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and

PROCEEDINGS OF THE GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN
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GEMMOLOGICAL ASSOCIATION OF GREAT BRITAIN

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THE TWENTY-FIVE LARGEST DIAMONDS IN THE CROWN JEWELS OF IRAN

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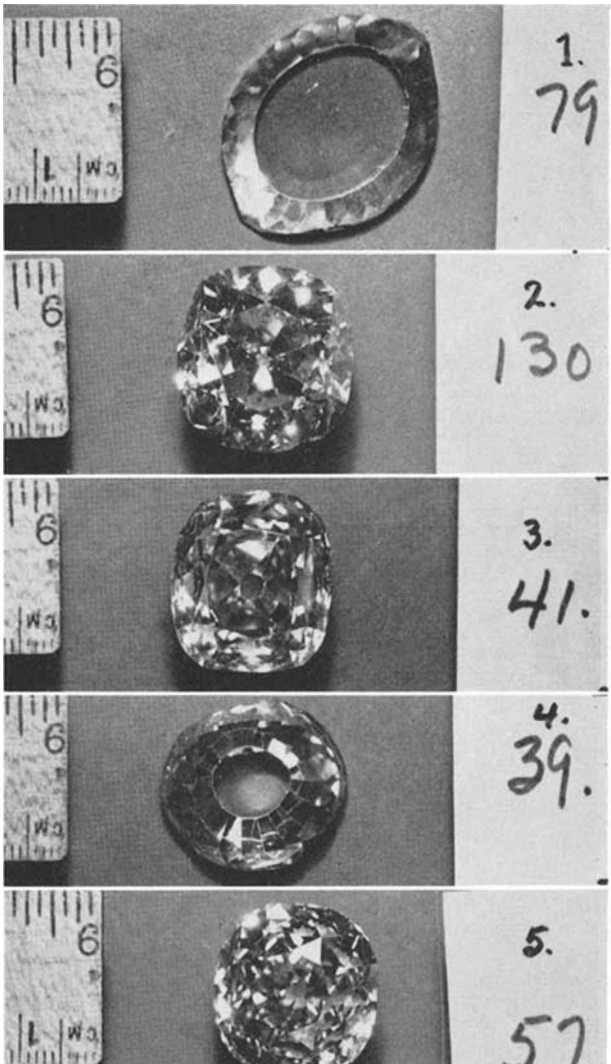
TWENTY-FIVE DIAMONDS, each exceeding fifty metric carats in weight, are listed and described in the accompanying table, which was prepared so as to clarify certain descriptive errors which have appeared in recent literature. Each diamond is illustrated and the number on each photograph is keyed to the table. This information has been abstracted from data accumulated in 1966, when the team from the Royal Ontario Museum made their protracted study of the Crown Jewels of Iran (Meen and Tushingham, 1968).

To Nasir ud-Din Shah (1848–1896) is due the acquisition and fabrication of most of the large diamonds of South African origin. In fact the cutting was done in the Golestan Palace by European cutters imported for that purpose. The diamonds of Indian origin were acquired by Nadir Shah in 1739.

The Table follows on pages 54 and 55, and the photographs are on pages 56 to 61.

Item	Photo No.	Weight (metric carats)	Dimensions (mm)	Cut	Colour	Fluorescence	Source	Remarks
1	79	51·90	31·67 × 24·19 × 6·55	Mogul	colourless	bluish	India	large flat back, worn slightly
2	130	53·50	21·75 × 22·92 × 15·00	Cushion brilliant	silver cape	medium blue	S. Africa	several inclusions
3	41	54·35	22·30 × 20·04 × 14·40	Rectangular brilliant	slightly peach	none	India	resembles "Cairo Cut" but of 8-fold symmetry
4	39	54·58	24·69 × 21·83 × 12·27	Mogul	colourless	none	India	quite clean
5	57	55·67	21·00 × 21·50 × 15·75	Cushion brilliant	cape	very slight	Africa	very clean, very brilliant
6	56	56·19	21·78 × 22·87 × 15·52	Cushion brilliant	silver cape	very slight	S. Africa	very clean
7	47	57·15	22·20 × 22·50 × 14·90	Cushion brilliant	silver cape	faint blue	S. Africa	small table, very clean
8	121	57·85	23·41 × 23·86 × 15·77	Brilliant	silver cape	slightly blue	Africa	modern proportions, clean
9	R9N4	60 (est.)	*c*.25·80 × 14	Square brilliant	yellow	—	?	very clean
10	R16N22A	60 to 65	31·50 × 27	Oval brilliant	pink	—	India	The Nur ul-Ain, believed part of Tavernier's Great Table, very limpid
11	46	65·65	25·43 × 22·67 × 16·75	Rectangular brilliant	cape	very slight bluish	S. Africa	very clean
12	38	72·84	25·90 × 22·03 × 13·97	Mogul	slightly champagne	greenish blue	India	clarity exceptional

13	R16N25A (right)	75 (est.)	32·80 × 23·80	Pendeloque brilliant	silver cape	—	S. Africa	nearly clean
14	R16N25A (left)	75 (est.)	32·80 × 24·80					
15	45	75·29	23·43 × 23·33 × 17·70	Cushion brilliant	cape	faint blue	S. Africa	very clean
16	44	78·96	25·40 × 22·65 × 17·92	Rectangular brilliant	cape	very slight bluish	S. Africa	very clean
17	66	86·28	24·50 × 26·00 × 16·10	Mogul	silver cape	strong blue	?	quite clean, large natural at girdle
18	43	86·61	30·92 × 13·34	Triangular brilliant	cape	slight blue	Africa	12-fold symmetry
19	52	114·28	27·80 × 27·94 × 20·62	Rectangular brilliant	silver cape	very faint	S. Africa	slight feathers & chips at girdle
20	37	115·06	32·03 × 24·28 × 14·74	Mogul	colourless	blue	India	very clean. The Taj-i Mah
21	53a & b	121·90	29·0 & 29·10 (point to point measurements)	Overall faceted octahedron	cape	very slight	S. Africa	symmetrical octahedron very clean
22	54	123·93	27·10 × 25·32 × 21·44	Rectangular brilliant	silver cape	very slight blue	S. Africa	very clean, naturals on girdle
23	42	135·45	31·67 × 26·70 × 21·00	Rectangular brilliant	cape	none	S. Africa	extra culet facets, very brilliant
24	51	152·16	31·75 × 28·10 × 20·40	Rectangular brilliant	silver cape	very slight	S. Africa	elaborately faceted girdle
25	R9N1	185 (est.)	41·40 × 29·50 × 12·15	Step Tablet	pink	blue	India	flawless. The Darya-i Nur



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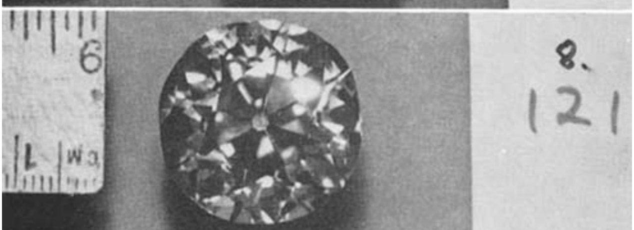

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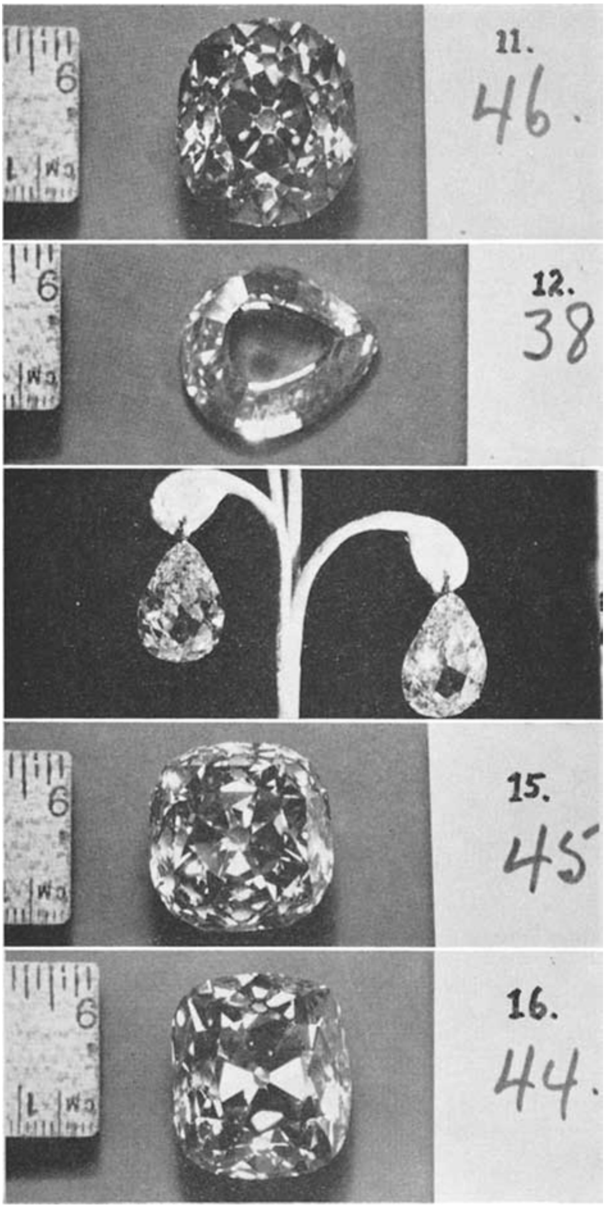

13 (right)
14 (left)
R16N25A


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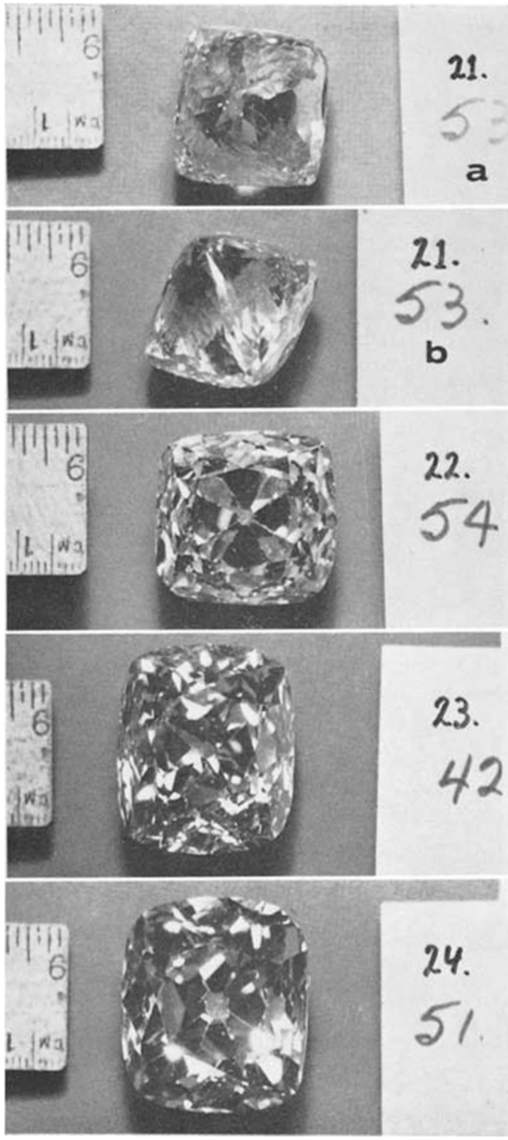
21.
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b
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54
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42
24.
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Item 25. Photo No. R9N1. The Darya-i Nur.

