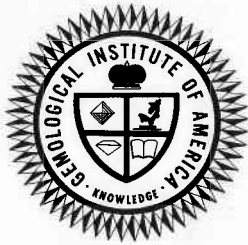


Gems & Gemology

GIA



WINTER 1967-1968



RICHARD T. LIDDICOAT, JR.
Editor

LAWRENCE L. COPELAND
Assoc. Editor

KATHERINE J. MURRAY
Art Editor

GEMS & GEMOLOGY is the quarterly journal of the Gemological Institute of America, an educational institution originated by jewelers for jewelers. In harmony with its position of maintaining an unbiased and uninfluenced position in the jewelry trade, no advertising is accepted. Any opinions expressed in signed articles are understood to be the views of the authors and not of the publishers. Subscription price \$3.50 each four issues. Copyright 1968 by Gemological Institute of America, 11940 San Vicente Boulevard, Los Angeles, California 90049, U.S.A.

GEMS & GEMOLOGY

Gems & Gemology

Volume XII

Number 8

Winter 1967-68

IN THIS ISSUE

226. South America and the World Diamond Market
by Eunice R. Miles
239. First Brazilian Diamond Dredge
by Prof. Dr. Almeida Rolff
242. Developments and Highlights at the Gem Trade
Lab in New York
by Robert Crowningshield
247. Developments and Highlights at the Gem Trade
Lab in Los Angeles
by Richard T. Liddicoat
253. Book Reviews

South America and the World Diamond Market

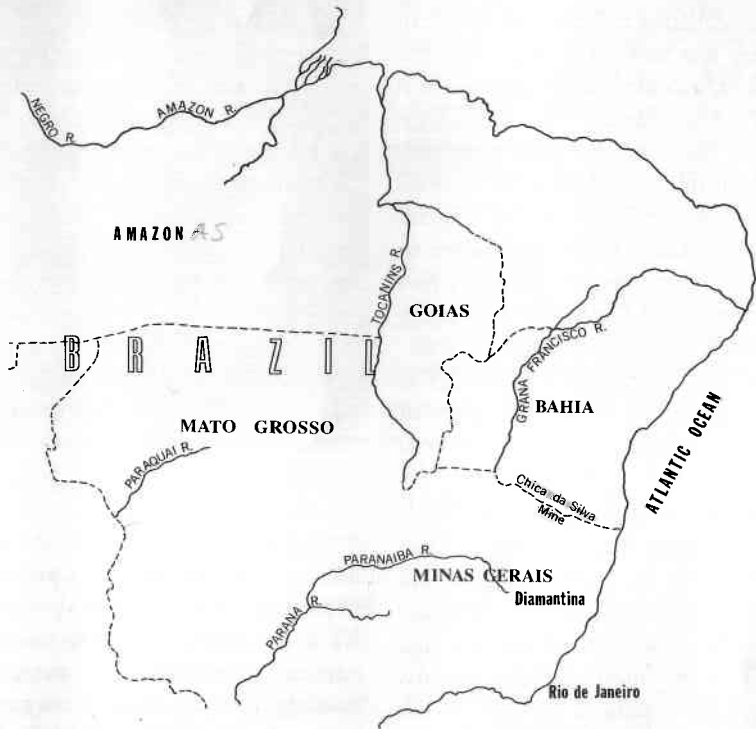
by

Eunice R. Miles

The diamond production from South America is an elusive figure in actual carats. This is because of the primitive mining operations and lack of strict government control in Brazil, Guyana (formerly British Guiana) and Venezuela. However, the yield is sufficient, especially from Brazil, to influence the world market. Brazil not only meets its domestic demand but produces enough to export to the Low Lands in Europe; small stones go to Israel, Japan and India. The latter two countries could absorb all of the diamonds Brazil could mine. It has been estimated the percentage of Brazilian export varies from 80% to 96% of its production. Since there is a great deal of buying in the bush in Brazil, only a "guesstimated" figure can possibly be given. It has been reported that an unknown percentage of Brazilian rough finds its way across the northern border via Guyana into the world market. A certificate of origin is supposed to be issued for clearance of rough diamonds from Brazil. There is a mining tax levied according to the value of rough goods, and the purchaser is liable for this tax, usually about 10%.

However, much rough never passes through official channels. There is a 1% tax on cut stones and 10% on jewelry.

United States diamond dealers, in general, do little direct buying from Brazil. Ten to twenty years ago Brazilian diamonds were cut in noticeable quantities in New York. However, in recent years more dealers prefer to trade through the Syndicate, where the supply is steadier and there is more quality control. We heard that the Syndicate buys Brazilian goods indirectly and that it is filtered according to quality and size into parcels from other sources. Rio is not as important a cutting center as formerly for a number of reasons: (1) Wages are lower in Petropolis, a mountain city about thirty-two miles outside Rio, where men (only) are cutting small stones. (2) It is difficult to interest the native Brazilian in skilled work. (3) Belgium is offering incentives to cutters who emigrated to Brazil during the second World War. In Rio as in other cutting centers, such as New York and Antwerp, there are a few skilled artisans who still specialize in cutting large,



Important alluvial-diamond-producing states of Brazil: Minas Geraes, Mato Grosso, Goiás and Bahia.

well-made, fine-quality stones. However, the demand is not great for such gems in Rio, but there is an insatiable demand for them in the United States and Europe. Also, labor costs are higher in New York, Belgium and even Israel, so the sizeable better-quality rough is preferred and the majority of it leaves Brazil.

Choice of Diamond-Cutting Styles in Brazil

How does the Brazilian look at diamond in fashion? Cape-color stones of five, six, eight, ten and twelve carats are common in the market. These light-yellow and "pique" (slightly imper-

fect) stones are in demand and bring higher prices in Rio. Quite in contrast to the United States, it is interesting to note the pear-shape brilliant has little fashion appeal in Brazil, whereas marquises and baguettes are in demand. Round brilliants from about one to ten carats are popular. There is no stable market for colored diamonds.

Brazilians are Becoming Gemology Conscious

Several of the more progressive jewelers in Rio are now issuing a quality certificate based on the Gemological Institute of America diamond report. This is being used as a sales aid and is in-

cluded with each diamond purchase. It was enlightening to learn that Brazilian jewelers are looking to the GIA for factual up-to-date information on scientific developments in gemology. Many of the personnel from these progressive firms have taken or are enrolled in the GIA courses. A course in gemology is included in the curriculum in Rio University. This institution is a part of a tremendous University City being built by the government within a section of Rio. A course in gemology is also being offered in the University of São Paulo, Brazil's largest industrial city.

Diamond Mining in Brazil

Brazil is not the only country producing diamonds in South America, but she has progressed further with her air-transportation system and has extended roads into the interior of the country. This in itself attracts foreign investment and buying capital and opens up the interior to trade and, in time, cultural expansion. However, at present, the people in the interior are still quite primitive. Most miners work on a seasonal basis, mining during the dry months and returning to their small farms the rest of the year. Over sixty thousand small operators are mining by crude means comparable to our 49ers gold-mining methods, and since much of this population is nomadic there is lack of control, so any figure of total production is speculative.

Diamonds are known to occur in over forty districts of at least eleven states in Brazil; to mention two, in Goiás along the Parana River and in Bahia along the Grana Francisco River.

To date only a little speculative panning has been done in the north in tributaries of the Amazon. The greatest concentration of mining is in the state of Minas Geraes. Here diamonds are found along the Paranaíba River and its tributaries; Diamantina is the center of the diamond-mining district. The relatively new Chica da Silva mine runs in an east-west direction along the northern border of Minas Geraes and southern Bahia. This mine is owned by an American company; it is a mechanized operation engaged in recovering alluvial diamonds by an electronically controlled dredge (that is, all digging and washing are done by machinery). It is producing over a quarter of a million dollars worth of diamonds per month, which was formerly a year's production. Up to the present time this has been a one-tract operation. It is a major engineering feat to even transport the equipment into Diamantina. Haulage is mostly at night over the highway system, which is closed to other traffic.

As industrialization progresses, economic and sociological problems arise. The sludge from the washing process is causing water pollution. In turn, this is becoming a major problem to the farmer who needs clean river water for his cows. The mining company must solve this pollution problem, since it is planning an expansion program of opening eight more tracts. The dredges are now under construction in Texas, U.S.A.

About eighty to ninety percent of the recovery in this mine consists of small stones averaging approximately five to eight stones per carat. They are consid-



Typical red-spotted diamond crystal from Mato Grosso, Brazil, approximately five carats.

ered quite "clean," or free from flaws. In contrast, the river deposits in Mato Grosso yield larger crystals, which produce three-, five- and larger-carat finished stones.

The government has extended a road system into the interior of this state, which can now look forward to increased development. It has been reported that production of diamonds was over six million dollars last year, although again, because of the individual operations, even this figure is questionable.

Brazilian Rough

Each mining area seems to produce diamond rough with its own peculiar characteristics, such as certain color skin, red spots or growth patterns on the crystal faces. In general, Brazilian rough displays a range of characteristics from quite colorless to dark-red-spotted crystals that often yield beautiful high-color stones. The red-spotted rough should not be boiled in acid until completely

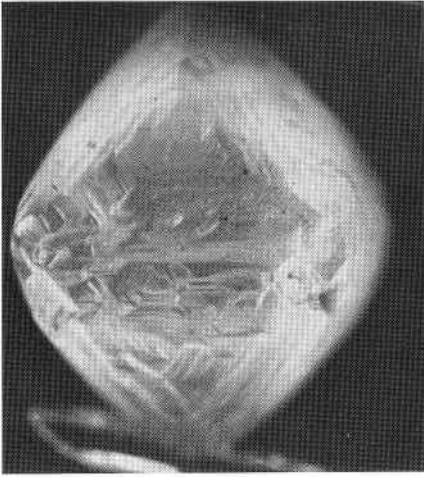
finished, because if the red foreign material remains in any of the cracks, it becomes hardened, almost as though it were baked into the stone, and is then almost impossible to remove. There are dark-skinned green stones and yellows and browns, the latter often facing up better when cut. Prospecting in Brazilian rough is a gamble that may be short lived, unless one is knowledgeable in the quality characteristics of Brazilian rough and its cutting potential.

