was the almost total blackening of the exposed conchiolin, as compared to the reddish-brown appearance of the conchiolin within the nacreous layers. The purplish overtone may have resulted from some of the conchiolin not having been completely altered, and in this state it was subject to some change by sunlight. The mother-of-pearl bead within the pearl tested had darkened only slightly, and this effect was present in banded concentrations related to the layered structure of the nucleus. Throughout the bead, however, the alteration occurred only in the form of very minute particles, in contrast to the larger masses found in the nacreous layers. The result was that the bead displayed little more than a light-gray body color, and some of the areas were almost completely white. One portion of the bead's surface located on the opposite side of the half-drilled hole displayed the most prominent discoloration, and it was accompanied by a noticeable, but unexplained, etching of the surface *(Figure 4)*.

During these tests, a green cultured pearl from another source was received for study, also with the claim that it had not been dyed. The same procedure was used to extract the nucleus and to separate the nacre. In addition to a similar alteration of the conchiolin, concentrations of green dye were encountered in irregular patches on approximately two-thirds of the nucleus, starting from the drill hole. It is possible that both dye and chemical treatment were used or that a dye alone brought about a chemical reaction with the conchiolin. Traces of the dye were observed in the nacreous layers. Exposure to unfiltered sunlight for eight hours failed to produce any color change. It seems unlikely that the color-treated pearls, with the exception of the black specimens, could be produced without the aid of a dye; however, additional specimens representing a cross section of available colors will have to be examined before any specific conclusions can be drawn.

(Note: To clarify the use of terminology on future GIA reports, unless definite traces of a dye or a surface coating are detected, such specimens will be classified as treated, rather than dyed, pearls. From the standpoint of identification, the connotation is the same.)

Recutting a Damaged Diamond

Although a damaged diamond may suffer a 22% weight reduction during recutting, it is possible for its value to remain unchanged. Recently, a damage report was issued by the Lab on a diamond that presented this unusual situation; namely, that even though its weight would be reduced from .96 carat to .75 carat after removal of the damaged area, its value would remain unchanged. To someone familiar with

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Jade Cutting Today

by

R. Norris Shreve

Purdue University and Cheng Kung University

Jade has been woven intimately into the life and civilization of the Chinese people for thousands of years. It became a symbol of their life and their existence. It was thus used in their culture exclusively in the ancient centuries. During the past one thousand years, however, jade became, by virtue of exquisite carving, their most prized ornamentation, whether of garment, of altar or of home.

To China we give credit for the most exquisite and elaborate use of jade throughout the world. Yet a number of other races used, admired and even venerated jade and jade objects. This was true of the Maori, the Polynesian inhabitants of New Zealand before the white man came. The Maori used jade axes and adzes to cut down trees and fashion their elaborate sea-going canoes, as well as for ornamental and symbolic purposes. In Mexico and Central America, the mineral was prized and utilized in ritualistic rites, and to a small extent for tools.

For thousand of years, the Chinese lapidaries have been carving their exquisite ritualistic, legalistic, symbolic and ornamental objects from jade. They have developed a facility for this beautiful and interesting work, exceeding that of any other nation. This has arisen from their dedication to this absorbing vocation from generation to generation, father teaching the son the skills and tricks of the trade that he had learned from his grandfather.

With the advent of the materialistic Communist ascendence on the mainland of China, many feared that such skills would die out or be transferred to the grinding and polishing of such prosaic objects as lenses and optical goods. This is not true, since at least one family of these lapidary-artists moved out of Communist China. The eldest brother transferred his stock of carved and symbolic jades and jade jewelry to Taipei, Formosa, where he operates the Yung Pao Chai Jewelry Store. However, one of the younger brother, Yusuf T. C. Chang, took several of his skilled cutters and his part of the business from Peking to Hong Kong, where his establishment now employs fifteen cutters and polishers at the Treasure Jade Factory, 62 Gran-

Figure 1

ville Road, not far from the Miramar Hotel (*Figure 1*).

Mr. Yusuf Chang was taught the jade-cutting skill as a boy, so he is perfectly at home in this intricate fabrication. He is the lapidary-artist who designs the work, marks the stones for cutting, watches each article through every stage, and occasionally takes a hand at the tools to instruct one of his apprentices or finish an intricate part of a vase or a figure.

