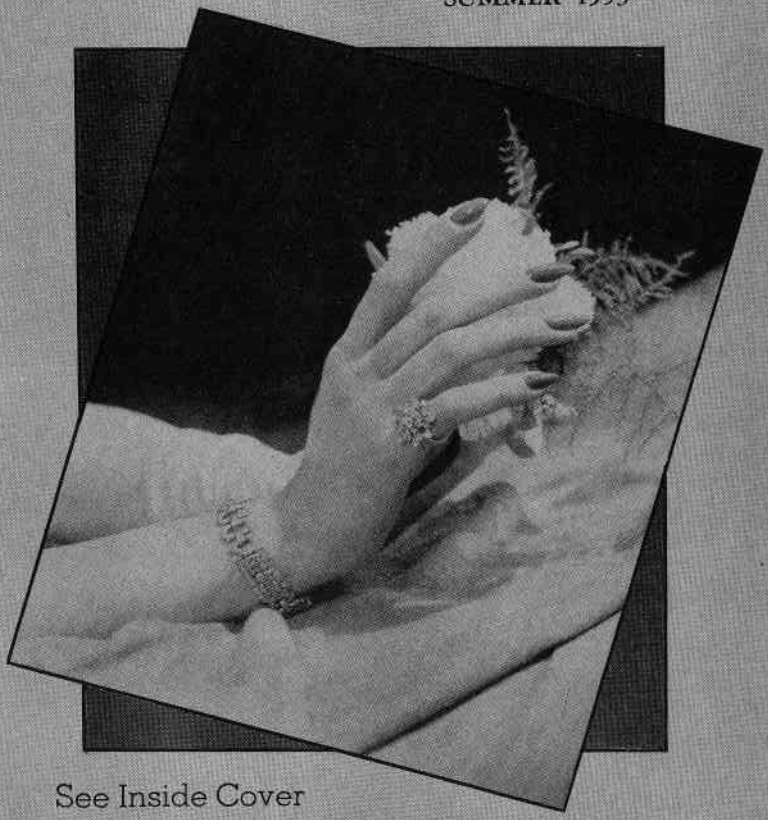
Gems and Gemology

SUMMER 1953



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Gems & Gemology

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The fashion for dinner rings is for dimension and lots of it! When the hand is small and a large ring is sought for matters of style, let it be light, open pattern like the diamond snowflake by Nat Kodow, Inc. For fashion hints see article on page 307.

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. 541 South Alexandria Avenue, Los Angeles 5, California, U.S.A.

GEMS OF ANCIENT MEXICO

by

ALBERTO RUZ LHUILLIER

Through the Spanish chronicles of the era of the Conquest, we understand the significance that the people of Mexico and Central America attached to jewels. Among the arts and occupations for which the autochthonous American people were noted, the art of the lapidary held an enviable place—followed in later centuries, before the Conquest, by the goldsmiths and silversmiths. Also, we know that the great quantity of valuable jewels among the Mexican Indians and Peruvians acted as an impetus to the conquerors to commit frightful crimes, lower than the impulses of the worst cupidity.

In the treasury of jewels that the Spaniards tore from their victims, the greater part was lost. Nearly all of the pieces of gold and silver were melted to meet the emergencies of the royal finances, while the rest passed into private hands. Many jewels were buried in the ocean as a result of the attacks of the Corsairs, and the mud of the canals and lake Tenochtitlan swallowed up forever a great part of the booty of Hernan Cortez and his captains in the famous *Noche Triste* (Dreadful Night) when the conquerors fled from the Aztec capital.

Thanks to the archeologist we have substantiated the fact that the use of jewels was common to all regions and peoples from the most remote times. However, the use of metals (gold, silver and copper) appeared in Mexico only some three centuries before the arrival of the Spaniards.

It is evident that the ancient Mexicans were not familiar with many of our gemstones, as is true of inhabitants of other cities of antiquity, for they did not know the extent of the natural deposits. Bernardino de Sahagun in his "History of the Deeds of New Spain" dedicated an interesting chapter to precious stones in which he mentions emeralds, jade, turquois, pearls (the heart of the shell), amber, opal, alabaster, obsidian, jasper, amethyst, rock crystal, in addition to many others that employ Mexican names and among which onyx, beryl, and carnelian have been identified.

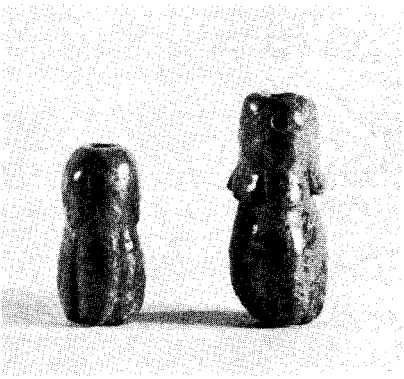
With such materials they fabricated objects destined for adornment of their persons and for the gods. Many of the precious stones could not be worn except by a certain class of society, and some were reserved solely for the divinities. Moreover, a magic quality was attributed to them for the heal-

ing of sickness and wounds. In the temples, idols of jade were worshipped and sculptures encrusted with the same material, obsidian or shell. Certain ornaments, such as nose pendants and lip rings, were distinctively hierarchical among the soldiers. Furthermore diadems, ear hoops, necklaces, breastplates, pendants, bracelets, finger rings, anklets, mirrors, brooches, and buckles were in use: that is to say, the same jewels that people have used universally and for all times. They also made mosaics encrusted with fragments of jade, turquois, obsidian and shell on a base of wood, clay or plaster to fashion religious symbols or masks of the gods.

Without metal tools, the work with gems had to be slow although human ingenuity permitted the jeweler to invent methods to facilitate his work. The shops of the lapidaries included thin sheets of obsidian, drills of jade, augers of hard wood and bone, cords of strong fibers, powder of hard stones and sand. With these technical resources, with a strong "dose" of patience and laboriousness, with his natural skill and his delicate artistic perception, the Mexican jeweler created marvels.

• **Jade idol with scroll of the solar god (approximately actual size).**

• **Jade beads in the shape of floral buttons (actual size).**



The Aztec lapidaries formed a distinguished society. They worshipped four deities who were supposed to be the inventors of their art. Xochimilco, near the capital Tenochtitlan, was their religious center because it was said that from that city had come the first lapidaries.

Of all the materials, the most highly valued then were jade—that is, jadeite- -nephrite and other green stones. These were held in such esteem that *chalchihuitl* (its Mexican name) was synonymous with "precious," as much from the material as the sentimental viewpoint. "My jade" was the sweetest term of endearment that a mother could address to her son.

The value of jade was much greater than that of gold, as inferred in the words of the conquistador and chronicler, Bernal Diaz del Castillo "These exquisite stones of chalchihuitl were extremely valuable, each one being worth and held in higher regard than a great cargo of gold." It seems that the same name that was given to gold implied an attitude in which veneration did not exclude a certain repulsion: "teocuitlatl," the excretion of the gods.

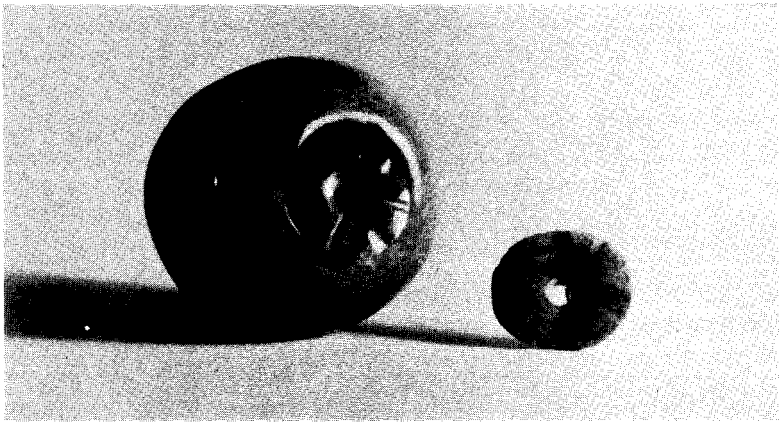
The origin of the jade approaches a mystery (See interesting article by Dr. Raymond J. Barber in *Gems & Gemology,* Spring 1952.), considering that up to now no natural deposits have been found with the exception of pebbles and a block of rough of 90 kilos. The pebbles used to be found in the rivers which flow down from the mountains of Guerrero and Oaxaca in the south of Mexico and the block mentioned appeared as an offering in Kaminaljuyu, an important archeological site in Guatemala. As we know, the Mexican jade is jadeite, like the Chinese jade, although in chemical composition slightly different, the general appearance being less transparent and more mottled than the other.

The finding of fragments of jade in archeological diggings in Mexico is very frequent but rarely has there been discovered in the same site a sufficient quantity of gems to be able to call it a real treasure. I want to refer here to some of them, the last two of which concern recent findings conducted in 1952 under my direction in the Mayan zone.

In chronological order, and also for its importance, the first discovery of an archeological treasure is without doubt that which Dr. Alfonso Caso made in Monte Alban, State of Oaxaca, in 1932. (We are not considering in this article the gems dredged by Edward Thompson at the beginning of this century in the sacred pool of Chichen-Itza, because they are almost exclusively objects of metal and not gems and do not belong to a single deposit or single discovery but to the numerous successive offerings that Thompson took out in the course of various years.)

In Monte Alban the Mixtecas buried various important personages in an ancient Zapotecan tomb with a quantity of jewels without equal in America, either in number of pieces or in their magnificence. During one week at the rate of more than 14 hours a day of work Dr. Caso, his wife, and two assistants excavated jewels, having previ-

• **Heavy jade bead hollowed out, with covers (actual size).**



• Head of god (bat) carved on plaque of jade (29 mm. long, 4 mm thick).

ously surveyed and photographed the objects "in situ." More than 500 objects were contained in the famous Tomb No. 7, some composed of hundreds of beads of gold, jade, turquois and pearls. ("Monte Alban, richest archeological find in America," Dr. Alfonso Caso. *The National Geographic Magazine,* October 1932.)