Brazil produced one of the largest famous diamonds, the 726.60-carat *President Vargas*. It was found in Minas Geraes in 1938 and bought by Harry Winston in 1939 for six hundred thousand dollars. It was cut into twenty-three stones.

Brazil is a country producing ever-increasing quantities of diamonds. With further development of land and air transportation, introduction of extensive mechanized mining in the central and eastern states and expansion of prospecting northward into the tributaries of the Amazon, Brazil is bound to have continually greater influence in the world diamond market.

Guyana and Venezuela

If we explore diamond mining in the interior of Guyana and Venezuela, we will find there is a similarity to mining in Brazil, since their diamond deposits are also alluvial in nature. Since Guyana is controlled by a communist government, little information filters out. There is a very low tax on rough stones taken out of the country. However, diamond trading, for the most part, is on a fly in-fly out basis. It is definitely for the rugged male.



Typical red-spotted diamond crystal from Mato Grosso, Brazil; approximately five carats.

ered quite "clean," or free from flaws. In contrast, the river deposits in Mato Grosso yield larger crystals, which produce three-, five- and larger-carat finished stones.

The government has extended a road system into the interior of this state, which can now look forward to increased development. It has been reported that production of diamonds was over six million dollars last year, although again, because of the individual operations, even this figure is questionable.

Brazilian Rough

Each mining area seems to produce diamond rough with its own peculiar characteristics, such as certain color skin, red spots or growth patterns on the crystal faces. In general, Brazilian rough displays a range of characteristics from quite colorless to dark-red-spotted crystals that often yield beautiful high-color stones. The red-spotted rough should not be boiled in acid until completely

finished, because if the red foreign material remains in any of the cracks, it becomes hardened, almost as though it were baked into the stone, and is then almost impossible to remove. There are dark-skinned green stones and yellows and browns, the latter often facing up better when cut. Prospecting in Brazilian rough is a gamble that may be short lived, unless one is knowledgeable in the quality characteristics of Brazilian rough and its cutting potential.

Brazil produced one of the largest famous diamonds, the 726.60-carat *President Vargas*. It was found in Minas Geraes in 1938 and bought by Harry Winston in 1939 for six hundred thousand dollars. It was cut into twenty-three stones.

Brazil is a country producing ever-increasing quantities of diamonds. With further development of land and air transportation, introduction of extensive mechanized mining in the central and eastern states and expansion of prospecting northward into the tributaries of the Amazon, Brazil is bound to have continually greater influence in the world diamond market.

Guyana and Venezuela

If we explore diamond mining in the interior of Guyana and Venezuela, we will find there is a similarity to mining in Brazil, since their diamond deposits are also alluvial in nature. Since Guyana is controlled by a communist government, little information filters out. There is a very low tax on rough stones taken out of the country. However, diamond trading, for the most part, is on a fly in-fly out basis. It is definitely for the rugged male.

Venezuela is another country vastly rich in mineral wealth, although not as advanced as Brazil. Again we find that the unstable governments over the years, its natural barriers, lack of adequate surface transportation and highway systems and lack of trained labor have been factors causing delay in opening the interior of Venezuela south of the Orinoco River.

Approaches to the Interior of Venezuela

There have been numerous approaches into the interior of Venezuela. Prior to the airplane, many prospectors approached Venezuela via a southern and easterly route through the waterways of Brazil and Guyana. Passage was up the Amazon River to the Rio Negro, to the Rio Branco in Brazil, and then the Tacatu River through the Guyana Highlands in the Pacaraima Mountain Range. It is in this area known as The Pool in the vicinity of Monkey Mountain, along the Ireng River and the more northerly Mazurini River, that these Guyana alluvial diamond-bearing deposits are being worked by crude methods, mainly by Negros (known as the River People) and some Indians. Being only about two hundred miles from Georgetown on the Atlantic Coast, some European and American prospectors found this land approach more accessible but now fly in by small plane.

There have been others possessed with diamond fever who have trekked westward from Guyana across Kowatipu Mountain and around the southern side of Mt. Roraima, finally connecting with the tributaries of the Caroni River in Venezuela. The great natural divide

between southern Venezuela and northern Brazil made this seemingly direct approach from Brazil impractical. It may also have been due partially to the natural flow of the rivers, those south of the divide flowing south and easterly and those north of the divide in Venezuela flowing northerly.

The northern approach to La Gran Sabana is via Caracas across the coastal mountain range and over the extensive oil plains to the vast interior, which lies south of the Orinoco River. It is in the river system in La Gran Sabana where the alluvial diamonds of Venezuela have been found. The airplane has made it possible to pass over inaccessible terrain, and a few crude landing strips have been cleared in the jungle for small aircraft navigated by skilled bush pilots. Reaching the diamond-bearing rivers via this northern route, we can soon see and sense why this area has long remained an untapped treasury of natural mineral wealth.

Taking off from the modern city of Caracas on the northern coast of Venezuela, we find she lies at the southern foot of the Aurea peaks about three hundred feet above sea level, in a beautiful valley formed by branches of the coast range and the extension of the Cordillera (heel) of the Andes. There are extensive oil-storage tanks dotting the coastline, since oil is a main product of Venezuela. Over the mountain range the land levels out and becomes extensively rich oil fields in the vicinity of El Tigre. Oil shafts stand out as stark silhouettes against the setting sun, resembling pictures in *National Geographic Magazine*. We pass over the treacherous



Rushing falls in a densely forested area of Gran Sabana.

Orinoco River delta, fourteen miles at its widest part. It is a muddy river, the home of the dolphin and the electric eel. The Orinoco has been the greatest natural barrier separating the plains in the north of Venezuela from the mineral-rich interior.

The valley of the Orinoco to the east and west as far as Ciudad (city of) Bolívar is composed of soft soil of unconsolidated sediments. Thus, engineers had been unable to erect a bridge. It was only when they found a small area of hard rock on both sides of the river at Angostura, the present Ciudad Bolívar, that they were able to span the river. As luck would have it, this was also the narrowest part of the river. (Angostura, translated, means *narrowest point*, and it is also the home of Angostura bitters.)

A momentous day in the history of Venezuela was January 6, 1967, the dedication of the Angostura Bridge. It was the first bridging of a mighty South American river; it can be compared to the laying of the first railroad crossing of our own country to open up the Great West. Over the Angostura Bridge with its four-lane highway it is estimated that about thirty thousand vehicles will travel per day, allowing commerce to flow and markets to open and cultures to spread. It leads into Ciudad Bolívar, which houses the School of Mines and Minerals, one of the five schools in the National University. The airport is small but is the gateway to the interior.

Only two hundred miles south of the airport lies La Paragua, a diamond-hunting ground for tourists. It is Vene-



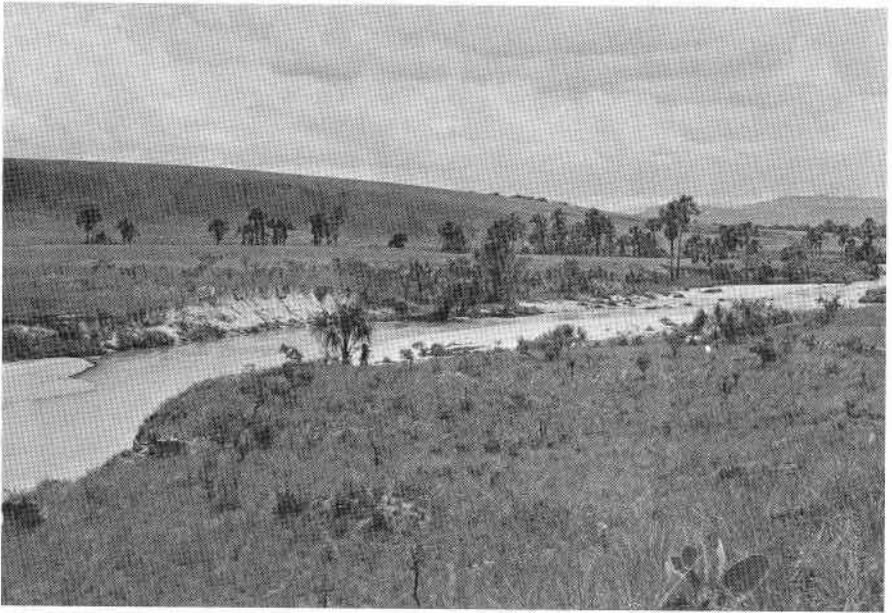
River route via Brazil into Guyana highlands, the alluvial-diamond-bearing area of Guyana.

zuela's Mufreesboro, where the city worker can escape on a four-day round trip to hunt diamonds. He may find a small stone, or more likely end up buying one from a veteran prospector whose story is usually worth more than the diamond.

Southeast of La Paragua lies La Gran Sabana, where less than five percent of the population of Venezuela exists. It consists mostly of Indian peoples. According to legend, in this highland is the source of the diamonds that are found in the lower alluvial river deposits. The main river feeding this area is the Caroni, which flows north to the Orinoco. The Caroni does not flow in a sharply defined river bed, but is a network of meandering water passages.

Along them there is panning for diamonds and gold. In some areas the waters are sluggish with extensive savannah forest merging into tall brown grass and dried-up weblike rivulet beds of cracked reddish-brown clay and conglomerate. Then, again, there are lakes fed by water rushing down from a series of cataracts and falls emerging from the densely forested, ominous, mesalike plateaus.

In one such highland is Angel Falls, one of the eight wonders of the natural world, over 3,212 feet high, rising in the mountain escarpment of Cerro Auyán-Tepui. One conjectures where the water comes from, since it does not flow as many waterfalls do, entirely over the highest ridge of rock forma-



The Caroni River, a network of meandering water passages, in which alluvial diamonds are recovered.

tion, but seems to gather part of its volume partially from underground in this vast sixteen- by twenty-two mile plateau. The water flows out of crevices at intervals forming a series of smaller falls below the main one, which eventually find their outlet in Lake Canaima. At the foot of these falls the waters are treacherous, yet here adventuresome prospectors have tried foolhardy recovery of diamonds.