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NOTES ON GILSON SYNTHETIC WHITE OPAL (September 1975)

By KENNETH SCARRATT, F.G.A.
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RECENTLY the Laboratory received on loan from a well-known Hatton Garden stone-merchant a Gilson synthetic opal and another synthetic opal said to be of a new type also manufactured by Monsieur Gilson. Both stones were of the white variety with a good play of colour.

To see if the structure lines of the new opal differed in any way from what we have come to regard as the diagnostic structure lines for Gilson opals, I examined it at first on low-power magnification under the Gemolite microscope with the diaphragm partially closed, ensuring that all light passed through the stone. I observed that the main colours of the stone with transmitted light were green, of a matt texture, and a strong red and orange (by reflected light some of the red and orange areas changed to blue and green, and some of the green areas changed to a greyish-blue). The overall structure of the stone looked similar to the "diagnostic" structure: however, a difference was revealed when I used a high-power magnification. The difference lay in the structure lines within each colour segment. Figure 1 shows the structure lines seen within a yellow segment of the original Gilson synthetic white opal. As can be seen, these resemble skin stretching around a healing scar. Figure 2 shows the structure lines within an orange segment of the new synthetic opal. I think that these structure lines may be described as resembling crazy paving.

Having noted this difference, I continued my examination of the stone. Visible from the back of the stone was a central white core. The core had a perimeter similar to the banding seen in agate, and, although it had a play of colour, it was weak in comparison to the rest of the stone. Because of this, I felt further investigation into this new stone was necessary. I approached another leading Hatton Garden stone merchant who very kindly loaned me six natural white opals of the same quality and colour as the two synthetics.

I then proceeded to see if there was any difference in the long wave or short wave ultra-violet transparency of these eight stones.

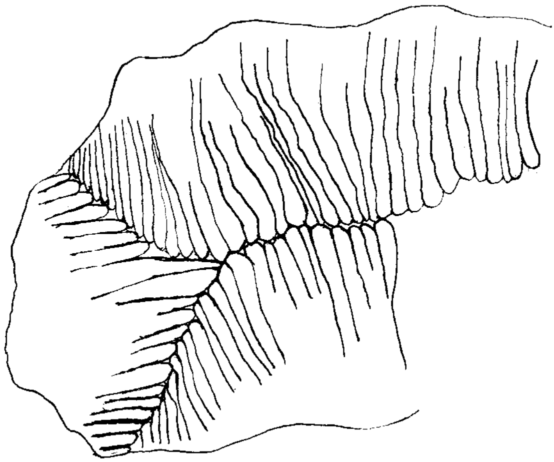


FIG. 1. The structure lines observed in a yellow segment of the original Gilson synthetic white opal.

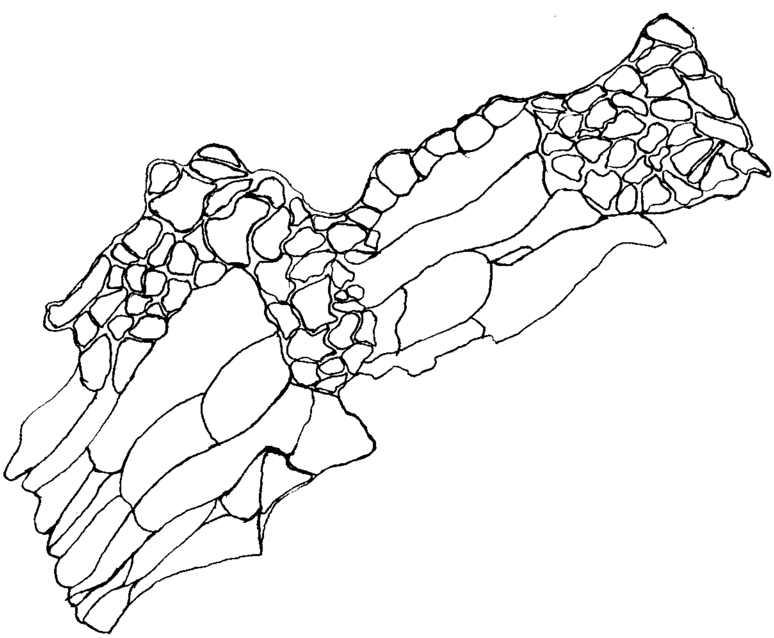


FIG. 2. The structure lines observed in an orange segment of the new synthetic white opal.

I tried 4, 6 and 8 second exposures on each wavelength at a height of 12 inches, the stones immersed in ordinary tap-water. The resulting photographs revealed that they all had the same degree of transparency.

To see if there was any difference in the specific gravities of the two synthetic opals, I made up a liquid consisting of methylene iodide and toluene in which the six natural opals sank slowly. I then put in the original Gilson opal—it floated. The new type Gilson synthetic, however, when placed in this liquid, floated for approximately 30 seconds, gradually absorbed the liquid, and then sank. Realizing that this stone had obviously taken in a considerable amount of the liquid, I removed it immediately and placed it once again under the Gemolite microscope. There was a substantial loss of colour from all colour segments and the structure as previously described had been enhanced. Over a period of approximately 2½–3 minutes, because of the heat emitted by the Gemolite light source, the colours and the structures gradually returned to their original strengths. I then examined all seven other opals to see if they had a similar reaction after being immersed in this liquid—they had not. Because of the difference in specific gravity between the original Gilson synthetic and the six natural opals, and the curious behaviour of the new synthetic, I decided to take hydrostatic measurements of their specific gravities. The Gilson had a specific gravity of 2·05 and the natural stones 2·07. The new type of synthetic, as is understandable, was rather more difficult because of its absorption properties: however, a calculation taken from its lowest weight in water revealed a specific gravity of 1·97. The increase in weight while in water over a period of 2½ minutes was 0·022 carats, which is considerable in a stone with a total weight of only 1·28 carats.

I left the stone for a period of 24 hours and then decided to see if its absorption in the heavy liquid had affected its transparency to short wave ultra-violet light. An exposure of 4 seconds at a height of 12 inches revealed, as can be seen in (Fig. 3), that the new opal was now opaque to this wavelength. Obviously some of the heavy liquid had remained within its structure. At this point, the quality of the stone had not been affected, but I felt, however, that further examination along these lines could do some damage. As the stone was not the property of the Laboratory I terminated my examination. My reasoning for this decision may be amply explained by

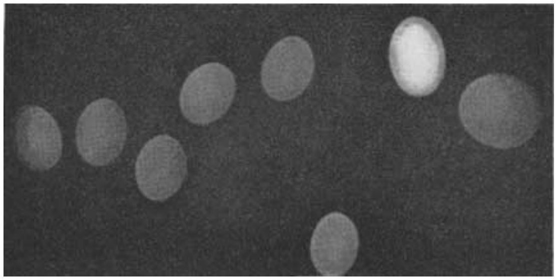
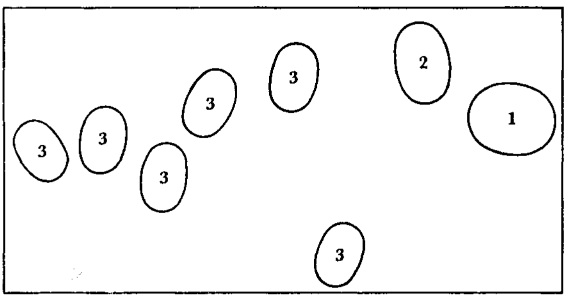


Fig. 3



1—Gilson synthetic Opal
2—New type synthetic Opal
3—Natural Opals

drawing attention to an article in *Gems and Gemmology*, Spring 1975, * by Richard T. Liddicoat, Jr, in which a permanent colour loss is recorded in what was assumed to be a porous Mexican white opal.

In conclusion, if this stone is typical in its absorption properties of the new type of synthetic, it can be said that extreme caution must be observed by all merchants dealing in it, and of course a warning must be given to anyone attempting to clean an item of jewellery in which this stone is set.

*Gems Gemol., **XV**, 1, 26.—Ed.

INTERNAL STRUCTURES AND IDENTIFICATION OF GILSON SYNTHETIC OPALS

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THE French chemist, Pierre Gilson, has been synthesizing gemstones for some years now, and we have recently had the opportunity to examine a number of his synthetic opals. His latest opals, both black and white, were so convincing—almost too good to be true—that we felt it desirable that some of their internal structural features should be more generally known. Our survey includes Gilson synthetic opal cabochons obtained in London from early 1974 until December 1975.

FIG. 1. Synthetic black opal (Gilson, early 1974) showing longitudinal banding, with some "herring-bone" structure; note "equigranular" appearance near bottom of photograph. ×4·5, reflected light.

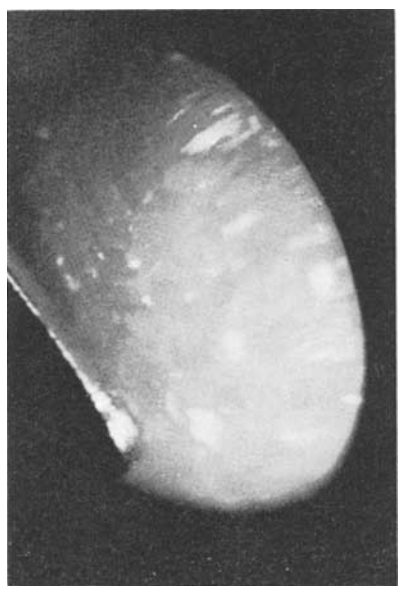

FIG. 2. Synthetic white opal (Gilson, late 1974) showing columnar structure extending from girdle; note "equigranular" texture on top of stone. ×8, reflected light.

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FIG. 3. Synthetic white opal (Gilson, late 1974) showing "equigranular" mosaic. ×5, transmitted light.

FIG. 4. Synthetic white opal (Gilson, Nov. 1974) showing "dendritic" line structure or "healed-scar" effect. ×13, transmitted light.