Among the gold jewelry were an abundance of necklaces, breastplates, finger rings, ear hoops, lip rings, nose pendants, earrings, tweezers for removing hair, and bells — forming the largest collection of American primitive gold. There were also excellent pieces of silver and copper.

But the objects made of precious stones were no less valuable. One of the most extraordinary was a goblet of rock crystal, a material most appreciated but difficult to fashion because of its hardness. There are few pieces of art known fashioned of rock crystal and it is probable that of the human skull in the British Museum is the most perfect. The ear hoops of obsidian were amazing because of the skill which was expressed in carving them to the thinness of a sheet of paper. Impressive also was the discovery of a human skull utilized like a framework of a turquois mosaic. Of greatest significance were the numerous carved bones of animals—some encrusted with turquois which bore figures of religious scenes and possible historical events, works which for their beauty and delicacy remind one of the ivory carvings of Asia. Among the jade pieces was the handle of a fan in the shape of a serpent; numerous finger rings; a head of an eagle with eyes inlaid with gold; another head of an eagle with a disc of silver; earrings, ear hoops, and beads from necklaces. Furthermore, vases of onyx, breastplates of carved shell, necklaces of tiger and crocodile teeth, beads of jet and amber, necklaces of coral shell and various pearls completed the marvelous Mixtec treasure.

The second treasure, which represents an extremely ancient era in the history of Mid-America, is that which Matthew Stirling discovered in 1941 in Cerro de las Mesas on the coast of Vera Cruz. Inside a small mound a deposit of 782 pieces of jade was found, scarcely protected by a floor of stucco and the remains of a censer of clay ("Expedition unearthed buried masterpieces" by Matthew Stirling, *The National Geographic Magazine,* September 1941). The finding embraced a great variety of objects and the color of the

• Carved band of jade (greatest outside diameter 32 mm.).

jade comprised not only the milky white but the black, with the greater quantity of pale bluish. The quality of carving and polish is remarkable. The better pieces are undoubtedly some small idols of typical "Olmeca" style, and some canoes. The rest were composed of ear hoops, necklaces, bracelets, tubular beads, stars and pendants, as well as bores and awls. This discovery was of great significance not only for the quantity and beauty of the objects but for the relationship revealed between the civilization called "Olmeca" of the Atlantic Coast and the archaic period of the Valley of Mexico.

The Mayas were also great lapidary artists ever since the most remote times. The famous Leyden plate of jade has etched upon it the most ancient date of Mayan history — equivalent to the year 320 of our times. Other jade objects were discovered in numerous Mayan cities such as Uaxactun, Kaminaljuyu, Piedras Negras, Copan, Nebaj, Palenque, Uxmal and Chichen-Itza—cities which flourished in that era from the time Mayan culture began to distinguish itself and become elaborate until it felt the Toltec influence, in the North of Yucatan and the brilliance of the great cities of the south was extinguished.

From the end of December 1951 to March 1952 I was commissioned by the National Institute of Anthropology and History to perform explorations and the work of reconstruction in Uxmal, one of the most important sites in Yucatan. This ancient capital of the Xiu dynasty, celebrated for its magnificent architecture, is possibly the most perfect of indigenous America.

In front of the Palace of the Governor, the most beautiful building constructed by the Mayans according to Sylvanus Morley, extends a grand terrace which guards the remains of platforms and temples extensively ruined. The central platform was explored more than a century ago by the famous North American explorer, John

• Breastplate of jade from Uxmal, Yucatan.

Stephens. A sculpture of stone was found there in the form of a two-headed tiger. This piece of sculpture disappeared from Uxmal during various generations and was restored a few years ago. In order to replace it in its original spot before reconstruction of the platform, the exploration of Stephens was continued, turning up — a few centimeters from the site in which the sculpture was discovered—a new treasure. This was composed of more than 900 pieces of jade, stones of gray and black, coral shell, the greater part being beads of necklaces and bracelets, earrings, ear hoops, and a rich breastplate with the figure of a priest engraved in the style of the purely classical period. Unfortunately, the slight depth at which the treasure was found was the reason for many pieces having been damaged by bad weather, and principally by fires which were set by rural people in the country during a great deal of the time for the sowing of corn.

In the same year (1952), also on behalf of the National Institute of Anthropology and History, there was ended in Palenque an exploration begun three years previously and which had continued during four seasons of hardship. It was concerned with an inner staircase, uncovered under the floor of the Temple of Inscriptions, and was entirely filled with stones and earth. In May of 1952, the exploration approached the termination of the staircase. Here a crypt was encountered, built at more than 20 meters below the temple and occupied for the greater part by what was then believed to be a great altar but which turned out to be like that which we discovered in November of the same year —a monumental and sumptuous sepulchre without parallel in America.

This sepulchre includes a monolith of six cubic meters, sculptured on its four sides, and hollowed out to prepare a place for the body. The cavity was sealed with a polished slab provided with perforations and a tablet completely engraved (eight square meters) hiding it entirely. The sepulchre rested on six supports, four of which bore reliefs. The crypt and its contents constitute one of the most sensational rewards of American archeology, not only because of the magnificence of its construction but for the beauty of the bas-reliefs of stone and stucco which adorn the sepulchre and the walls of the crypt, for the wealth of its offerings and finery of the Great Personage interred there, and also because it reveals a new function of the American pyramid.

As in Egypt, we find here a pyramid which conceals a funeral crypt. The sumptuousness of the mausoleum, and the intention to build an eternal and imperishable monument suggest an attitude toward death very similar to that of the Pharoahs.

But let us return to the theme of this article: the jewels. When the exploration of the inner staircase, which was to lead us to this tomb, was begun we found in a chest of masonry, a pair of ear hoops of jade placed under a stone mottled with red. When we reached the end of this same staircase, in another chest of masonry we found other gifts: three little dishes of clay, three shells full of red-powdered pigment, seven beautiful beads of jade, two ear hoops of the same material. Inside the red powder of one of the shells was hidden two discs of jade wrought in the shape of flowers and one unexpected pearl in the shape of a tear, supplied with perforations at its narrowest portion to permit its being suspended. The pearl measured 13 mm in length by 8 mm at its largest diameter. Its orient was rather well preserved but its surface was somewhat cracked and it was cleaved at the center exposing the interior so that one could estimate its formative nucleus. (See informative item in *The Loupe,* November-December 1952.)

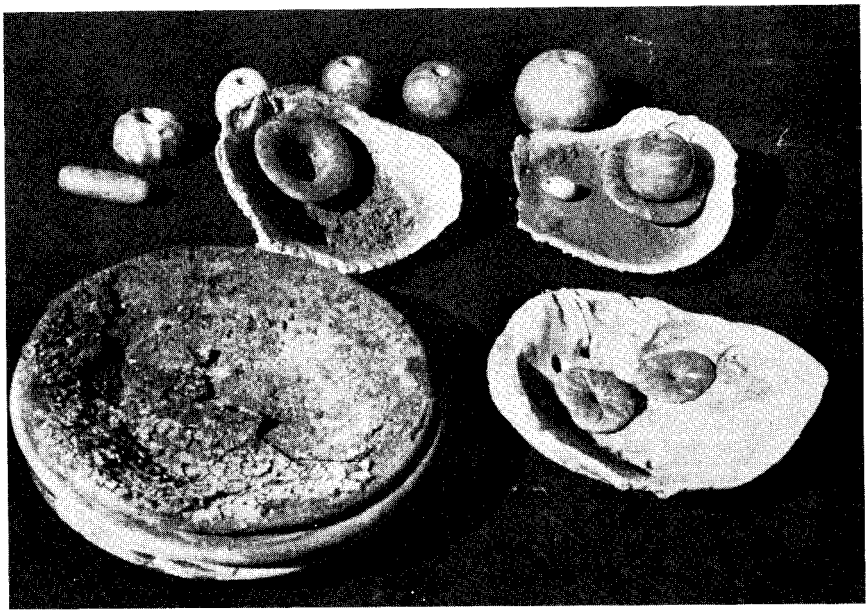
At the entrance to the crypt, at the base of the slab which served as a door, lay the remains of six youths apparently sacrificed to accompany beyond the grave the personage interred in the crypt. Within the tomb proper we came upon new offerings: various