Seeing Mr. Chang in the midst of his busy artistic life, it is hard to realize that he was once a refugee from Communist China and that he fled by ship first to Taiwan before settling in Hong Kong. Indeed, his wife and son were lost in a shipwreck when they later attempted to join him. It is heartening to see how so many of the Chinese, such as the Chang brothers, have risen above their adversity and re-established themselves in the atmosphere of freedom that prevails in Hong Kong and Taiwan (Formosa).

The age-old method of foot operating, hand holding, eye seeing and brain directing combines all four instrumentalities in that superlative harmony — sometimes slow, other times fast — that is needed to ensure the highest type of artistic production. This is the reason, according to Mr. Yusuf Chang, for the necessity of hand cutting artistic jade objects. A fine painting or a beautiful piece of sculpture cannot be made without this correlation of mind, eye and hand. This procedure also encourages individual artistic results, rather than identical mass-produced products.

Thus, even in these days of machine production, one shop is continuing to practice the ancient art of fashioning jade and other hard stones. This shop also trains young Chinese, so that the

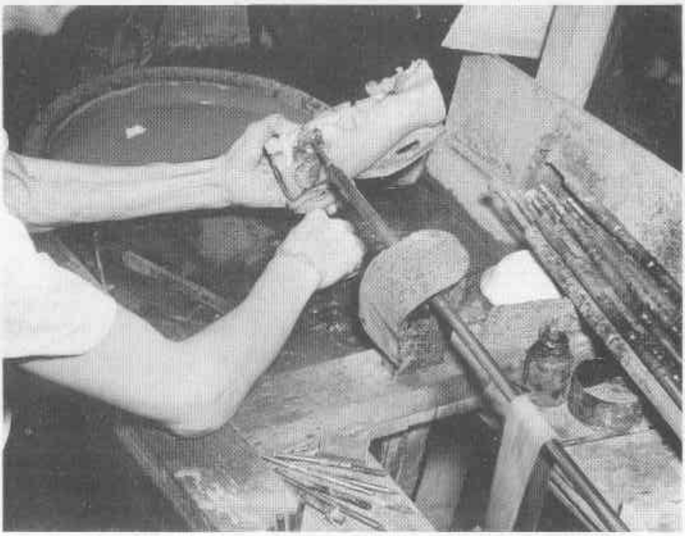


Figure 2

exquisite and unique production of the Chinese art and civilization may be perpetuated.

When simple objects such as boxes or grape motifs are being made, machinery can be employed to cut the flat faces or round surfaces. Even here, however, many prefer the hand-cut surfaces, because they are less geometric and more pleasing to an artistic eye and decidedly more in harmony with the old Chinese individual methods and fashions.

Likewise, the smoothing and polishing of flat surfaces can be effected economically by motor-driven buffing wheels. However, diamond-impregnated sawing wheels usually stand idle in the Treasure Jade Factory, since their high cost cannot compete with the wire- and disc-cutting methods of old China. Also, the diamond saw wastes more material. I saw only two of Mr. Chang's men using motor-driven saws or polishers during each of my two visits. The other thirteen employed the ancient hand methods.

The one concession to modern technology is the use of 100-, 80- and 60-grit carborundum as a cutting, grinding, boring and polishing abrasive. This is a quicker and more satisfactory agent than the long-used emery, or low-grade corundum. In the past, the exhaustion of a quarry as a source of the abrasive sometimes hindered the cutting of jade until another source was found.

Beside each jade cutter is a basin of water in which he frequently dips the object being fashioned (*Figure 2*). This enables him to check the progress of his work, and the basin serves to collect the carborundum and the jade cuttings. At the end of the day, he stirs the water and allows the solids to settle. The next morning, the waste is separated from the carborundum, so that the latter can be used again.

