Gems & Gemology

A bi-monthly periodical, without paid advertising, supported by subscriptions from Gemologists and other gem enthusiasts, aims to increase the gem merchant's knowledge and ability in order that he may protect more thoroughly his customers' best interests.

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Gems and Gemology is the official organ of the American Gem Society and with it is included the Bi-Monthly Confidential Service of the Gemological Institute of America. It is published as a part of the educational gem and jewelry program of the American Gem Society by the Gemological Institute. The Gemological Institute of America is a non-profit educational institution directed by voluntary boards consisting of international gem authorities and appointees of American jewelry trade associations. It confines its activities to the furnishing of education, books, instruments and educational publicity material of a gemological or jewelry nature. In harmony with its policy of maintaining an unbiased and uninfluenced position in the gem and jewelry trade, no advertising is accepted in this or any other of its publications. *Gems and Gemology* will not overlap the field of any other periodical in America or England.

IN OUR NEXT ISSUE

The various exhibits to see both at the World's Fair when it re-opens this summer in the various museums of Chicago will be reviewed.

Probably the last writing of the late Dr. Oliver Cummings Farrington, found among the papers he left at his death, is an account of the magnificent gem collection in the Field Museum of Natural History. It is published for the first time in *Gems and Gemology.*

The first of a series of articles on the display of gems and jewelry will appear.

Dr. René Engel records his use of pleochroism in a difficult determination.

Microscopes for use in the small gemological laboratory will be discussed in a confidential service.

The Glossary, Encyclopedia, and other regular features will continue, and many timely articles will appear.

EDITORIAL FORUM

Cultivated Pearls in Dispute

A producer of cultivated pearls, advertising in a jewelry trade magazine last month, reproduced a page describing cultivated pearls from the booklet *Fascinating Facts About Gem Stones.* This booklet is published by the Gemological Institute for distribution to customers by the retail jewelers of America. Attention was drawn in the advertisement to a statemen regarding cultivated pearls which read, *"However, to the scientist they are genuine."* This statement, considered by itself and not in connection with the sentences which immediately preceded it on the same page, implies that the Institute considers that cultivated pearls are genuine. This naturally drew a storm of criticism from dealers in genuine natural pearls. The jewelers who criticized were not familiar with the present position of the Institute.

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Even though the biologist does consider cultivated pearls to be genuine, the Institute does not believe he should make that statement and not mention how they differ.

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Nor is the Institute's viewpoint that of jewelers who have had no scientific education. As an educational institution, it cannot always agree with them. But the sympathies of the Institute do lie with the jeweler and his many problems, and its efforts are entirely to protect him and his customer. The Institute seeks to educate its students so that they will not be deceived by advertising of the nature of that referred to above.

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It is *not* the purpose of the Institute to quote science in such a manner that it will serve to harm the jewelers' interests. Nor is its purpose to condone confusing names, or deceiving statements made by that small portion of the trade whose very life depends upon incorrect representation of its merchandise.

Advertisements of Gem Stones

Many requests reach this magazine and the organizations of which it is the mouthpiece asking why we cannot accept advertising of gem dealers, or at least furnish lists of gem dealers. This need for information as to where to obtain certain gems themselves, and certain qualities of diamonds and other gems, has been growing among the hundreds of American gem students for many years.

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The only available source of importance for such information has been an English magazine, with advertising of English and oriental dealers. Although many students and members of the Advisory Boards of the Institute are in England and the Orient, we believe that American gem dealers should be given preference. For this reason, we are endeavoring to interest one or more American jewelry trade magazines in carrying permanently a section which would be confined to extensive diamond and gem advertising.

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This section, we believe, could also be made by a national magazine a vital force to interest retail jewelers in the movement of the AMERICAN GEM SOCIETY "To Make America Gem Conscious." It seems almost unnecessary for us to remind our many inquirers that our policy is one of no advertising, and if any other method can be found, we prefer not to recommend dealers.

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Research Service and Its Purpose

The chief purpose of *Gems and Gemology* is to keep the student abreast with the latest and the most important advances in the science of gemology. Its monthly confidential service includes many features which, except for their very recent nature, would be included in the courses of either *The American Gem Society* or the *Gemological Institute.* They form, in fact, a supplement to the courses of the Institute, containing information which was not available as the courses were written. Every science develops monthly and everyone must study all his life or fall behind in the race in his vocation.

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The features prepared by the staff of the Institute, or developed by the Institute by inquiry among authorities, and which add to the science of gemology, are indicated in this magazine as *Research Services.* The articles which are so indicated should be of great interest to the sincere student. In publishing *Gems and Gemology,* we make a determined effort in include every new development of this science of gems, whether developed by the Institute or announced by independent authorities. The student, through reading this service, will be always in touch with the important recent developments of the subject.

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To graduates of the Society's and Institute's courses, certificates of yearly *Research Examinations* will be issued. These will indicate to the public that they are eligible for active practice and are still in the legitimate jewelry business. These yearly examinations will cover the new developments and research additions to gemology during that year. In no other publication will the student find this material so completely included and so conveniently arranged as in *Gems and Gemology.* Research additions to those portions of the courses already completed will now be exclusively released in *Gems and Gemology.*

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No February Issue

We have received requests for the February issue. There was no February issue; *Gems & Gemology* was announced as a bimonthly service. In order to avoid this misunderstanding in the future, we are calling this the March-April issue, and we shall continue this plan of designation.

G.I.A. TO PRESENT SUMMER COURSES IN GEMOLOGY AT LOS ANGELES

Tentative plans are being made for an intensified session of personal instruction at the Institute headquarters in Los Angeles this summer. The course will be given in the latter part of July or early in August. The material in the A.G.S. *Graduate Member* Course and the Institute *Qualifying Certified Gemologist* Course will be covered in the three weeks' term. Dr. René Engel, Instructor in charge of Mineralogy and Geochemistry of the California Institute of Technology, and Robert M. Shipley, will lecture in the Institute series, and three members of the Institute staff will instruct classes.

Under the present plans, the first week's instruction will cover the preparatory course of the Gemological Institute—the work now presented in the A.G.S. course. The second and third weeks will cover the Gemological Institute course to the *Qualifying Certified Gemologist* examination. Visual work of the C. G. final courses will be included also and these theoretical courses completed by student upon his return home. A week-end visit to several Southern California gem mines, with the owner-gemologist as conductor, will be a feature. The tuition will be $50 per week, which will include all laboratory fees. Individual laboratory instruction will be given to each student, and determination of unknown gems will be taught to the students as a part of the work.

The enrollment in the course will be strictly limited to twelve—twice as many as the number of instructors.

MOTHERS' DAY GEM TO BE SELECTED

B. W. BELL

Window Feature Sent to Every Subscriber

The American Gem Society plans, as one feature of its sales campaign, to select a Mothers' Day gem. Previously the bulk of the sales of Mothers' Day gifts have been candy or flowers—some perishable remembrance. A mother should be remembered on her Day by a more important gift than it has been the custom to give. A durable remembrance such as a piece of jewelry is more desirable, since it will be kept and cherished by the mother to whom it is given.

An inexpensive stone might at first glance seem best. Still, the jeweler might profit more by a gem of greater cost and the use of the slogan, "Buy a Real Gift for a Real Mother This Year," in his window display.

Several stones have been suggested as being appropriate for a Mothers' Day gem. The best suggestions received are amber, amethyst, garnet, and jade. Amber has been suggested because of its rich historical associations—it has long been valued as a gem—and because of its soft beauty. Amethyst is a good stone for the occasion; its color is fitting for an older woman; also,

amethyst is a stone easily accessible to every jeweler. Quite a range of colors is possible if the garnet is chosen; most of its varieties are inexpensive and easy to secure. Jade is also a likely gem for Mothers' Day. It is a well-known stone, constantly increasing in appreciation and popularity. It is likewise a gem revered since ancient times.

Gifts of amber or jade could be had in a greater price range and in more varieties of jewels. The others might harmonize better with grey hair and with more colors of costumes.

Vote to Be Taken

The American Gem Society members, both Graduate and Associate, and all others interested are asked for their votes on a Mothers' Day gem. Below is printed a ballot; mark your choice and mail it to the headquarters of the Society. Be sure to write your name plainly. We will tabulate the votes and announce the results to everyone who has voted. To *Graduate* and *Associate Members* of the *American Gem Society* we will send a central window feature advertising the gem which is selected. This is one of the two or more yearly advertising services which the *American Gem Society* will supply to its members. The results of the vote will be published, and the announcement will reach those who have voted at least two weeks before Mothers' Day, which is May 13. If you are not yet affiliated with the *American Gem Society*, send your $3.50 for membership dues and a subscription to *Gems & Gemology* with your vote; thus you will receive the window sign with the announcement of the results. If your vote is received and you are not a member of the Society, you will receive only the announcement of the results.

The American Gem Society,
555 South Alexandria Street,
Los Angeles, California.

The following is my choice for a Mother's Day Gem:

Amber.....[ ]
Amethyst.....[ ]
Garnet.....[ ]
Jade.....[ ]

Vote for one only.

I do not favor any of the four above gems and suggest instead:

Other Gem—(.....).....[ ]

Name.....

Address.....

City.....

( ) I am not yet a member of the American Gem Society. I enclose $3.50 for my membership and subscription to *Gems & Gemology*. Please send the window feature when you send me the announcement of the results of this poll.

DIAMOND LOUPES

ROBERT M. SHIPLEY

In my article on loupes published last month, a slight error was made in the address of the Carl Zeiss Co., which was given as Jena, Switzerland. This should have read "Jena, Germany."—Author's note.

Either my article in *Gems & Gemology* for January, or articles by me in jewelry trade magazines, have resulted in an unexpected reaction. A few readers gathered the impression that a criticism of the very excellent work of the A.N.R.J.A. Code Committee was intended. The reaction was unfortunate, but it seems, to me at least, to be unfounded. So also is any thought that either the Institute or I myself hoped to influence an increase by the Code Authority in the strength of the standard eye-loupe required by the Code to 10X. Statements by me commending the work of the Code Committee and calling for the support of the present Code Authority, have been published in this and other journals. I have repeated these statements before groups of jewelers and have also made the students of the Institute familiar with similar statements by including them in an assignment which was sent. Too much praise cannot be given to the Code Committee for accomplishing the establishment of a standard magnification for loupes. Not only was a lower standard desired by many, but great pressure was undoubtedly placed on this Committee to prevent the establishment of any standard whatever. My personal opinion is that the accomplishment of the Committee in establishing a loupe of seven power, as well as other rules having to do with the cost and nomenclature of gems, is of exceptional quality and a striking reflection of the fair and courageous character of its members.