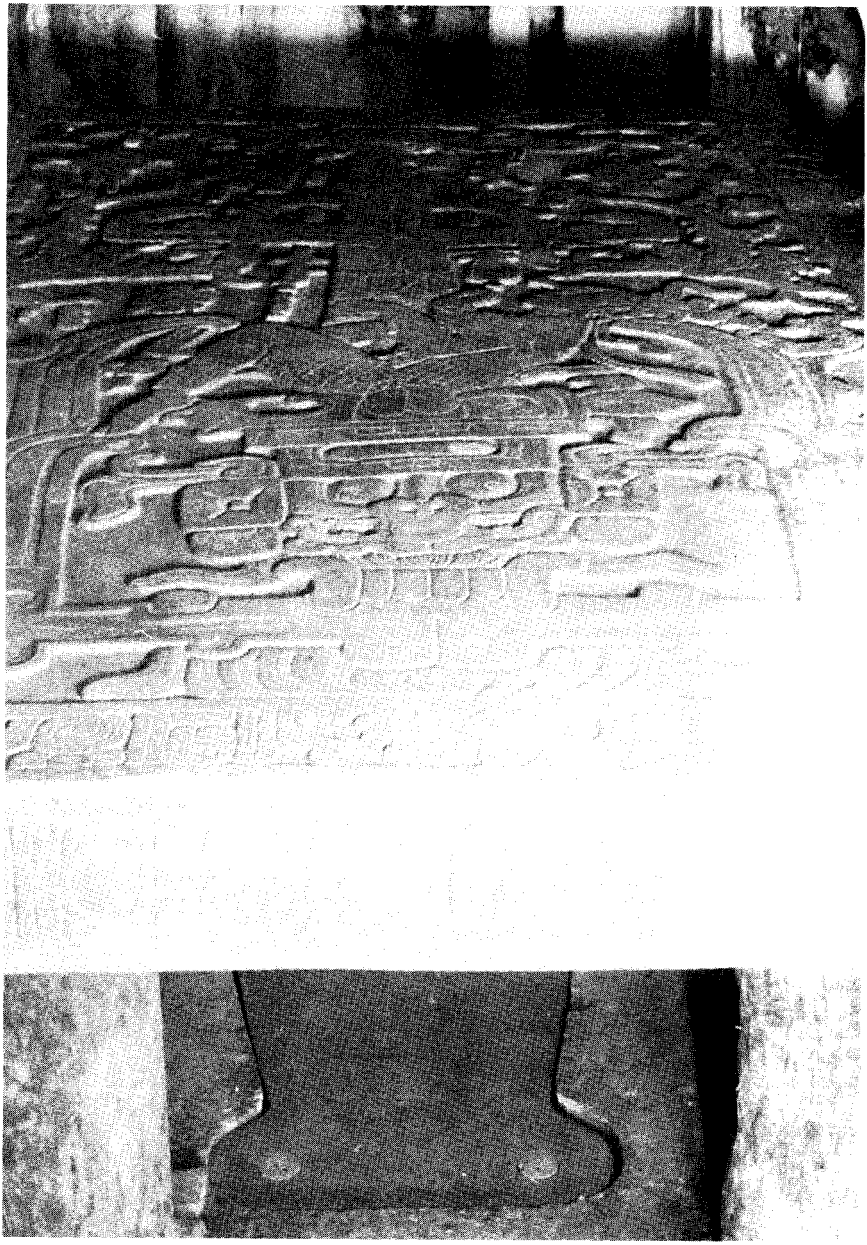
vessels of clay, perhaps left with food and drink; two very beautiful human heads modeled in plaster, and under the sepulchral stone a quantity of jewels. These included a necklace made of large pendants of slate carved in the shape of flat axes, and a mosaic of jade which doubtless represented some deity and which had to be cast on the sepulchre after the interment as it had fallen down in the scattering of the fragments.

To return to the flagstone which closed the sarcophagus; after lifting the huge stone sculpture of five tons I found the skeleton of a man which I am absolutely sure was a personage of greatest importance in Palenque history, perhaps one of their most famous kings. Near the red substance covering the inside of the sarcophagus and the bones, gleamed jewelry of jade, establishing the high rank of the personage. For the first time we beheld, on human remains, adornments which we knew in bas-reliefs: a diadem of discs on the forehead; a collar of many-formed stones among which flowers and some fruits (squashes, melons) abounded; ear hoops with hieroglyphic inscriptions; a breastplate of numerous tubular stones arranged on concentric threads; bracelets, each of 200 beads; the ten finger rings still placed around the finger bones. One of these rings bears a magnificently carved face.

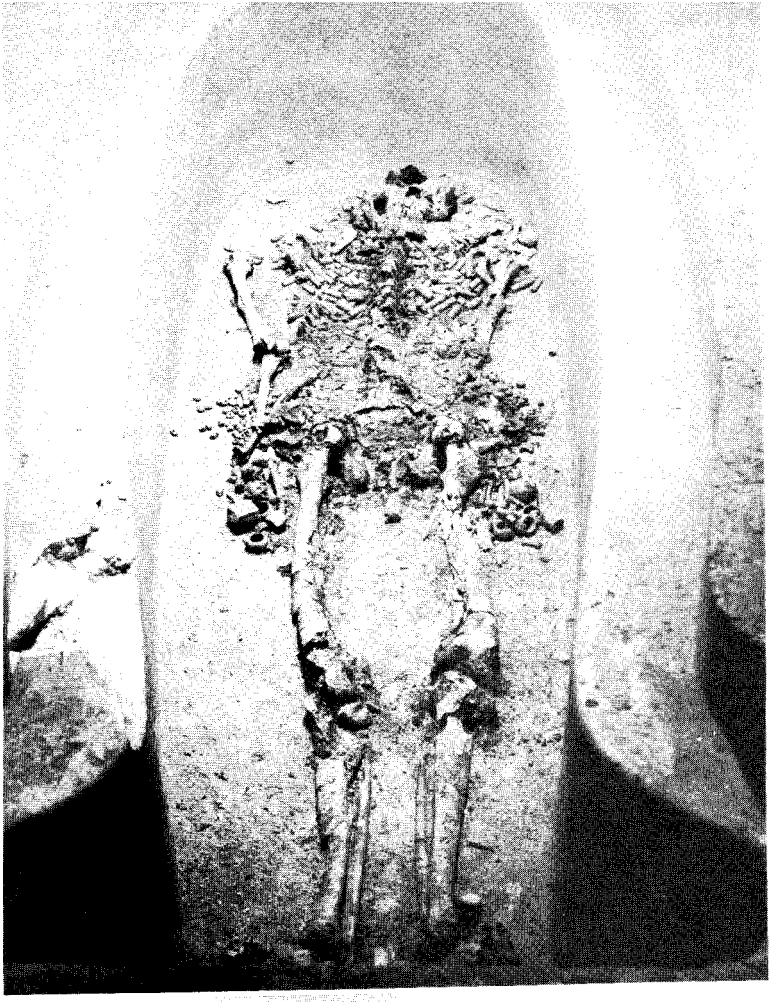
The personage held in his hands probable symbols of his rank: a large spherical bead in the left hand and a cubical one in the right, both of jade. At his feet there were two other heavy beads—one of them hollow and supplied with covers—and a lovely idol whose face showed the features of the solar god. Another statuette of jade must have been sewed in the loin cloths to judge by the position in which it was found and by the numerous holes which appear in its outline.

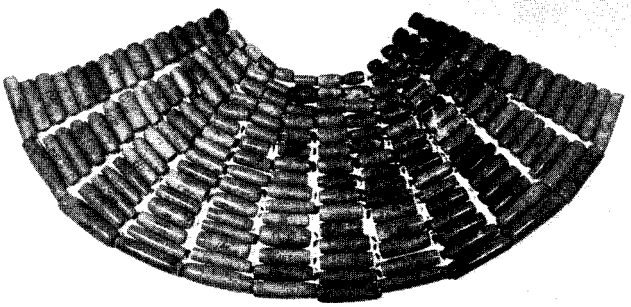
• Offerings within the inner staircase of the Temple of Inscriptions: three small dishes of clay, three shells, seven beads of jade, two ear hoops and two buttons of jade, one pearl.





• Sepulchre of the Temple of Inscriptions in Palenque, Chiapas, with sculptured stone raised and the sarcophagus still closed by a gravestone provided with holes which the removable stoppers lock.





• The opened sarcophagus, Temple of Inscriptions, Palenque, with skeleton still in its original place, covered with jewels. Second illustration shows the plastron of tubular beads assembled into its original form.

• **Mask of mosaic jade with eyes of shell and iris of obsidian removed from Palenque crypt.**

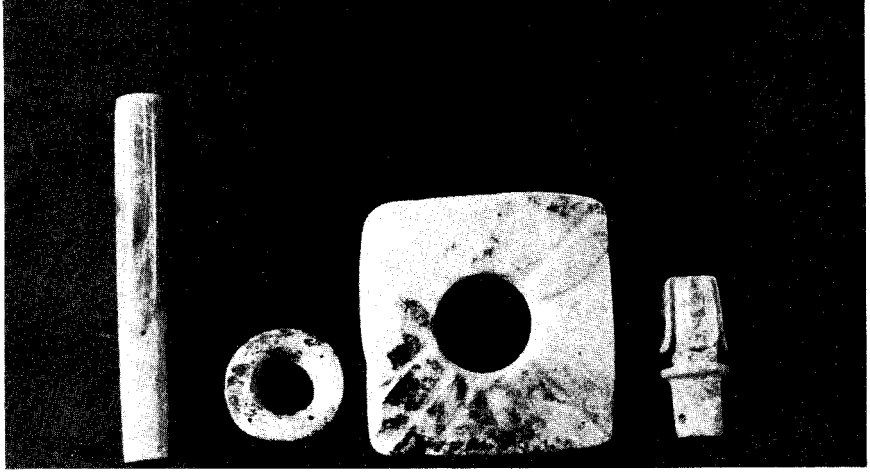
At the time of interment, the personage wore on his face a mask made of a mosaic of jade, with eyes of shell and the iris of obsidian in the center of which a black painted dot marked the pupil. At each side of the head was found an enormous pearl 36 mm in length which we believe formed a part of the ear loops, like a counterweight which might be suspended back of the ear as is seen in various Palenquan bas-reliefs.

Palenque was probably a Mayan city of the greatest cultural development. Its buildings show that the builders possessed besides an empirical knowledge of the laws of mechanics, an amazing ingeniousness to always find a solution to the technical problems which affected the realization of their bold projects, and yet with a very peculiar perception of the aesthetic in which the majestic and the delicate are harmoniously blended. In sculpture and in the modeling of stucco, the Palenquans were surely the ones who attained in America the most perfect art, acknowledging reality and at the same time soberly styled, reflecting a delicate sensibility and an absolute technical dominion.