The photographs accompanying this

Figure 3

article show the workmen engaged in the steps necessary to convert a rough block of jade into an object of beauty. The first step is to purchase jade boulders at the auctions. These were formerly in Peking, Canton and Shanghai, where the merchants sold the stones that had been transported eastward by camelback the thousands of miles from Sinki-ang along the "jade trail," or a shorter distance (but still a long way) north from Burma. At present, Mr. Chang is working only with the beautiful mauve and the green variegated jadeite from Burma, which is taken directly to, and auctioned in, Hong Kong. Many are the chances taken, because the purchaser cannot see within the rough and weathered outer surface, but must judge from several small cut-and-polished "windows" that indicate the color, texture and structural quality of the interior portions. The general outside appearance is likewise an indication to the experienced eye.

The second step is to saw the large boulders into pieces of more suitable size and shape for finished objects. By wetting the resultant fresh surfaces, the master lapidary gains a truer indication of the quality of the jade. Occasionally, the cutting is done with a diamond saw; more often, however, particularly with large boulders, it is accomplished by employing a twisted three-strand iron wire stretched between the ends of a wooden bow, which may measure as much as five feet in width *(Figure 3)*. Two men or apprentice boys draw the bow back and forth, while a third boy pours a

Figure 4

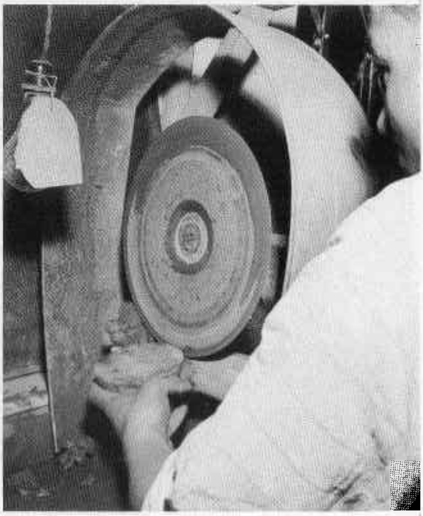


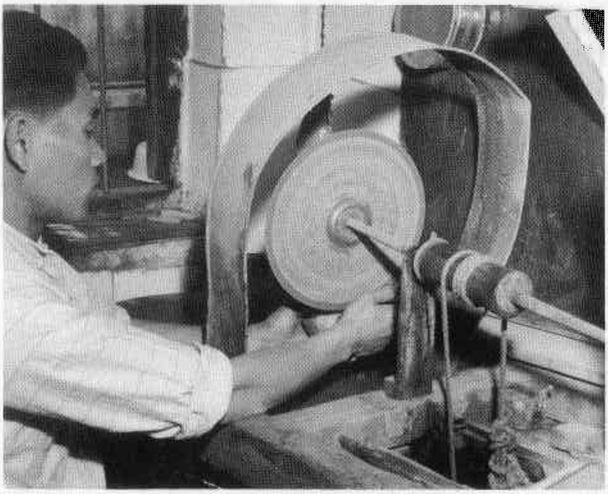
Figure 5

mixture of water and coarse (#80) carborundum into the cut.

The third step is to cut, with the least possible loss of material, the larger pieces into blocks of sizes and shapes suitable for carving into intricate objects. For this purpose, occasionally a diamond saw is used, but a 15-inch disc of thin steel is more successful and economical. The workman feeds the wet carborundum mixture onto the peddle-operated disc with one hand and holds the piece of jade in the other hand. Since the disc is peddle operated, it travels first one way and then is reversed. This operation is illustrated in *Figures 4, 5 and 6*.