We have been advised that a seven power loupe corrected for spherical aberration, mounted in an eye cup, will soon be placed on the market by Bausch and Lomb. This loupe will probably offer to the buyer or dealer who examines a great many diamonds the added advantage, over the $1.00 Bausch and Lomb loupe mentioned below, of a glass which focuses not upon a single point, thus relieving the chance of overlooking an imperfection.

However, since it is reported that this loupe will sell for $5.50 to $6.50, it would seem more to the retail jewelers' advantage to spend a couple of dollars more for a 10X triple aplanat and thus obtain the added protection so easily available to himself and his customer. Certainly, the advertising value of featuring added "customer protection" and the additional sense of security in his own decisions are worth the additional expenditure. Before the code I recommended a 14X loupe for the latter reason.

For the retail jeweler who exercises extreme care to protect himself and his customers, I recommend the purchase of a 9X or 10X magnifier, corrected for spherical or chromic aberration, such as is made by Steward, Zeiss, Spencer, Bausch and Lomb (Hastings type only), Leitz, Busch, and others, as a hand magnifier, and which is made and registered by the Gemo-

logical Institute as an eye loupe. These should be selected by him according to his own personal opinion of their respective merits.

As mentioned in my last article, some diamond dealers may have sufficient time and confidence in their own ability that they prefer to use a simple 7X loupe, uncorrected for chromic and spherical aberration, which focuses upon only one spot within a diamond. For such dealers, it seems entirely sufficient to recommend the eye loupe No. 81-41-02 which has been made for many years by Bausch and Lomb. This consists of two simple lenses and magnifies seven times; it can be bought from any material house for $1.

Confidential Findings by Laboratory Test*

Findings of tests made by the Institute Laboratory regarding various makes of loupes are contained in the January issue of *Gems & Gemology*, and more will be included in future issues. Several loupes have been tested in the Institute Laboratory since the publication of the last issue. The Institute itself is also announcing a loupe. Reports follow:

Busch, Germany. Ten power triple aplanat in folding case. The loupe we received was a very fine one, with an extraordinarily large lens and a flat, clear field of view. However, a report has reached us from a student, that one of these loupes showed a great deal of chromic aberration, which destroyed the focus. *Price*, about $6.25.

G. I. A. Registered Loupe. The best lenses are selected from among those submitted by the various optical companies and mounted in an eye-cup made especially for the Institute. Only lenses which meet rigid tests for focus and correction for chromic and spherical aberration are thus mounted. *Price* $8.75.

E. Leitz; Wetzlar, Germany. 10X triple aplanat. The instrument checked by the Institute was not satisfactory. It did not give a sharp focus at any distance. Some users of Leitz loupes report them to be very satisfactory. *Price* $8.00.

Zeiss 10X Eye Loupe. Excellent aplanatic triplet. Holder awkward and heavy. Entirely impractical for use as eye loupe. *Price* $8.75.

*G.I.A. Confidential Service.

COURSES IN PRECIOUS STONES AT COLUMBIA UNIVERSITY

PAUL F. KERR

The course is designed to cover the natural occurrence and a description of the rough forms of gem materials, together with a discussion of the principal gem producing localities, forms of gem cutting, nomenclature, classification and principles of simple and rapid gem detection and an outline of the methods used in appraisal and evaluation. Equipment is available for illustrating the principles of gem detection and a considerable amount of demonstration apparatus has been assembled for lecture purposes. The use of complicated equipment is avoided as far as possible, and the principal

purpose of such apparatus as is employed is instruction in the rapid and non-injurious identification of gems.

The Department of Geology and Mineralogy at Columbia University has included a course on the study of gems and precious stones in its curriculum over a period of twenty years. Instruction in the subject was first offered during the Summer Session of 1913. The work at that time was under the direction of Professor Alfred J. Moses. Professor Moses was continuously identified with instruction in the subject until the time of his death in 1920. Under his direction a complete collection of gems, precious stones and ornamental materials was assembled in the Eggleston Mineralogical Museum of Columbia University. This collection is now housed in Schermerhorn Hall and shows all forms of gem material, not only cut stones but also rough. Professor Moses showed a great deal of interest in the subject of gems and precious stones, and not only took part in university instruction but spent a great deal of his outside time in visiting the numerous jewelry establishments in New York City. He even voluntarily went behind the lapidary's bench and became fairly experienced in the art of cutting and polishing precious stones.

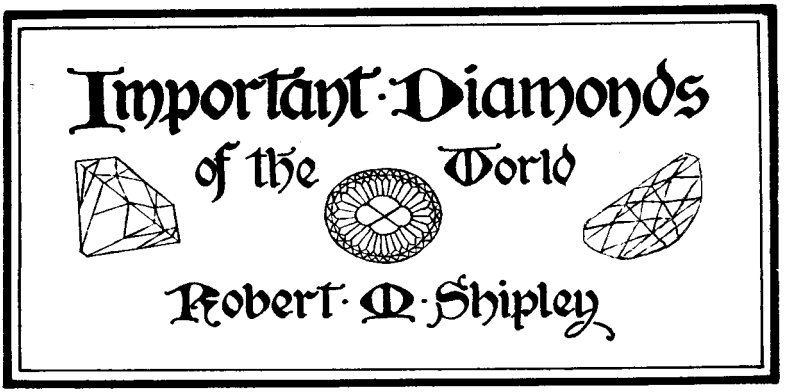
It is probable that Professor Moses stood in the front rank of American mineralogists, not only in the development of the study of precious stones but in the systematic instruction in mineralogy. He was the author of a text book on mineralogy which includes a description of gem stones of considerable value. In addition, he was the author of a booklet, entitled, "The Identification of Gems and Precious Stones without Injury to the Specimen". His name appeared frequently as an author in connection with articles in technological journals dealing with mineralogy.

Instruction in gems and precious stones was discontinued at Columbia University for a short time after the death of Professor Moses. It was continued, however, in 1923, and has been carried on with increasing support since that time. The course is no longer conducted during the Summer Session, as it was at first, but has been transferred to the Extension Department of the University and is now given during the evenings extending throughout the Spring Session.

The course is designed primarily for those engaged in the jewelry trade or for others who wish to improve their knowledge of precious stones. A goodly number are enrolled who are in no way connected with the jewelry business but merely desire to increase their fund of general knowledge. The work is handled in such a manner that it can be taken by beginners.

Attendance has varied considerably throughout recent years, although it is probable that the average class would number between thirty and forty students. In the last ten years a total of about 350 students have passed through the course. At present the instruction is under the direction of both Doctor Krieger, Instructor in the Department of Geology and Mineralogy, and the writer. The course is given in two parts; one part consisting of a series of lectures, one each week throughout the Spring Session; the other part consisting of a parallel series of laboratory exercises and demonstrations given on another night.

NOTE: Dr. Paul F. Kerr, the author of this article, is a voluntary Member of the Advisory Boards of the G. I. A. A biography of Dr. Kerr will appear in the May-June issue.



THE REGENT

The Pitt diamond, afterwards called the Regent, although one of the last of the big diamonds to be found in India, is one of the most renowned of gems, both because of the unusual beauty released by the diamond cutters who fashioned its present form and also for the fact that once in the rôle of a quick asset it made possible the establishment of Europe's most remarkable empire. Its artistic merit is acknowledged by a place of honor in the world's greatest art museum, and its story proves that the history of a diamond may be interesting without an attendant record of bloodshed.

The diamond weighed, as a rough stone, 410 carats, and it is said that it was found in the Partial Mines on the Kishtna River about the year 1701 by an Indian slave. The slave, in order to avail himself of the possession of his treasure, cut a hole in the calf of his leg and secreted the stone among the bandages. Successfully making his way to the sea coast, he divulged his secret to an English sea-captain. The story says that he offered the stone to the skipper in return for a safe passage to a free land and a share of the proceeds. However, temptation must have proven too great for the skipper, because during the ensuing passage to Bombay the slave was unfortunately lost overboard—not entirely by accident it is evident.

The skipper then sold the stone to Jamchund, a Parsee merchant, for about $5,000. Prompted perhaps by a hope of stilling a troubled conscience, the captain spent the proceeds in riotous living, and very soon thereafter, in a fit of remorse and delirium tremens, hanged himself.

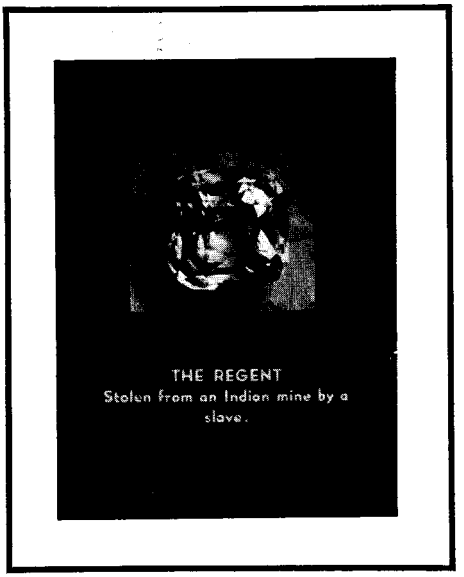
It is a matter of definite record that Jamchund, who was then the best known diamond merchant in India, did in 1701 approach Thomas Pitt with this stone, leaving it in his possession days at a time in the hope of accomplishing a sale at a price of almost half of a million dollars. Pitt was then governor of Fort George (Madras) and great-grandfather of Thomas Pitt of American Revolutionary fame. No doubt Governor Pitt drove a hard bargain, although it is quite apparent that he could not have known from the appearance of the rough stone what color or degree of perfection might result from its cutting. This risk must always be assumed by the purchaser of a rough diamond. After three months of negotiation, it was purchased by Pitt for 48,000 pagodas or a trifle more than $100,000 and, valued at but 6,500 pagodas, sent to England in a British ship.