As for the jewels which we discovered in the tomb of the Temple of Inscriptions, we can state today that in their work with precious stones the Palenquans were, likewise, great and refined artists. We have the impression that there did not exist for them anything impossible to accomplish in architecture, sculpture and lapidary art, since their ingeniousness and artistic feeling permitted them to overcome any difficulty. This is evidenced by the complex shapes of the beads, produced from irregular fragments of jade whose original conformation was made use of to transform into flowers, full blown or partly open or closed, and in lengthened or spherical beads. Other evidences are the beads with lengthwise perforations through which the threads of the necklace passed transversely. Another is the perfect adaptation of fragments for mosaic, for which they used bits of broken jewels. A large bead had been scooped out and provided with two plaques for fastening it; ear hoops were made of various constituents, skilfully fitted to represent a whole flower. Finally, many pieces show tiny inlaid pegs to close old perforations or splinters carefully fastened to repair a fracture.

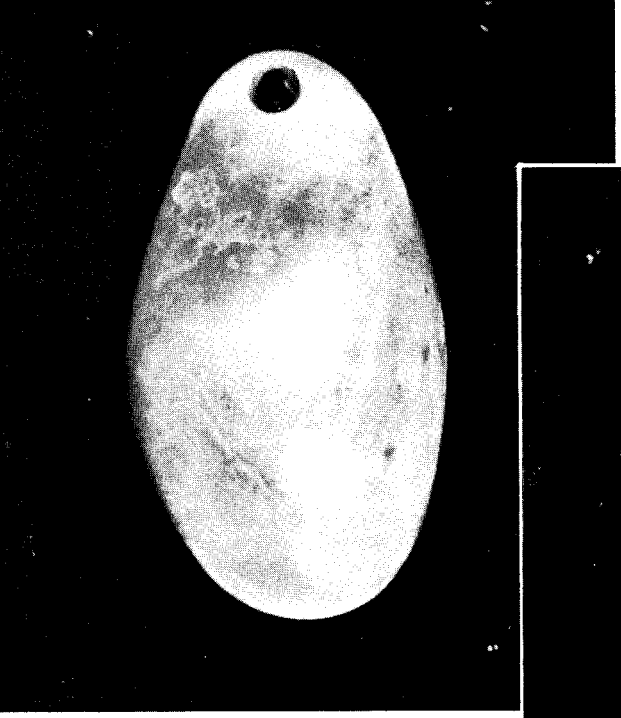
But, perhaps, the greatest proof of the inventiveness and skill of the Palenquan jewelers is shown in the great pearls which we have mentioned. At first sight they look like marvelous huge pearls whose orient has withstood the effects of 13 centuries, but in reality these pearls are magnificent falsifications. Each pearl is composed of two hollow pieces of mother-of-pearl shell, exactly cut and polished, which were fitted in one case lengthwise and in the other transversely, held in place as one by a limestone paste which filled the supposed pearl.

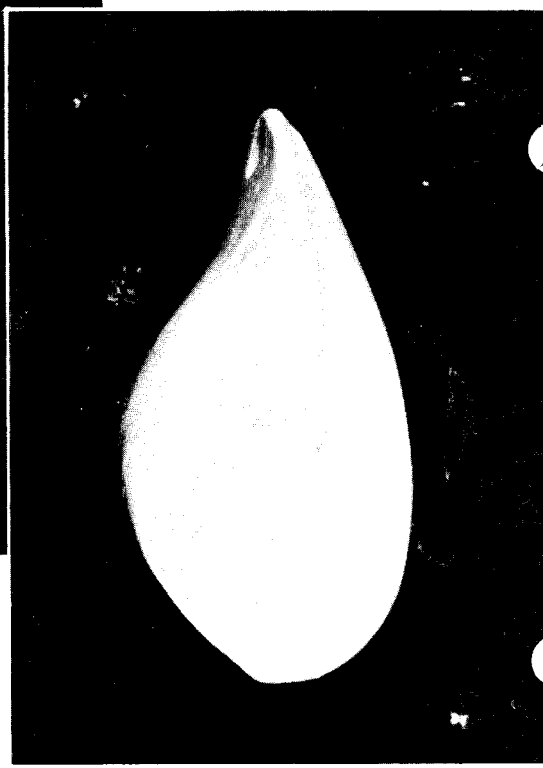
To judge the stage of progress of the Mayan civilization, it is most important to learn that these pearls are not authentic, since had they been real the only virtue would have been that of the oyster—and the lucky fisherman who would have found them. On seeing these gigantic false pearls, we understand better the social structure of the Palenquan theocracy in which a great, all-powerful king demanded pearls of a size larger than Nature produced—or, at least, only rarely—but which the developing technique of the jeweler's art was capable of inventing.



• Different jade constituents which made up the ear hoops found in crypt at Palenque (five eights actual size).

• Ten finger rings of jade worn by personage unearthed at Palenque (actual size).





• "Pearl" probably from left ear hoop (length 32mm); upper right shows two pieces of shell fastened to create the "pearl," and at the lower right, opened at center to expose the limestone filling which united the two pieces of shell. The "pearl" at lower left formed part of the right ear hoop (36 mm. long).

Dr. George Frederick Herbert Smith
Noted Authority
Dies in London

by

ROBERT WEBSTER

It is with a great sense of loss that we report the death on Monday, April 20th, at the ripe age of 80, of Dr. George Frederick Herbert Smith, C.B.E., the doyen of English gemology. He was born on May 26, 1872, being the eldest son of the Rev. George Smith, successively Headmaster of Edgbaston Proprietary School, Birmingham, and of Doncaster School; who later became the Rector of Hormead, Hertfordshire.

Dr. Herbert Smith was educated at Winchester College, Hampshire, and at New College, Oxford, where he took a first class honors degree in mathematics and physics. It so chanced that after taking his degree at Oxford, the late Henry Miers resigned his appointment at the Mineral Department of the British Museum (Natural History) in order to take the Chair of Mineralogy at the University. Herbert Smith was offered the post at the Museum in place of Miers, and on the advice of his father accepted the position. Before taking up his appointment Herbert Smith visited Munich for some four months, where he studied crystallography under Professor P. Groth.

In 1903 Herbert Smith married Rosalie May Agnes, the younger daughter of the late John Ellington. Her decease in 1936 undoubtedly clouded the latter years of his life.

During the early part of the century, in the course of his work in the museum, Herbert Smith was often called upon to identify gemstones submitted by dealers and members of the public. He soon saw that the methods normally used by the mineralogist were far too painstaking and that quicker identification would be possible if the refractive indices could be rapidly measured. In the museum there was an old Bertrand refractometer, a type of instrument which is hopelessly inaccurate. With his knowledge of optics, Herbert Smith soon realized why such a refractometer failed to function with any accuracy and designed a much more efficient instrument. This was described in the *Mineralogist Magazine* for 1905.

This gem-testing refractometer, a great advance on anything produced earlier, had only a limited application for the scale was arbitrary, and, further, no readings could be taken with stones having a greater refractive index than 1.76. In 1907 he designed an improved model with the scale calibrated in indices of refraction and reading to 1.79. This instrument is still in use today.

In the realm of mineralogy, Herbert Smith was instrumental in designing the three-circle gonimeter which bears his name; and in collaboration with his colleagues on the staff of the Mineral Department, wrote many

important papers on mineralogy and crystallography. Herbert Smith's work in the museum undoubtedly kindled his enthusiasm for gemstones.

In 1908 the Conference of the National Association of Goldsmiths discussed the formation of teaching courses and examination in gemology, and some three years later the scheme was launched. It is fitting that Dr. Herbert Smith was approached in those early days for his ready help and advice was invaluable. Further, he agreed to become the Principal Examiner, a post which he held until 1952—just 40 years. It was at this time (1912) that his book *Gemstones,* now in its twelfth edition, was first published and became the standard text book for the new study.

Dr. Herbert Smith played another important part in the advancement of the gem trade in that he was most assiduous in expediting the adoption in England of the metric carat of 200 milligrams as a legal weight for precious stones. This became effective in that country in April 1914, mainly through his active liaison between trade associations and government officials.

Dr. Herbert Smith's connection with the Gemmological Educational Committee, and with its offspring the Gemmological Association, remained unbroken till his death. He was instrumental, as Principal Examiner, in fearlessly maintaining the high standard for the Diploma of the Gemmological Association of Great Britain—a standard which has contributed to the prestige attaching to this diploma throughout the world. It is fitting, therefore, that he should have been elected President on the death of Sir William Bragg in 1942.

In 1921, Herbert Smith left the Mineral Department of the British Museum to take the administrative post of Assistant Secretary of the museum; becoming Secretary in 1931, a post which he held until 1935 when he returned to the Mineral Department as Keeper of Minerals until his retirement in 1937.

His retirement from the museum did not mean cessation of activity; either in the realm of gemology or in the many other fields in which he was intensely interested. Throughout those grim days when the enemy was literally on England's doorstep, Herbert Smith did much to keep going the continuity of education in gemology. Indeed, the well-being of the Gemmological Association during those days was in great measure due to his ready accessibility and to his constant attendance at meetings, however fierce the enemy's "hate."

The incorporation of the Gemmological Association of Great Britain as a separate entity in 1947 was the outcome of his recommendation. Dr. Herbert Smith was one of the first members of the Educational Advisory Board of the Gemological Institute of America, a post which he held until his death.

Apart from gemology, Dr. Herbert Smith's major activity was in nature study. He was Hon. Secretary of the Society for the Promotion of Nature Reserves from 1921 until his death, and for some years he edited the *Natural History Magazine.* The end of the war did not lessen, but rather increased, his work in this sphere. He was on the Conference on Nature Preservation in Post-War Reconstruction, and on its Nature Reserves Investigation Committee and he was Chairman of its Geological Reserves subcommittee appointed in 1944. He was Chairman of the Wild Plants Conservation Board and Member of the Executive Committee of the Council for the Preservation of Rural England. It was primarily for his work in these matters that Dr. Herbert Smith was honored by the award of the Commander of the British Empire (C.B.E.) in the spring of 1949.