For the fourth step, the master

Figure 6



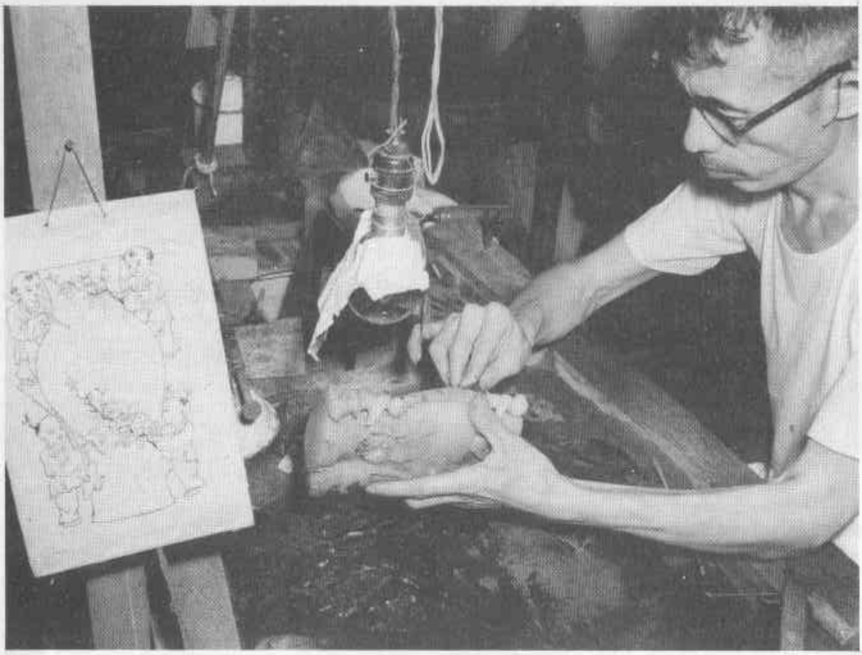


Figure 7

lapidary makes a sketch of the object he has designed for a particular block of jade. In this shop, such drawings are made by Mr. Yusuf Chang. Here, also, Mr. Chang's appreciation of the texture and color of the stone, and its possibilities for a work of art, enables him to produce exquisite carved objects. This skill was acquired only after many years as a lapidary-artist.

The fifth step calls for the rough execution of the drawing in the jade block by one of the skilled and experienced artisans. The sketch hangs before his working area for easy and convenient reference as he roughs out the object *(Figure 7)*, using #60 carborundum on iron discs and drills of various sizes.

When the article is fairly well roughed out, specialists do the boring and drilling for the inside cavities or fabricate the hanging rings that are so characteristic of Chinese jade objects. Boring out the interior is a precarious procedure. It is done by revolving a thin split cylinder with a cord across a hand bow and around the boring cylinder *(Figure 8)*. The work, of course, is plentifully charged with carborundum. It takes several days to make a bore of seven or eight inches deep by three-fourths of an inch in diameter. This is done with such skill that the top is only slightly larger than the bottom. Only Mr. Chang breaks out the rod by a skillful blow at the top after removing the drilling cylinder. It

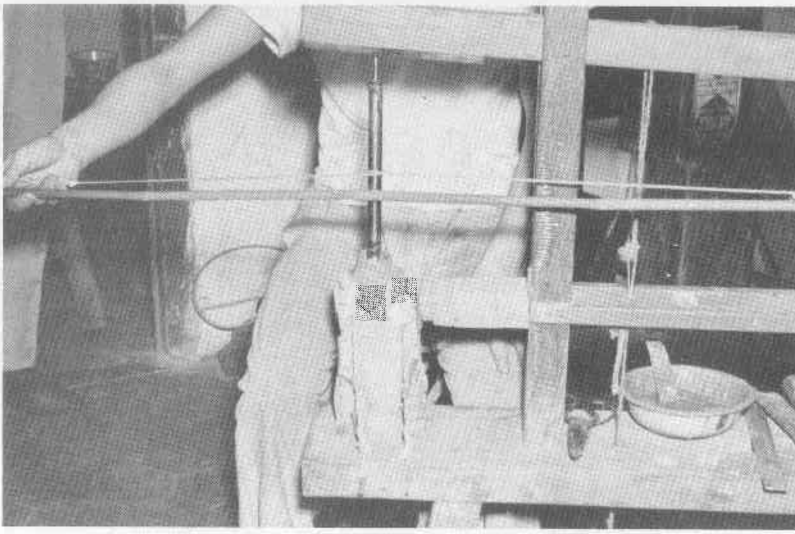


Figure 8

would be wasteful if the rod broke off at any place except at the bottom of the boring.

The seventh step is to enlarge the interior openings after the removal of whatever number of boring cylinders have been required. This enlarging is effected with carborundum on steel drills of various sizes, until the required interior space is attained.

If the object is to be a bowl or vase with rings, these are now cut by the specialist *(Figures 9 and 10)*.

The ninth step is carried out by the highest skilled lapidary-artist, for it is now his responsibility to transform the rough carving into the intricate one envisioned by Mr. Chang. Fine carborundum is used as the abrasive. It is here that the final details take shape (*Figure 11*).