Geology of Plateau Area

Geologists have found this area is underlain by Precambrian igneous base rock and metamorphosed rock formations, mostly of gneiss and schist. There followed a later submergence period, probably during the Triassic-Jurassic Periods, causing the flood plains, when the vast deposits of sediment of the earlier drainage pattern were consoli-

dated into sandstone, grading from fine-grained to coarse conglomerate. Also, irregular formations of igneous rock in the shape of lenses and irregular layers are reported to be sandwiched into this sedimentary formation. There must have later followed a tremendous land upheaval, raising this sedimentary bed into the mesa plateau we see today. It is almost identical in geological formation to our Colorado River Valley and the Grand Canyon. If the vegetation could be stripped from the Angel Falls plateau, we would easily recognize the similarity of the rock formation of these two natural wonders.

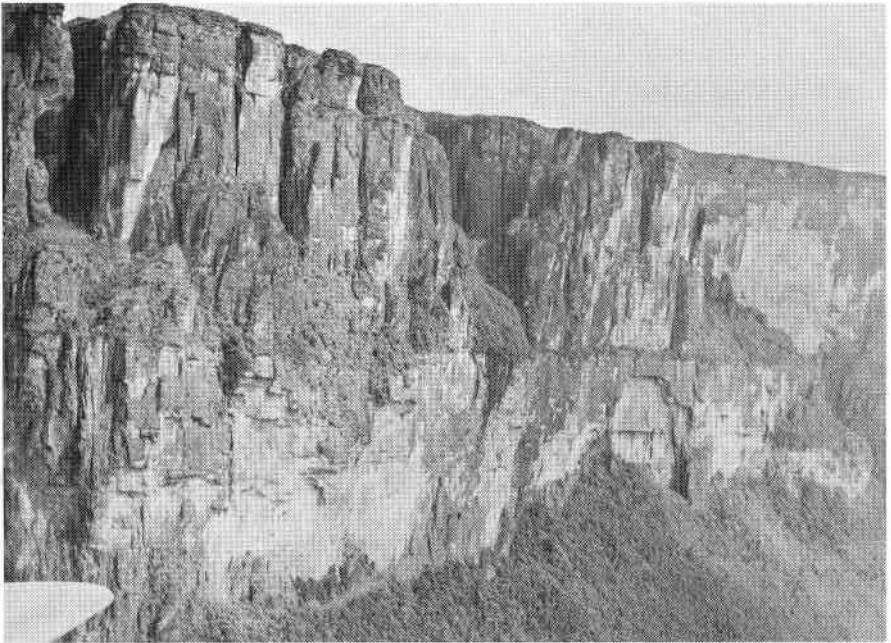
Why, you may ask, has man not landed on these table-top-looking plateaus? He has tried, but failed. About 1930, a prospector named McCrackin from Denver, Colorado, hired Jimmy,

Angel to fly into the Gran Sabana to find a "stream of gold." The story is told that McCrackin did recover about twenty pounds of gold but never told Angel the source of his find. McCrackin died soon after returning to the States. Jimmy Angel made numerous subsequent trips and it was on one flight that he discovered the famous falls, which are usually shrouded in clouds. It was in 1935 that Craig, an engineer with Angel, was killed by a coral snake. Following this, Angel crashed in an attempted landing on the plateau in 1937 and the plane remains as a parched skeleton memorial. So, to date, man has not conquered this mesalike plateau, which, according to the legend, is the source of the diamonds found in the alluvial deposits below the falls.

River Mining

The present ill-defined drainage system of southeastern Venezuela indicates a radical change from an arid to a hot and humid environment, where fauna and flora are now flourishing, and consequently the river systems in southern Venezuela are becoming more sharply defined. The dense root systems hold the soil and water; thus, the river channels are becoming deeper and the flow stronger. In some of the rivers where alluvial diamond mining is being carried on it has been necessary for the miners to pile up barriers to divert the water from the main stream, causing shallow pools of streamlets, allowing pothole mining and washing.

The diamondiferous-bearing gravel is shoveled into a three-section sieve



Rock escarpment of the plateau of Anyan Tepui; savannah forest at base.

and washed by moving the sieve with a sidewise motion in the shallow water. This kind of mining might also be referred to as "pick-and-shovel mining." One man digs holes below the gravel surface into the semiconsolidated bank or along the shoreline of the diverting barrier and shovels the loosened soil into a three-layer wire-mesh sieve, a *surucu*. Another miner carries on the washing process. Theoretically, the larger diamonds are caught in the top section of the sieve, the approximately one- to five-carat size in the middle section, and the small crystals and possibly flake gold and very small nuggets in the fine mesh at the bottom.

Another method of washing is to sit on the shore and wash the gravel in a circular pan, a *batea*, with sloping sides.

The gravel is washed around in the pan for a "feel recovery" by hand. A third method is the use of a sluice box, or a *tom*. This is a rectangular wooden box with holes at one end. This box is usually placed in an inclined position on the bank or it may be suspended on cross poles, in an "H" formation at either end of the *tom*. Gravel is shoveled into the box and water is poured over it. The diamonds are then caught in the holes at the end of the box in this manual-washing process.

Diving for diamonds is another crude and hazardous method of recovery. Two or three men work together from a hollowed-out log canoe. One is equipped with a diving suit and weights on his feet. He is lowered into the water and may go down twenty feet or more.

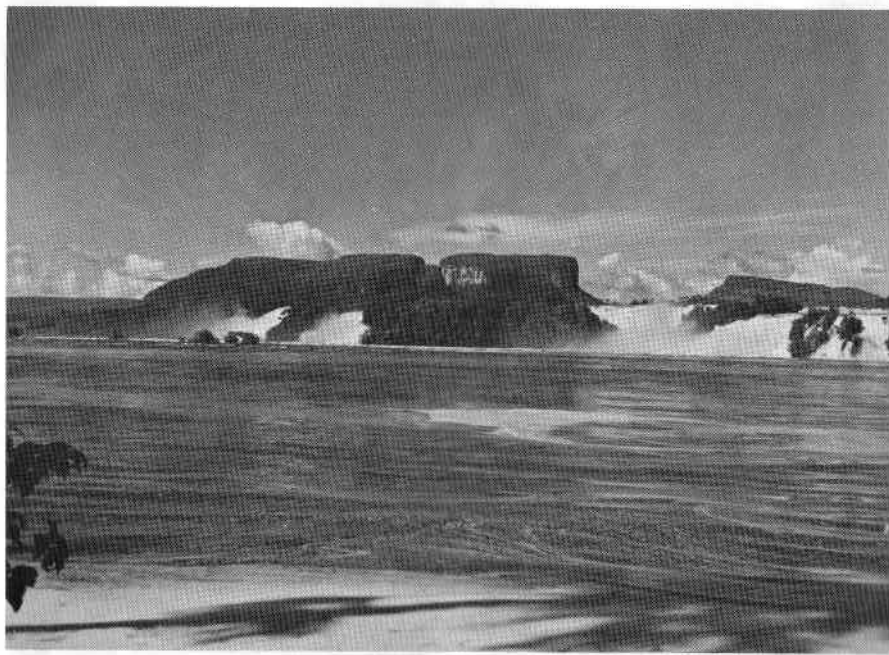


Table-top plateau, Anyun Tepui, in which Angel Falls rise, and a series of lower falls dashing into Lake Canaima (the legendary source of alluvial diamonds).



Gran Sabana, the alluvial diamond region in the interior of Venezuela.

Another man pumps air down to the submerged miner who is feeling around the bottom. When he feels a possible "strike" he puts a stake in the mud, and a leather "poke" is lowered down to him to fill with mud, hopefully diamond bearing. It is then hoisted to the surface and goes through a washing process.

A safer and more productive method of recovery is with movable caissons, or diving machines. However, it has been rather unsatisfactory to move such equipment into the interior of Venezuela, since there is no system of roadways. A few years ago an American mining company did attempt a mechanical operation on the Icabaru River near the Brazilian border. This was short

lived, for when the present government came to power, although not a military regime, it confiscated all of the mining company's equipment, which is now under military guard. All that remains is a diverting barrier in a rushing jungle river, a few potholes along the bank and rusty cans. A few Indians remain living in open shacks, reflecting their exposure to the white man who left this skeleton of a river-mining village.

This mining compound is fenced in as posted land. Such claims in the interior of Venezuela must be registered with the government, although there is no land tax in undeveloped areas. A permit to mine is granted, and the government is very particular about recovery of its strategic mineral resources. In

order to take diamonds out of Venezuela legally, one is required to fill out a form known as a *gia* and to pay about two percent of the value of the rough. Extraneous other charges increase the final tax to about five percent.

What is the present status of diamond mining in Venezuela? Most mining is by prospectors, many having found society too confining, some Negros and Indians. They find diamonds, but will not recover them in your presence. The Indian chief usually wears a diamond, as do the prospectors. They believe that diamond is a good-luck charm. If you ask where they found their diamond they will make a wide gesture that means "out there" toward the foreboding river and the wilderness. It may be safely said that friends are more important than money in the interior of not only Venezuela, but Guyana and Brazil. But both are necessary! There are some diamond buyers who fly into the interior regularly and the rough is brought to certain trading centers.

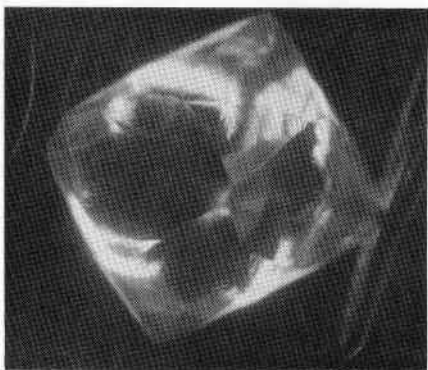
Character of Venezuelan Rough

Venezuelan rough is often spotted with black inclusions; however, if these are eliminated by a skillful marker and cutter it produces magnificent stones of high color. Clear triangle-shaped crystals are also common. Beautiful blue rough, almost the color of light-blue topaz, occasionally occurs. The apple-green natural-coated rough, when cut, produces fine colorless finished gemstones. There are also small yellows and industrial grays. The authoress has been told that the Guyana and Venezuelan rough have similar characteristics, al-

though it has not been her good fortune to knowingly examine Guyana rough.