FIG. 5. Synthetic white opal (Gilson, Sept. 1975) showing broadly "equigranular" texture, overall milkiness, and turbid central patch. ×5 reflected light.

FIG. 6. Synthetic white opal (Gilson, Nov. 1975) showing pinkish-buff matrix colour, pale pink, blue and yellow patches and "dried leaves" effect. ×4, transmitted light.

FIG. 7. Synthetic white opal (Gilson, Nov. 1975) showing "lizard skin" effect. ×12, transmitted light.

FIG. 8. Synthetic black opal (Gilson, Dec. 1975) showing "lizard skin" effect and crenulate margins. ×12, reflected light.

FIG. 9. Synthetic white opal (Gilson, Nov. 1975) immersed in chloroform showing transparency spreading from girdle at top left. ×5, reflected light.

FIG. 10. Synthetic white opal (Gilson, Nov. 1975) immersed in chloroform for 2 minutes showing transparent margin and turbid central patch; note iridescent areas (showing as light patches). ×5, reflected light.

The synthetic black opal (early 1974) is quite characteristic, showing well-defined longitudinal bands with some fine striae along their length and some at oblique angles giving rise to "herring-bone" patterns between adjacent bands (see Fig. 1). The transverse section of the longitudinal bands (where it can be seen near the girdle) shows an equidimensional mosaic similar to the overall appearance of the later Gilson opals. Surface blemishes resemble evaporated drops of water on glass. These opals are transparent to some degree and show a dark brown body colour.

Seen by transmitted light the white opal cabochons (late 1974) display a pronounced "equigranular" texture (many "grains" are around 0·75 mm across, but generally in the range 0·5—1·5 mm) resembling a quartzite in thin section if viewed from above or below (see Fig. 3). However, the side elevation (Fig. 2) shows the columnar structure which seems to be characteristic of opals of this date. The general colour effect by transmitted light is produced by the pinkish-buff matrix, but patches of "washed-out" pale pink, greenish-blue and yellow are also evident (see Fig. 3). Natural opals that we have examined recently usually do not show this colour variation, but range from shades of very pale yellow to brownish-orange in transmitted light. By reflected light the earlier synthetic opals show patches of colour in a turbid matrix. In these and later synthetic opals the mosaic pattern appears to remain static with changing viewpoint and at certain angles almost the whole area of the base shows one colour by suitable reflected light. In contrast, in many natural opals the iridescent pattern appears to change shape and depth to a varying degree as the viewpoint is altered.

Synthetic white opals obtained in November 1974 also show an equidimensional aspect, but with coarser "grains" generally in the range 0·5—2·5 mm, many around 1·5 mm across. The general appearance by transmitted light is again of a pinkish-buff matrix with pale bluish and yellow areas; however, the overall appearance gives the impression of dried leaves, caused by the twisted shadows at "grain" interfaces. Greater magnification (see Fig. 4) of the material reveals the "dendritic" pattern resembling rivers with their many tributaries in hill and valley country—a feature described by Scarratt (1976). The columnar structures previously described are still present, and it is possible to identify a characteristically shaped "grain" on the top of the stone and to recognize a similarly shaped

FIG. 11. Synthetic white opal (Gilson, Nov. 1975) showing mosaic, "lizard skin" effect and overall iridescence in yellow-green. ×4, reflected light.

FIG. 12. Synthetic black opal (Gilson, Dec. 1975) showing mosaic with distinctly crenulate boundaries and "lizard skin" effect. ×4, reflected light.

FIG. 13. Synthetic black opal (Gilson, Dec. 1975) showing mosaic with distinctly crenulate boundaries and "lizard skin" effect. ×4, reflected light.

FIG. 14. Synthetic black opal (Gilson, Dec. 1975) showing "lizard skin" effect and crenulate margins. ×12, reflected light.

"grain" on the under-surface, a reasonable indication that the column extended from top to bottom of the cabochon.

Specimens of synthetic white opal obtained in September 1975 also appear generally equidimensional, but with more irregular boundaries to the mosaic. One stone (see Fig. 5) has a very turbid centre patch (see Scarratt 1976). At higher magnification fine lines are evident in the reflected coloured surfaces, sets of lines sometimes intersecting at angles reminiscent of amphibole, pyroxene or calcite cleavage traces.

The latest white opals (obtained in November 1975) also show an equidimensional aspect with a mosaic to 3 mm across or more, and with finely crenulate boundaries to the "grains" (see Fig. 11). On magnification (by reflected and transmitted light) the "grains" show a distinctive pattern resembling lizard skin or fish scales (see Fig. 7). The columnar structure seen in earlier white opals is still discernible but greatly reduced in its impact. By transmitted light the overall pale pinkish-orange colour and the pale bluish and yellow patches are still apparent, as is the "dried leaves" effect (see Fig. 6). An overall milkiness or turbidity is discernible by transmitted light, but becomes very noticeable by reflected light, adjacent "grains" often displaying different degrees of turbidity with the "lizard skin" effect apparently superimposed.

The latest (December 1975) synthetic black opals are very striking in appearance. In contrast to earlier material they are almost opaque and only transmit light (a very dark brown) on the thinnest of edges. By reflected light (see Figs. 12 and 13) they show a generally equidimensional mosaic with distinctly crenulate margins to the "grains" (cf. the white opals of November 1975). Magnification reveals the presence of the distinct "lizard skin" effect (see Fig. 14). By reflected light, areas which are not orientated to show a play of colour, show a milky effect "superimposed" on the general dark matrix colour.

Many, if not most, gemmologists will have convinced themselves that they can recognize natural opal at a glance, but nevertheless, they may not be familiar with the detailed appearance of the iridescent patches when magnified. Therefore, we show patterns seen in several natural opals at our disposal, but these patterns are but a small fraction of the various possibilities (see Figs. 15 to 18).

The synthetic white opals examined showed a very weak off-white (often bluish-white) fluorescence under short-wave (2357Å)

FIG. 15. Natural opal, showing mosaic with some "albite twinning" structures. × 7·5 reflected light.

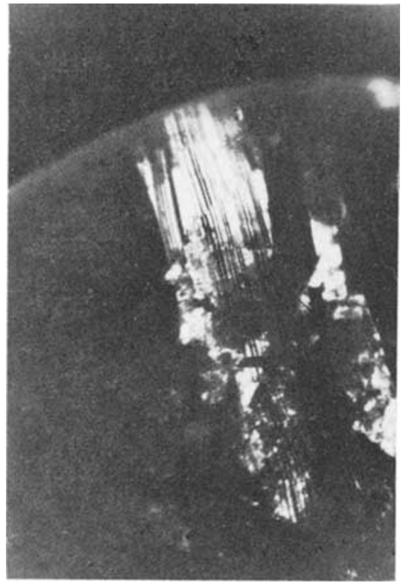

FIG. 16. Natural opal, enlarged view of "albite twinning" structure. × 30, reflected light.

FIG. 17. Natural black opal showing iridescent areas with intersecting sets of parallel lines. × 6·5, reflected light.

FIG. 18. Natural white opal showing typical irregular ragged iridescent areas. × 12 reflected light.

UV light; a stronger, generally whitish, fluorescence was observed under long-wave (3650Å) UV radiation, with a short greenish phosphorescence which could only be seen after the eyes had become dark adapted. The synthetic black opals examined were inert. Not all the natural opals examined fluoresced, but others showed a strong (usually whitish) fluorescence, brighter under long- than short-wave radiation, and a strong, readily visible, persistent phosphorescence following long-wave irradiation.

In view of the known porosity of some opal we were reluctant to carry out refractive index measurements using the normal dark coloured, halogen-bearing contact liquids; instead we used the colourless liquid benzyl benzoate (R.I.1.567) and obtained a series of readings by direct and distant vision techniques. However, since there were no really plane surfaces good results were not forthcoming but were within the range 1·45 to 1·47 for the synthetic opals tested.

To remove quickly the small residual mark caused by the benzyl benzoate it was decided to wash one opal in pure chloroform, which has a similar refractive index (1·45) to opal. On immersion the test stone immediately appeared to lose some iridescence and became more milky. Within 30 seconds the girdle of the stone became transparent (see Fig. 9), showing only iridescent patches and resembling water opal. The transparency spread quickly towards the centre of the stone and within 2 minutes one half the width of the stone was transparent (see Fig. 10), showing an extremely pale yellowish body colour. These changes were accompanied by the vigorous emission of tiny bubbles. After 15 minutes the transparent area extended across two thirds of the width of the stone, but the central turbid patch did not diminish further after 30 minutes immersion.

On removal from the chloroform the stone immediately regained a milky appearance, and the base seemed normal within 2 minutes, although it took 14 minutes to dissipate all traces of transparency from the curved top of the stone, the joints in the mosaic pattern being outlined in white at one stage during the drying out process. The original appearance of the stone was completely restored after evaporation of the chloroform.

The other synthetic opals examined also became transparent on immersion in chloroform, but the size and shape of the residual milky patch and the rate of change were somewhat variable. Black synthetic opals immediately lost iridescence on immersion followed by some loss of turbidity, and then appeared as sombre, dark brown, translucent cabochons sometimes with black spots or other markings. They quickly regained their beauty on removal from the chloroform.

The use of chloroform as an immersion liquid with similar refractive index to opal obviously helps to achieve transparency and it appears that the abundant pores of the synthetics rapidly fill with chloroform—the air being dispersed as bubbles. It would seem that the milky appearance of these opals is directly related to the high porosity, light being reflected or diffused at the surfaces of the minute pores.

For comparison, a series of both black and white natural opals was then immersed in chloroform. In general there was a slight loss of iridescence with an apparent increase in turbidity, and the margins of the stones were, of course, less well-defined when viewed in the chloroform. In the stones examined we saw no spread of transparency as seen in the synthetics and it would appear that in the stones tested the solvent penetrates to a more limited extent or not at all, indicating that the Gilson synthetics are more porous than their natural counterparts which were tested. The fact that the synthetics adhere to the tongue (indicating high porosity) whereas the natural stones tested did not, bears out the differences in porosity.

It is tempting to suggest that behaviour on immersion in chloroform is a useful guide in the testing for Gilson synthetics, but considerable caution should be exercised since chloroform is a very powerful solvent (and anaesthetic!) and could damage the cement of any doublet (its true nature possibly concealed by a setting) subjected to this treatment, and could carry any surface contaminant into the pores of the opals.

Summary

The following properties of Gilson synthetic opals appear to be worthy of note, and taken together should assist in their identification:

1. The stones show a broadly equidimensional mosaic viewed from above or below.
2. Many white synthetic opals show a pronounced columnar structure viewed from the side.
3. Some white synthetic opals show a distinct "dendritic" structure at higher magnifications by transmitted light.