The tenth step involves smoothing and polishing. This is a laborious operation, based on the stone's quality and varying structure. Experience and skill are required; when it is done properly, however, the beauty and interest of the article are enhanced greatly. Fine-grit carborundum is used first, and precipitated alumina usually is used for the final polish.

The materials now being carved by Mr. Chang and his skilled workers are Burmese jadeite, South American rose quartz, African tiger's-eye and South American green quartz. Amethyst, rock crystal, agate, turquois and lapis-lazuli also are carved. Since his jade comes from non-Communist lands and the carving is done in Hong Kong, it is easy to obtain from the Commerce and Industry Department of the British Consulate in that city a comprehensive certificate of origin to permit Mr. Chang's jade to enter the United States.

All of these hand operations are time consuming, although the workmen are steady and industrious and seldom are

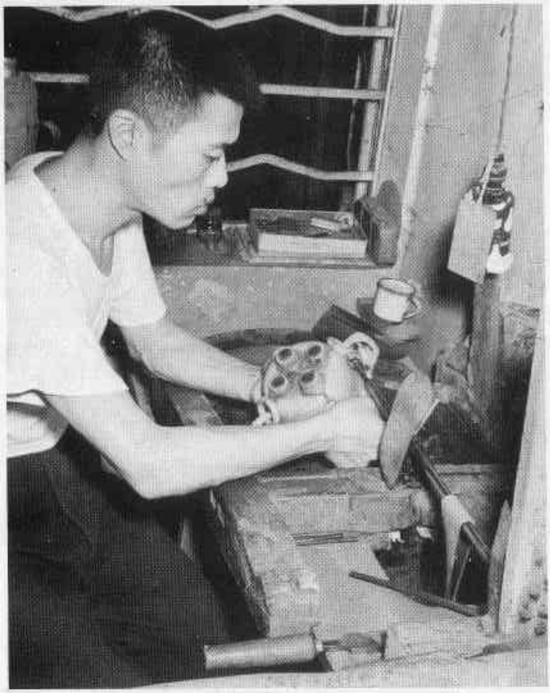


Figure 9

Figure 10

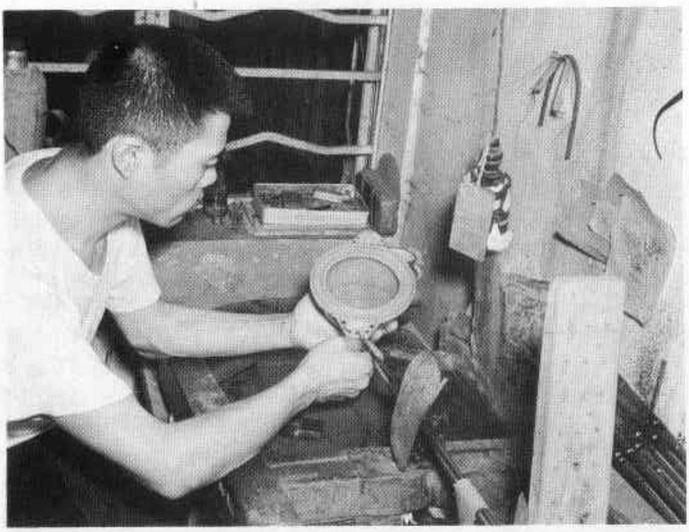


Figure 11

distracted from their work, even when being photographed. Mr. Chang gives the following time estimate for some of his skilled assistants to carve a ten-inch high jadeite vase:

Step 1. Purchasing the jade boulders.

Step 2. Cutting the boulders into smaller pieces for inspection and planning: two days.

Step 3. Rough fashioning into blocks suitable for finished objects: five days.

Step 4. Sketching the design: one day.

Step 5. Rough execution of the design in the jade: three to four days.

Step 6. Special operation. Boring holes for the interior cavity. For two ¾-inch holes, 8 inches deep: four days.

Step 7. Special operation. Drilling and smoothing the interior cavity: four days.

Step 8. Special operation. Fabricating two rings: three days.

Step 9. Finishing the vase by fine, detailed carving: ten days.

Step 10. Smoothing and polishing the surface: five to ten days.