Venezuela can boast the recovery of one of the famous diamonds of the world, the *Libertador (Liberator)*, weighing 155 carats. It was found in 1942 in the Gran Sabana and purchased by Harry Winston in 1943. It was cleaved into two pieces weighing 115 and 40 carats. These cleavages were fashioned into three emerald cuts, weighing 39.90, 18.12 and 8.93 carats, and a 1.44-carat marquise. It is safe to conjecture that since such rough has been found in this area, more will eventually be recovered.

To grade diamonds "in the rough" is a unique experience. It is here one can easily be overcome with diamond fever. Handling the crystals only hours out of the alluvial mud, you are drawn impulsively to the river. But wait—the waters are dangerous, since the anaconda snake with its squeezing death grip and the razor-tooth man-eating piranha, known as the *carib*, are present in most waters. Also, along the shores lurks the beautiful but deadly coral snake. It is the Indians who know the art of living in this land, as is evident when you fly over the forested plateau and see areas being burned to protect the villages from wild animals such as the jaguar (the big cat), snakes and the invasion of the *sauba* ant, which destroys crops. The Indians live principally on yucca, which they cultivate inside their log-fenced areas, chicken, wild hog and game from the hunt. The juice from a citrus fruit is like an oasis in the desert. There are no sanitary facilities or roads or means of bringing supplies in, other



Gem-quality crystal from Venezuela; approximately five carats.

than to a few crude landing strips.

What is the Future of Venezuela's Interior?

It is safe to speculate that it will become a new frontier. The Orinoco Mining Company has opened a vast iron mine in eastern Venezuela, south of the Orinoco. A road is being engineered into the mine over mountains never before penetrated. There are flights into Lake Canaima at the base of Angel Falls. The completion of the Guri Dam on the Caroni River will generate as much power as the Tennessee Valley Project; this will change crude mining operations in the river system. The Catholic Church has a few active missions in southern Venezuela near the Brazilian border. The Venezuelan government has an interior roadway system planned and an extensive long-term land-reclamation program. So much depends on the stability of the government as to how rapidly this area will be developed and its mineral resources recovered.

Conclusion

It has been conjectured that the diamond deposits of South America and

those in Africa may be related. One school of geologists believes in the Continental Drift Theory, since the indentation of the western coast of Africa and the nose of the eastern coast of Brazil appear to fit together like pieces in a jig-saw puzzle. If the present theory holds that the original source of diamonds is in a volcanic neck, no primary sources of diamond in South America have been found to date. It has been rumored that kimberlite has been found in the interior of Brazil. However, no such specimens were on display in the Bureau of Mines in Rio, as was recently acquired secondary-deposit conglomerate embedded with diamond crystals from Mato Grosso. Geologists have proven there is a relationship to alluvial South American diamond deposits.

It may not be of any great economic importance to find the primary source of diamonds in South America but merely a satisfaction in knowing the geologic answer. However, the main problem confronting the prospector is locating the rich alluvial deposits. The engineers must first cope with nature to make this interior habitable for man's own physical existence before he can introduce modern mining methods and equipment. The findings of the great scientific expedition now engaged in the Amazon may revolutionize man's approach to probing the interior of these South American countries for strategic mineral resources.

(Photographs courtesy Ministry of Development, Department of Tourism, Caracas, Venezuela. Special thanks to Miss Kathie Horan, N. W. Ayer & Son, Inc., New York City, for her research for illustrations.)

First Brazilian Diamond Dredge

by

Prof. Dr. Almeida Rolff
São João del Rei
Minas Geraes, Brazil

Diamonds have been known in Brazil for the past two and a half centuries. From their discovery until the present time, all diamond production has come from individuals or small groups of miners scattered over the country. Five major diamond fields are known; two in Minas Geraes have been worked since 1725. Some mines in the northern field, in the Diamantina area, are worked in a pseudomatrix rock—a Precambrian conglomerate bed in the Minas Series formation.

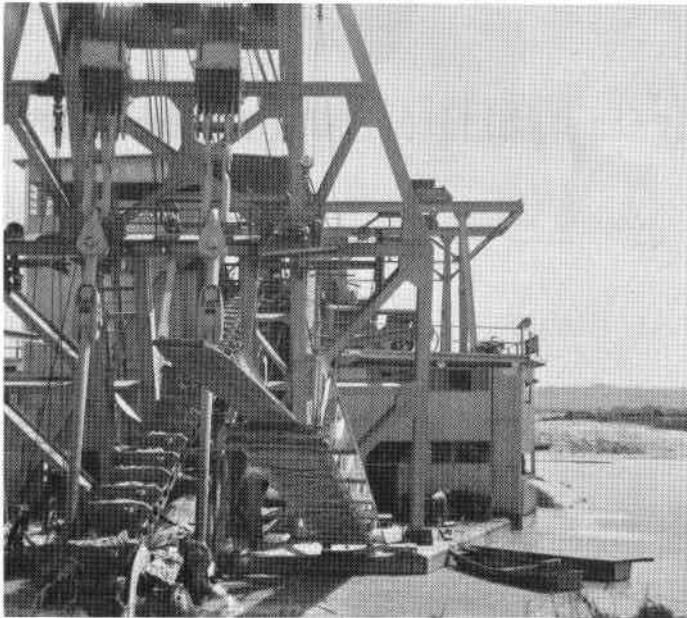
In the western field only placer deposits are known, and in this 50,000-square-mile area some of the country's largest diamonds have been found. All of them were recovered by crude mining methods.

Approximately 10,000 carats of diamonds, some in the 100-carat range, have been found in this field without finding a true diamond pipe. Some carbonatite pipes exist, but no kimberlite pipes are known.

In October, 1966, the first technically advised mining operation was begun on the Jequitinhonha River, which drains the Diamantina region, or the

northern Minas Geraes field. After a careful placer-drilling program, with more than 600 drill holes bored and several experiments made on the recovery of diamonds from the gravels, a mining company called Mineração Tijuca SA started active work with a dredge, called the Chica da Silva dredge. This is the first connected-line bucket dredge in the world to ever work a river placer deposit. This river was the site of the country's first diamond discovery, in 1725. At that time, of course, only India and Borneo were diamond producers, so one can realize the importance of the discovery to Portugal. It was much later, only a century ago, that the African fields were discovered. But even today, Brazil has made no efforts to mechanize or modernize its diamond-recovery methods, other than the dredge discussed in this article.

Although there are several technical problems to be worked out with respect to this kind of mining, these difficulties are being solved in partnership with two other dredging firms: Pacific Tin Dredging Co., which specialized in cas-



Front view of the dredge.

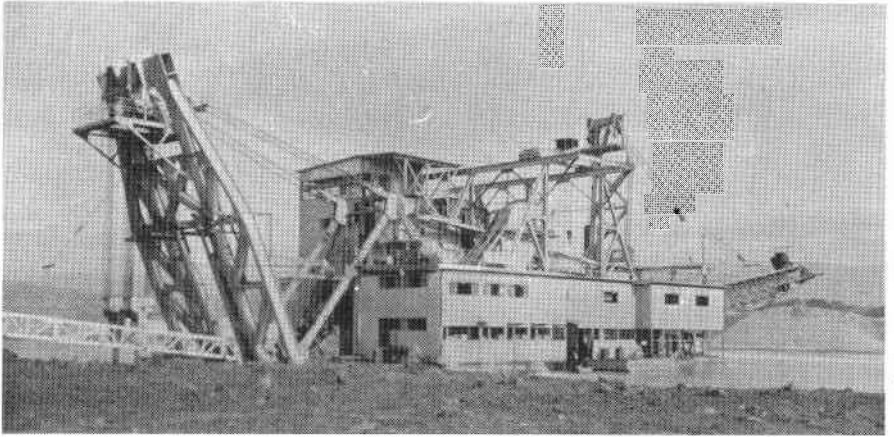
siterite mining in Malaya, and Dragagem de Ouro SA, a pioneer in gold recovery by bucket dredge in Brazil.

Just one year of work has shown that it is possible to recover diamonds as small as 40 to 50 to the carat by the use of specially developed jigs modified from Cleveland jigs used in Malaya. On the average, 85% to 95% of all stones recovered are of gem grade, but no large stones have been found in the area since its discovery period, when all the large stones were removed. Some gold is a by-product of the quest for diamonds.

Interesting experiments are made to determine diamond values in the placers and to ascertain whether conventional ore-dressing equipment is effective for diamonds. In one test, diamond crystals

are thrown into a river barren of diamonds and the dredge recovers 95% of them. As a rule, diamonds cannot be recovered by drilling a placer, although this can be done with gold and other heavy minerals. In order to determine if standard equipment has a good recovery rate, 4-inch-diameter holes are drilled and pieces of plastic of the same density and size as Brazilian diamonds are put in the holes. The recovery rate of the equipment from this test is approximately 90%.

After special road studies were made from aerial photographs, more than 3000 tons of heavy equipment was hauled in from the United States to a point 150 kilometers from the rail head without loss or disaster. This was only one of many problems solved by this



General view of the Chica de Silva dredge.

pioneer Brazilian diamond-mining company.

The accompanying photographs taken by the author show the size and other interesting details of the dredge. They were made through the courtesy of Alexandre Misk, general manager of Mineração Tijucana SA.

According to the Brazilian Embassy Bulletin for July, 1967, it is possible to remove 3000 cubic meters of diamondiferous gravels a day, or approximately one million tons a year. At a rate of 0.05 carats per cubic meter, the possible production may be on the order of 50,000 carats a year. The last recorded

export of Brazilian diamonds from all fields was about 200,000 carats, so the new dredge may be responsible for 25% of next year's production. The importance of the dredge to increasing Brazilian diamond production is obvious. As divulged by the company, another dredge is being moved from the United States to assist the Chica da Silva with the mining.

Very small diamonds, 40 or 50 to the carat, called "mosquito eyes," are being cut in Israel. The larger stones are fashioned in Brazil. The colors are light green, light brown and colorless in common crystal forms.

Developments and Highlights at the

Gem Trade Lab in New York

by

Robert Crowningshield

A New Synthetic Emerald?