Governor Pitt, returning to England in 1710, discovered that gossip had preceded him to the effect that he had obtained the gem by unfair means and although it seems to have been publicly received by general incredulity, the imputation was a source of great worry to him as was, also, the publicity given to his possession of the stone. The known possession of such a gem

drew much attention to him, and he is said to have traveled in disguise, concealing his movements and rarely sleeping two nights in the same bed.

He immediately published a statement of the details of his purchase of the stone, and when he died was careful to leave the complete narrative, which it was found necessary to publish 17 years after his death when the scandal was again unearthed by political opponents of his family.

For seven years Thomas Pitt retained his disturbed possession of this stone, although during a good portion of this time it was in the process of cutting and polishing. The original rough stone had weighed 410 English carats, which distinguished it at the time as one of the largest diamonds ever found. This was before the days of diamond saws and modern methods, and two years' time was required to fashion this gem. The resulting stone weighed but 143.2 metric carats, but the cutting job is one of the finest ever accomplished upon any important diamond of the world. The stone is in a cushion shaped brilliant cut, $1\frac{1}{16}$ inches long, 1 inch wide, and $\frac{3}{4}$ of an inch deep, and contains but one very small imperfection. The cleavages and dust brought a sum variously stated at $30,000 to $45,000 and the resulting gem remains to this day one of the finest and most brilliant of known diamonds, surpassing most of those cut by more modern methods.



In 1717 the Pitt became the Regent when Thomas Law, acting as Pitt's agent, sold this wonderful gem to the Duke of Orleans, then Regent of France, during the minority of Louis XV. Thomas Law, afterwards famous in connection with the Mississippi Bubble, was a Scotch financier then at the height of his power in France, and the stone was purchased for the crown jewels. Law thus qualified as one of the world's great diamond salesmen since he accomplished the sale, with only a model as a sample, for a total price variously stated to have been $625,000 to $675,000, but received no cash payment; the French government deposited other jewels as collatral. At first only the interest was paid, but eventually the account was closed. Law received $25,000 commission upon the sale and the deal netted Thomas Pitt about $500,000 and permanently established the fortunes of the Pitt family which later gave to England the Earl of Chatham.

The Regent, which was also known in France as the "Millionaire," was in the crown of France when Louis XV was coronated, and it caused the

crown to be known as the most valuable in Europe. After the downfall of the monarchy and the beheading of Louis XVI, the Regent, together with other art objects belonging to the former "tyrants" were shown to the "citoyens" on request. Those, who demanded as a right of the sovereign people a sight of this national diamond, were admitted to a strong room where, under the eyes of several disguised police, they were allowed to hold in their hand the securely bound and chained "Millionaire." In 1791 the Regent was valued at $2,400,000. For the third time in its history it was stolen—together with the Sancy and the Blue Hope Diamonds and many other treasures of the crown—when, upon the night of September 17, 1792, the Garde Meuble, being carelessly guarded, was entered. With the exception of the Regent, and perhaps the Hope, no other of these gems were ever recovered.

When the police were despairing of any success, word was received and quickly verified that the Regent was buried in a ditch in an alley of the Champs-Elysees, the Fifth Avenue of Paris. Napoleon, then an ambitious leader of the people, hoping to increase his threatened power and desirous of financing his Marengo campaign, pawned the stone to Berlin bankers as security for the cost of necessary "horse-furniture" incident to the campaign. Again, later, Napoleon borrowed funds upon it from the government of Holland for the financing of a subsequent campaign. In 1802 he redeemed it and wore it in the hilt of his sword at his famous, personally conducted, coronation as Emperor.

After Napoleon's time the Regent was for a while the shuttle-cock of political fortunes. Carried off to Blois by Marie Louise after the exile of her husband Napoleon it was handed over to Louis XVIII by her father, the Emperor of Austria. Louis XVIII fled with it to Ghent in 1815, but brought it back when he ascended the French throne. Again among the newly augmented crown jewels of Napoleon III it survived the Second Empire and the Prussian war and when the French crown jewels were sold at auction in 1886 the Regent was reserved "on account of its historical value" and perhaps, also, because of its value as possible security for "horse-furniture" or "air-craft fuel" in some future war.

No more convincing proof of the esteem with which peoples of culture regard gems as objects of art has ever been evidenced than in the case of this beautiful stone. France has placed its Regent in the central case in the Gallery of Apollo, most important gallery of the Louvre Museum in Paris. In discouragement of racketeers or of authors of detective stories, it is well to mention that night theft of the Regent is difficult, since the entire glass case is automatically lowered into a vault upon the closing of the Museum.

THE SCIENTISTS' VIEW OF THE CULTIVATED PEARL

A. McC. BECKLEY

Says Dr. J. R. Dolphin, M.Sc., A.I.C., F.C.S., A British research chemist, in his article in the *Encyclopaedia Britannica*—" 'Cultured' pearls are 'natural' pearls beautified by the scientific control of their formation and growth". In this statement, Dr. Dolphin apparently reflects the opinion of the majority of biologists and masters of kindred sciences. These scientists feel that since the formation and composition of the cultivated pearl is essentially the same as that of the natural, it is genuine.

Louis Boutan, in his famous book *La Perle*, devotes an entire chapter to "the three principal methods for obtaining a greater number of genuine pearls by human intervention". These methods he lists as:

1. Multiplication by cultivation of the molluscs which produce the pearls.
2. Multiplication of the number of pearls produced by increasing the causes of parasitic infection. (A parasitic infection is known to be one of the causes of the formation of a pearl.)
3. Multiplication of pearls by the direct intervention of man. (Insertion of a pearl sac in a second oyster.)

Boutan—who is Professor of Zoology on the Algiers Faculty of Sciences—makes it clear that he considers pearls produced by any of these methods to be genuine.

To quote further from Dr. Dolphin's *Britannica* article, " 'Natural' pearls are found which contain no central nucleus, and Dr. Alverdes and K. Mikimoto independently, by transplanting small sections of the living epithelium cells from one oyster into another demonstrated the development of pearl matter, but such pearls were very irregular in shape, and entirely free from nucleus". This would indicate that a pearl formation was artificially produced without the aid of a nucleus which would probably be classed in the trade as a baroque. In his article, Dr. Dolphin infers that if anything the cultivated pearl is somewhat superior to the natural. He says that cultivated pearls contain a smaller amount of water than do the genuine—"an important factor", says he, "after the pearl has dried out".

Dr. H. Lyster Jameson—who has done a great deal of research on the detection of cultivated pearls—in the May issue of *Nature Magazine* says, "The trade distinguishes different kinds of pearls, according to shape and size (fine pearls, baroque pearls, etc.) just as biologists distinguish certain classes, according to where they arise (parenchyma or mantle pearls, muscle pearls), or to the kind of shell material of which they are composed (nacreous pearls, columnar pearls, hinge pearls, penostracum pearls). All these classes, some valuable, some worthless, are from the biological point of view pearls. Biologically speaking the Mikimoto pearl satisfies all the conditions which go to make up a pearl as defined above".

Dr. Jameson's opinion is one with which the producers of cultivated pearls naturally would have the general public most familiar, and his statements have been quoted several times in the descriptive literature issued by these producers. The late Dr. David Starr Jordan, a great authority on fishes, and sometime President of Stanford University, has also been quoted to this purpose. His statement concerning cultivated pearls, as it is frequently quoted in this connection is: "As they are of exactly the same substance and color as the natural or 'uncultured' pearl, there is no real reason why they should not have the same value. . . . Each sort has the same luster and sheen, a quality which cannot be imitated by any form of 'Paste' or 'Artificial' pearls. The best method . . . has been carefully studied and patents have been taken by Mikimoto."

All these excerpts show the scientists' attitude toward the cultivated pearl. But the viewpoint of these men is essentially that of the biologist. They thoughtlessly overlook the protection due to an uninformed pearl-buying public, which a qualified statement as to their actual value would clarify. How little *these* men have been in touch with the gem trade is well illustrated by the quotation of one more statement from the *Encyclopaedia Britannica* article previously mentioned.

"The only method of ascertaining which variety is 'cultured' is to cut the pearl and examine the cross-section. In the case of the former, the mother-of-pearl bead can be observed."

The man of science who makes a statement of this sort knows as little of the development of the trade as the ordinary dealer has known of sciences. The viewpoint of scientist and merchant must be harmonized.

NOTE: This article presents the viewpoint of the scientist toward the cultivated pearl. That this viewpoint is correct, the Institute does not agree. In the next issue, it is hoped that the other side of this question may be set forth by the dealers in genuine natural pearls.

BIOGRAPHICAL SKETCHES

DR. RENE ENGEL

ROBERT SHIPLEY, JR.

The Gemological Institute of America takes pride in announcing as a member of its Advisory Boards, Dr. René Engel, Instructor in charge of Mineralogy and Geochemistry at the California Institute of Technology.

Dr. René Engel, mineralogist and geochemist, member of the G. I. A. Advisory Boards.

Dr. Engel came to America from Paris, France. The greatest part of his formal education was in France, where he took several degrees. He worked with Dr. Verneuil, who is famous for his developments in the manufacture of synthetic corundum, and also with Professor Moissan in his experiments in the synthesis of the diamond. Dr. Engel became associated with A. Karl, a former student of the Curés, in work with radium. His interest in the radio-active elements finally brought him to America, where he came in search of radium ores.

When his search for these rare ores proved unprofitable, he applied to the Anaconda Copper Company and was given a position. He served in various engineering and geological capacities in this company. At the outbreak of the World War, Dr. Engel was called to serve in the Chemical Division of the French Army. During the war, he served as a Member of the French Scientific Commission in the United States, and also as a Member of the Nitrogen Commission in London. After the war he was detailed as Geologist and Inspector of the Sarre Coal Mines and the Sarre-Lorraine Boundary Commission for the Peace Conference.

In 1919, Dr. Engel returned to America and resumed his work with the Anaconda Copper Company. However, the copper depression caused him to leave this company in 1923. He accepted the position of Professor of Geology and Mineralogy at the Oklahoma School of Mines. The next year, he held a similar position at the New Mexico School of Mines. In 1925, he joined the faculty of California Institute of Technology.