In more social spheres he held office as one of the Hon. Secretaries (1918-1925); Vice President (1925-1928); and President (1928-1932) of the Society of Civil Servants; and Hon. Secretary and Treasurer of the Civil Service Arts Council for 1924. In

later years he was a most active member of the Council of the Royal Albert Hall. During the last few years he held "At Homes" in one of the spacious anterooms at the Albert Hall which were attended by many of his gemologist friends.

At the commencement of each academic year Dr. Herbert Smith always found time to visit the gemology classes at Chelsea Polytechnic and give a few words of advice to the new students. Probably his last major activity was to fly to Glasgow to talk to the members of the newly-formed West of Scotland Branch of the Gemmological Association.

The death of Dr. Herbert Smith, austere of countenance — the facade of a kindly heart, one who was always ready to give help and sage advice, is indeed the loss of a true friend to gemology in England — nay, throughout the world.

Further Observations on Synthetic Red Spinel

by

DR. W. F. EPPLER

The exceedingly interesting contribution of Dr. E. J. Gubelin's "More News of Synthetic Red Spinel" in the Winter Issue of this journal is particularly instructive since he describes the first synthetic red spinels which were, no doubt, manufactured according to the Verneuil process. His complete and convincing explanations also comprise a theory on the growth of striae in synthetic stones. He implies that the curved striae which are particularly distinct in synthetic red spinel, result from a specially difficult crystallization of the material and tries to substantiate his theory by comparing them with synthetic red corundum which also displays distinct striation and apparently "does not like to grow."

Empiric experiences made during the manufacture of thousands of synthetic corundums and spinels do not entirely concur with the author's assumption. Above all, it must be emphasized that both corundum and spinel boast a particularly great facility of crystallization in nature as well as in the laboratory.

One proof of this may be found in the fact that neither in nature nor in artificial manufacture can a so-called "corundum glass," i. e. amorphous corundum, be produced. On the contrary, amorphous "glass" may very easily be manufactured from most silicates. It has great tendency towards crystallization and it was primarily this which made it possible to produce corundum and spinel by the Verneuil process.

On the other hand, with both types of synthetic stones made in the Verneuil furnace, differences may be noted in the speed of growth and in the existent or non-existent curved striae. However, there is no direct correlation between speed and ease of growth and the various features of curved striae. The following table compares Dr. Gubelin's theory of succession with Dr. Eppler's, the latter being based on the present stage of practical experience.

SUCCESSION OF SYNTHETIC CORUNDUMS AND SYNTHETIC SPINELS ACCORDING TO THE INCREASING FACILITY OF CRYSTALLIZATION

According to Dr. Gubelin		*Dr. Eppler*
Syn. Red Spinel	very strong and marked curved striae	Syn. Red Spinel
Syn. Red Corundum	narrow, well-formed curved striae	Syn. Blue Corundum
Syn. Blue Corundum	wide, blurred curved striae	Syn. Yellow Corundum
Syn. Light Yellow Corundum	very weak curved striae	Syn. Spinels in all colors except red
Syn. Colorless Corundum		Syn. Red Corundum
Syn. Spinels in all colors except red	with none, or very seldom any curved striae	Syn. Colorless Corundum

COSTUMING and the sale of COLORED STONE JEWELERY[1]

Part I

by

Robert Crowningshield

Jewelry plays an extremely important role in color and line in the costuming of women and the wise jeweler will make use of this fact to increase his stone business. By keeping informed on fashion trends, and learning a few of the basic rules governing the appropriateness of accessory accents, he can offer his customers an added and valuable service and at the same time open a new means of revenue for his business.

In their enthusiasm, gemologist-jewelers are at times prone to forget the basic reasons which prompt the purchase of gems and jewelry. Without being conscious of it, they sometimes may give the impression that optical properties, durability, rarity, and intrinsic value are the prime requisites in a gemstone. But, if a piece of jewelry had to be sold solely on these attributes—if it were not desired because of what it did aesthetically for the purchaser or recipient—it is doubtful if it would ever leave the salesroom.

In the words of a noted jewelry fashion writer: "It is important to remember that women buy (and wear) jewelry first, last and always because they think it will make them more beautiful—and because it will add fashion flair to their clothes. We should remember that we are a fashion industry and that fashion is almost the only reason for our existence. We don't sell jewelry to keep women warm—or to cover them."

What a woman wants her jewelry to do is to help make her more attractive. Good jewelry can—if it is well designed and correctly worn—give a woman just that crowning lift- that feeling of assurance—which no other item in her wardrobe can do—and this includes a mink coat!

Among the personalized services a jeweler can offer his customers—and one which may help to stem the tide of increased department store jewelry buying—is knowledge and advice concerning gems and jewelry as costume accents and harmonious accessory pieces based upon the wearer's individual personality requirements—as well as figure, features, coloring.

How often have we known gifts of jewelry received, admired—and then hidden away in the jewel box—never to be worn? When this occurs the item is not accomplishing its purpose, and the whole industry suffers. The tactful jeweler might have prevented this with only a few suggestions based upon knowledge of color and line.

Naturally, not all of us are artistic and to some it would seem presumptous to advise a woman what to wear or how to wear it. But, actually, each of us has some latent ability to accomplish a purpose through selection of color and accessories. We reveal this each morning when we select tie and

1. Adapted from a lecture given at the Annual Conclave of the American Gem Society.

socks—the jaunty red tie for accent with the blue suit for an exhilarating moment—or the blue tie to harmonize with the suit, for the more conservative mood.

The study of accents and harmonies in dress requires considerable time in schools of design but there are certain basic principles which can be learned and used by all jewelers and we will try to point out some of these in this series of articles. Even if you feel you have no talent along these lines, much knowledge can be acquired through observation—and the use of such knowledge as a selling tool will pay off in excellent dividends.

We all know one color harmonizes with another when they are near each other on the color wheel. Such is the case of green and green-yellow. Similarly, harmonies are produced by combining different tones and intensities of the same hue. Thus, light yellow and dark yellowish gray are harmonies —being merely a different tone and intensity of pure yellow.

Conversely, one color accents another when it appears at a distance from the other on the color wheel. This is illustrated by such combinations as violet and yellow which appear exactly opposite each other.

Most of us are aware that a color wheel is a circle made by the radial succession of the spectral colors, plus those hues between violet and red not found in the spectrum, and the intermediate colors between each basic spectral color.

Each intermediate variation around the wheel—as well as the basic colors of red, orange, yellow, green, blue, and violet—is considered a hue. Pure hues are those that are unmixed with white, black, or neutral gray—which is called a chromatic color.

If we mix white with a pure hue, the tone or value of that hue is lightened, while black darkens the tone. In each case new colors result, but not new hues.

Similarly, if neutral gray is mixed with a pure hue, intensity is lowered and a new color is produced. There are perhaps a million different color combinations, but these are the result of variation in tone and intensity of only about 150 distinguishable pure hues.

Color effects which can be produced through the use of jewelry are almost endless. A single ensemble of jewelry may either harmonize or accent. For instance, an amethyst brooch and ring will harmonize with a grayish violet, or purple gown. But wear these pieces with a chartreuse ensemble and they provide a striking contrast. This same amethyst ensemble will, in addition, give a fine contrast when worn with white or gray, or—if the stones are not too dark —with black.

Thus we see, if carefully selected, one ensemble can give the crowning touch to a variety of outfits in the wardrobe of a woman and preclude the common practice of buying costume jewelry for each new addition to the wardrobe—trinkets which will never bring the satisfaction to the owner that she will get from the knowledge that she is wearing real stones. Naturally, an ensemble of this kind must be well designed, attractive, appropriately selected in relation to the personality of the owner.

When a woman has been convinced of the value of jewelry in increasing the attractiveness of her appearance, it becomes a necessity to her. Jewelers who have secured customers by convincing them to choose their jeweler before choosing their gems have also a wonderful opportunity to teach them to choose their gems before they choose their gowns.

Contrast and harmony can be affected not only by color, but also by texture. A texture such as velvet contrasts with diamonds and other brilliant stones. These same stones, however, will be harmonious with such textures as satins and other shiny materials. Opaques, such as carved gems or cabochons, contrast with rough textured materials and thus offer accents to tweedy fabrics and other daytime apparel.

"But I never have calls for colored

stones," is a lament often heard among jewelers. Why should he when he has done nothing to promote their sale or show how they may be used as the most beautiful of all color accents and fashion accessories? The jeweler who waits for his customer to ask for his wares will witness more and more of his business being deflected to the store where merchandise is displayed with fashion, style, and color employed as strong selling tools.

There is no syndicate or international colored stone organization to promote the sale of colored stones for the jeweler. It is entirely up to him to educate not only himself, but the public as well.

The jeweler who feels that he cannot afford to neglect his diamond promotions to spend time on colored stones would probably find his diamond volume increasing right along with his colored stone sales since many colored gems need diamonds to accent them. Of course, he will never know until he has actually tried to merchandise them.

Nothing could be more effective than to let the public see the stones attractively displayed—demonstrated as to use—purpose—appropriateness. Let the customer see how these stones add color and harmony—dignity —high style—when tied in with current fashions.

This matter of fashion costuming in jewelry makes a wonderful appeal to women when it is tied in with window displays. The jeweler who does not get display ideas from women's fashion magazines is missing a real opportunity to reap benefits from a readership primed to buy on fashion merit. Similarly, jewelers have a ready source of fashion information in their own trade publications.

With fashion working for the jeweler, periods between standardized gift buying occasions can be more meaningful to the shopper and to the jeweler's business. Jewelry sold on the basis of what it can do for the wearer will create a satisfied customer who will become a walking advertisement for the jeweler and that particular store.