Step 11. Carving and polishing a special wooden stand.

Step 12. Making a silk-lined box.

This experienced group of fifteen men, under a life-long artist-lapidary, are able to produce quite a number of important pieces of jade or rose quartz in a month's time of six full days each per week. If demand lessens, grape and other fruit motifs are carved from jade, carnelian, rose quartz and other hard stones.

It is difficult to overestimate the importance of continuing China's ancient jade-carving craft in a free city such as Hong Kong. It is hoped that Mr. Chang's trained men will go to other free countries (e.g., Taiwan or Singapore) to keep the art alive.

New York City Diamond Class

Los Angeles Diamond Class

Milwaukee Diamond Class

New York City Diamond Class

Members of the New York City Diamond Evaluation Class that met August 22nd, through August 26th. Standing left to right: **Thomas J. Keefe,** Bloomfield, N. J.; **John T. Barber,** New York City; **Hidetaka Meiki,** New York City; **Dan Laraia,** New York City; **Sang Y. Kim,** New York City; **Seymour Gursky,** Brooklyn, N. Y.; GIA instructors, **Mrs. Eunice Miles** and **Robert Crowningshield; F. D. Marshall,** Rock Hill, S. C.; GIA instructor, **Bert Krashes; Richard E. James,** Fairfield, Alabama; **James M. Cushnie,** West New York, N. J.; **Joseph E. Martin,** Christiana, Penna.; and **Milton P. Koshland, Jr.,** Oaklyn, N. J. Seated left to right: **Herbert Levine,** Endicott, N. Y.; **Mrs. Martha H. Curry,** Rock Hill, S. C.; **Marvin Zuckerman,** Cedarhurst, N. Y.; **Grover C. Crowe,** New York City; **Joseph W. Lucie,** Olean, N. Y.; and **David Francis Adams,** Albany, N. Y.

Los Angeles Diamond Class

Members of the Los Angeles Diamond Evaluation Class that met August 22nd, through August 26th. First row left to right: GIA instructor, **Gale M. Johnson; John Parkins,** Arcadia, California; **Elwood Rees,** Twin Falls, Idaho; **Robert Levy,** Los Angeles; **Paul Oliver,** Salt Lake City, Utah; and **H. J. Fink,** Tujunga, California. Second row left to right: **J. M. Formaker,** Los Angeles; **Hugh E. Morris,** Fresno, California; **Irving Kaplan,** El Paso, Texas; **Ruth Martin,** Beverly Hills, California; **Edward T. McNally,** Spokane, Washington; and **Peter Smith,** Cheney, Washington. Third row left to right: **James E. Davies,** El Cajon, California; **J. R. La Rosa,** North Hollywood, California; **Mrs. Edwin H. Hunt,** Indianapolis, Indiana; **Clarissa J. Viets,** Los Angeles; and **Gertrude Doolittle,** Los Angeles. Standing left to right: GIA instructors, **Joseph Murphy** and **William A. Allen.**

Milwaukee Diamond Class

Members of the Milwaukee, Wisconsin, Diamond Evaluation Class that met August 1st, through August 5th. Seated left to right: **Gerald W. Krueger,** Fort Atkinson, Wisc.; **Roy R. Cali,** Milwaukee; **Frank Homan,** West Allis, Wisc.; **Steve L. Grubba,** Adams, Wisc.; **Herbert L. Reimer,** Oshkosh, Wisc.; **Ralph H. Kazik,** Madison, Wisc.; and **William R. Menard,** Wauwatosa, Wisc. Standing left to right: GIA instructor, **Bert Krashes; K. M. Garrison,** Sheboygan, Wisc.; **Bernard Nesemann,** Plymouth, Wisc.; **Ed Borland,** Kenosha, Wisc.; **Harold E. Rades,** South Milwaukee; **Chester W. Thelen,** Kenosha, Wisc.; **Richard Scroggins,** Manitowoc, Wisc.; **Marc R. Nicolet,** Berlin, Wisc.; and **John Porasik,** Racine, Wisc.

(Continued from page 74)

Our matrix-mineral display cabinet was greatly enhanced recently by the gift of a fine specimen of Franklin, N.J., prehnite measuring 6″ x 8″ x 24″. We wish to thank Gary Smith, Paterson, N. J. for the gift.