A very fine, slightly bluish-green synthetic emerald weighing 2.18 carats was presented to the Laboratory as a new synthetic emerald, but no other information was forthcoming. Its properties agreed with those of flux-grown synthetics: R.I. 1.56-1.565, S.G. 2.67 and strong-red ultraviolet fluorescence. Under magnification one could see indistinct, parallel straight wisps (*Figure 1*) and straight striations, which gave every appearance of the striations of synthetic corundum, except for the lack of curvature (*Figure 2*).

Chrome Tourmaline

We are indebted to Mr. Campbell Bridges, South African mining geologist, for the gift of several fine, dark-green tourmalines from Tanzania. The presence of chromium was pretty definitely established by the absorption

spectrum (*Figure 3*) and by the fact that the stones appeared bright red under the emerald filter. It is our understanding that the stones are very limited in size: calibre and melee sizes are all we have encountered. The first piece of jewelry we have seen in which these

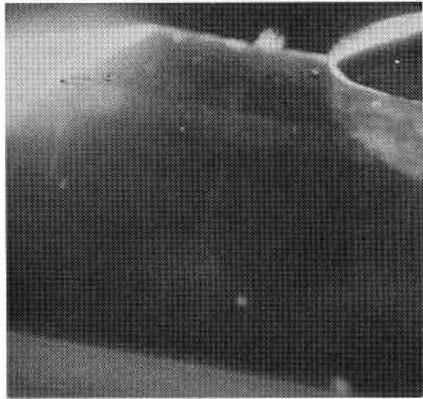


Figure 1

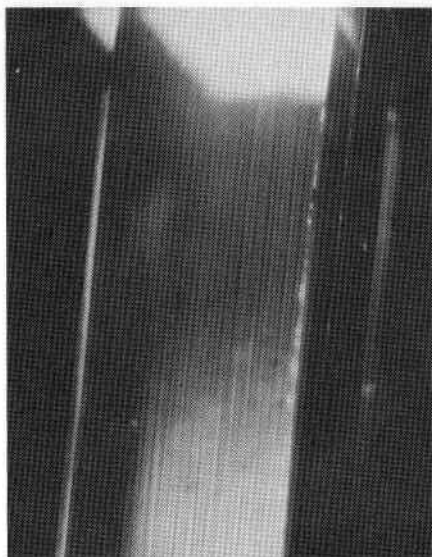


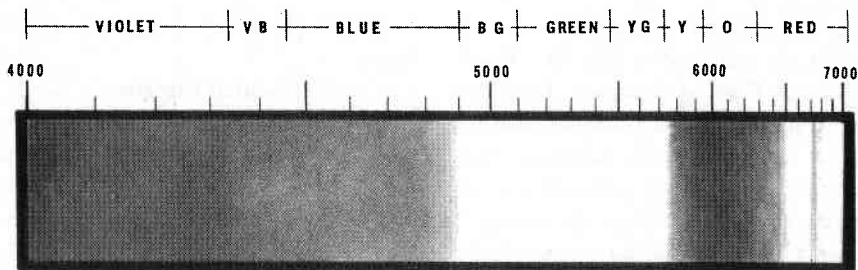
Figure 2

stones were used would have posed considerable difficulty for a gemologist with a loupe only and no prior information that tourmaline occurs in this color. The item was an opal cluster ring with 20 of the very pleasing, bright, slightly yellowish-green stones. Since the color was not quite an emerald green and the dichroism was not distinct, doubts as to their identity can be appreciated. *Figure 4* illustrates one

stone that gave every impression of being glass. The facet junctions were rounded, a chip beneath one prong appeared glassy, and the "polished-through" gas bubble all joined in suggesting glass. (Since the stones were small, they were set in such a manner as to preclude taking a refractive index.) On the basis of the double refraction proved by dichroscope and microscope, red color under the color filter, and the spectroscope, the stones were proved to be the new tourmaline but of much better quality than any we have seen to date. The "polished-through" bubble shown in the photograph is actually an exposed hollow tube. Many of the stones in this ring were devoid of inclusions.

Unusual Garnets

A lot of 12 peculiarly colored brownish-purple garnets, reportedly from a new locality in India, had the very low refractive index of 1.73-1.732 — near the theoretical low of pyrope. The specific gravity was 3.67 — also near the low for pyrope. However, the absorption was clearly that of almandite, though not strong.



CHROME TOURMALINE - Tanzania

Figure 3



Figure 4

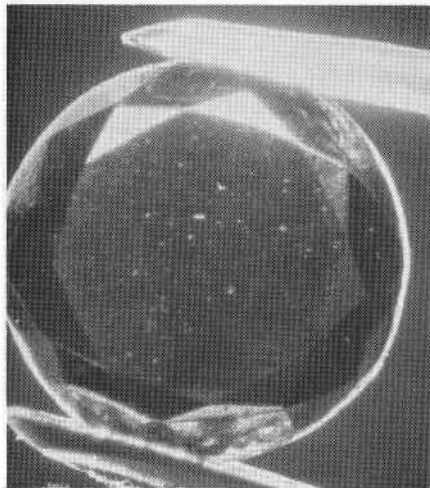


Figure 5

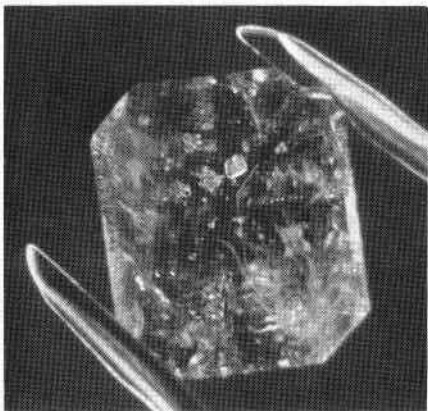


Figure 6

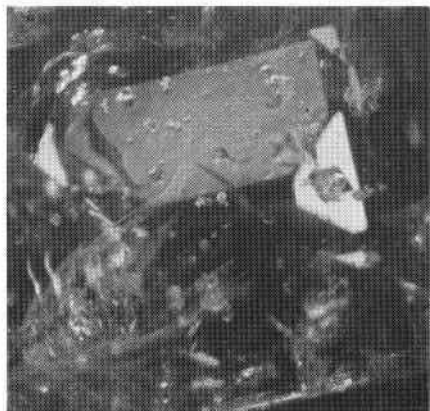


Figure 7

Massive Lazulite

We are indebted to Mr. Eric Engel, Brazilian Trading Company, for a fine specimen of rough massive lazulite, which he states makes handsome polished stones. We have polished one face of the stone and confirm the beauty of color. Heretofore, we have never had a specimen of this form of lazulite and find that its properties conform with those published: R.I. 1.61-1.64, S.G.

$3.07 \pm$. There was no significant spectrum.

Faceted Cuprite

We are pleased to add to our collection a 2.05-carat cuprite, a gift from Mr. Gerald Boseley, California rare-stone dealer. *Figure 5* illustrates the hairlike inclusions that characterize the stone, which was an intense dark red.

Unusual Crystal Inclusions

Figure 6 illustrates a Chatham syn-

thetic emerald with unusually well-developed crystal inclusions. *Figure 7* shows them enlarged, together with typical wisplike inclusions. We are indebted to Mr. Lucien Grunzweig, GIA student, for allowing us to study and photograph the stone.

Dyed Jadeite

The first dyed jadeite we encountered more than 10 years ago was cut in the cabochon form. Later, we began to see carved discs and, lately, dyed round beads. Recently, we have seen several hololith bracelets in which the dye had either been, accidentally or purposely, irregularly deposited; this caused the finished stone to appear much more natural. One of these bracelets, of which *Figure 8* is a section, was not only quite mottled but the color was considerably more realistic than the usual dyed stones we see.

Fancy-Color Rough Diamonds

Among the more than 20 rough crystals of colored diamond received recently as a gift to GIA from Lazare Kaplan and Sons were several that had

a mottled dark-green "skin" (*Figure 9*). We were especially pleased to have these for study with the spectroscope. In the stones through which some light could be transmitted we saw an intense absorption line at 5040 A.U. and a weaker line at approximately 4980 A.U.

Risky Setting Job

In the last issue of G & G we discussed a diamond that had broken because of improper seating in the prongs. We have become very alert to this potential source of danger to a stone, and were amazed to see a fancy diamond with a value in six figures set so that the side prongs (the stone was pear shape) did not have a seat and the prongs barely came over the edge of the stone. The arrow in *Figure 10* points out the most serious prong deficiency.

Gilson Synthetic Emeralds

Figures 11 and 12 illustrate two synthetic emeralds that, by virtue of their fluorescence and refractive index, we assumed to be manufactured by Gilson in France. Both were purchased in Thailand as natural emeralds and both

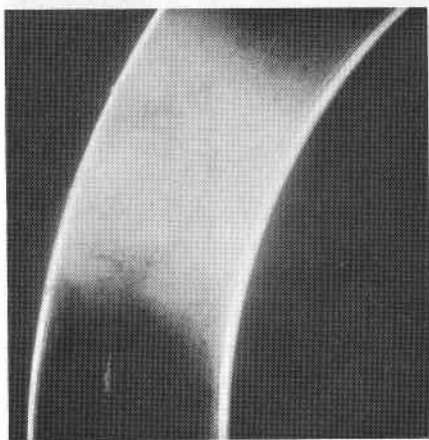


Figure 8

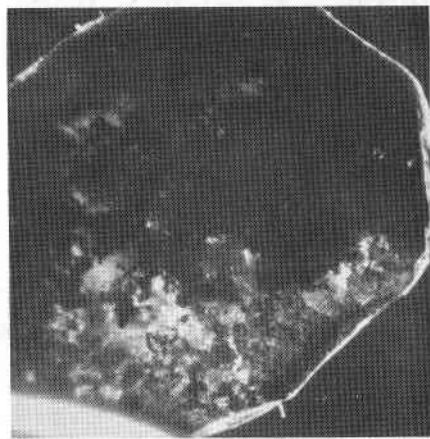


Figure 9



Figure 10



Figure 11

showed somewhat unusual twinning and banding. In fact, the inclusions were quite different from those of the Gilson stones marketed in the United States.

Acknowledgements

We are indebted to our good friend, Graduate Gemologist, **Melvin Strump** of Superior Gem Co., New York City, for a paper of 29 fine faceted iolites.

We are very happy to add to our collection specimens of oölitic opal, received from New York manufacturer **Jack Gutschneider**.