Dr. Engel has a lively interest in gem stones, and is voluntarily assisting the development of the Institute's facilities for identifying gems. An article by him on the pleochroism of gem minerals will appear in the next issue.

Next month: Prof. Paul F. Kerr, of Columbia.

ROUGH DIAMONDS PRESENTED TO INSTITUTE

The DeBeers Diamond Mining Corporation, desiring to aid in the activities of the G.I.A., has sent very valuable publicity material to the headquarters in Los Angeles. Included were many fine photographs of the mines and equipment in South Africa, some taken from the air especially for the Institute. The most valuable donation was three rough diamond crystals. One of the crystals is an octahedron, one is a modified dodecahedron, and the third is a spinel-twin or maacle. These diamonds all show very plainly the characteristic surface markings of the mineral.

Dr. Alpheus Williams, former General Manager of the DeBeers Mines and author of the monumental *Genesis of the Diamond,* cabled at the same time that the Institute had entire permission to use quotations and reproductions of photographs or color plates from his book. *The Genesis of the Diamond,* considered by the majority of mineralogists to be the most valuable book on the subject in existence, will be reviewed in an early issue.

UNIVERSITY GEM COURSE TO BE HELD IN LOS ANGELES

A night course in gem stones is announced by Dr. Thomas Clements, Chairman of the Department of Geology of the University of Southern California. This course, which is to be given under the auspices of University College, the adult education division of the University, will start on Monday, April 2, at 7 P.M., and will continue for twelve weeks, classes being held in Room 406 Bridge Hall, on the campus. Dr. Clements will be instructor in the course, which carries university credit.

The course is based on the well-known book by Kraus and Holden, "Gems and Gem Materials," which will be used as a textbook. The material covered during the twelve weeks will include the elements of crystallography as applied to gems, the physical properties of gem materials, and the geologic background of their occurrence. The most important gems will be studied in detail. Methods of recognizing gem stones and detecting imitations will be explained. Attention also will be directed to some of the famous gems of the world and to their history.

This Course Recommended

Dr. Clements' course, the tuition fee for which is $14.50, will be accepted as the required gemological training for the American Gem Society. Layman students who complete this course and jewelers who complete it plus the short sales course of the *American Gem Society* will be eligible for *Graduate Membership* in the Society. This U. S. C. course will also be accepted as full entrance credit to the *Certified Gemologist* course of the Institute.

This University of Southern California course is especially recommended both for beginners and for advanced students who wish to get a different slant on the study of gems. Dr. Clements' presentation of the subject is sure to be clear and concise; he is an excellent teacher.

SAPPHIRE

MILTON D. GRAVENDER

THE colors of the sapphire suit well a perfect day in September, the month for which it is the birthstone. This gem, which most us think of in the varying hues of blue, may almost run the gamut of the spectrum. All of the numerous colors constituting the gem varieties of the mineral corundum are known as sapphire with the exception of red. The red variety is ruby. Sapphires other than blue are all known as fancy sapphires. Among these are:

Yellowish Red	Golden Sapphire
Bright Orange	Padparadscha
Yellowish Red	Hyacinth Sapphire
Reddish Purple	Almandine Sapphire
Violet	Amethystine Sapphire
Yellow Green	Chrysolite Sapphire

Because the source of all fancy varieties was formerly the Orient, names such as "Oriental Topaz", "Oriental Amethyst", "Oriental Chrysolite", and "Oriental Emerald", have been used by jewelers for them. Scientists consider these terms deceptive and misleading. This practice has unquestionably robbed the sapphire of much of its glory and interest and does not add to the desirability of the other stones. That variety known as the "cornflower" blue is the most highly prized. "Cashmere Sapphire" is the term given to the velvety corn-flower blue color, described as having a "softened" appearance. This grade is, at present, almost impossible to secure. The "Burma" sapphire has a fine "rich" blue, darker in artificial light. The "Ceylon" sapphires occur usually in gray blue to purplish blue, generally clear and brilliant. "Montana" sapphires are a pale electric or steel blue with a characteristic metallic lustre. "Australian" sapphires are usually dense, inky blue, often almost black under artificial light, and have a greenish cast, when held to the light. These terms are used in the gem trade and refer to grades and not necessarily to the locality in which they are found.

The sapphire is said to be the symbol of truth and constancy. Tradition tells us that it was upon a sapphire that the ten commandments were engraved. The Persians believed that the earth rested on a great sapphire of which the reflection gave color to the sky. It is known as the celestial stone.

Star sapphires, together with the star rubies, are known as *asterias*, and have superstitions of their own. As the stone is moved a living star appears. The three cross bars, which form this star represent faith, hope, and charity. Oriental tradition reveals it as a guiding gem, warding off ill omen and bringing good fortune to its owner even after the gem has passed from his possession. Sir Richard Burton, famous explorer of the last century, and translator of the Arabian Nights, owned a large star sapphire which he considered his talisman because it brought good horses and

prompt attention wherever he went. The reward for such attention was a view of the stone. The Orientals believed that good luck was sure to follow.

J. Pierpont Morgan purchased and presented to the American Museum of Natural History in New York the sapphire asteria known as the "Star of

The Star of India. Weight, 543 carats. Courtesy: American Museum of Natural History.

India". It is most remarkable for both size and perfection of star. It weighs 543 carats.

The principal source of star sapphires is Ceylon. They are found in colors varying from a pronounced blue to pale grey. Probably because the star is as a result of the inclusions which they contain, asterias are never perfectly transparent. The more distinct the star appears under a direct light the more valuable the stone.

Ceylon is also the principal source of fancy colored sapphires, although many have been found in Montana. Siam is said to furnish half the world's fine blue sapphires. Quantities are also found in Ceylon, Australia, Burma, and Montana. The supply from Cashmere in Upper India is almost exhausted.

Sapphires are most beautiful and durable stones, because they are exceptionally brilliant, very hard, and do not fracture easily.

This is an excerpt from Mr. Gravender's booklet, *Fascinating Facts About Gem-Stones*, which has been prepared as a popular handbook for distribution among jewelers' customers. Information concerning the booklet may be secured by writing to the Institute.

MONTHLY REPORT OF DIAMOND MARKET

ANTWERP CUTTERS OPTIMISTIC

The London market reported few sales of cut stones during the last month, and almost none of rough. The Diamond Corporation is holding no sights until March or April; hence, the principal source of rough goods is at present inactive. The London correspondent of the *Belgian Diamond Industry* magazine seems to regard the bad state of the diamond market to be largely the fault of America—because the Americans are not buying, and because their dollar will not stabilize.

Indian and Italian buyers have been keeping the Antwerp market alive, and a few Americans have bought there. In Antwerp most of the inferior rough is cut. The large sale of Congo diamonds by the Diamond Corporation which we reported in the January issue was largely less desirable material, so it is logical to suppose that a large part of it reached Antwerp and affected the price of these poorer qualities. The Antwerp dealers were having trouble because they could not get credit. *Die Deutsche Goldschmiede-Zeitung* reports that a credit association has been formed which eliminates this difficulty.

The Amsterdam cutters, who handle the fine rough, have been quite inactive. An "Amsterdam Week" which was held in an attempt to bolster the falling number of sales in this market, proved very disappointing.

In general, the diamond market abroad seems slightly improved over last month, although this market has depended largely upon American buyers. No especial activity is yet reported to us by the American market. Since the devaluation of the dollar, the rate of exchange has gone from $40.25 to the 100 Belgian florins to $68.00 to the 100 florins. The resulting increase of diamond prices in the American market, according to Mr. A. Kirsh, diamond importer, is about 65%

STRAIGHT STRIAE IN SYNTHETICS*

ROBERT SHIPLEY, JR.

Curved zones of color, of bubbles, or of striae in corundum and spinel had come to be regarded as definite proof of the synthetic character of the stone in which they appeared. It became accepted as a corollary that straight zones were proof of a genuine stone. Newer synthetics placed on the market have almost straight zones, as the accompanying microphotograph illustrates. This microphotograph was taken by the writer, of one of the new alexandrite-like corundums in the possession of the Gemological Institute. The magnification used in making the photograph was approximately 200X.

Microphotograph of one of the new synthetics, showing the nearly straight striae. Taken in G.I.A. Laboratory.

This recent appearance of the straight zones in synthetics is no cause for alarm. As gemology devises tests for detection, makers of substitutes then work to overcome them. These newer synthetics would be almost impossible to distinguish under any magnifier of less than 100 power, but with correct microscopic equipment, their determination is quite easy. The patches of characteristic spherical bubbles peculiar to synthetics are present in these later-manufactured stones. The bubbles are smaller and more difficult to locate than they were in earlier synthetics, but they will succumb to 200 magnifications or more.

Internal cracks caused by rapid cooling likewise seem to have been eliminated in many synthetics of recent manufacture. The stone of which the accompanying microphotograph was taken, showed no such cracks either within the body of the stone or near the junctions of the facets. Moreover, there are but a very few bubbles. These are so small in size that about 700 magnifications are necessary to be sure of their spherical shape and characteristic appearance.

The structure lines which are illustrated here are quite visible. They are also quite distinctively lines of synthetic corundum, in spite of their

*G.I.A. Research Service. *Certified Gemologists* will be issued *Yearly Research Certificates* upon the passing of an examination. Study material for this examination is included in the above article.

straightness. An inexperienced judge might pronounce the stone genuine from the straight lines, but a man who had handled many synthetics would seldom be fooled. There is a sweep to these structure lines which is never found in a genuine stone. In a genuine, the lines are more sharp-edged in their outlines, and they lack the continued sweep of the lines in synthetic material. Sometimes such lines are "silk", which is easily recognized and never occurs in synthetics.

It is becoming more difficult to distinguish between synthetic and genuine corundum without proper equipment. As a result, synthetics are appearing in more important pieces of jewelry. The synthetics used in finer jewelry are, of course, of the best quality, often of Oriental cutting. Some have appeared in jewelry of a style in vogue before the advent of synthetics!