We are indebted to student Tom Schneider, Lincolnwood, Illinois, for several well-cut-and-polished colorless synthetic sapphires that because of their superior proportioning and polish, have a much better appearance than the commercially cut stones currently being ballyhooed as "Diamondite," "Lusterite," etc.

We are especially indebted to Mr. Akbar Ouskouian of Meshed, Iran, for a selection of four qualities of rough turquois and a polished sample of each. We were particularly intrigued to learn that very little fine material is found but that a ready market exists in our own Southwest for even their chalkiest quality. Mr. Ouskouian is concessionnaire for all turquois produced in the Iranian mines, which are a royal concession. He spent several weeks this summer in Chicago at an exhibition of Iranian products and crafts where he displayed, among other turquois specimens, a necklace layout of finest turquois valued at more than $12,000.

We are indebted to Dr. J. F. H. Custers, through the good offices of GIA Board member George Kaplan, for a compact instrument employing a pair of earphones used to test natural blue diamonds. The instrument makes use of the semiconductivity of blue diamonds.

(Continued from page 80)

proportion grading, this would not be unusual; however, it came as a pleasant surprise to an insurance company, though causing some consternation on the part of the customer. The stone had been set in a high four-prong setting, and the four exposed areas of the girdle between the prongs had been badly chipped during wear. To remove the chips by total recutting would have required a reduction in the diameter from 6.62 mm. to approximately 5.93 mm., with a corresponding weight loss of about .21 carat. It was possible to retain the original value because the stone was very shallow, and the reduction in diameter was just adequate to correct the proportioning. In other words, the damage was confined to that portion of the stone that represented excessive weight retention from the crystal at the expense of beauty. Increasing the weight and size of a diamond from a given piece of rough by utilizing cutting discrepancies such as a shallow crown or pavilion does not increase its value beyond that of the maximum-size ideal cut that could be obtained from the same rough. This stone presented an outstanding example of the importance of detailed proportion analysis in diamond evaluation.

Cat's-Eye Demantoid

A very attractive ¾-carat cat's-eye was submitted for identification. Although it could have passed as a fine-quality chrysoberyl, it proved to be demantoid garnet. The chatoyant effect was caused by a rather concentrated "horsetail" inclusion in which the individual needles were nearly straight and parallel.

Gemological Digests

South Africa

A particular type of diamond found in South Africa may play an important role in the space age. The diamond, a rare natural blue stone, is so sensitive to temperature changes that it can record a drop or rise of five-hundredths of a degree. Scientists at the Diamond Research Laboratories, in Johannesburg, developed a means of attaching electric leads to the diamond, making it a valuable thermistor, a sensing element for a super thermometer. In space ships and satellites, the diamond thermometers can be used not only to record minor changes in temperature, but also to detect radiation. And, in medicine, they would give almost instantaneous temperature readings.

Borneo

It has been reported that a 33-carat diamond was found recently in the Bandjar district, in South Borneo, by a prospecting party. The report also stated that the prospectors had been offered about £125,000 for the stone.

USA

Although commercial diamond production is not presently contemplated, the Norton Company, makers of abrasive and grinding wheels, has announced that it has made synthetic diamonds. The company's process is said to involve the subjecting of carbon to high temperatures and pressures. The fact that patent applications have been lodged would seem to indicate that some novel features might be involved.

British Guiana

It has been reported that a diamond rush is under way in British Guiana, where miners are rushing to Kurupung, in the upper reaches of the Mazaruni River. Between January 1 and 15, production in the area rose to 2,738 carats, compared with 660 carats for the same period in 1959.

Diamond Sales

Sales of diamonds from African producers, reported quarterly by the Central Selling Organization in London, reached a near-record high for the first three quarters of this year. The 1960 sales through September 13 amounted to $185,626,064 and are exceeded in value only by sales during the same period of 1959 when total diamond sales amounted to $191,-539,172.

Sales of gem and industrial diamonds for the third quarter of 1960 totaled $63,185,665. Of this total, gem diamond sales amounted to $44,105,-043, down somewhat as compared with the third quarter of 1959 when gem sales amounted to $47,295,508.