There is evidence of a customer-jeweler relationship in Europe which does not often exist in this country. One jeweler who received his training in Europe revealed that the ultimate goal of his apprenticeship was to observe prospective customers — their coloring, personality, choice of clothing — as well as their activities and social backgrounds. With this knowledge at hand he was then taught to create or suggest choices of personalized jewelry.

Later, he used this training to good advantage in this country. He was called to the home of a very prominent lady in the East who wanted an expensive assortment of emerald and ruby jewelry. This was not an unusual selection for a person of wealth, but the European-trained jeweler, having seen and observed the woman many times, had a strong feeling that this type of jewelry just did not suit her personality. In his mind he had pictured her as the "coral type." He, accordingly, offered to make up a set of coral jewelry which he felt would be right for her—and she could either refuse or accept it. Reluctantly she agreed.

When the items were finished, and she could see the effect they had on her whole appearance, she was delighted. The opportunity to make a six or seven thousand dollar sale would have dictated the course of many jewelers.

Why had this man chosen to make a one thousand dollar sale instead—actually insisted upon it? This man was more progressive than the first thoughts might indicate. In this woman he has a roving saleswoman. Her obvious pleasure in her own personalized jewelry—added to what it did for her appearance—has brought him much more business than he would have obtained had he filled her original request for the more expensive emerald and ruby items.

The emeralds and rubies would have perhaps inspired respect on the part of her friends for their obvious intrinsic value —

(Continued to page 313)

PAGES FROM A JEWELER'S NOTEBOOK OF MEMORIES

Part II

by

GEORGE MARCHER, C.G.

After leaving Albuquerque and proceeding northward 40 or 50 miles we found ourselves in the vicinity of the old Aztec Mine. Although it was several miles off the main highway and recent heavy rains had left the roadless road soft and muddy, we decided to go. After traversing most of the distance without special difficulty we came to low, deep, rutty places that looked ominous. The muddy mush being of slimy clay, we put on chains and plunged along. Soon we were stuck. By the use of a spade and some scarce underbrush we got through and to our objective.

In our imagination we always invent a picture of what we are to see for the first time. But, as usual, this was different. Briefly described, the opening was covered by an isolated cluster of rocks that reminded me at first of a bandstand in the park, but the similarity faded as we came closer to the group.

Clambering part way down into the mine, 30 or 40 feet, we encountered the same hard rock all the way down. Near that point, however, we found some long vertical lines or streaks as if Mother Nature had marked the brownish gray wall with a broad, beautiful blue pencil, tempting one to dig deeper and deeper, while a huge projecting rock immediately above mutely attested to defeat in guarding the treasure from man's despoiling aggression. Thin chippings of turquois-bearing specimens lying about beneath offered further evidence of the last battle.

On returning to the surface and seeking further information we luckily ran across an Old Timer who proved to be a veritable history book concerning the modern vicissitudes and entanglements connected with this ancient property. From meager notes taken at the time in 1935, 18 years ago, I will try to recount the recital and avoid inaccuracies as much as possible.

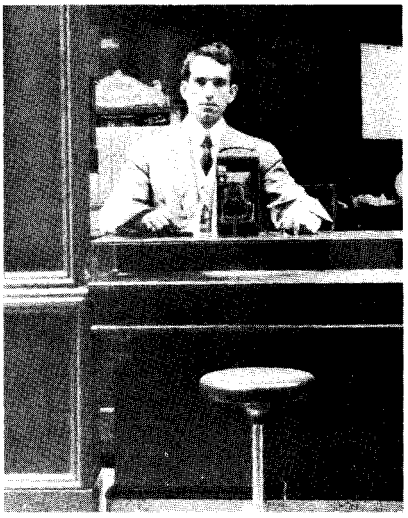
That this mine had been operated by the Indians, probably Navajos, as early as 300 years ago is evidenced by the size of a large tree that now grows on the old dump—

Editor's Note: In the spring 1953 issue of this publication a typographical error in the last line of column 1 appears on page 274. This should have read "but we found that a touch of rouge huff." Likewise, on page 269 the cutline indicates the photograph was taken during the 1919-1921 term of Mayor Snyder. Actually, he served three terms and this picture was taken during an earlier term during the first decade of the century.

waste material removed during the operation of the mine. Within the mine, when first explored by the white men, were found many stone hammers -- doubtless used to break up further the larger fragments of turquois-bearing rock laboriously detached from the tough resistant interior.

To detach these larger pieces hot fires were evidently built against the walls and cold water then dashed against it to crack them loose. Then presumably, such pieces were set upon by the Indians with the stone axes to break away the matrix and free it from the blue. Doubtless they developed a good deal of ingenuity in cleaving away excess matrix as they have cleverly done on sharp-pointed arrowheads. Doubtless they did considerable shaping and finishing by rubbing the crude gemstones on smooth surfaces of rock or wood, using sand as an abrasive. They had no lapidary wax, or cement, with which to hold the stones while working them, but they had to be held only with their scuffed and bloody fingers. Other thin flat pieces were drilled with a sharp-pointed stone and strung on a slender thong along with many other similar pieces of turquois or of shell. Then the surface of the entire strand was worked down together into a long snake-like neckpiece of wampum. Sometimes such a neckpiece was further decorated, as they still are today, with larger turquois chunks drilled through from side to side near one end and inserted into the wampum to hang at various intervals.

Returning to the Old Timer's story—whose name, unfortunately, I failed to record—he declared there was found in this mine a huge "sledge," let us call it, that consisted of a smooth extra tough rock weighing about 40 pounds and about 15 inches in diameter, made with a groove around its middle to receive thongs by which to handle it. Presumably it was used to break up rocks brought out on the floor of the mine when they were too large for the less effective axes, or it might have been used also to swing against some loosened rock in the wall



• Self portrait of the author

of the mine. This in the only rock-sledge ever heard of before, he asserted.

Let us pause here a moment to ruminate over this piece of the Stone Age brought right down to our very threshold. At that time who owned this valuable mine? Nobody, or everybody! Discoveries have been made indicating that the Aztecs from Old Mexico made periodic trips to various deposits of turquois in the Southwest—even into California. Sometimes they were met with hostility, and at other times with friendly indifference. That this prehistoric fondness for this "fragment of the sky" was not a matter of insignificance is attested to by a rumor or myth passed on to me by the Old Timer. He related that some time prior to 1878 a cave-in at another old turquois mine, about three miles north of Cerrillos, killed and buried about 90 Indians at work in the mine. (See article by Governor Prince who was from New York and appointed as governor of the territories.)

Ruminating further, what if you or I were to be deprived of all modern mining facilities such as explosives, drills, hammers,

sledges, picks and shovels and even wheelbarrows, and had to tackle the job? But it was done!

From some sketchy notes made at the time of my conversation with this Old Timer —casually made without any expectation of writing about them—I offer some further points with as much accuracy as I can maintain. Within about nine miles of Cerrillos there were several turquois properties, and there may be some confusion on that account. It seems there was much more activity in that region than we in California were aware of.

Sometime prior to 1890 Pedro Muniz sold the Aztec Mine to Story and Allen who took all of their rough to New York and sold the best of it to Tiffany's, then organized the firm of the American Turquois Company. In August, 1892, a group of investors sent Frederick Kunz out to investigate the merits of the mine. Making his headquarters in Sante Fe during his two-day visit, he was aided by a Mr. Yontz and a Mr. Spitz, both being jewelers there. Kunz' report was favorable and the property was bought for $35,000.

A Mr. J. G. Dody, who styled himself as the sole agent of the American Turquois Company, came out every summer "with some whiskey" and took out a quantity of material. Then, on returning to New York, he would sell the finest to Tiffany's and then continue on to Europe where he would dispose of the rest. He stopped coming about 1896.

A Mr. McNulty was then appointed manager. But about 1897 or 1898 some Chicago stockholders, not having received any dividends for some time, sent Wm. Sterne, a Kansas City detective, to Sante Fe to investigate. After staying with Mr. Yontz and learning what he could, he went down to the mine, but was refused admittance. Later, through an order obtained from the attorney for the firm, he was permitted to go into the mine. Knowing nothing about such a property, and probably expecting to see lumps of turquois sticking out of the rocks all around, he gave a rather negative report.

Soon after this investigation six or seven experienced miners from the Hacthita Mines were obtained, making 18 men all together. During this more vigorous campaign, a marvelously beautiful vein was uncovered. When held to the light the turquois was slightly translucent and was of a clear sky blue color and a fine smooth texture.

McNulty, with the help of his son, chipped off the rock, sent the best quality to New York, and buried all the remaining cull material—about 1200 pounds—thought unfit to ship. Presumably Mrs. McCram, daughter of McNulty, in Cerrillos "might still have some of the cull material." Still no dividends, no interest, no principal.

At this point old Col. Smith, past 70 years old — a promotor with big I's, a smooth talker, a copper man from Butte, Montana, but now a representative of some monied people in Boston—appeared on the scene. McNulty had been given power of attorney to sell and the Boston people, together with Mrs. Meyers of Sante Fe, took over the property for a consideration of about $50,000.

Col. Smith, who was put in charge, immediately put up about eight "nice little shacks all painted a bright turquois blue for the workers to live in." Smith, however, did not last very long. The investors soon founds lots of trouble and they ousted Smith. In 1935, a young man by the name of Sewell leased the property from Mrs. Meyers on a royalty basis.

Incidental to this mining information, Old Timer mentioned an interesting old Indian idol that was found about 40 years previously. It was of alabaster, a solid marble-like form of gypsum. It had round turquois eyes and a round turquois mouth. Sorry, no more details.

A fetish also was found there in a buckskin sack. It was decorated with turquois by the Santa Domingo Indians for a hunting fetish. By attaching it to an arrow and shooting it, it was supposed to retard the game for the weary hunter. *(To be continued)*

Book Review

JEWELRY MAKING FOR SCHOOLS, TRADESMEN, CRAFTSMEN by Murray Bovin, published by the author, 68-36 108th Street, Forest Hills, L. I., New York, Indexed. $2.50 with soft cover, $3.50, hard cover. Reviewed by Joseph A. Phillips.