Vocational Research Groups Progress

Two of the California Vocational Research Groups are ready to take the *Qualifying Certified Gemologist* examination—these are the Los Angeles and Berkeley organizations. Several members of the Huntington Park group attended the laboratory class at the Institute Headquarters last Thursday night.

The Cleveland members have completed the assignment on refraction and are looking forward to the examination for *Graduate Members* A.G.S.

Jadeite Thought Discovered in America

A specimen, found near the sea coast of southern Oregon, was received recently at the Institute. At a casual glance, it appeared to be quartz. It was colorless and translucent, a water-worn pebble about two inches across. However, upon closer examination it proved not to be quartz. Its specific gravity was 3.5 by a hasty reading on the Jolly balance. The specific gravity of quartz is less than 2.7. Further tests indicated that the mineral was jadeite. Knowing its source, this seemed impossible. But the determination was tentatively set at jadeite, and the mineral is now to be analyzed chemically, and a Becke test for refractive index is to be made.

The finding of jadeite on an American continent would be of great importance, especially from an historical and archaelogical standpoint. The ancient inhabitants of the North and South American continents, the Aztecs, Mayas, and Incas, left behind them ornaments of both jadeite and nephrite. Sources of nephrite have been found in Mexico, Central and South America. Professor Schlossmacher, in *Bauer's Edelsteinkunde*, mentions a report of the finding of jadeite in Mexico, but he discredits the report. Should this specimen received from Oregon prove definitely to be jadeite, it may constitute the first proven mineralogical occurrence of jadeite on this continent.

THE TOUGHNESS OF GEMS*

Because almost all the mineral species whose varieties are cut as gems are listed in mineralogical classification as *brittle*, certain gems are in danger of becoming regarded as very fragile. This is a mistaken supposition, for the mineralogical classification of brittle does not imply that all the brittle minerals are fragile. The term brittle, used in a mineralogical sense, does not mean a fragile substance. It indicates merely a degree of elasticity, as a glance at the classification shows. The mineralogical degrees of elasticity are:

1. *Flexible;* when a mineral can be bent without breaking and remains bent.
2. *Ductile;* when a mineral can be drawn out into wire.
3. *Malleable;* when the mineral can be sliced with a knife, and the slices can be flattened with out with a hammer.
4. *Sectile;* when a mineral can be cut with a knife, but flies to powder when struck with a hammer.
5. *Brittle;* when a mineral powders upon an attempt to cut it.

Almost all of the minerals which produce gems are listed under the brittle classification. But it is easily seen that the term brittle refers to the degree of workability of a mineral rather than to its toughness. Indeed, of the flexibile minerals, which from their position at the head of the table seem to be the toughest group, talc is a member. Yet talc, or soapstone, as it is more commonly known, is anything but a durable mineral.

Under the fifth classification, brittle, mineralogists make three further divisions. These are:

A. *Friable;* when a mineral is easily separated into grains. An example of this is found in koalin, or china-clay.
B. *Soft;* when the mineral offers little or no resistence to scratching or breaking. Graphite is an example.
C. *Tough;* when the material is difficult to break or to scratch. Almost all of the gem-materials appear in this classification.

Gemologists further divide the mineralogical classification of tough stones, listing them as either *tough* or *fragile*. Therefore, topaz, which mineralogically falls under the *tough* subdivision of *brittle* stones, is gemologically classed as *fragile*.

From this discussion, the main point to remember is that the term brittle does not imply that a mineral lacks durability. It merely indicates that the mineral is of an elasticity which does not permit it to be worked with tools in the manner in which metals are worked. Gem-minerals are in the tough division of brittle minerals, and their durability in comparison with the majority of minerals is excellent. In fact, in *Dana's Textbook of Mineralogy*, nephrite which falls in the *brittle* classification of minerals is declared to be "extremely *tough*".

*This is an A.G.S. Research Service. *Graduate Members* of the Society and *Certified Gemologists* will be issued *Yearly Research Certificates* upon the passing of an examination. Study material for this examination is included in the article above.

LAYMEN GROUPS HEAR GEMOLOGICAL LECTURES

The Kiwanis Clubs of America seem to be the first national group to become interested in the new science of gemology. Mr. Earl McBath, *Graduate Member* of the *American Gem Society*, has been requested by a Chicago chapter of this organization to speak on the subject of gems sometime during March or April. Robert M. Shipley, Jr., of the Institute staff, addressed the combined Kiwanis Clubs of Southgate and Walnut Park, California, at their meeting on January 15. Readers will recall the announcement in the January number, of Mr. F. Otto Zeitz' speaking before another Kiwanis group in Chicago.

Nor are the Kiwanis the only persons interested. The sixty members of a women's club of Sioux City, Iowa, asked Wilson T. Clark to address them on the subject of gems; his talk was delivered February 28. Qualifying Certified Gemologist John Vondey threw caution to the winds and appeared before the Mineralogical Society of San Bernardino, California at their February meeting. The report is that Mr. Vondey withstood the mineralogists' barrage of questions without noticeable difficulty.

Graduate Members and *Students* of the *American Gem Society*, and *Students* of the *Gemological Institute*, may secure prepared talks without charge. Two of these are finished and ready to be mailed to prospective speakers upon application to the Educational Publicity Department of the *American Gem Society*, 555 South Alexandria Avenue, Los Angeles, California. These are:

Talks available to qualified persons:

1. *The Diamond.* Concerning the qualities which produce its value, and the stability of its value in comparison with other commodities.
2. *Imitation Gems and Their Detection.* Explains simply the use of hardness points, the refractometer, and the dichroscope, with special reference to substitutes for rubies and emeralds. This talk was written especially for delivery before a men's organization. This talk, when given before the Kiwanis Club of Southgate, was very well received.

Several other lectures are being prepared and may be secured in the near future from the Educational Publicity Department. These include:

1. *The Diamond and Other Gem Stones.* Their formation and the deposits in which they are found.
2. *Famous Diamonds of the World.* Stories of the magnificent historical diamonds, and the hatred, war, love and fortune which they carried in their trains.
3. *The Romance of Gems.*

Several talks of carefully prepared subject matter are available to all *Graduate Members* and *Associate Members* of the *American Gem Society.* These are not so carefully prepared and so diligently checked for inaccuracy as are the preceding titles, but they are popular in nature and are well above the standard of similar articles previously offered by trade associations. These are:

1. *Diamond Buying.* Hints for the layman who plans to purchase a diamond.
2. *Diamonds in Jewelry.* The diamond described as a basis of the jewelry trade.
3. *Ruby.* Its sources, qualities, and the romance attached to this gem.
4. *Colombia and the Emerald.* The emeralds of Cortez, and the Columbian mines from which they came.
5. *Chinese Jade.* The jade markets of Canton and Peking. The love of the Chinese for this gem.
6. *The Romance of Rings.* Some of the history and the association of one of the oldest forms of jewelry.
7. *Platinum.* Its properties and its applications, especially in jewelry.

These talks may likewise be secured by writing to the Educational Publicity Department at the above address.

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(To be continued)

BOOK REVIEWS

ROBERT M. SHIPLEY

Bauer's "Edelsteinkunde" (Precious Stone Science). A new work by Prof. Schlossmacher, Director, Mineralogical-Petrographic Institute, of Konigsberg. Published by Bernhard Tauchnitz, Leipzig, Germany. RM58.00 (about $23.20). Obtainable from the G.I.A. Book Department.

(Continued on next page)

The first edition of this work was a quarto volume published in 1896 by Professor Dr. Max Bauer of the Mineralogical Institute of the University at Marburg, Germany. A second edition was published in 1906.

The first edition was translated into English in 1903 by Dr. L. J. Spencer, editor of the English Mineralogical Magazine, Keeper of the Minerals at the British Museum, and a Member of an Advisory Board of the G.I.A. Dr. Spencer in fact became co-author of the English text, which although now somewhat out of date, was long considered the most valuable English work on gems.

This third edition, in German, was first published in pamphlets during its preparation in the years 1928 to 1932. It contains 120 more pages than the 751 pages of the previous edition and because much of this edition is in greatly reduced type size, it contains much more material. The eight excellent color plates of the original edition are repeated with the addition of one, much inferior in quality, depicting synthetics. Many valuable photographs have been added to the original text.

The work is more technical than the previous edition, Bauer apparently having much more direct contact with actual gems than has Schlossmacher. The latter has obtained many valuable first hand personal opinions from producers, cutters, trade associations, and dealers.

He begins with a new and excellent introduction on geology, especially its eruptive phases. Another addition is a section of elementary mineralogy and crystallography, which includes the latest theories of the atomic crystal structure. He follows Michel in including an exposition of the effect of X-rays, cathode rays, violet rays and radium on gems.

The second part contains a description of the diamond which covers 183 pages and to which have been added descriptions of the new sources of diamond discovered since the last edition. The author incorporates the theories of Goldschmidt regarding the genesis and crystallography of the diamond with perhaps too little consideration of the opinions of other authorities. Then follow sections on the other principal gem species containing valuable material, upon a foundation in many cases the exact text of the second edition. New sources are well covered, although I believe some errors have been made in reporting new occurrences as gem material, which could hardly be classed as gem material, at least in the trade.

German market prices of gems freely quoted are already of negligible value. In many cases, specific gravity and refractive index of individual color and gem varieties of the same species are given; not figures covering the entire species; as is customary in many texts.

Ten pages are devoted to cultivated pearl; but to glass and other imitations and substitutes, little has been added except a rather weak section on synthetics.

The fashioning of colored stones section is the result of valuable contracts with lapidaries. Of extraordinary value are the many references to authorities and their works, and the listing of confusing or deceptive tradenames.

As always, some errors have apparently crept in. The green semi-translucent garnet from South Africa is mentioned in one place as andradite and in another as grossularite. Synthetic alexandrite is apparently classed as a synthetic commercial gem stone, together with ruby, sapphire, and spinel, and later the statement is made that it is but a scientific experiment.

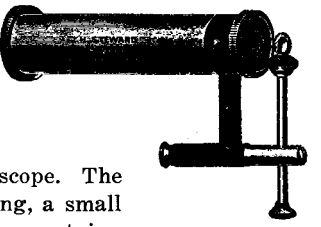
While probably not as practical as several other works on this subject and not of as much value to the jeweler unless he has studied over a period of many years, or completed an organized course in gemology, it is, in my opinion, by far the most complete and valuable work on the subject in print. Other works which have been published in special fields or for special purposes, are much more valuable, but this will remain as the monumental text.