From GIA student and avid amateur lapidary, mineralogist and collector, **Joe Rothstein**, we received a handsome specimen of pink dumortierite and a stilbite "rose."

From an anonymous donor we received a selection of small but very good color rough blue sapphire from Brazil.

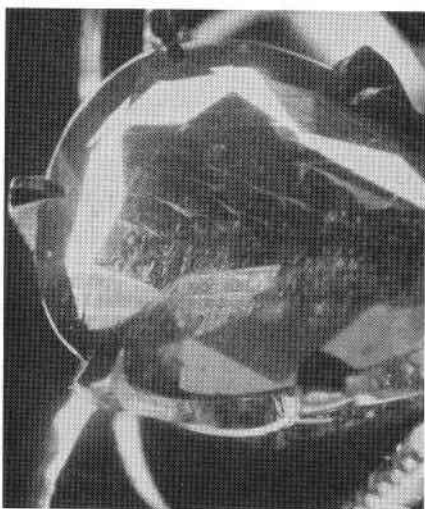


Figure 12

We have noted in this column before that quite acceptable cabochon-quality ruby has been found in Brazil, but this is the first good-quality blue sapphire we have received.

(continued on page 257)

Developments and Highlights at the Gem Trade Lab in Los Angeles

by

Richard T. Liddicoat, Jr.

Blue Zoisite

During the last two months we've been almost deluged by samples of the magnificent new blue zoisite. The latest example was a fantastic 170-carat crystal with the most amazing dichroism. Two of the colors were particularly outstanding. Examined through a dichroscope or through one Polaroid plate, one direction showed a handsome blue reminiscent of the rare faceted lazulite, and a 90° direction showed a violetish red similar to that of fine ruby. We are very anxious to see a cut example, because we are sure it will make a fascinating gemstone. Its hardness seems to be slightly greater than that of the common zoisite we have examined in the past. Usually, zoisite is considered to be 6 to 6½ in hardness, but this is just slightly less hard than chalced-

ony. With pressure the new material will scratch chalcedony but chalcedony will scratch it somewhat more easily. Although the only stones we have examined to date are crystals, we have been able to examine and photograph a few inclusions. One appeared to be either an outline of a triangular-shaped negative crystal or two smaller tubelike negative crystals that joined at an angle approximating 60° (*Figure 1*). The other inclusions were opaque hexagonal platelets that could possibly be hematite (*Figure 2*). The arrows point to the inclusions.

Assay Button

We received for identification a green-glass button that was assumed by the sender to be a meteoric glass. When examining it in the polariscope we got a very strong anomalous double refrac-

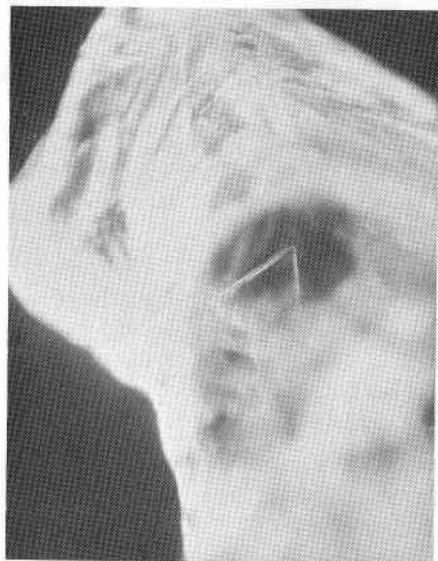


Figure 1

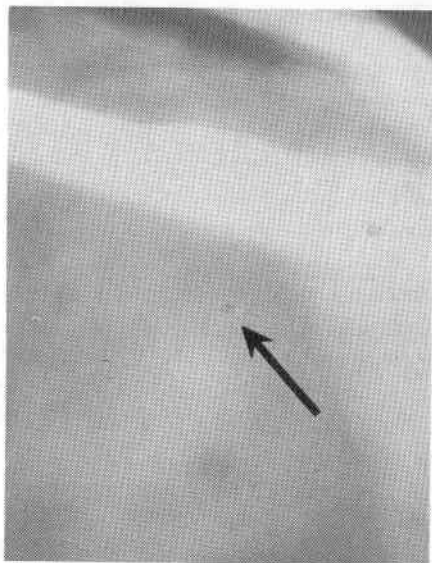


Figure 2

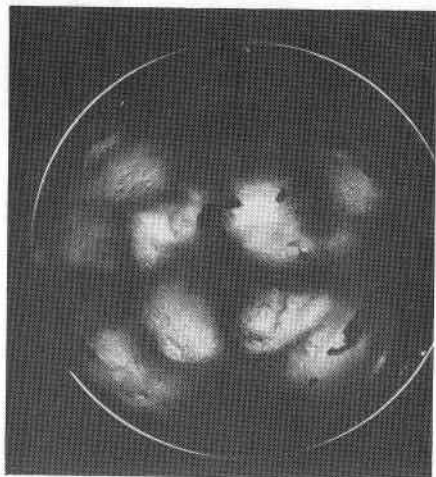


Figure 3

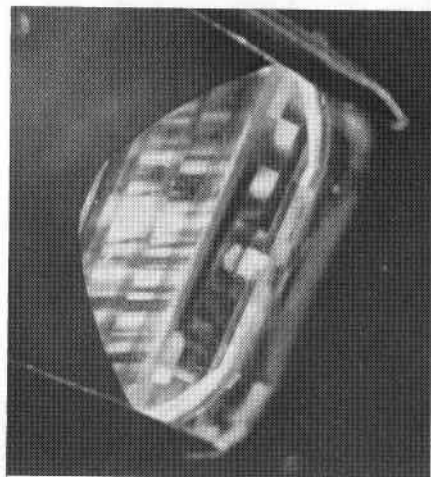


Figure 4

tion, resulting in a cross with very strong colors (*Figure 3*). The cross is black and the surrounding, almost-square ring is the first ring of color. We were familiar with the appearance of such a stone and identified it as an assay button of green glass.

Transparent Green Grossularite

Figure 4 shows a very interesting strain pattern in a transparent green grossularite garnet from Zambia. Its properties were: R.I. 1.736, S.G. 3.595, unit-cell size 11.85 Å. It was sent to us by a collector who had bought the stone

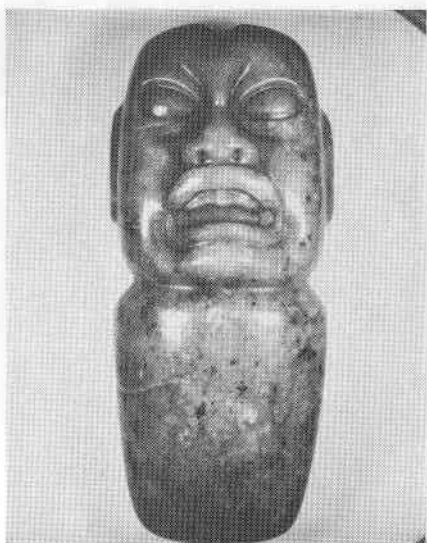


Figure 5-A

from Kenneth Parkinson in England, who said he had three of the stones. We have never before seen transparent green grossularite and were very appreciative of the opportunity to study it.

Carved Cordierite

We received for identification two large carved objects, said to be pre-Colombian, that could be traced back several hundred years within the same family (*Figures 5a* and *5b*). At first glance, one looked to be gray jadeite with a slightly mauve portion in one area; the other was quite uniformly gray. When we got spot refractive index readings in the 1.54 area, we assumed they were probably quartz, but decided to use the X-ray powder camera to determine beyond question their exact nature. We were amazed to learn from the X-ray patterns that they were not jadeite as they appeared to be, but cordierite. Iolite is the name given to cordierite when it is transparent and

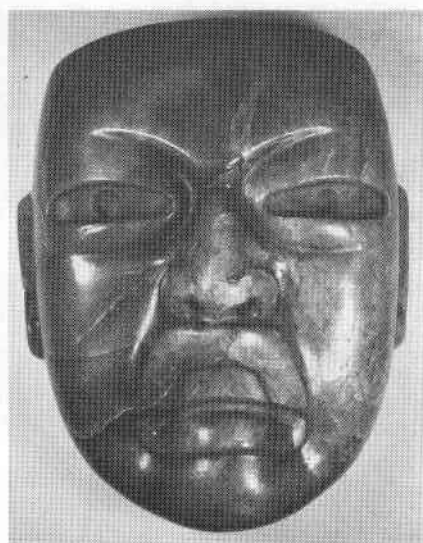


Figure 5-B

used as a gem. Thus, the slightly violetish tinge to the one section of one of the figurines was not surprising. In all our testing of art objects of this kind we have never encountered a uniform composition of cordierite, as in this instance. We were very interested to find it.

Brown Diamonds

It would be nice if every item reported in the New York and Los Angeles Laboratory columns contained earth-shattering information, but items of this kind don't occur that often. Occasionally, we see something of interest and photograph it with a view to making column material for the next issue. We examined a number of brown diamonds recently and saw some rather interesting characteristics. In *Figure 6*, polishing scratches can be seen across the table on one of the stones that were particularly well displayed, merely because the background was dark, as one

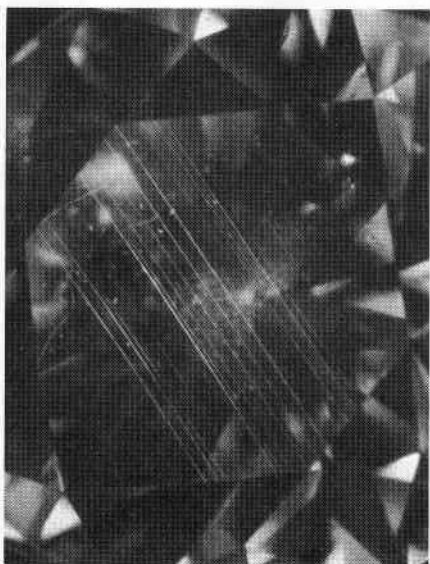


Figure 6

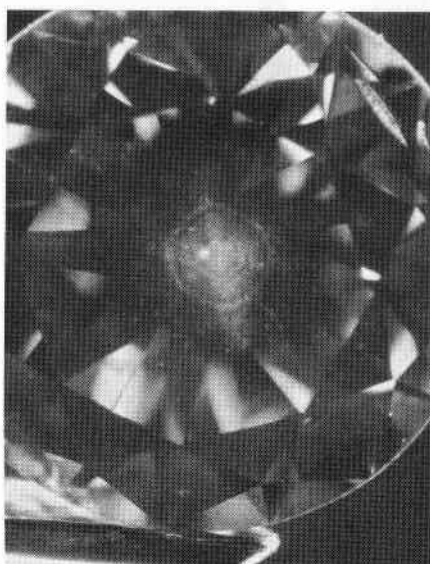


Figure 7

would expect in a brown diamond. Polishing marks of this kind are seen frequently on colorless or near-colorless diamonds, but they don't show up nearly as well. Therefore, we photographed these to illustrate what polishing scratches look like. *Figure 7* shows a cloud in the heart — a characteristic of

brown diamonds.