This excellent book helps fill the void of literature covering jewelry making techniques useful to the handmade jewelry craftsman. The book should be extremely useful to the retail jeweler who finds it convenient to do much of his own jewelry repair work and would like to do more of his special order work. Even the jeweler who sends all of his special order and repair work out to the trade shops should read the book so that he can be more familiar with the processes involved and have a better idea of what can and cannot be done.

The book deals with fundamental jewelry processes, decorative processes, casting (including an excellent section on centrifugal casting), stones and settings, and jewelry objects and their construction.

The author's style is clear and concise. Good photographs and easily understood drawings help him cover a tremendous range of material in an almost too brief manner.

In covering each operation, all tools and materials needed are named and described and many hints are given to keep the reader from making costly mistakes. Alternate methods and techniques are usually given for each operation.

All in all, this book should prove most helpful to anyone connected with the jewelry trades.

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Costuming

(Continued from 309)

but they would not have elicited requests for the name of her jeweler!

Another similar incident was reported by a young man from Switzerland. An American tourist came into the Lucerne store where he is employed and admired a certain choker type necklace of large stones. This young man—trained to suit the jewelry to the personality of the wearer—tried to dissuade her from buying the necklace which would have accentuated her squarish features. Instead, he selected another necklace which flattered her tremendously. The customer was immensely pleased—even writing later from her Wisconsin home to express her appreciation. Needless to say, friends of hers traveling in Europe make it a point to stop in this store and ask for that particular young man to serve them.

In neither of these cases was the advice of the jeweler needed to complete a sale. Actually, in the first instance a smaller sale was made than the customer had intended. But in both cases the satisfied customer appreciated the personalized service and the understanding helpfulness of the jeweler. He was interested not just in making a sale—but in sincerely helping the customer select an item which would do something special just for her. Such services are certain to result in repeat sales.

In another instance a young lady purchased a large oval garnet ring in Switzerland. Although she was impressed by the store and by the salesman, what influenced her in making the final decision was the time spent by the salesman in selecting a ring which he thought was "just right for her," and then telling her why he thought so. Her experience is another fine example of the happy and satisfied customer.

Almost more than with any other item sold today, there is a great responsibility on the part of the jewelry salesman to make certain his customer's satisfaction—and not the cash register—motivate his sales talk. To do this, he must have at hand tools in addition to a scientific knowledge of the interior of gemstones. *(To be continued)*

Editor's Note; In the next installment, specific points and rules are explained and illustrated to enable the jeweler to increase his jewelry sales by assisting customers to make appropriate and intelligent selections based on individual requirements.

Gemological Digests

DECOLORATION OF METHYLENE IODIDE

Editor's Note: *The following observations by D. A. Benfield of the Diamond Research Laboratory in Johannesburg were sent to the Gemological Institute by Dr. R. G. Weavind, Acting Director of Research, following the publication of B. W. Anderson's article in the last issue of GEMS & GEMOLOGY.*

Pure methylene iodide is described as a colorless liquid of specific gravity 3.33 and index of refraction 1.756. By virtue of the former property it finds application in separation processes. Due to its high refractive index it is widely used in gemology and optical mineralogy for the identification and study of various precious and semi-precious stones and minerals, while it is also used in the measurement of refractive indices of certain substances by immersion techniques.

When freshly prepared, methylene iodide has a slightly yellow color, however, it is unstable and decomposes liberating colloidal iodine which imparts a dark red color to the liquid. This is undesirable since it hampers optical immersion examination not only because of decreased translucence, but also because the immersed particles are often stained by precipitated iodine; moreover, it is troublesome when used for purpose of separation.

The literature mentions decoloration of methylene iodide by shaking with mercury, tin or copper. These metals react with the colloidal iodine forming relatively insoluble iodides, which can be removed by filtration. However, these metallic iodides dissolve to some extent in the methylene iodide resulting in changes in the specific gravity and refractive index of the liquid. For instance 22.9 gm. of stannic iodide will dissolve in 100 gm. of methylene iodide at 10° C and 100 gm. of the latter will dissolve 2.5 gm. of mercuric iodide at 15° C. The solutions of these metallic iodides in methylene iodide are usually cloudy and unsuitable for the previously mentioned uses.

It has been found that the colloidal iodine is easily removed by shaking the liquid with a strong solution of sodium thiosulphate in a separating funnel. The resulting purified methylene iodide is a light yellow color and has approximately the same refractive index and specific gravity as the original liquid. The iodine readily reacts with the solution of sodium thiosulphate and the resulting solution floats on the surface of the methylene iodide in the separatory vessel. It is then a simple procedure to draw off the heavier and purified methylene iodide. The latter may be slightly cloudy due to traces of sulphur, which will however, dissolve in the methylene iodide, and finally a clear solution will be obtained. Since decolored methylene iodide decomposes relatively rapidly it should be treated in the above manner immediately before use.

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NEW WATCH CARE BOOKLET AVAILABLE

YOUR WATCH — ITS OPERATION AND CARE, a booklet directed to the layman on the care of watches, has just been announced by the publishers.

Although this book has been prepared for owners and prospective owners of watches, it is to be made available to jewelers who wish to give it to customers. Single, sample copies are free to jewelers on request when accompanied by a self-addressed, stamped envelope.

Quantities in multiples of 1,000 booklets are available to jewelers at cost. For further information, write to Benmar Standard Company, Post Office Box 708, Church Street Station, New York 8, New York.

Something About Unusual Gems

by

MARTIN L. EHRMANN

The history of gems dates as far back as the 6th century B.C. The earliest description and use of gems came from the Chinese in the Chou dynasty, 6th century B.C., when jade was the revered gem. It was used not only for jewelry but also for sacrificial and religious purposes, as the Chinese believed that jade was capable of warding off the evil spirits. They made many objects of jade and so-called jade, which were used in their daily ceremonials. This jade cannot be compared in any way with what we know as the gem jade used today.

The early appreciation of jade, and slowly the appreciation of other gemstones, developed through the centuries and has continued because of their vivid colors, durability, and brilliancy. The first scientific treatise on gems was written by Caius Plinius Secundus, between 23 A.D. and 79 A.D. He was a scientist, student, and collector, and his works indicate an early profound knowledge of gemstones. It is surprising that without modern scientific facts, these predecessors in gem collecting were so close in identification descriptions. A very significant fact is that, in those early days, writers divided gemstones into two groups. One group was described as "the more noble gems"; the other group was called "gems of inferior quality," paralleling the later and modern description of precious and semiprecious stones. With the advent of modern science, mineralogists, students and gem collectors availed themselves of the newly-created developments to further their studies of minerals and gems, making it the exact science it is today. Peculiarly enough, few jewelers were instrumental in creating this interest among the public. It was the mineralogist who did the groundwork. Why? Because the jeweler was interested only in commercial stones such as diamonds, emeralds, rubies, aquamarines, amethysts, and other less expensive ones, of gem variety.

During the era of big earnings and few taxes, literally millions of dollars were spent for Old Masters. Mellon, Kress, Rockefeller and other millionaires paid as much as a million dollars for a Rembrandt or Titian just because the most fabulous of all art dealers, Sir Joseph Duveen, was able to put it across. The same people would have been delighted to spend some of their money on fine gems. The first American collector of gemstones was J. P. Morgan, who became interested through George F. Kunz. Other great collectors were John D. Rockefeller, Jr., Bement, and Roebling. Their various collections are now in museums in different cities in the United States.

Dr. George F. Kunz, who, as vice-president of Tiffany's, was actually the first to realize the possibilities of interesting wealthy people in gem collecting. During the International Fair in Philadelphia late in the 19th century, he exhibited a very fine collection of gemstones, which he had obtained from all over

the world. J. P. Morgan, the Wall Street financier, became intrigued and infected with Dr. Kunz's enthusiasm and purchased the entire collection for a fabulous amount. That purchase constitutes the present Morgan Gem Collection in the American Museum of Natural History in New York, and it is truly the finest gem collection in the world.

Many of the lesser-known gems are most interesting because of their unique optical and physical properties. Unfortunately, little attention has been paid to them, although some would certainly have made the grade in the jewelry business if it were not for the fact that some physical or optical quality or rarity prevented its reaching that goal. Nevertheless, these stones can still be interesting to the jeweler, either as study material or as demonstration material for talks before groups of people interested in the unusual.

Within the past 20 years, many wholesale gem dealers decided that they were losing a good bet by neglecting the lesser-known gems. They have succeeded in marketing them most successfully. This realization was due mainly to the influence of the Gemological Institute of America in imparting the knowledge about such gems to the jewelers who began to take courses early in the 1930's. Many of these jewelers became so fascinated with the gems that they started their own collections, not necessarily of the large and expensive sizes but of very fine examples of each species obtainable.

Today, there are many thousands of mineral collectors throughout the country. As a rule, these "rock hounds" become converted to the gem collecting fields and, of course, go after the unusual. There are mineral and gem societies in every large city in the United States. These groups should be cultivated by the jeweler, as he is in the best position to procure the rare stones for them when the occasion arises.

For this discussion, nine unusual stones have been selected and described.

TITANITE OR SPHENE

Top on this list is the most interesting of the unusual gemstones, the titanite or sphene. It is truly a most attractive stone and, in brilliancy comes close to the diamond. Unfortunately, nature depleted it of one of the major qualities, hardness, to rank as a fine gem. It has a hardness of five to five and a half, a specific gravity of 3.4 to 3.6, and it occurs in various shades of yellow, brown and green. Its refractive index is high, 1.900 to 2.034, and the dispersion is very near that of the diamond. Titanites occur in Switzerland at St. Gothard, in Zillerthal, Tyrol, in Madagascar, Maine, New York, and Bridgewater, Bucks County, Pennsylvania. The only two localities where titanites have occurred in gem material are Pennsylvania and St. Gothard. Because of their high admantine luster, refractive index and dispersion, they were soon in great demand by collectors, museums and gemological students.