THE AMATEUR LABORATORY*

MAKE YOUR OWN DICHROSCOPE

W. R. LEONARD

Students of gemology, especially those who have the facilities of a work-shop, have been building their own dichroscopes. The dichroscope is a very useful instrument, quick and simple in operation and positive in its results. For this reason many gemologists have been buying the dichroscope as the first piece of apparatus for a laboratory. A few have chosen to build their own instruments and some of their results were quite satisfactory.



Dichroscope with special attachment for holding stone.

It is quite a simple matter to build a dichroscope. The essential parts are a length of thin-walled tubing, a small lens, and a piece of calcite. The calcite is the most important part of the instrument, so it should be selected and fashioned with the greatest care. Clear, easily cleavable calcite suitable for this work may be bought from the Gemological Institute of America, or Ward's Natural Science Establishment. A piece at least one-quarter of an inch on a side and one inch long is required.

Calcite cleaves very readily along the planes of a rhombohedron. That is, it can be cleaved to form approximating a distorted square. In making a dichroscope, the calcite should be cleaved to a shape about 3/16"x3/16"x1". However, if difficulties in cleaving the calcite are encountered, the prism may be made as short as ½" in length. An ordinary kitchen knife is a good instrument to use to cleave the calcite. The knife is placed upon the block of the mineral along a direction parallel to one of the faces. Then the back of the knife is struck sharply with an iron rod or a small hammer. If the calcite cleaves smoothly, leaving a flat, shiny surface, it is not necessary to polish it. However, some persons prefer to have the ends of the calcite prism squared up. This can be done by grinding the ends square on an iron lap, using alundum powder, then finishing the ground surfaces to a high polish by rubbing them on a glass plate covered thinly with red rouge. A bright finish can then be added by gently burnishing the calcite with a fine-grained chamois skin. The squared ends to the calcite prism add slightly to the clearness of the image seen through the dichroscope.

The tube to house the calcite prism should be at least 1½" long and at least ½" in inside diameter. Brass tubing is the most satisfactory. The walls of the tube should not be more than $\frac{1}{16}$" thick. The length and inside diameter may be slightly larger than these dimensions, to suit the material accessible.

An ordinary bottle cork is cut to fit tightly inside the tube; the cork should be the same length as the calcite prism. Then the cork is cut out with a sharp knife so that the calcite prism will fit inside it. This makes the simplest and most satisfactory mounting for the calcite. It is not necessary to cement the calcite to the cork if the cork is cut so as to fit tightly.

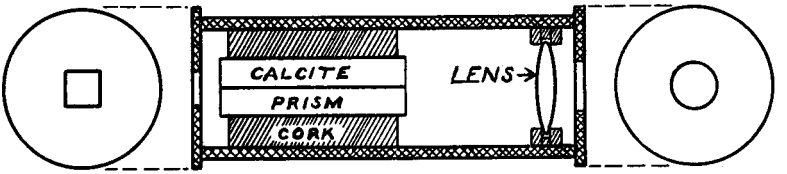
*G.I.A. Confidential Service. Articles regarding various laboratory equipment will follow.

If cement is needed, ordinary glue is quite satisfactory to use to cement the prism firmly inside the tube.

The lens should be small enough to fit inside the tube. It should be not more than 7 power, with a focal length of about 1½ inches. The mounting of the lens in the tube must be largely left to the individual. Some of the students who have the facilities have mounted the lens between two metal rings which are machined to fit tightly inside the tube. If it is not possible to machine such rings, cork and cement may be used. One ingenious student used two rings of thin cardboard.

The caps to fit over the ends of the tube should be made of sheet brass, about $\frac{1}{16}$" thick. If tools for working sheet metal are not available, strong cardboard can be made to serve. However, the cardboard does not make a durable construction and should be avoided if possible.

The shape of the holes in the caps of the dischroscope is important. The opening nearest the lens should be circular and large enough to allow the image from the lens to pass through it. The most satisfactory size for



Detail of dichroscope; scale actual size. Showing projections of end caps.

this hole is ⅛" to ¼" in diameter. The opening in the opposite cap—that is the one away from the lens—should be perfectly square. It should be $\frac{1}{16}$" on a side, never should it be more than ⅛" square.

The cap with the circular opening may be mounted as soon as the calcite prism and the lens are firmly in place. The mounting of the caps offers a problem for the builder's ingenuity. If no better means are available, the cap may be fastened on satisfactorily with metal cement.

The fastening of the cap opposite the lens should be the last operation in the constructing of the dichroscope. It should be held in place by hand while the builder looks through the eye-piece. Through the eye-piece, two images of the square in the opposite cap will be seen. The cap should be turned about until these two squares are quite distinct from one another. The squares may be aligned so that they appear corner to corner, or they may be placed side by side, as the builder desires.

After the cap with the square hole is lined up correctly, it should be fastened to the tube in the same manner as the opposite cap was fastened. Then the dichroscope is ready for use.

A GEMOLOGICAL ENCYLOPEDIA

(Continued from last issue)

HENRY E. BRIGGS, Ph.D.

Streak

The streak or streak powder is often used to help identify a mineral. The streak or streak powder is the powder abraded from the sample when it is rubbed on a harder substance. The color of most streak powders is white to greyish white, although some minerals have other colors. The streak of hematite is red.

Fracture

The fracture of a mineral is the breaking of it on a line which is not parallel to the cleavage plane of the mineral. That is if the cleavage of a mineral is in one direction only—say it is parallel to the base of the crystal —then the fracture would be the breaking of the mineral in a direction say at right angles to the base.

The fracture is sometimes used to determine a gem crystal and is described as conchoidal (shell-like), sub-conchoidal, splintery, uneven, etc.

Cleavage

Minerals are often found to part along certain definite planes and can be split along these lines. This is called cleavage. Some minerals have a single cleavage plane, as the topaz, the cleavage plane of which is parallel to the basal pinacoid, and which is called basal cleavage. Other mineral may have many cleavage planes and as in the diamond or in fluorite, where the cleavage planes are parallel to the faces of the octahedron; such cleavage is called octahedral cleavage.

Cleavage may be described as perfect, imperfect, highly perfect, easy and other such terms all of which merely describe the ease or difficulty with which a certain mineral may be cleaved. Cleavage is usually characteristic of the mineral although it is often more perfect in one sample than in another.

The cleaving of a mineral is done by first determining the plane of the cleavage and then by cutting a slight niche or scarfe into the mineral along the cleavage plane, into which a sort of chisel is placed and struck a light but deft blow. The cleaving of a mineral successfully is something of an art. It is often made use of by lapidaries to avoid sawing as the cleaving is quicker and hence cheaper. Especially in diamonds cleaving is resorted to and it is really an art all by itself in the diamond cutting industry.

Parting

Sometimes the parting of a mineral is spoken of as "false cleavage". It is the parting of minerals along certain planes and is often due to polysynthetic twining. It may also be caused by pressure.

Parting as well as cleavage should be taken into consideration when a gem is cut as in some minerals it is important to have the cleavage plane in a certain direction in a cut gem so as to give the gem the utmost in

strength. However the optical properties of the mineral must also be taken into consideration and sometimes it is impossible to have the gem properly oriented both from an optical and physical standpoint of view.

Specific Gravity

The specific gravity of a substance is the ratio of its weight as compared with the weight of an equal volume of water at 39 degrees Fahrenheit.

The specific gravity of solids can easily be determined with an ordinary balance type scale as follows: Weigh the sample in air, jot down on a paper the weight in air. Now fill a vessel with distilled water, which is large enough to allow the scale pan to be immersed in it and so that the sample in the scale pan will be completely immersed. Place the vessel full of water under the scale pan and into it pour enough sand or such substance to just balance the scale again. Now thoroughly wet the sample with distilled water and place it in the scale pan which is immersed in the water, *and be sure the mineral sample is completely immersed.* Now add weights to the the opposite pan in the usual way until the scale is balanced. The weights in the pan when the scale is balanced is the weight of the specimen in water. Jot down this weight and we are ready to make our calculations. Subtract the weight in water from the weight in air and the difference will be the weight of a volume of water equal to the volume of the sample. Now divide the weight in air by the difference just mentioned (the weight of an equal volume of water) and the result will be the specific gravity.

As an example we will assume that a crystal weighs 7 grains in air. We suspend it in water and weigh it and find it then only weighs 5 grains. We then subtract 5 from 7 and get 2 grains the weight of a volume of water equal to that of the crystal. We now divide 7 by 2 and get a dividend of 3.5 which is the specific gravity of diamond.

Specific gravity may also be measured with one of the many balances which are especially made for that purpose or by the suspension method. The suspension method consists of placing the gem in a heavy liquid. If the gem floats in the liquid it shows that the specific gravity of the gem is less than that of the liquid. If the gem sinks in the liquid to the bottom, it shows the specific gravity of the gem is greater than that of the liquid. When he specific gravity of both the liquid and the gem is the same, the gem will be suspended midway between the bottom and top of the liquid. This test is of value where the sample is too small to test in the usual way as outlined above.

The liquids which are usually used in this test are: Strong brine (salt and water) used to test the sp. gr. of amber. Methylene iodine, the specific gravity of which is 3.31 maximum (undiluted), Potassium mercuric iodide, specific gravity, 3.196; Cadmium borotungstate, specific gravity, 3.284; Barium mercuric iodide, specific gravity, 3.58; Thallium silver nitrate, specific gravity, 5.0 (this is a solid at ordinary temperatures but is liquid at 70 degrees centigrate and may be used at this temperature).

A mixture of thallium malonate and thallium formate known as Clerici solution has a specific gravity of 4.65 is easily diluted with water and may be used to take a wide range of tests for this reason. The specific gravity of any of the solutions may be measured by any of the several methods such as with the Westphal balance etc.