4. By transmitted light the overall pale pinkish-buff matrix colour is interspersed by patches of pale pink, greenish-blue and yellow.
5. By transmitted light there is often a "dried leaves" effect caused by discontinuities between adjacent "grains".
6. In later black and white synthetic opals a "lizard skin" or "fish scale" effect is seen on magnification, both by transmitted and reflected light.
7. Many Gilson opals have high porosity and tend to absorb liquids rapidly, and in this connexion it has been noted that the synthetics tend to stick to the tongue, whereas many natural stones do not to the same extent.
8. Many Gilson opals become transparent on immersion in chloroform (and possibly other solvents also).

It is a pleasure to acknowledge the ready help and co-operation of our colleagues in the Institute and at the Gem Testing Laboratory during this work. We are particularly indebted also to Mr J. A. Fleming, Mr E. A. Thomson and to Mr M. O'Donoghue for the loan of specimens.

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ON GEM RHODONITE FROM MASSACHUSETTS, U.S.A.

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INTRODUCTION

Rhodonite, $MnSiO_3$, occurs as massive gem material, well suited to carving and the cutting of cabochons, at many places in the U.S.A. Foremost among these are the deposits of Rosamond, California, and Plainfield, Massachusetts. The present paper discusses the Massachusetts occurrence of this beautiful gem material.

Fine gem-quality rhodonite was discovered in Cummington, Massachusetts, about 1825, has been recovered from the area steadily for the last 150 years, and is still available at this writing. For early descriptions of the deposit, the reader is referred to the works of Hitchcock (1825) and Nash (1827).

LOCATION

The deposit is located in a small village, Plainfield (population 562), which snuggles in the gentle foothills of the Berkshire Hills of Hampshire County, in western Massachusetts. Plainfield is about 24 miles north-west of Northampton. The deposit is located on the property of the Betts family, and is known locally as the Betts manganese mine.

The rhodonite is found here at the contact of the Hawley and Savoy schists and has been recovered as a by-product of the bedrock mining of rhodochrosite and from glacially-distributed boulders strewn through the adjacent town of Cummington, where the material was first found in glacial boulders. The material, both in the boulders and at the outcrop, is black in surface colour due to oxidation of the manganese.

Kunz (1891) describes the removal of blocks of rhodonite weighing several hundred pounds each, which "were equal in quality and beauty to the Russian rhodonite."

The name rhodonite is from the Greek *rhodon* (ῥόδον), in allusion to its beautiful pink colour. Older specimens sometimes bear the local name "Cummingtonite," but this name should be dropped. Cummingtonite is a legitimate species name for a magnesium amphibole $(Mg,Fe)_7Si_8O_{22}(OH)_2$, first described from Cummington, Massachusetts, which is the type locality.

Mineralogy

The Plainfield rhodonite is intimately associated with quartz, rhodochrosite, kutnohorite, secondary manganese oxides (chiefly pyrolusite), and minor amounts of pyrite and galena. The black manganese oxides coat all natural exposures of the material and large boulders of rhodonite may have up to several inches of black-coloured material on the surfaces. The black areas run in veinlets throughout much of the pink rhodonite, giving a very pleasing visual effect and adding to the appeal of the material. Although this dense outer rind of black material appears to be a separate phase, it is, in fact, oxidized rhodonite and gives an x-ray powder pattern of rhodonite with no extraneous lines. Very thin black coatings of manganese oxides are usually found on the outermost surface of this black rhodonite.

The colour of the Plainfield rhodonite varies from a deep reddish pink to very light pink. More rarely encountered are zones of orangish material, which resemble the spessartine associated with rhodonites from Madagascar, but these are zones of orange rhodonite. The variation is noted above only for completeness. Actually, most Plainfield rhodonite is a very uniform pink colour. Also attractive are veins of rhodonite ($\sim 1{\cdot}0$ cm wide) in the surrounding quartz. White spots as irregular segregations are encountered but are not abundant in the material. The majority of these white areas are fine-grained kutnohorite, $Ca(Mn,Mg,Fe)(CO_3)_2$, and are easily distinguished from the white quartz by the inferior polishing hardness of the kutnohorite, which has a relatively dull lustre, both in rough and polished samples.

The texture of this rhodonite varies slightly. Most of the material is a dense intergrowth of microcrystals, but some less dense, friable material is also found. In general, the Plainfield material conforms to the observation of Sinkankas (1959) in that both the richness of colour and the transparency go hand-in-hand with the compactness of the material. The more friable rhodonite has a much lighter colour and a higher degree of opacity. Rhodonite is a very tough material, due to the intergrowth of microscopic crystals, and this high tenacity adds to the gem potential of the material. Due to this toughness (approaching that of jadeite in some samples), the Plainfield rhodonite lends itself well to carving. According to Kunz, some "polished specimens of thin-cut stones and a vase were shown in Tiffany's exhibition of gems at the Exposition in Paris" (Emerson, 1895, Pers. Comm. from Kunz).

TABLE I. ANALYSES OF RHODONITE

NMNH #	SiO_2	Al_2O_3	FeO**	MgO	CaO	ZnO	MnO	Total	Colour
67950–2	46·25	0·00	6·34	0·43	2·75	0·25	43·67	99·69	Light pink
67950–1	46·21	0·03	4·74	0·26	2·72	0·27	45·45	99·68	Light pink
121258	47·21	0·04	4·72	0·52	3·10	0·28	44·50	100·37	Light pink
103735	46·07	0·02	3·98	0·30	4·06	0·26	44·56	99·25	Pink
44774	46·22	0·01	3·90	0·28	4·23	0·19	44·26	99·09	Pink
45004	46·26	0·03	3·85	0·34	3·72	0·24	44·67	99·11	Pink
82439–1	45·98	0·01	3·45	0·23	3·55	0·22	45·55	98·99	Pink
132707	46·60	0·02	3·43	0·35	4·24	0·26	45·16	100·06	Light pink*
R14464	46·98	0·04	3·39	0·29	3·67	0·32	45·62	100·31	Pink
82439	45·36	1·88	2·93	0·26	3·72	0·24	44·84	99·23	Pink
105214	46·84	0·02	2·72	0·22	2·37	0·30	48·02	100·49	Light pink
105214	45·76	0·02	1·71	0·19	3·90	0·24	47·23	99·05	Orange
105214	47·04	0·03	1·67	0·14	4·07	0·20	46·93	100·08	Black
Theoretical	45·90						54·10	100·00	
Hermann (1849)***	48·91		tr	2·35	2·00		46·74	100·00	
Schlieper (1850)	51·21		4·34	tr	2·93		42·65	101·13	

Analyses accurate to ± 2% of the amount present.
All samples have less than 0·20 Na_2O and K_2O.
*—Partially decomposed.
**—Total iron calculated as FeO.
***—Calcium and magnesium values were accidentally reversed in Dana (1850).

Chemistry

Two previous analyses of the Plainfield rhodonite exist and are shown in Table I. Inasmuch as the analysis of Schlieper (1850) indicated iron was present, but Hermann (1849) found only a trace of iron and considerable magnesium, it was decided to analyse some samples of this gemmy rhodonite to determine the limits of variation in the composition.

Thirteen samples were analysed using an ARL-SEMQ electron microprobe utilizing an operating voltage of 15 kV and a beam current of 0·15 μA. Standards used were analysed rhodonites in the collection of the Smithsonian Institution. A tabulation of these analyses is given as Table I.

The compositional variation in Plainfield rhodonite is minor, with the major fluctuation being the amount of iron substituting for manganese. Iron varies from 1·67% to 6·34% FeO. In general, the colour of the pink rhodonite does not vary consistently with the iron content. Calcium substitution is limited and varies between 2·37% and 4·24% CaO. Those rhodonites with the lighter hues of pink do have a lower calcium content, but there is no firm evidence of relationships between colour and composition for this gem rhodonite. The analysis of Hermann (1849) is not representative of the Plainfield rhodonite. The presence of magnesium in his analysis suggests that there may have been admixed kutnohorite in his sample.

Not abundant, but occasionally encountered, are lenses within the rhodonite. They have a distinctly zoned structure; black to grey in the centre and surrounded by an orange phase. Both the black and the orange phases are rhodonite but do vary in composition from the common pink material. Both the black and orange zones of these lenses are relatively low in iron (1·67% and 1·71% respectively) when compared with the pink material. One sample with a lens as described above (# 105214) was analysed in the present study, and the analyses of the separate zones are given in Table I.

Summary

Rhodonite from Plainfield, Massachusetts, is a very beautiful ornamental gem material, with a relatively uniform colour. It is ideally suited to carving due to its toughness and is a superb cabochon material. The black veining provides a very attractive

contrast to the pink body-colour and heightens the visual appeal of the mineral.

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A NOTE ON THE OCCURRENCE OF EMERALD AT MAYFIELD FARM, FORT VICTORIA, RHODESIA*

By SUSAN ANDERSON, B.Sc., F.G.A.

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EMERALD is currently being produced from a new locality in Rhodesia. The beryl claims are situated in the north-west corner of Mayfield Farm, approximately 12 km north-east of the town of Fort Victoria. The Mayfield Beryl Block was first pegged and registered in 1970 and is now owned and operated by Callock (Pvt.) Limited, who kindly loaned the material discussed in this report.

Geology

The beryl at Mayfield was apparently formed in a hydrothermally emplaced glassy quartz reef that is conformable with the country rocks. Pale green euhedral beryl and kaolinized feldspar occur in the reef quartz. The material of gem interest is found in a rubble zone and the hanging and foot-wall ultramafic schists contacting the quartz. These country rock schists were formed by potassium metasomatism of serpentinite as a result of the hydro-

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thermal activity. On average the rocks contain 0·15% chromium and vary mineralogically from predominantly biotite-phlogopite schists to rocks that additionally contain tremolite, hornblende, talc and chlorite. Apart from outcrops of serpentinite and granite near the mine, exposure is poor, and is limited to the main open-cut and several trenches. The group as a whole is an ultramafic remnant of the Precambrian Basement Complex enveloped as inclusions in granite from which emanated the beryllium-bearing quartz vein material.

Mineralogy

Refractive index determinations were made by the oil immersion method in monochromatic sodium light using a Leitz-Jelly refractometer. The refractive indices are:

extraordinary ray—1·589 (±0·001)
ordinary ray—1·584 (±0·001)

Birefringence is 0·005.

Insufficient material was available for confident specific gravity determinations: however, one reading obtained using a pycnometer is 2·72.

Spectrographic analysis of the emerald shows:

Nickel %	*Chromium* %	*Copper* %	*Iron* %
0·02	0·20—0·25	0·02	0·5

(Analyst: I. H. Green)

No absorption spectrum was noted with a hand spectroscope, although strong bands centred at 5202, 5206 and 5208 ångströms, weaker bands at 5345, 5348 and 5409 ångströms and a strong band at 4289 ångströms were present on the large quartz emission spectrograph.