Oölitic Opal Again

In the Spring, 1967, issue of *G & G* we mentioned oölitic opal and its slight resemblance to the heat-treated black opal that is so common today. A short time ago we received one for identification and photographed it under high

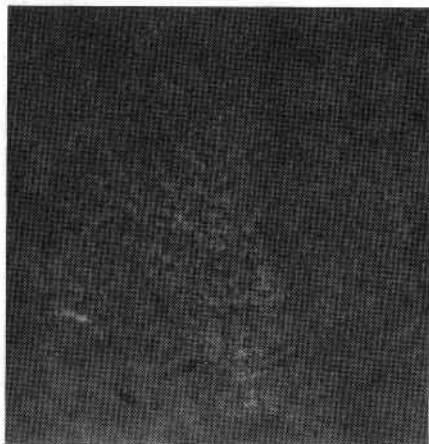


Figure 8

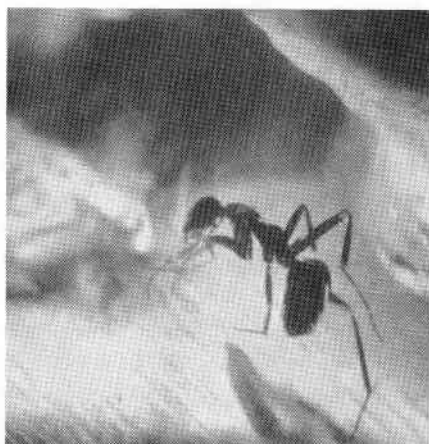


Figure 9



Figure 10

magnification. Black spots seen in treated opal might easily be confused with the tiny brown inclusions we found in this oölitic opal. However, in the oölitic opal they were spheres rather than irregular little black spots and were concentrated only in certain areas (Figure 8).

Modern Art and Ancient Amber

A large piece of transparent yellow-brown material that strongly resembled amber was tested recently. In the body of the fragment was an ant, whole except for one leg and a mandible (Figure 9). Interestingly enough, the material had a refractive index of 1.56 and a strong plastic odor when touched with a hotpoint. It was, we assumed, the imitation amber called Amberdan.

Figure 10 shows an attractive carved opal, in which the face is carved from an ironstone band in the material, with the flowing hair in attractive opal.

Unusual Materials

Among the odd stones submitted for identification during the past few months was a magnificent rhodochrosite. It weighed about 5 carats and was

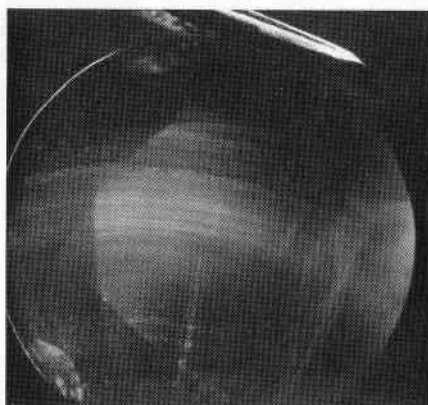


Figure 11

exceptionally beautifully cut. With the beautiful color, ideal transparency, good proportions and an exceptional polish, this stone was very lovely. At the same time, we identified a cobaltocalcite that had an interesting agatelike structure. At first glance it somewhat resembled the curved striae of a Verneuil synthetic (Figure 11).

Hammered Effect on Pearl

One of the characteristics of natural pearls is the so-called hammered effect. We have never seen it more strongly in evidence than on a large single pearl shown in Figure 12. Note the rather deep indentations on the surface, similar to that of repoussé finish on silver. The hammered effect is common, but this showed up so well that we photographed it.

Biaxial Tourmaline

Recently, Chuck Fryer tested a brown tourmaline and was surprised to discover a slightly biaxial interference figure (Figure 13). There was no doubt as to the stone's identity, because he ran an X-ray powder analysis on it, but evidently it was sufficiently strained to

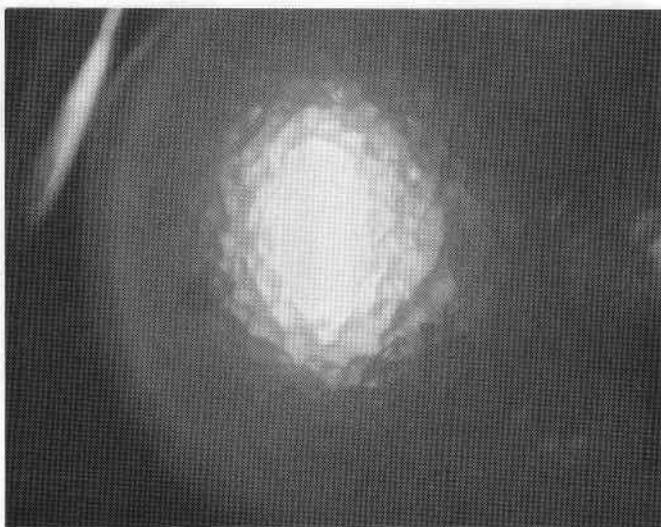


Figure 12

create a slight 2V angle.

Almost Deposited

Often we see melee with very large tables, but the one pictured in *Figure 14* had almost no crown at all. As is visible in the photograph, the table extended almost to the girdle.

Odd Triplet

We were rather surprised by a buff-

top triplet that consisted of a synthetic sapphire cabochon and a base of faceted synthetic spinel.

Unusual Matching

A pair of pear-shaped diamonds was submitted for a quality report. The stones, each of which weighed 3.31 carats, were shaped exactly the same and had dimensions almost identical.



Figure 13



Figure 14

were 12.37 x 8.92 x 4.87 mm. and the other, 12.44 x 8.91 x 4.80 mm. Both were VVS₂ and the color of the two was very close. It is very rare to find stones of this size in a pear shape with such close matching.

Acknowledgements

We wish to express our sincere appreciation for the following gifts:

From **Edward R. Swoboda** we were delighted to receive three zoisite crystals, several brownish ones, and two pieces from chrome tourmaline broken off from a large crystal. The absorption spectrum for the tourmaline is shown in *Figure 15*.

We received yet another useful paper of stones from **Ben Gordon** of Gordon

For example, the measurements of one Jewelry Corp. in Houston, Texas. They are very much appreciated.

To **Andrew Sarosi**, student, Altadena, California, for a cabochon of treated opal matrix.

To **Walter J. Bauscher, Jr.**, student, Hadden Heights, New Jersey, for three ruby crystals from Cowee Creek, North Carolina.

To **Harold Vogel**, student, Chicago, Illinois, for a selection of rubies, sapphires and emeralds.

To **C. D. Parsons**, cutter, Burbank, California, for a faceted round datolite brilliant.

To **Sunday Boyajian**, International Gem and Pearl Co., Los Angeles, California for the gift of a garnet bead.

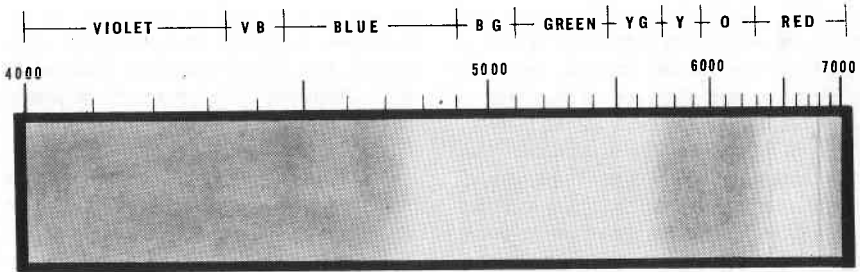


Figure 15

Book Reviews

EDELSTEINE (Precious Stones). Published by Schäfer & Schmidt KG, Friedrichsdorf, Germany, 1967. 8½" x 11½" format. 62 pages. Illustrated with 32 color plates.

Edelsteine was compiled under the auspices of the gem- and diamond-cutting industry of Idar-Oberstein, Germany (*Verband der Edelsteine und Diamantindustrie*), under the direction of President Konrad Wild and Manager Otto Veek. The text was written by Dr. Hermann Bank. The photography is by Karl Hartmann.

This book is essentially a collection of outstandingly beautiful color photographs of both the more commonly encountered and the less frequently seen gemstones, as well as examples of carved and engraved gems. In the great majority of plates the color reproduction is amazingly accurate and leaves nothing to be desired. The background is an inconspicuous, solidly colored light tone of gray, an excellent neutral color for showing gems to best advantage. The plates are ideal for framing, if so desired. They have been arranged primarily according to the standard mineralogical classification; i.e., as to oxides, silicates, phosphates, etc.

As an introduction to the color photographs, the first few pages of text discuss briefly the historical background of gems, cutting and polishing, and the various means of classifying gems. Following the 32 plates, short paragraphs describe each of the species and varieties illustrated on the preceding pages.

Edelsteine will make a valuable and decorative addition to any gem library.

Books, London, England, 1967. 98 pages. Clothbound. Illustrated with black and white and 54 color plates. Price: about \$1.80.

Valued above all other gem materials by the Chinese, fought for by the Maoris of New Zealand, and offered as gifts to the conquering Spaniards by the Aztecs of Mexico, jade has a long history that spans 4000 years and five continents.