Industrial diamond sales for the third-quarter period rose to $19,080,-622, the highest third-quarter sales figure on record. In the third quarter of 1959, industrial diamond sales amounted to $17,687,701.

South Africa

It has been reported that the noted De Beers Diamond Mine in Kimberley, South Africa, may be reopened. It has been closed for forty-six years.

Honor Roll

Following are students who have recently been awarded diplomas in the **Theory of Gemology**:

Glenn Nord, Morrison & Adams, Lemon Grove, California; **Daniel E. Smith,** Konnerth Jewelry, Salem, Ohio; **Robert E. Johnson,** Fox & Stevens, Olean, N. Y.; **Richard Gordon Donoghue,** Henry Birks & Sons, Ltd., Ottawa, Canada; **Mitchell Phillip Rosnov,** M. Rosnov, Inc., Philadelphia, Pennsylvania; **Mrs. Sophie L. Welsh,** Campus Jewelers, Minneapolis, Minnesota; **Phillip H. Posten,** Fresno, California; **John Harold Aebischer,** John Aebischer Jeweler, Struthers, Ohio; **Glenn E. Bergstrom,** Minneapolis, Minnesota; **Robert Capestrain,** Capestrain Jewelers, Canton, Ohio; **Harold Tivol,** Tivol Plaza, Inc., Kansas City, Missouri; **Chester Lieder,** Mermod, Jaccard, King, St. Louis, Missouri; and **Dr. Theophilus F. Weinert,** Redwood City, California.

Following are students who have recently been awarded diplomas in the Theory and Practice of Gemology:

Dorothy Larson, H. G. Larson Jewelry, Kewanee, Illinois and **Theodore George Volkert,** the Frank Herschede Company, Cincinnati, Ohio.

Book Review

The Story of Jewelry, by Marcus Baerwald and Tom Mahoney. 199 well-illustrated pages. Published by Abelard-Schuman, Inc., 404 Fourth Avenue, New York City. Price $6.50.

Baerwald and Mahoney published a book some years ago entitled "Gems and Jewelry Today," in which they gave popular treatment to the subjects of gemstones and jewelry. This is a second book on the same general subjects. The authors have been careful to make their account more factual than most books of this type, yet it retains a quality that should make it popular with the layman.

Chapter heads include "Precious Stones aand Precious Metals," "Diamond Lore and Values," "Famous Diamonds," "The Lure of the Pearl," "Cultured Pearls" and "The Ruby and the Sapphire," followed by chapters on other gemstones, "Gem Minerals of the United States," "Birthstones," "Bridal and other Rings," "Jewelry Design and Fashion," "Jewelry for Men," "Medals, Gold Boxes and Jeweled Eggs," and "Care and Protection of Jewelry." The book includes, in addition, a short glossary and an index. It is set in large-size, easily readable type face. Illustrations, in contrast to the text, are on coated stock to improve their quality.

JEROME BAKER WISS

Jerome Baker Wiss, Chairman of the Board of Governors of the Gemological Institute of America from 1955 to 1958 and well-known Certified Gemologist, American Gem Society, passed away on September 10, 1960. Wiss, better known as Jerry or Buck to his many friends, completed his training at the Institute in a summer class in 1939. For many years, he headed the prominent northern New Jersey jewelry firm of Wiss Sons, Inc. He was also an officer of long standing in the cutlery firm of J. Wiss & Co. and of the Kroydon golfing-equipment manufacturing firm.

In addition to his many years of service to the Institute as Governor and Board Chairman, Wiss acted as advisor to the Institute's Eastern Division. His fine collection of colored diamonds was loaned to the GIA on several occasions for study and display purposes. His collection of rarely encountered gemstones has been on continuous loan to the Eastern Division for a number of years.

Wiss was widely known in New Jersey for his many lectures on gemstones. Gem-identification problems of a particularly difficult nature were often taken to him by fellow jewelers because of his reputation for exceptional ability in that field. His keen sense of humor and zest for living made for him a host of friends.

Jerome Wiss retired from active management of Wiss Sons, Inc., several years ago and moved to South Laguna, California. Three years ago, he suffered a severe stroke, from which he never fully recovered. He is survived by his widow, Margaret, five daughters and a sister.