The emerald shows marked pleochroism, the colour-change being:

extraordinary ray—blue/green
ordinary ray—yellow/green.

Colour-banding is present, the zones being parallel to the basal plane.

INCLUSIONS

Mineral inclusions are rare, and in the specimens examined only small groups of phlogopite platelets were noted. These averaged 0·15 mm in diameter and are presumably of protogenetic origin. In contrast, liquid inclusions are common and may be distinguished on the basis of the containing-cavities into three types:

(*a*) Minute rounded or drop-shaped cavities that occur in linear trails and dense aggregations giving the beryl a "peppered" appearance. These aggregations are formed into twisted planes randomly orientated, and at low magnifications they appear to be particles of an opaque mineral. The average size of these cavities is 0·02 mm, and, in addition to containing liquid, each has a gas bubble.

(*b*) Tubular cavities or negative crystals aligned parallel to the vertical crystallographic axis are also present. Some examples are more than 1 mm long, and, in most, an elliptical gas bubble is present. Some tubular cavities are stained with iron-oxide, and in others a brown mica with spherulitic habit is present.

(*c*) Other cavities with variable shape in section are present. Some polygonal ones may be square, rectangular or triangular, whilst others are rounded or tadpole-shaped. These cavities invariably contain a gas bubble, spherical in form, and, in some, a mineral inclusion as well. The alignment of these cavities is variable, but crystallographically controlled.

These liquid-filled cavities with a gas inclusion—two-phase inclusions—are characteristic, and, in combination with optical constants, may serve to distinguish the Mayfield emerald from material originating elsewhere.

IMPROVED U.V. TECHNIQUE FOR DETECTION OF "SUSPECT" STONES

By T. F. ZOOK, M.A., F.G A.

EXPERIMENTATION has shown that the following technique which was developed using U.V. light can aid the gemmologist in detecting "suspect" stones from among those which react to irradiation with ultra violet light. An electric long- and short-wave *Mineralight Ultra-Violet Lamp* which was supported in a metal stand (and thus converted to appear similar to a desk lamp) was used to perform the tests in a room devoid of all other light than that from the U.V. source. The U.V. lamp transmitted long wave at 365 millimicrons or short wave at 254 millimicrons. Room temperature at the time of the experiments was in the region of 70°F or 21°C. The base of the lamp-stand was covered by a piece of black non-reflective paper for the first step, and in the second step a 72mm by 55mm mirror (whose layer of "silver" lay 2mm below the top surface of the mirror) was placed over the black paper to provide a reflective surface.

In *Step Number 1*, the stone to be tested was held in tweezers with the culet pointing up toward the U.V. light source and was held at a distance from that light of about two inches or 5 centimetres. First long-wave irradiation was used and then short-wave irradiation was tried. If the stone fluoresced, the extent and the colour of the reaction were noted. Paste imitation stones usually betrayed their presence by showing a pavilion which appeared to have a dark cone covered by an etched or frosted surface. Synthetic spinels tested also responded to U.V. light with a brightly coloured fluorescent ring in the girdle area and with a dark pavilion—a reaction akin to that of imitation paste stones except that the spinels showed a much lighter frosted surface over a dark pavilion, particularly under short-wave U.V. light. Synthetic corundums and YAGs which reacted to U.V. irradiation in this step showed a dark cone in the pavilion area over which there appeared to be a transparent glassy glaze, again surrounded by a brightly coloured fluorescent ring in the girdle area. Some composite stones also betrayed their presence by one or the other of the above reactions (depending upon whether the pavilion was a paste or a synthetic material). The above reactions were accepted only as indicators of composition and were not taken as conclusive evidence. It was found that stones of

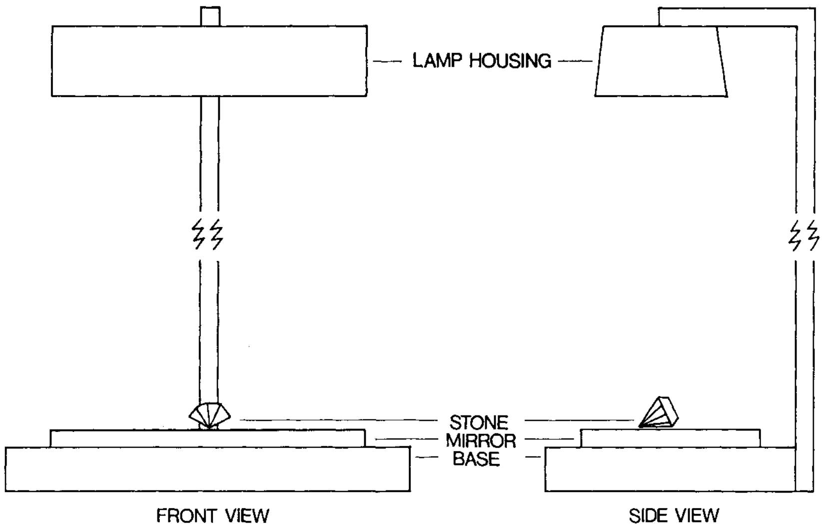

FIG. 1. Diagrams (not to scale) to show position of stone on mirror in Step No. 2.

a natural origin, which were either heavily included, or which had large inclusions or which had colour-zoning, also often appeared to have a darkening in the pavilion area due to a differential U.V. irradiation reaction from that of the host stone.[1]

In *Step Number 2*, the unmounted stone was placed on the mirror surface in such a way that it rested on part of its girdle edge (see Fig. 1). Tweezers were used to nudge it so that it revolved slowly around its complete perimeter, and while this was happening the mirror image was constantly checked by the observer from a distance of 4 to 8 inches (10–20 cm) from the stone and on an oblique angle of 40 to 60 degrees above the horizontal desk surface. Both long- and short-wave U.V. light were used. The mirror image clearly revealed the areas which were fluorescent and those which were non-responsive or inert.[2] A fluorescent ring around the girdle area with a dark pavilion was a "suspect" stone. Likewise a bright fluorescent area within a stone which appeared inert was a warning signal of a possible composite stone in which the cement was fluorescing. Any image reflected which showed a different reaction to U.V. light within different areas of the stone became a "suspect" stone.

At the conclusion of both steps 1 and 2, either a decision was made to subject the "suspect" stones to further tests or in the case of stones under consideration for purchase the stone was closely examined by either a 10 × loupe or the microscope to determine whether it had inclusions or colour-zoning which may have caused it to react differentially within itself to U.V. radiation. Since this technique takes but a short time to complete, and since it effectively alerts the gemmologist to "suspect" stones, it can be a good preliminary tool. However, caution must be used during its performance not to work with the hand under the lamp and never to look directly into the U.V. lamp itself.[3] In the case of composite stones[4] which are colourless, or which are red, it is a distinct aid to the investigator who finds it difficult to detect a composite red or colourless stone by differences in lustre and alerts the investigator to the necessity of further careful testing.

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2. In *Step Number 2,* positioning of the gemstone on the mirror permits observation of the luminescent pattern in two aspects: one in the direct view, and the other by its reflection in the mirror. Experience has shown that the latter view is most revealing with respect to the detection of a composite, synthetic or paste nature of a stone.

3. Tweezers and not the hand should be used for work under the U.V. lamp because of reactions in the skin: see Wurtman, Richard J., *Scientific American.* 1975, 233 (1), 69-74, The Effects of Light on the Human Body.

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Gemmological Abstracts

ALEXANDER (A. E.). *The jewels of Fortunato Pio Castellani and Carlo Giuliano.* Gems & Gemology, 1975, XV, 2, 50-56. 6 illus.

Discusses some of the pieces of jewellery produced by these two Italian goldsmiths. 18 pieces made by Giuliano are described and 12 made by Castellani. Some personal details of these two artist-craftsmen are given.

R.W.

BALL (R. A.). *Opal from Coolgardie, Western Australia.* Australian Gemmologist, 1975, 12, 6, 171-173. 3 illus.

A report on the opal found at Coolgardie in Western Australia. The occurrence is in a network of veins in Precambrian sediments, both precious opal and potch being found in the cobweb-like network of veins, usually of very small width. Some five specimens were examined by the scanning electron microscope, one specimen of which consisted of a quartz crystal coated with iridescent opal. The occurrence appears to have little commercial significance.

R.W.

BALL (R. A.) and CLAYTON (N.). *Opal references and abstracts.* Australian Gemmologist, 1975, 12, 6, 181-189. 1 map.

A very useful compilation of references to the literature on opal. These are set out in sections, such as "Occurrence", which is further sub-divided into countries; Formation; Structure; Synthetic Opal; Treated Opal, etc. Each section is prefaced by a survey which is of importance in itself.

R.W.

BOSCH-FIGUEROA (J. M.), and MONÉS ROBERDEAU (Y. L.). *Processo de la talla brillante del diamante: clasificación e importancia de la calidad de talla en el brillante.* (The process of cutting a diamond as a brilliant: classification and importance of the quality of cutting in a brilliant.) Gemologia, 1975, 5, 19/20, 15-33.

A description of the diamond-polishing process with photographs and diagrams illustrating ideal proportions.

M.O'D.

BOSCH-FIGUEROA (J. M.) and MONÉS ROBERDEAU (Y. L.). *El color de las gemas.* (Gemstone coloration). Gemologia, 1975, 5, 19/20, 35-41.

A general survey dealing chiefly with the role played by the transition elements in the coloration of gemstones.

M.O'D.

CASSEDANNE (J. P.) and (J. O.). *L'opale verte de la fazenda brejinho (Brésil).* (Green opal of Fazenda Brejinho, Brazil.) Bulletin de l'Association Française de Gemmologie, 1975, 45, 6-7.

A green opal with a S.G. of 2.07, hardness of 5½ and R.I. of 1.450, which is neither fluorescent nor radioactive, has been found in the south of the state of

Bahia. The green opal fills fissures in a chalcedony and forms veins which turn at times into larger blocks. The colour resembles that of peridot.

M.O'D.

CROWNINGSHIELD (R.). *Developments and highlights at GIA's Lab in New York.* Gems & Gemology, 1975, XV, 2, 57-62. 12 illus.

A number of diamonds are mentioned, including a "chameleon" stone, a diamond which had been badly burnt during repair and a diamond which contained a patch of stocky needles running in one direction. There is a discussion on the electro-conductivity of some diamonds particularly with respect to any semi-conducting diamonds which were subsequently treated. The durability of G.G.G. stones was the subject of experiment and there is a considerable write-up on "mood stones". There is a report on a new gem material from the U.S.S.R. This is a rock-like material which has a violet coloured part said to be the new mineral canasite (or *kanasite* according to Min. Abs.). Some information is given on "Imori stone" ("meta jade").