In his book J. P. Palmer, an Assistant Keeper at the Fitzwilliam Museum, Cambridge, England, has provided a concise review of the fascinating story of jade — the gem mineral that provides durability with delicacy of color and the appearance of fragility with impressive strength. In the introduction, Mr. Palmer describes (too briefly and inadequately) the properties of jadeite and nephrite, methods of carving, and the use of jade in the cultures of various countries. Naturally, China assumes an important part in the book, but there are also adequate sections on Iran, India, New Zealand and pre-Columbian America.

Following 38 pages of text are 54 color plates, preceded by six pages of explanatory notes on the illustrations. Eight black-and-white illustrations in the text include a map entitled *Jade in Asia*. Unfortunately, the quality of some of the color plates leaves something to be desired. More than 80 works of art are shown. The pieces belong to such famous institutions as the British Museum, the Victoria & Albert Museum and the Fitzwilliam Museum, as well as to various private owners and fanciers of jade.

One color plate is of a magnificent carving of a recumbent water buffalo from the Fitzwilliam Museum, carved in the Yuan or Ming dynasty (it is difficult to date a piece

JADE, by J. P. Palmer. Published by Spring

such as this, since this period extends from 1280 to 1644). The buffalo and a black horse, also illustrated, are said to have stood in a corridor of the Winter Palace in Peking. Other pieces illustrated include weapons, plaques, animals and birds, fittings to decorate swords and scabbards, discs, scepters, water vessels, ceremonial objects, plates and bowls, vases, screens, seals, cups, masks and other representations.

Jade is not a particularly important or significant book on this subject (others are far more comprehensive), but it is interesting for the diversity of objects and their colors depicted in the plates. The addition of an index would have been useful.

JEWELRY, by L. Giltray-Nijssen. Published by Universe Books, Inc., New York, 1967. 112 pages. Illustrated with black-and-white photographs and line drawings. Price: Clothbound, \$2.75; Softbound, \$1.95.

There is little to commend this book, for the same general subject — the development, history and fashion aspects of jewelry during the past 200 years — has been treated much more comprehensively elsewhere. However, it should prove interesting and enlightening for those who have only a casual interest in the subject.

In the first chapter the author discusses very briefly and very generally precious metals, diamonds and pearls. There is no discussion of colored stones. Subsequent chapters include *Court Fashion & Court Jewelry*, the *Empire & Biedermeier Periods*, *The Victorian Era* and *Art Nouveau*. This is followed by a chapter entitled *Yesterday* (jewelry from 1900 to 1939) and one called *Today* (jewelry from 1940 to the present). Further sections consider birthstones and zodiacal gems, concluding with short property tables of gemstones and a map showing the sources of precious metals, diamonds and pearls. Plates showing some of the popular styles of cutting and line drawings of a few famous diamonds, together with a short bibliography, are found at the end of the book.

Jewelry seems to have covered the subject

as well as possible in such limited space.

GEMS, by Mab Wilson. Published by Viking Press, Inc., New York City, 1967. 168 pages. Clothbound. Illustrated in black and white and with 27 color plates. Price: \$8.95.

Gems is an attractive book about gems written in a clear-cut, nontechnical style specifically for the lay reader. The book is confined to discussions of the major gemstones, emphasizing the romance, history and lore surrounding them.

In the first nine chapters, the author writes briefly on such topics as *Amulet or Adornment?*, *Curious Lore*, *Stone Symbols*, *Art & Nature*, *Beauty*, *Durability*, *Rarity*, *Scarcity*, *Portability* and *Fashion*. The remaining nineteen chapters consider the individual gems. Fashion and historical aspects are stressed throughout. The color plates are above average. Most of the black-and-white illustrations are of kings, queens and other important historical figures who could boast the ownership of famous and renowned gems.

Gems contains nothing that has not been dealt with in many previous books, but the presentation makes effortless, enjoyable reading. It will no doubt be favorably received.

THE AUSTRALIAN AMATEUR LAPIDARY, By K. J. Buchester. Published by Ure Smith, Sydney, Australia, 1967. 211 pages. Clothbound. Illustrated with black-and-white photographs and line drawings and four color plates. Price: \$5.50.

This is the first major Australian book written expressly for the instruction and guidance of the amateur lapidary. It follows the author's popular *Australian Gem-Hunter's Guide*, published in 1965, also by Ure Smith.

The Australian Amateur Lapidary is written in a clear, easy-to-understand style. It introduces the beginning lapidary to all phases of this fascinating art, leading him to the point where he can cut and polish colored gemstones of all kinds.

The first chapter outlines the history of this ancient craft from primeval times to the present day. The next three chapters discuss

the art itself, the various Australian clubs devoted to it, and describe the physical and optical properties of gemstones. The remaining chapters explain everything one needs to know about lapidary: the various styles and methods of cutting, the machinery and tools required and how to use them, gem carving, tumbling procedures, sphere making, setting up a lapidary workshop, the value of rough and cut gem materials, etc. Appendices include the weights and measures of gemstones and tables of materials used for cabochon work, faceting and carving. There is also a selected bibliography and a concise glossary of terms for quick reference.

Amateur lapidary is still in its formative stages in Australia but its potential is tremendous, mainly because of the immense natural supply of rough gem materials throughout the continent. Doubtlessly, this absorbing and rewarding hobby will become a major pastime in Australia, and the *Australian Amateur Lapidary* should become the recognized guide to the lapidary art in that country.

THE ROCKHOUND'S GUIDE TO NEW YORK STATE MINERALS, FOSSILS & ARTIFACTS, by William A. Tervo. Published by Exposition-Banner Books, New York City, 1967. 148 pages. Clothbound. One map. Price: \$5.

This book represents the first compilation of information for locating the sites of minerals, fossils, rocks and artifacts in New York State. The author, a veteran rockhound, geologist and hobby-shop owner, lists more than 700 localities rich in geological and archeological deposits throughout the Empire State. All of these localities are described and pinpointed accurately, county by county, in nineteen chapters. However, the addition of detailed maps would have implemented the written description materially. He gives directions on how to get to the deposits, what is to be found there, and other pertinent information long needed for a successful rock-and-mineral hunt.

In the book's introduction the author

states, "You are fortunate in your interest in New York State. Whether you are a mineralogist, geologist, paleontologist or just a looker, New York has a lot to offer. You need only to observe; but the trick is to look in the right places. This book will direct your lookings into specific regions."

Mr. Tervo's book should be welcomed by the residents of the state who pursue this popular hobby, as well as by visiting rockhounds.

PEARLS IN PICTURES, by Jo Mary McCormick. Published by Sterling Publishing Co., Inc., New York City, 1966. 96 pages. Clothbound. Illustrated with black-and-white photographs and line drawings. Price: \$3.95.

Pearls in Pictures, one of the Visual Industry Series, is a useful addition to the story of cultured pearls. It purports to cover natural and imitation pearls, as well as cultured pearls, but the only important coverage is on cultured pearls. With the exception of a few relatively minor errors, the book is excellent and the pictures are good.

This book would make a worthwhile addition to any jeweler's library on the products he handles.

THE STORY OF GEMS AND SEMI-PRECIOUS STONES, by Frederick H. Pough. Published by Harvey House, Inc., Irvington-on-Hudson, New York, 1967. 142 pages. Clothbound. Illustrated with black-and-white photographs and line drawings and color plates. Price: \$3.95.

When a book is written for the novice, as this apparently has been, it is certainly at least as important for it to be free from errors as if it were written for experts. This book has more than its share of mistakes. The author is a mineralogist, but apparently he is somewhat afield in the gem area, judging by some of his statements. For example, he suggests the use of specific gravity to distinguish between red spinel and pyrope garnet. He states that pyrope has an S.G. of 3.5 and red spinel, 3.6. Actually, the S.G. of pyrope is usually in excess of 3.75, so it is

greater, rather than less, than that of spinel. Although a theoretically pure pyrope would have a lower S.G., none has ever been encountered to our knowledge, and the R.I. he lists for pyrope is not for the theoretical material.

The behavior of light in the diagram on the dust cover is impossible. Although it may be excused, perhaps on the basis of artistic license on the cover, such an excuse hardly applies to its use in the text (on page 37) or to the drawing on page 38 where light also is illustrated bending incorrectly.

His choice of glass as illustrative of a 1.55 R.I. is rather unfortunate, since glass has a range from under 1.5 to over 2.0.

The novice would certainly be misled by the statement on page 23 that "Diamond cleaves easily in only one direction."

Some references to diamond cutting are neither accurate nor illuminating. For example, it is stated that after a large diamond is cleaved, it is sawed as nearly as possible to the rough shape of the finished stone, and that "ideally, one-third of a diamond should be above the girdle and two-thirds below it."

Another statement reads that a diamond that has a natural other than on the girdle is

considered imperfect.

There are 155+ carats per troy ounce, rather than Pough's stated 183.

An emerald filter is defined as a piece of colored glass!

In tables that show gem values, ruby, emerald and jade are in the very high category (jade low to very high), meaning over \$1000 per carat, but diamond, alexandrite and cat's-eye are listed only as high (up to \$1000 per carat). Although jade is described as two minerals, the R.I. range shown is 1.65-1.68, which is the range for jadeite only.

Where it is not inaccurate, it is often ambiguous or misleading; e.g., "chrysoptase" is green, like jade, but it is a little cloudier than jade and slightly more opaque."

After a succession of books for the layman by Dickinson, Wilson and others, we expected more from Dr. Pough.

The book is not without assets. Some of the comments regarding various stones, especially historical notes, are very worthwhile. The book is probably a useful addition to a gemological library. It is, however, disappointing to find so many unnecessary errors, especially in a book intended as an introduction to the gem field.

NEW YORK LAB NOTES

(continued from page 246)

We appreciate the gift of a Brazilian ruby crystal from **Mr. Eric Engel**, Brazilian Trading Company.

We wish to thank authors **Mab Wilson**, **Gordon Axon** and **William Elder Marcus** for autographed copies of their most recent books. Mrs. Wilson's is an elaborately illustrated "cocktail table" kind of book simply titled *Gems*. Gordon Axon's book is entitled

The Wonderful World of Gems and grew out of his love of collecting. Mr. Marcus' book, entitled *Seven Precious Gems*, is a compilation of the separate little booklets that the firm of Marcus and Company issued to favored customers in the '20s and '30s. Unfortunately, the latest work lacks the superb color plates of the originals.