(To be continued)

HOW TO BUY DIAMONDS

by ROBERT M. SHIPLEY

This is the first of a series of articles by Robert M. Shipley on the subject "How to Buy Diamonds". Another series will consist of articles explaining how a customer may best select a diamond. This latter series will be entitled "How to Select a Diamond", and each article after its appearance will be immediately republished in pamphlet form and will be obtainable by both *Associate* and *Graduate Members of the A. G. S.* for distribution as pamphlets to their customers.

The other series of short articles will consist of information of value to the merchant who is maintaining or wishes to establish a diamond department. This must necessarily begin with elementary instructions as it must be of value to the person who has never before bought or sold diamonds as well as to the person more experienced in such activities.—Editor's Note.

A purchase of diamonds for resale to the public requires a reasonable amount of technical knowledge and practical experience if the merchant wishes to be considered a "diamond man" by his customers. The time may come when the public prefers to buy trade-marked diamonds, but that development in the history of jewelry merchandise will not occur until the great majority of retail merchants prefer to transfer entirely the asset—which is the personal confidence of their customers—to trade-marked merchandise. Although such a transfer would lessen the many responsibilities of the jeweler by relieving him of the necessity of knowledge of diamonds, the majority of such retail merchants believe that the very survival of the jeweler as a special merchant in the business life of the country depends upon his maintaining this personal confidence of his customer and not delegating it completely to advertising lines. Whether or not this is a wise decision, it is not my province to say. Unless the A.G.S. or some other medium can develop and maintain some method of publicity whereby diamonds can be made more desirable to the American public and kept interesting to them, it is probably much better that the distribution of diamonds pass into the hands of two or three large firms who, by establishing and maintaining prices on trade-marked merchandise may be able to afford the advertising cost necessary to develop the aforementioned desire and to maintain the said interest.

Trade-Marked Diamonds

If one chooses to sell only trade-marked diamonds, he will succeed best if he has absolute confidence in the firm from which he buys, accepts their descriptions of the diamonds sold to him, and makes his sales on the assurance to his customer of the reliability and accuracy of that firm and its trade-mark. As before mentioned, his problem is greatly simplified and his necessary effort curtailed. He sells his customer confidence in the integrity, knowledge, and buying power of the firm which owns the trade-mark. This seems almost an ideal method, but its drawback, which is pointed out by many merchants, is that after he has built confidence in this trade-mark, his customer may find it easier to buy in department stores or from specialty merchants other than jewelers. However, distributors of trade-marked diamonds have, until the A.G.S. campaign, been the only agency using desire-creating publicity.

A Diamond Man's Equipment

The first thing a jeweler who wishes to create confidence in his own knowledge and ability should buy is one or more diamond loupes or hand magnifiers. Eye loupes are usually preferred because the merchant has become accustomed to one during his work at the bench as a watchmaker or repair man. Hand magnifiers are becoming more commonly used, but it is doubtful whether they will supercede the eye loupe. The Jewelers' Code at present specifies the use of a 7X loupe to be used in grading diamonds. If the merchant has the "trained eye" required by the code, it is possible for him to use the 7X loupe which has long been manufactured by Bausch and Lomb, consisting of two lenses mounted in a two-section eye loupe which is sold by material houses for $1.00.

I would recommend to the merchant who wishes to be careful that imperfections never be found in his diamonds by *any* person using *any* 7X loupe, and who also wishes to appear to his customers in a professional light, to purchase also a 10X triplet, corrected for chromic and spherical aberration. These may be obtained either in eye cups or as hand magnifiers—either of which may be obtained from the Gemological Institute or can soon be obtained from any material house. They cost from $5.50 to $12.50.

For the merchant who has elected to establish confidence in his own integrity, accuracy and knowledge, and prefers to buy diamonds in the competitive market, either mounted or unmounted, this series of articles is prepared. This merchant must, in selling diamonds, first sell confidence in his own knowledge of diamonds, ability to buy them at the lowest price for the given quality, and accuracy in making his selections. Therefore, it is first necessary for him to supply himself with these loupes and other tools of a diamond merchant.

First among these tools is a diamond scale. These may be purchased from any jewelers' material house and there are a number of them which can be recommended depending upon the amount of money the merchant wishes to place in this equipment.

Recommendations

Portable. Folds into case which may be carried in the pocket. Not so accurate a balance as the following two. *Price* $13.50.

Kohlbush. A fine balance, enclosed in a glass case. *Price* $75.00.

Chainomatic. Finest diamond scales available. Fine adjustments may be made without opening the glass case in which the balance is contained. *Price:* New $150.00; good used Chainomatics about $100.00.

Other Accessories Necessary

The real diamond merchant should also possess a Moe gauge. This is a gauge by which is obtained the approximate weight of a mounted diamond from its measurements made by the gauge. A Moe gauge may be purchased from any large material house at a price around $4.00, including its accompanying book of tables. It is also of use in measuring diamonds for proper proportions of cutting. The next necessity is a good diffused light which varies as little as possible. For this reason a north light is usually recommended. It is not desirable to examine diamonds in a direct light such as that from an electric light or the sun, or the direct reflections from either, because even a diffused light varies from day to day depending on the weather. Some method of observation under diffused light which would not vary from day to day is greatly to be desired. Designs for a diamond testing apparatus in which light conditions are ideal and constant have been shown to me and it is hoped that a description and announcement of it may be available in an early issue of this periodical.

With the necessary lighting conditions established, the merchant is in a position to carefully examine diamonds for imperfections and for color.

GEMOLOGICAL GLOSSARY

(Continued from last issue)

(The key to pronunciation will be found in the January issue.)

Alomite (al'oe-mite). Trade-name for the fine blue sodalite quarried at Bancroft, Ontario, Canada, for use as an ornamental stone. Also called Princess Blue.

Aloxite. Trade name for a form of fused crystalline alumina, or artificial corundum.

Alpine Diamond (al'pin). Pyrite.

Altered Stones (ol'terd). Stones which are coated or internally treated with some foreign substance in order to change their color or appearance. See also Coated Stones.

Alundum. Trade-name for artificial corundum.

Amatrice (a-mae'-tris, a-mee'-tris). Trade-name for a green gemstone from Utah, consisting of variscite, utahlite, or wardite, or a mixture of these in a matrix of quartz(chalcedony, etc. So-called a-matrix) because it is an American matrix gem stone.

Amazonite (am'a-zon-ite). Same as Amazon stone.

Amazon Stone (am' a-zon). Bright green gem variety of microline (feldspar); also sometimes sold as jade.

Amber (am'ber). A transparent to translucent fossil resin used as a gem material. See also Block Amber.

Ambergris (am'ber-grees). A waxy substance found floating in tropical seas, and as a morbid secretion in the sperm whale, whence it is all believed to come. Valued in perfumery.

Amberine (am'ber-in). Yellowish-green agate.

Amberoid (am'ber-oid). Pressed Amber.

Amber Opal. Brownish-yellow variety stained by iron oxide.

Ambroid (am'broid). Same as amberoid.

"American Jade" (a-mer'i-kan). Californite.

"American Ruby". Red garnet.

Ambrite (am'brite). A fossil resin occurring in large masses in New Zealand.

Amethyst (am'ee-thist). A pale violet to a deep purple transparent variety of crystalline quartz used as a gem stone. February birthstone.

Amethystine Quartz (am"ee-thist'-in). Quartz of an amethyst color, not necessarily in crystals or solidly colored.

Amorphous (a-more'fus). A word meaning "without form" applied to minerals or gem materials that have no definite internal structure or arrangement of atoms. Sometimes used to mean no external form, but such usage is confusing and probably ill advised.

Amphibole (am'fi-bole). Also called hornblende. A mineral similar in structure to asbestos. Nephrite is a variety of amphibole.

Amulet (am'ue-let). A charm, or talisman, worn on the person to prevent disease or misfortune.

Amygdaloid (a-mig'da-loid). An igneous rock having gas vessels filled with secondary minerals.

Amygdaloidal geode (a-mig"da-loi'-dal). A geode which has formed in an amygdaloid. See also geode.

Amygdule (a-mig'dule). A spheroidal aggregate of secondary minerals formed in a cavity of igneous rocks.

Anaglyph (an'a-glif). Same as cameo.

Analcite (an-al'site). A white or slightly colored variety of zeolite. Not a gem mineral.

"Ancona Ruby" (an-koe'na). A reddish Quartz. See rubasse.

Andalusite (an"da-lue'site). A transparent to translucent, brown-green, yellow green or gray gem stone. Chiastolite (macle) is a variety. Also incorrect trade name for brown tourmaline.

Andradite (an'dra-dite). A species of garnet transparent to opaque. Demantoid, topazolite, and melanite are varieties of andradite.

Anhydrite (an-hei'drite). Anhydrous calcium sulphate occurring rarely in orthorhombric crystals, usually massive, white or slightly colored. Not a gem mineral.

Anhydrous (an-hei'drus). Not containing hydrogen or water in its composition.

Anisotropic (an-ei"so-trop'ik). Doubly refractive, affecting light differently as it passes along lines of different direction. See also refraction.

Anomalous (a-nom'a-lus). Uneven, irregular.

Apatite (ap'a-tite). A transparent green, pink, blue, purple, violet, or colorless gem stone.

Aphrizite (af'ri-zite). Black tourmaline.

Aplanatic Lens (ap"la-nat'ik). A lens free from spherical aberration. See Aberration.

Apophyllite (a-pof'i-lite, ap"o-fil'-ite). A hydrous silicate of potassium mineral, usually transparent. Not a gem mineral.

Apricotine. Trade-name for yellowish-red, apricot-colored quartz nebbles from near Cape May, New Jersey, used as gem stones.

Aquagem (a'kwa-jem). Trade-name for a light blue synthetic spinel. Synthetic aquamarine spinel.

Aquamarine (a"kwa-ma-reen'). A transparent usually blue to sea green colored species of beryl. See also Brazilian Aquamarine, Madagascar Aquamarine, Russian or Uralian Aquamarine.

Aquamarine Chrysolite. Greenish-yellow beryl.

Aquamarine Emerald. Trade name for genuine Beryl or Aquamarine triplet. See "Emerald Triplet".

Aquamarine Topaz. Greenish topaz.

Aquamarine Triplet. A genuine triplet which is used to imitate an emerald, and often incorrectly called an "Emerald Triplet". It consists of two portions of aquamarine with a cemented layer of green coloring matter between them.