R.W.

LIDDICOAT (R. T.). *Developments and highlights at GIA's Lab in Los Angeles.* Gems & Gemology, 1975, XV, 2, 44-49. 15 illus.

An unusual faceted tablet was found to have a central hexagonal crystal of sapphire surrounded by pinite. A number of articles of "scrimshaw" on whale teeth are illustrated. The teeth are coarse ivory. A difference in quality of polish of a diamond on each side of a twin plane was ascribed to poor polishing. A large spinel inclusion in a spinel, an unusual large synthetic pink sapphire, an unusual black diamond and a hornbill snuff bottle are other items mentioned.

R.W.

LÓPEZ-SOLER (M.), VENDRELL-SAZ (M.) and BOSCH-FIGUEROA (J. M.). *Medición de la refringencia de las gemas.* (Measurement of gemstone birefringence.) Gemologia, 1975, 5, 19/20, 7-12.

Methods described include the use of a polarizing microscope, immersion techniques and that of the measurement of minimum deviation.

M.O'D.

MACFALL (R. P.). *The story beyond the story of the great tourmaline discovery.* Lapidary Journal, 1975, 29, 5, 994-1001.

Tourmaline has been found at the Dunton Mine, Plumbago Mountain, near Newry, Maine, U.S.A., in the celebrated pegmatite area of Oxford County. Some stones of high quality, including one green specimen measuring $10'' \times 4''$ have been recovered, and a regular supply to lapidaries has been maintained.

M.O'D.

MUMME (I. A.). *Rocks, gems and minerals of Olary.* Australian Gemmologist, 1975, 12, 6, 173-178. 1 map.

A very well-written report on the minerals found in this area, which stretches from the Peterborough district of South Australia to Broken Hill in New South

Wales. The article mostly details the occurrence of gold and other economic minerals. There is much interesting information on the recovery of uranium deposits found in the Olary, and the geology of the area is also discussed. The gem materials discussed seem to be only suitable for cutting into cabochons, and such are andalusite, chiastolite, beryl, feldspar, cornelian, chrysocolla and haematite. Some quartz in the yellow and brown varities, citrine and cairngorm, and some epidote are suitable for faceting.

R.W.

NASSAU (K.). *The origins of color in gems and minerals (Part 3).* Gems & Gemology, 1975, XV, 2, 34-43. 7 illus. and 2 tables.

This part of the series concludes the valuable and authoritative article on colour. The text covers the "band theory" which is well explained, and refers also to semi-conductors. Much is told about Type Ia and Ib diamonds as well as Type IIb where the cause of semi-conduction and the blue colour of such diamonds are explained. The concluding sections of this important series of articles refer to colour produced by dispersion, scattering, interference and diffraction.

R.W.

REAM (L.). *Nephrite in Washington.* Lapidary Journal, 1975, 29, 9, 1748-57.

Nephrite deposits have been found in the serpentinites of Washington state and in particular from alluvial deposits in Snohomish and Skagit counties. Much of the nephrite is not good quality and most has a grey tinge.

M.O'D.

SCAVIA (F. M.). *Cenni di propedeutica alla gemmologia.* (Notes for an introductory course in gemmology). L'orafo italiano, August 1975, 48-50; Sept. 1975, 90-92.

The first article covers birefringence and optic sign, the second dispersion.

M.O'D.

SCHUBNEL (H. -J.). *Excursion à la mine de saphir de Bo-phloï, Thailande.* (Visit to the sapphire mine of Bo-Phloï, Thailand). Bulletin de l'Association Française de Gemmologie, 1975, 45, 8-10.

The mine is situated north of Kanchanaburi, which is about 170km from Bangkok. Pits are dug to recover the sapphire which is associated with black spinel and some of the colour is good. Most is cut locally or in Bangkok.

M.O'D.

SKALICHY (J.). *The Czechoslovak moldavites.* Lapidary Journal, 1975, 29, 8, 1560-62.

Moldavites occur in two parts of Czechoslovakia, in the area of České Budějovice in southern Bohemia and in the Trebic area of Moravia. Some bicoloured specimens exist, but in general the colour is deep green from Bohemia and a brownish-green from Moravia.

M.O'D.

TOMBS (G. A.). *Notes on identification of Gilson synthetic opals.* Australian Gemmologist, 1975, 12, 6, 179-180. 3 illus.

The author gives the findings of his examination of the Gilson synthetic opal, which may be of assistance in distinguishing the natural opal from the synthetic stone. Natural opal may or may not fluoresce under long-wave ultra-violet light, but if it does fluoresce, usually in a cream or white colour, it will also phosphoresce for some seconds. The synthetic opal was found not to fluoresce under long-wave ultra-violet light, but under short-wave ultra-violet rays fluoresced a dusty green with only a short phosphorescence of about a half second. The synthetic opal showed high transparency and a pattern of colour stacking is visable which forms "chimneys" which are so rarely seen in natural opal. Under the microscope at 60 times magnification the colour zones were seen to be a series of distinct hexagons. Examination of the colour patches of both natural and synthetic opals showed zonal type colour stripes in the synthetic stone not present in the natural stone. It is unfortunate that the text does not make this quite clear and does not quite agree with the illustrations.

R.W.

WEBSTER (R.). *More notes on turquoise.* Lapidary Journal, 1975, 29, 8, 1428-1456.
Covers synthetic turquoise, Eilat stone and faustite.

M.O'D.

ZEITNER (J. C.). *The legend and lore of turquoise.* Lapidary Journal, 1975, 29, 8, 1430-1450.

An account of the derivation of the various names used for turquoise and of the legends associated with it from the earliest times. Illustrated in colour.

M.O'D.

BOOK REVIEWS

ANDERSON (B. W.). *Gemstones for Everyman.* Faber and Faber Ltd. 1976. pp. 368. Illustrated in black-and-white and in colour. £15·00.

Another book from the pen of B. W. Anderson can scarcely fail to be important. "Gemstones for Everyman", in spite of being intended for a wider public than that provided by the gem trade, is gemmologically both important and valuable. It is over thirty years since this author's first book, "Gem Testing", appeared, although that can scarcely be regarded as a single work, having run through eight editions (a ninth is even now in preparation) and grown, with much revision, addition and re-writing, from a modest and slender volume to a substantial tome which has been a standard work for many years.

With "Everyman" in mind the present book simplifies the scientific approach considerably. Instruments other than lens and colour filter are described with no attempt to involve the reader in their construction or in the theoretical optics behind their working.

Crystallography is discussed quite briefly and the cubic system is used to explain the bare essentials of crystal morphology. No gemmological textbook deals with more than very elementary crystallography, and it has been, I think, somewhat difficult to draw the line even closer in this book. Axial definitions of the other six systems are given, but that for the monoclinic system is inaccurate and revives one which the reviewer battled for years to have eliminated in another well-known textbook.

The author was, for 46 years, Director of the "Hatton Garden Gem Testing Laboratory". He uses this name in preference to the more cumbersome official name. This was the first full-time laboratory anywhere specifically engaged solely in gem-testing and Anderson was almost certainly the first full-time gemmologist. Gemmology as we know it today is very largely based on his personal work over the years and such things as the 1.81 liquid, absorption spectroscopy as applied to gems, the crossed filter technique, immersion contrast photography and a host of other testing methods have resulted directly from his investigations. With others he has explored new gem problems and constantly surmounted the apparently insurmountable. With such a fund of gemmological "know-how" on which to draw one is left wondering how the writer decided what to leave out.

In spite of the broad aims of the book the text on individual gem species, arranged for the most part in a very practical order of comparative hardness, is crammed with extremely valuable information and is perhaps even more useful to the serious gemmologist than to the layman.

Personally I take pleasure in the fact that this is a "book-sized" book. Far too many publications of recent years are in a larger and often unconventional format and apparently intended to lie carelessly on coffee tables as evidence of the erudition of their owners. A book intended to be read and re-read should, in my opinion, fit comfortably into a bookcase without requiring a major disruption of shelves to accommodate it.

The 17 colour plates are mostly of outstandingly fine specimens in the collection of the Geological Museum, plus one or two fine stones belonging to the author and his wife. They are from fine transparencies prepared by E. A. Jobbins and J. Martin Pulsford of the Institute of Geological Sciences. Reproduction is good, but the colour printing process cannot capture the full effect of the original photograph. Black-and-white plates have less impact but are well produced.

A black-and-white drawing of the absorption spectrum of a (Burmese?) zircon needs some indication of colour, or at least of which end is which. A line diagram of four different faceted cuts has its captions in reverse order to the drawings. The text refers to line drawings of right- and left-handed quartz crystals when only right-handed is actually shown. These could be confusing to the layman. A glossary definition of Ångstrom Unit, given quite correctly in another form in the text, is given as "1 ten-millionth of a metre", instead of "-millimetre". An effort was made to correct this by telephone but, between the knowledgeable author in Devon and the less informed publisher's staff in

London, the correction was not made. I feel that Post Office telecommunications could take some of the blame for this.

In the case of sapphires and some other stones the author has rather unwisely quoted prices. Even accurate figures quoted in times of economic stability can rapidly date a book. In times of rampant inflation values quoted can be wildly out long before the book is in print. In the present work such figures can be taken only as broad indications of trend and not as valid values.

Seen from a gemmological viewpoint this is a valuable contribution to the current literature and well worth a place on every gemmological bookshelf. It is more difficult for me to assess it from the point of view of the layman. But the explicit and careful writing, so characteristic of this author, seems to me to result in a book which is both interesting and intelligible enough to live up to its title.

R.K.M.

AREM (Joel E.). *Gems and Jewelry.* Bantam Books, New York, 1975. pp. 159. Illustrated in colour. $1·95.

A very simple but lucid introduction to gemstones with (on the whole) adequate coloured illustrations, at least for this price range of book. The photographs of synthetics are particularly good; many of the specimens are from the Smithsonian Institution. A longer bibliography would have been useful, especially in so short a book. Some of the captions seem odd, particularly that describing a stone purporting to be chrome fluorite and another which mis-spells Malagasy.

M.O'D.

AREM (Joel E.). *Rocks and Minerals.* Bantam Books, New York, 1973. pp. 145. Illustrated in colour. $1·95.

A well-illustrated guide in simple terms outlining mineralogy. The information on simple crystallography is well presented and most of the book describes the better-known minerals and rocks.

M.O'D.

DRAGSTED (Ove). *Gems and Jewellery in Colour.* Blandford Press, Poole, 1975. pp. 232. Illustrated in black-and-white and in colour. £3·25.