From Pennsylvania, the largest stone cut is about 12 carats and is now in the Academy of Natural Sciences in Philadelphia. There is a necklace layout of titanites in the National Museum in Washington, D. C., the largest stone weighing about 12 carats, graduating down to one carat. The American Museum of Natural History also has a fine collection, as has Harvard. In Europe, the British Museum of Natural History has some of the largest and most varied of cut titanites in the world. At the Technical Hochschule in Zurich, Switzerland, there is one beautiful yellow titanite in the rough that would cut several stones of at least 20 carats each. But this crystal is perfect in every way and will probably never be cut.

For a stone unsuitable for jewelry purposes, the titanite is much in demand and brings rather high prices. A one carat clean stone may bring as much as one hundred dollars per carat. A 20 carat stone would run up to about five hundred dollars per carat, and a buyer would easily be found. In 1946, a New York wholesaler had about two dozen cut titanites, ranging in sizes from two to 12 carats. One particular group was of exceptionally fine quality, brown color, brilliant

cut. The play of fire, of red and green, was so vivid that they looked like opals of finest quality. These gems sold quickly at high prices. Unfortunately, they are rare and cannot be replaced.

DEMANTOID

Another unusual and interesting gemstone is the demantoid which is a variety of the andradite garnet group and occurs in a pleasing grass green color. It is unusual for a colored gemstone to have so high a dispersion. Demantoid has a dispersion of 0.057, very close to that of the diamond, and a refractive index of 1.940, also very high. The demantoid did not come into the jewelry trade because it is not up to standard in hardness and because it is so rare that insufficient material could be found to supply the demand.

About a hundred years ago, it was first found in the Ural Mountains in Russia, close to the emerald locality. At first, the demantoid was thought to be true emerald and was called Uralian emerald. Later, jewelers preferred to call it erroneously by the name of olivine, a name which has clung persistently despite the fact that true olivine is peridot. Demantoids demand a fair price. A one carat stone sells from 50 to 75 dollars. Three to four carat stones sell from one hundred to one hundred and fifty and up to two hundred dollars per carat. Large stones of over ten carats range in price up to five hundred dollars per carat.

Demantoids were very popular in Russia during the end of the last century. Court jewelry, set with a variety of gems, always included demantoids. A beautiful gold cross, containing 24 demantoids, appeared on the market in London in 1938 and was sold for five thousand dollars. The largest and center stone weighed over 12 carats; the others ranged downward to three and one half carats. Other fine examples are now in the hands of discriminating collectors. The National Museum in Washington has several, the largest weighing about eight carats. The American Museum of Natural History and Harvard University Museum also have fine examples, as do the most noted museums in Europe.

BENITOITE

This gem was first discovered in 1907 in San Benito County, California, which accounts for its name. It is truly the All-American gem as that is the only locality in the world where it occurs. Peculiarly enough, its chemical composition resembles that of titanite. In appearance, it resembles sapphire because of its deep blue color. Its refractive index is about the same as sapphire, but it can be easily distinguished from it by its inferior hardness and optical properties. At first, the stones were mistaken for sapphires and sold as such. Upon positive identification as benitoites, they suddenly disappeared from the market. The earliest large stone cut weighed about seven carats and was owned by Godfrey Eacret of San Francisco. Other fine specimens are owned by collectors and museums throughout the world.

In 1938, the Italian ambassador to the United States became very much interested in benitoite. Through the American Museum of Natural History, he contacted a dealer in New York City from whom he purchased the largest emerald cut benitoite then available, weighing six and one quarter carats, for two hundred and fifty dollars per carat. He presented the stone to Benito Mussolini.

The largest collection of cut benitoites is owned by Mr. E. R. Swoboda of Los Angeles. It consists of approximately one hundred stones, ranging in sizes from one half carat to four and one half carats each.

HIDDENITE

This gem variety of spodumene (the lilac pink color is kunzite) was found in 1881 in Alexander County, N. C. For a long time, it was also considered an All-American gem, as there were no other known localities. However, in the past 15 years, hiddenite has been found in Madagascar and Brazil. It was named after W. E. Hidden, its discoverer. Hiddenite is very close to the emerald in color and in all physical and optical properties. Only its extreme rarity prevented its

becoming a most popular and sought-after gem. Many specimens, especially in the rough state, are well represented in large museums throughout this country and Europe.

SCAPOLITE

Gem variety of scapolite was discovered about 1900 in the ruby mines in Mogok, upper Burma. These specimens had a milky sheen and a pinkish color and were first called pink moonstones. Later, several stones were cut and exhibited a fine chatoyancy, making very attractive cat's-eyes. Subsequently, scapolite was also found in clear yellow pieces, resembling golden beryl, in Madagascar and Brazil. Although strictly a collector's item, scapolite would be an interesting stone for the jeweler to study.

RUTILE AND ANATASE

These two stones are rarely used in gems because very little of the rough occurs clear enough to be of cutting quality. Rutile, when clear, is a vivid red and could easily be mistaken for a diamond, as its refractive index is much higher, 2.616 to 2.903. It is a fine example of Nature's work. If it were a little harder than its six to six and one half, and if it were found in large quantities, rutile could easily become the king of all gems. Small sizes of these stones can be found in private collections and in several museums. Because of its high index, rutile was recently synthetized and is being marketed as Titania.

SPHALERITE

Last, but not least, is sphalerite, a common mineral, commercially mined for zinc. It is mentioned here only because it has a refractive index very close to that of the diamond, and its dispersion is more than three times that of the diamond. It occurs in abundance in many parts of the world in white, red, brown and yellow, and it has a hardness of only three and one half to four on the Mohs scale, which makes it useless as a gem.

There is no doubt that gems are a fascinating subject. The jeweler, willing to spend a little time in their study, can derive a great amount of pleasure for himself and also add to the profits of his business.

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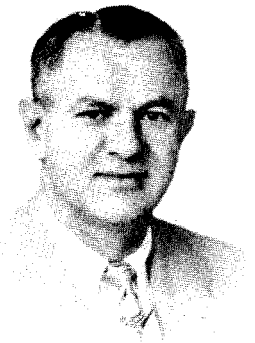
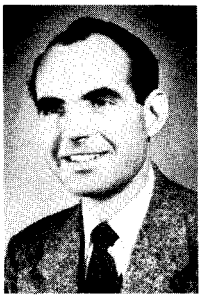
About the Author



Martin L. Ehrmann, born in Germany, received an engineering degree from the University of Hamburg before coming to this country in 1923. His interest in gems and mineralogy, however, led him to the colored stone business in New York. This knowledge of gemstones, and familiarity with the German language and European terrain, prompted the U. S. Government to send him on the mission to obtain a quantity of tourmaline from Occupied France. It was this strategic material which made possible the use of the atomic bomb the following year. After his discharge from the U. S. Army, where he served as a Colonel in the Intelligence Service, he joined the firm of Lazare Kaplan & Sons. Later, he opened his own diamond business in Los Angeles. He has authored many articles on gemstones and gem materials and, in collaboration with the late Herbert P. Whitlock, wrote *The Story of Jade.* His most recent work has been in perfecting the process of coloring diamonds through atomic bombardment in the cyclotron—a work on which he had conducted experiments prior to World War II.

Contributors in this Issue

ALBERTO RUZ (LHUILLIER) is head of the Bureau of Prehispanic Monuments in Yucatan and Director of Archaeological Explorations in the Mayan Zone, auxiliary posts of the National Institute of Anthropology, Mexican Society of Geography and Statistics, and of the Society of Americanists in Paris. For the past fifteen years he has participated in archaeological explorations on behalf of the National Institute of Anthropological History of Mexico and has worked in the Zapotecan regions (Monte Alban), Mixtecan (Monte Negro), Toltecan (Tula), and Mayan (Edzna, Costa de Campeche, Uxmal, Kabah, and Palenque). Born in Paris, France, in 1906, of a Cuban father and French mother, he later returned to Havana to study for an engineering degree in Sugar Chemistry. Still later he went to Mexico and acquired citizenship in that country. He was the student-founder of the National School of Anthropology from which he graduated in 1945. The following year he received a fellowship from the French Government to do post graduate work in Paris. He is the author of numerous reports, articles, essays, pamphlets and books about his special field—archaeology and Mayan art. His recent work and discoveries in the Palenque district, as described and pictured in this issue of *Gems & Gemology,* have created world-wide interest.



ROBERT CROWNINGSHIELD, A.B., F.G.A., C.G., directs the eastern branch and laboratory of the Gemological Institute of America in New York City. He joined the staff of the Institute in 1947 shortly after completing his gemological studies and attending resident classes in Los Angeles. His native interest in gemstones and jewelry was heightened during World War II by his trip to Australia while serving in the United States Navy. On each of three trips to India and Ceylon he acted as port advisor to members of the crew interested in buying gemstones. It was during a short unscheduled stopover in Ceylon that he met a native Singhalese—a G.I.A. graduate—who introduced him to the possibilities of studying the science of gemology. Always interested in jewelry design, Lt. Crowningshield, during slack periods aboard ship, had designed gold settings for gems picked up by his shipmates, using the extremely inadequate equipment available. During the years he has been with the Institute, and in handling the many pieces of jewelry and gemstones that pass daily through the Gem Trade Laboratory, he has become more cognizant of the importance of a need for careful selection of jewelry in relation to color and line, based on the personality and requirements of the wearer. His series of articles, beginning on Page 307, covers this subject.