Aragonite (ar'a-gon-ite). A mineral composed like calcite, of calcium carbonate, but differing from calcite in its orthorhombic crystals, greater density, less distinct cleavage etc. It occurs commonly in beds of gypsum and of iron ore, in basalt, etc. Not a gem stone.

Arborescent (ar"bo-res'ent). Tree-like in appearance.

"Arizona Ruby" (ar"i-zoe'na). Deep red pyrope (garnet) from Arizona and Utah.

"Arizona Spinel". Deep-red pyrope (garnet) from Arizona and Utah. Same as "Arizona Ruby."

Argillaceous (ar"ji-lae'shus). Consisting of or containing clay.

"Arkansas Diamond" (ar'kan-so). Diamond from Arkansas; also (incorrectly) rock crystal from Arkansas.

Artificial Stones (ar"ti-fish'al). Stones which have been manufactured. Includes synthetic, reconstructed and imitation stones.

Asbestos, asbestus (as-bes'tos or az; or as-bes'tus or az). A kind of mineral unaffected by fire; a variety of amphibole.

Assembled Stones. A term suggested by Shipley for any stone made of more than two parts of genuine or of genuine and imitation gem-materials.

Aschentreckers. Dutch word meaning ash drawers (tourmaline).

Ash Drawers. Early name applied to tourmaline because of its electrical property.

Asparagus Stone (as-par'a-gus). Pale-yellow apatite.

Asteriated (as-te'ri-ate"ed). Like a star—with rays diverging from a center.

Asteria (as-te'ri-a). A star. Any gem stone displaying asterism.

Asterism (as'ter-izm). Property of being asteriated.

Atom. See also molecule. When ordinarily used in mineralogy, or gemology, refers to the smallest particle of an element which exists either alone or in combination with similar particles of the same or a different element.

Augite (o'jite). A mineral. See pyroxene.

Australian Sapphire (os-trae'li-an, os-tral'yan). A trade name for any deep inky-blue sapphire.

(To be continued)

TITLES PROTECT BOTH JEWELERS AND CUSTOMERS

The following statement has been issued jointly by the Gemological Institute and the American Gem Society:

Gemological titles serve three purposes:

1. As protection for the experienced and legitimate merchant against unqualified and "high pressure" competitors.
2. As a challenge to stimulate the merchant who is not yet properly equipped, to improve his ability, profits, and position in his community.
3. As protection to the buying public against unqualified merchants.

Examinations are established for *Graduate Member American Gem Society*, not to discriminate against practical jewelers who are well posted on diamonds and other gems and jewelry. Nor will examinations for *Certified Gemologists* harm gem experts. On the contrary, these titles are for the protection of these very persons and examinations are open to all by writing to the Society or Institute. By these titles, merchants who can pass examinations will be distinguished by their customers from those who can not.

Nine Pass Qualifying Certified Gemologist Examination

Since the publication of the January *Gems and Gemology*, the following have passed the *Qualifying Certified Gemologist* Examination.

Hans J. Bagge, J. Milhenning, Inc., Chicago, Ill.
Paul Cohard, Peru, Ill.
Leslie E. Dewey, J. B. Hudson, Inc., Minneapolis, Minn.
Ferdinand L. Hotz, Jr., Chicago, Ill.
Alvin M. Knudtson, Roseburg, Oregon.
E. C. Luscomb, C. D. Peacock, Inc., Chicago, Ill.
Paul C. Reitz, Juergens & Andersen Co., Chicago, Ill.
E. Paul Shaw, J. B. Hudson, Inc., Minneapolis, Minn.
Richard H. Van Esselstyn, with Mirabeau C. Towns, New York, N. Y.

Graduate Members of the A. G. S.

The following is a list of the *Graduate Members* of the A. G. S. at the time *Gems and Gemology* goes to press.

ARIZONA
Newton Rosenzweig, *Phoenix*

CALIFORNIA
Walter Dibb, *San Diego*
Ned L. Ender, *Woodland*
G. Fred Fisher, *Fresno*
F. J. Hyde, *Huntington Park*
Lotta H. James, *Hanford*
Percy F. Jones, *Los Angeles*
George Kerrigan, *San Diego*
Leo Kirchhoff, *Long Beach*
W. R. Leonard, *Los Angeles*
Mary C. Mand, *Long Beach*
George H. Marcher, *Los Angeles*
Edward R. Mitchell, *Alameda*
James A. Newton, *Long Beach*
Paul Noack, *San Bernardino*
H. E. Rapp, *Los Angeles*
I. F. Roure, *San Francisco*
Floy Runyon, *Huntington Park*
George R. Schneider, *Hollywood*
H. S. Smith, *Redlands*
John Vondey, *San Bernardino*

COLORADO
Capt. Ted Syman, *Denver*

ILLINOIS
Paul Cohard, *Peru*
Herbert A. Fischer, *Chicago*
J. B. Gum, *East Moline*
Earl McBath, *Chicago*
John J. Ryant, *Chicago*
F. Otto Zeitz, *Chicago*

INDIANA
Sylvester P. Claus, *Mishawaka*

KANSAS
W. G. Glick, *Junction City*

MAINE
Linwood Cross, *Portland*

MASSACHUSETTS
Justin DeVylder, *Springfield*

MICHIGAN
Richard M. Pearl, *Detroit*

MINNESOTA
Karl G. Johnson, *Minneapolis*

MONTANA
Colin L. Christie, *Butte*

NEW JERSEY
T. Harry Goodwin, *Trenton*

NEW YORK
Barney Bobek, *Little Ferry*
Richard Van Esselstyn, *New York City*
Samuel R. Zickerman, *Corona, L. I.*

NORTH CAROLINA
Harold Seburn, *Greensboro*

OHIO
Basil B. Felts, *Cleveland*
Edward F. Herschede, *Cincinnati*
John B. Hudgeon, *Bedford*
Earl E. Jones, *Cleveland*
E. Howard Phillips, *Conneaut*

OREGON
Alvin M. Knudtson, *Roseburg*

PENNSYLVANIA
Eugene O. Muth, *Philadelphia*
Wilbur Stahler, *Allentown*

RHODE ISLAND
C. Alden Aldrich, *Providence*
F. B. Thurber, *Providence*

SOUTH CAROLINA
Gilbert T. Humphreville, *Spartanburg*

WASHINGTON
Albert Beck, *Walla Walla*
H. W. Crothers, *Aberdeen*

WISCONSIN
Henry R. Bloedel, *Milwaukee*
Ellsworth Miller, *Green Bay*
Edwin E. Olson, *Milwaukee*

NOTE: Because of numbers, it has been found impossible to publish lists of Associate Members.

THE NEW WORD

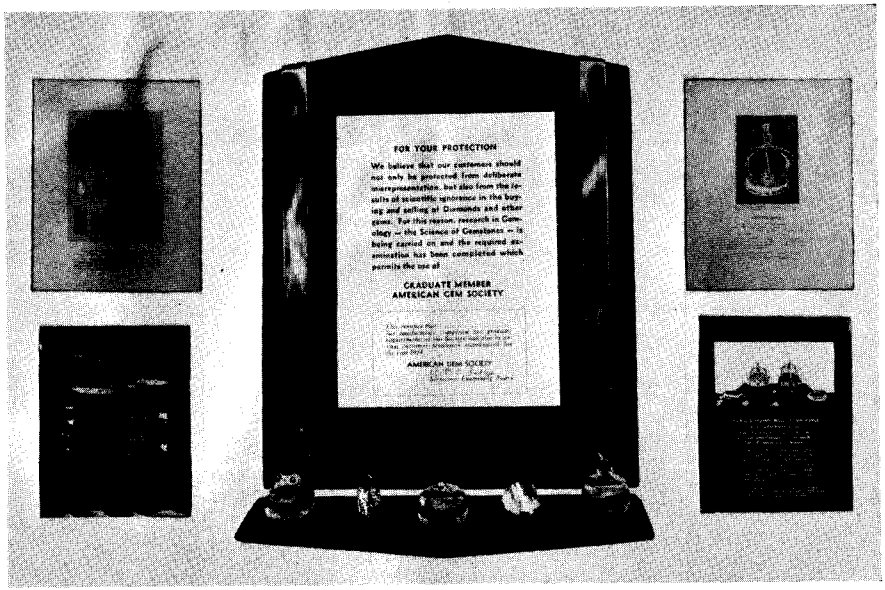
"GEMOLOGY"

GEMOLOGY is the science of diamonds and other gems, and of their qualities and values.

GEMOLOGY combats misrepresentation and deceptive names.

GEMOLOGY furnishes titles to those jewelers who can pass examinations in a knowledge of that science. These titles separate those jewelers who can prove the possession of a fundamental knowledge of gems from those who can not, and distinguishes those who can qualify as authorities.

GEMOLOGY furnishes accurate facts direct to the public.



ROB WAGNER SAYS:

"One does not go to a plumber for a hair-cut."

Neither does one now go to a jeweler for a diamond if he has not passed an examination in GEMOLOGY.

Barbers did surgical work until the surgeon's profession was established. . Jewelers sold gems until the new profession of GEMOLOGIST was established.

GRADUATE MEMBER OF THE AMERICAN GEM SOCIETY examinations have been passed in this store.

EXQUISITE DISPLAY ACCOMPANIES GRADUATE MEMBER COURSE

BLACK GLASS, PLATINUM METAL FINISH, AND BLACK VELVET

Displays not only your own diamonds and gems, but also **9 actual photographs** and 3 exquisite **color plates**, with accompanying explanatory signs to create desire and appreciation of gems; **6 window signs** stressing importance of buying from you, and 6 signs creating gem desire and building up value of title *Graduate Member American Gem Society;* **3 actual displays** of: rough gem minerals, cut gems, and gem testing instruments, to accompany latter sign.

SHOULD ITSELF PRODUCE MORE THAN ENOUGH EXTRA PROFIT TO PAY THE ENTIRE COST

This complete 14 months' window display service is included ***without additional*** *cost with the first 25* ***Graduate Member*** *courses in gemology and gem and jewelry salesmanship,—prices $5.50 per month.*

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