In the course of his brief introduction, Mr Dragsted writes: "Like the craftsmen of ancient cultures, contemporary jewellers create ornaments from snail-shells and fossils, from wood and fruits, and they set conventional stones in imaginative, new, and sophisticated ways." And it is this very wide acceptance of what constitutes a gem material that sets this little book apart from any other, though, as may be seen below, it contains many other original features.

The book opens with a series of short introductory chapters. Most of these are too brief to be of much consequence, but the section on crystals includes a useful series of drawings of the idealized forms shown by crystals of the various systems, and the "Gem Trade" chapter has similar drawings of the different styles of cutting and of the most commonly used settings.

Then come the coloured plates, which occupy nearly a hundred pages, and upon which the popularity of the book must chiefly depend. The plates are from a series of coloured drawings by Otto Frello, of which there are no fewer than 820 shown. To assemble all the necessary materials and to make the drawings constitute a major piece of work. The aim has been where possible to show the rough gem material, the cut and polished version of this, and finally the gem set in some form of jewellery. Amorphous materials are dealt with first, then cubic, tetragonal, hexagonal, trigonal, orthorhombic, monoclinic and triclinic stones. A final series is shown of synthetic gem materials. Each of these drawings is numbered and a key printed on the same page. The remainder of the book is taken up with extended descriptions of the stones and other gems shown in the plates.

To modern eyes, which by now have become accustomed to the very accurate representations of gemstones made possible by colour photography, these plates appear rather crude, and the crowded assemblage of a number of stones and jewels on the same page gives a somewhat jumbled effect. As is always the case with drawings of gemstones, the opaque materials are represented more realistically than the transparent, faceted gems. But the vast range of materials covered by the plates is certainly impressive, and one can agree at once with the author's contention that so varied a collection can be found in no other book, however large.

In the non-crystalline and organic section we get not only the expected pearls, coral, amber, ivory, tortoiseshell and so on, but shells, beetles, fossils, and a substance quite new to the reviewer called bezoar. This is a stony concretion found in the stomach or intestines of the bezoar goat, and though quite unattractive was apparently often mounted in the form of an expensive jewel in the Middle Ages because of its high reputation as an antidote to poisons and even the plague. When it comes to the crystalline gems, all the minerals which have been used as gems or even occasionally faceted by ardent amateur lapidaries are included. It was somewhat startling to see three cut specimens of painite depicted: one was aware of no record that any cut stones have been fashioned from this rarest of Burma minerals.

The descriptions of the stones and other materials shown on the plates, which occupy the last eighty pages of the book, contain a large amount of interesting detail with a slant reflecting the historical and antiquarian interests of the distinguished author. A curious but obviously intended omission in these descriptions is any reference to the physical properties (hardness, density, refractive index) of the materials, though methods of measuring these had been briefly described in Chapter 10 under "Identification of Gems." Inclusion of such data would occupy very little space and could hardly offend the eye of the non-scientific collector, while it would add considerably to the value of the book as a guide. This would be particularly helpful in the case of the out-of-the-way minerals which are not included in any standard work on gemstones.

Very few errors or misprints were noticed: in future editions, "trigonal" should replace "tetragonal" at the bottom of page 18, and the oxygen and hydrogen inlets should be reversed in the drawing of the Verneuil furnace on page 220.

B.W.A.

FERNIE (W. T.). *The occult and curative powers of precious stones.* Rudolf Steiner Publications, Blauvelt, New York, 1973. pp. 486. $3·95.

A reissue of the text first published in 1907 under the title Precious stones: for curative wear, etc.

M.O'D.

GÜBELIN (E. J.). *The colour treasury of gemstones.* Elsevier-Phaidon, London, 1975. pp. 137. Illustrated in colour. £4·50.

This is a translation of "Edelsteine" by the same author, published in German, French* and Italian in 1969. It covers the more important commercial stones and each coloured plate, of very high quality, includes both mounted and unmounted specimens, some of the latter in their rough state. There is quite a lot of information on mining techniques and some of these are illustrated. Details of the stones are confined to general scientific points only—this is not a textbook, but one designed to please, as the lyric style suggests. There is a glossary in which a large number of technical terms are explained. A most pleasing book.

M.O'D.

LIDDICOAT (Richard T.). *Handbook of gem identification.* 10th edn. G.I.A., Los Angeles, 1975. pp. xv, 440. Illustrated in black-and-white. Price on application.

The latest edition of this standard and justly celebrated work includes new materials in the synthetic field, including Gilson opal and stones subjected to gamma-ray irradiation. The preface suggests that a new synthetic alexandrite made by the pulling method may soon appear, though the reviewer has not yet seen it. GGG and other fairly new materials are included in the various tables which are so useful a feature of this first-class book.

M.O'D.

PAPE (Hansgeorg). *Leitfaden zur Gesteinsbestimmung.* (Guide to stone testing). 3rd edn. Ferdinand Enke Verlag, Stuttgart, 1975. pp. 152. Illustrations in the text. DM 11.80.

A useful pocket-sized guide to the finding of minerals. Only the commoner species are included; there is a short bibliography.

M.O'D.

PURTELL (Joseph). *The Tiffany touch.* Pocket Books, New York, 1973. pp. 390. Black-and-white illustrations. $1·50.

A lightly-written history of the celebrated firm of New York jewellers—especially interesting on the history of design in the nineteenth and early twentieth centuries.

M.O'D.

RANSOM (Jay Ellis). *Gems and minerals of America.* Harper & Row, New York, 1974. pp. xxiii, 705. Illustrated in black-and-white and in colour. $17·50.

By "America" the author means "the United States", and at first sight this would seem to be a most useful guide to gemstone localities, since they are arranged alphabetically under state and county. This section appears to be correct, but some of the other matter needs revision. The cause of the play of colour in precious opal is stated to be due to interference of light from cracks within the stone: corundum is seldom found in scalenohedral form: and Professor Strunz's first name is Hugo, not James. Mineralogical Record is missing from the bibliography, as is Webster's "Gems". The colour plates are quite wretched.

*Reviewed in J. Gemm., 1970, XII (3), 91.—Ed.

A disappointing book, though a careful revision would work wonders. The sections on conservation and lapidary say nothing that has not been said—frequently—before.

M.O'D.

RODGERS (Peter R.). *Agate collecting in Britian.* B. T. Batsford, London, 1975. pp. 96. Illustrated in black-and-white and in colour. £4·95.

The price of this small book is not in keeping with its standard of production, which is indifferent; there is insufficient differentiation between the specimens illustrated in colour, and those shown in black-and-white are not really very clear. The introduction is carelessly written (or derived); the statement that agate cannot be marked with a file will surely lead many collectors astray, and emerald is not the rarest of gemstones. The notes on quartz are also not very clear, and the termination of a quartz crystal shows rhombohedral, not pyramidal form. I was also surprised to see amethyst classed as coarsely crystalline. The note on the colour of opal is rubbish; the author must surely have access to up-to-date textbooks, most of which carry correct statements on this phenomenon. In the tables at the end of the book some lapidary societies are incorrectly named and those beginning with the definite article are amusingly listed alphabetically under the letter T: this is scarcely flattering to the potential reader. Points in favour include the provision of O.S. map references for localities and the maps in the text.

M.O'D.

SCARFE (H.). *The lapidary manual.* Batsford, London, 1975. pp. 172. Illustrated in black-and-white and in colour. £5·50.

Quite a well-written and certainly a well-illustrated book—the colour plates depict specimens from the collections of the Geological Museum in London. The bibliography is perversely arranged in alphabetical order of titles. In other respects the book is similar to many others on the market.

M.O'D.

WEBSTER (Robert). *Gems in Jewellery.* NAG Press Ltd, London, 1975. pp. viii, 136. 35 black-and-white and 6 coloured photographs. £3·90.

Gemmologists throughout the world have long known the late Robert Webster (whose death is reported on another page) as an indefatigable worker: many of them cut their gemmological teeth on his "Practical Gemmology" (now in its 5th edition) and his "Gemmologist's Compendium" (also now in its 5th), and to-day when in need refer to his monumental "Gems", meanwhile being kept up to date by articles from his pen in this *Journal*, *Gems & Gemology* and elsewhere. In 1975 he not only produced the third edition of "Gems" (and no doubt was already collecting additional material for the fourth!) but also found time to offer this wholly new work, which is addressed to a slightly different public. It is intended as a book not for the specialist but for the general reader who is interested in jewellery. It is not, however, a book about jewellery. The information conveyed by book-titles, as by newspaper headlines, is limited by the need for compression, and in this case the title is elliptical and might be more fully expressed as "Gems [normally to be seen] in Jewellery": there is no discussion of jewellery as such—though there are seven photographs of interesting pieces—but all the gem-materials commonly met with in jewellery are described—their appearance, properties, provenance, treatment (cutting, polishing, heating, staining, etc.) up to but not including setting. Rarities like taaffeite and painite and minerals which are cut and polished only for collectors are quite rightly omitted, but a number of not-so-usual stones are covered by a chapter on "Some lesser-known gemstones."

The book consists of twenty chapters dealing with individual gem-materials—from diamond (two chapters) through ruby and sapphire (one), the beryls (one), and other gemstones grouped together in chapters, to pearl (one), cultured pearl (one) and organic gems (one), including one chapter on ornamental stones and one on synthetics. These are followed by a short chapter on testing methods, tables of physical features of stones classified by colour (10pp.), a page of "wedding anniversaries" ("silver wedding", "diamond wedding", etc.—many of the earlier ones having no connexion with jewellery), the NAG list of birthstones and colours, a short list of books for further reading and an index.

As I wrote in reviewing the first edition of "Gems" nearly fourteen years ago, it is the business of the critic to criticize. The publishers' blurb says that the text is "absolutely authoritative in the facts provided", but, while nobody would dispute that, *quandoque bonus dormitat Homerus*—even Mr Webster sometimes had a lapse! I was surprised to find Alexander II (born in 1818, the eponym of alexandrite and assassinated in St Petersburg in 1881) described as the last of the Russian Tsars and murdered at Ekaterinburg, for Mr Webster must have remembered as well as I do the shocking news of the massacre of Nicholas II and the Imperial Family in 1917: and I cannot accept the statement (p. 25) that aquamarine shows *blue* through the Chelsea filter! The chapter sub-headings ("The Garnets: *they are not always red*") coupled with unhelpful quotations ("*Red hyacinths of antiquity. Rev. C. W. King. 'Antique Gems'* ") seem sadly out of character, and there are many misprints and mis-spellings which proper proof-reading should have eliminated—mostly not affecting the sense, though the printing of "Andamooka" for "Amberooka" (p. 58) and of part of the table of green stones on the wrong page (p. 128) as a continuation of the table of red and pink stones may well cause some confusion. The colour photographs are not satisfactory: although opals—surprisingly—are quite well shown, the diamonds are very poor—more dark than bright: almandine, hessonite, rhodolite and spessartine all look the same colour, and the star-garnet is near-black with two white spots but no star, and the hiddenites are not green! As already mentioned, Mr Webster's previous books have all run into numerous editions, and I see no reason why with proper corrections this one should not follow suit: these criticisms are offered in the hope that they may be of some assistance in preparing a second edition.

In general, this is a nicely produced and attractive volume, and, for these inflationary days, not unreasonably priced.

J.R.H.C.

ASSOCIATION NOTICES

OBITUARY

GEORG O. WILD

On 23rd November, 1975, one of the world's outstanding gemmologists, Georg O. Wild, died suddenly at his home in Idar. He was born in January, 1894, and was thus approaching his eighty-second birthday. After his schooling in Idar he was sent to New York at the early age of fifteen to continue his education, and eventually was able to earn his living as a dealer in precious stones both in New York and in Idar. As a young man he also travelled widely, visiting most of the major gem deposits, and eventually acquired a knowledge of gemstones in all their practical aspects more intimate and profound than that of most academically trained scientists.

Though Wild was a dealer all his life, he was endowed with a curiosity which was essentially scientific. He established a small research laboratory in Idar, and there, working either alone or in collaboration with friends who were trained scientists, he tackled various problems in gemmology which interested him, his chief preoccupation for many years being the cause of colour in gemstones.

The earliest of his papers on this subject was published in the *Zentralblatt für Mineralogie* in 1922, his collaborator being R. E. Liesegang, who became famous for his theories on the growth of agate, and after whom a street is named in Idar town. Nine years later (August 1931) the very first issue of the British journal, *The Gemmologist*, contained an article by G. O. Wild on "The colour of precious stones", which was soon to be followed by others on the same topic and later by papers on other aspects of our science. His upbringing enabled him to speak and write excellent English, which helped him to become good friends with fellow enthusiasts in Britain. Our mutual appreciation of each other's work was also helped by the fact that, partly due to financial stringency and partly to a natural austerity of outlook, we each preferred to use the simplest forms of apparatus, often improvised, with which to carry out our investigations. The quartz spectrograph, for instance, with which Wild and his co-workers carried out their search for trace-elements influencing colour, was a very small and simple affair.

This propensity for simple and improvised testing methods remained with Wild all his life. His delightful and original short book "*Praktikum der Edelsteinkunde*" (1936) was followed fourteen years later by a slim paper-backed volume, written with K. H. Biegel, with a long explanatory title which in English would read "Small signposts for the identification of gemstones by the simplest means."

In 1932, Georg Wild furthered the cause of gemmology in his native Idar by founding the German Gemmological Association (Gesellschaft für Edelsteinkunde), which was thus one of the earliest of such national Associations to be formed. His skill as an artist-craftsman should also not be forgotten. Following the Fabergé tradition, but in a more realistic fashion, he produced delightful carvings of animals and birds from pieces of rough ornamental stones, exploiting their colour-variations and characteristic markings to very happy effect.

All told, Wild published nearly one hundred scientific papers. These were for the most part quite short, reflecting the laconic nature of his conversation; but each one was apt to contain some really original observation which became before long embodied in our growing science.

In commemoration of his 75th birthday in 1969, the Deutsche Gemmologische Gesellschaft paid Georg Wild a truly remarkable compliment in the preparation of a special issue of their *Zeitschrift* in his honour. This contained articles and tributes from all quarters of the globe, and apart from these a list of more than four hundred names of individuals or Societies who sent congratulatory messages. It is doubtful whether any other gemmologist could call forth such an amazing display of affection and respect. It is sad that our present tribute must be paid, not to the living, but to the dead.

B. W. A.

It is with great regret that we announce the death of Mr Robert Webster on 22nd February, 1976, in his 77th year. A full obituary notice will appear in the July *Journal.*

GIFTS TO THE ASSOCIATION

The Council of the Association is grateful to the following for their gifts:

Mr John R. Fuhrbach, F.G.A., G.G., of Amarillo, U.S.A., for an oval cabochon of golden coral from Maui, Hawaii, U.S.A., "deep water" location.

Mr and Mrs Kennedy, of Charlotte, N. Carolina, for a collection of green spodumene crystals from Alexander County, N. Carolina.

Mr Arthur Kermeth, F.G.A., of Sutton, for specimens of crystals including topaz, emerald, ruby, quartz, red and green tourmaline and zoisite.

Mr Albert Ruppenthal for a copy of his book "Edle Stein und Mineralien."

MEMBERS' MEETINGS

London

A meeting of members was held at Goldsmiths' Hall on Tuesday, 10th February, 1976, when two films were shown. One was entitled "Arum" and included many fine examples of the goldsmith's craft throughout the ages and also dealt with the mining and refining of gold. The second film had been sponsored by the State Gem Corporation of Sri Lanka and was called the "Island of Gems". There were some excellent aerial views of the countryside where gemstones are found and the film covered the recovery of gems from alluvial sources as well as methods of mining.

Midlands Branch

Mr James Parke, ex-President of the Mid-Warwickshire Antique Collectors Circle, gave a lecture on antiques on the 14th January, 1976, at the Auctioneers' Institute, Birmingham.

North-West Branch

The official inaugural meeting of the North-West Branch was held on the 4th February, 1976, at the Royal Institution, Liverpool. The guest speaker was Mr B. W. Anderson, B.Sc., F.G.A., who gave a talk on the Recollections of a Veteran Gemmologist.

Scottish Branch

On the 13th February, 1976, at the North British Hotel, Edinburgh, a talk was given by Mr E. A. Jobbins, B.Sc., F.G.A., of the Institute of Geological Sciences, South Kensington, entitled "Gem Surveys in Brazil and Guyana." This extensively illustrated lecture described the search for diamond, opal, amethyst and rutile in Piaui State, Brazil, also for agate and jasper in Guyana, and the setting up of a lapidary training scheme in Georgetown. Other aspects of the local natural history were also considered.

PRESENTATION OF AWARDS

The Annual Reunion and Presentation of Awards was held at Goldsmiths' Hall on 17th November, when the Chairman, Mr Norman Harper, noted that the large gathering included members from France, Holland, Italy, Spain, Switzerland and the United States. Since last year the President had been knighted and become Sir Frank Claringbull and the Treasurer, Mr F. E. Lawson Clarke, had become President of the National Association of Goldsmiths.

Every year saw new records broken in the number of candidates who sat for the examinations throughout the world. Last year's total of 994 had risen to 1,153, though only 532 had passed.

Mr Richard Cope, F.G.A., Chairman of the National Association of Goldsmiths, after presenting the awards, recalled that when he received his diploma in 1957 he did not think for one moment, at that time, that one day he would be presenting diplomas to other successful candidates. In congratulating them on receiving the "seal of your labours", he added that it really marked the start of a long hard road at a time of great changes and problems in gemmology. The progress in the manufacture of synthetic gem material had been astonishing.

"In every area where scientific strides are being made (and these include both gemmology and horology in the retail trade)," he said, "there is the demand for more knowledge and better understanding of the subjects."

Jewellers using these subjects required professional knowledge, for consumers were hungry for technical detail and advice, even demanding it. Their qualification was a platform on which to build, and they should never stop learning. To keep abreast of change and progress they should have an enquiring mind, a thirst for further knowledge and a deep and genuine interest in gemmology.

For those who were jewellers, gemmology had great value for valuation work, in the buying of the right stock—both right gemmologically and right commercially—and in selling the stock to the customer. The manufacturer also needed to select his gem materials for his merchandise with sound knowledge of the gemmological trade. But gemmology had also grown up from being product knowledge in the jewellery trade to become an expanding and fascinating science. It had contributed to progress in mineralogical research.

Finally, Mr Cope said, their qualification admitted them to a happy world-family. They should take pride in possessing their qualification, not be afraid to ask advice if they were unsure, and derive pleasure in using it.

Mr Lawson Clarke, in thanking Mr Cope, pointed out that he was greatly interested in trade education, being a former Chairman of the N.A.G. Education Committee and a trade representative on the Distributive Industry Training Board.

COURSE INSTRUCTOR

The Association requires an Assistant Correspondance Course Instructor to undertake part-time assessment of papers during the period October to May. Only persons resident in the U.K. should apply. Applications should be addressed to the Secretary, Gemmological Association of Great Britain, Saint Dunstan's House, Carey Lane, London, EC2V 8AB, and should give full details of qualifications.

COUNCIL MEETING

At the meeting of the Council held on Tuesday, 10th February, 1976, the following were elected to membership:

Fellowship

Agee, Carl B., Rotterdam, Holland. D. 1975

Bassett, Allen M., Paris, France. D. 1975

Bloom, André D., Streetly. D. 1975

Brown, Grahame, Brisbane, Australia. D. 1975

Buhler, Stefan, Geneva, Switzerland. D. 1975

Cartwright, Donald R., Little Bookham. D. 1975

Cornford, Carol R., East Grinstead. D. 1975

Cornford, Richard, East Grinstead. D. 1975

Domenech Casellas, Maria V., Oviedo, Spain. D. 1975

Garcia Abril, Ana M., Valencia, Spain. D. 1975

Grant, Malcolm J., Fordingbridge. D. 1975

Hammett, Roger S., Southall. D. 1975
Hutchinson, Janice, Plymouth. D. 1975
Iwahori, Mitsuo, London. D. 1975
Jackson, Brian, Edinburgh. D. 1975
James, Alan R., Pelsall D. 1975
Jhaveri, Ravindra J., Bombay, India. D. 1975
Jones, Alison R., Woking. D. 1975
Kan, Eishi, Tokyo, Japan. D. 1975
Kortelainen, Sirpa, Helsinki, Finland. D. 1975
Laine, Simo E. W., Helsinki, Finland. D. 1975
Lo, Wing Yat Sunny, Hong Kong. D. 1975
Marti Girona, Maria M., Barcelona, Spain. D. 1970
Matthesius, Johannes G., Amstelveen, Holland. D. 1975
Mayor Giner, Juan E., Vinaroz, Spain. D. 1975
Miller, Wilda L., Pretoria, S. Africa. D. 1975
Morrill, Christine, Cambridge. D. 1975
Moule, Alexander J., Toowong, Qld, Australia. D. 1975
Noble, Patrick, Heckmondwike. D. 1975
Padro, Angel, Barcelona, Spain. D. 1975
Phillipson, Erica K., Richmond. D. 1975
Ripley, Evelyn, Stockton. D. 1975
Schulze, Heinz, Austin, Tex., U.S.A. D. 1975
Vainio, Y. Erkki, Leppakoski, Finland. D. 1975
Van Westen, Linda J. L., Eindhoven, Holland. D. 1975
Wong Leung Kim Po, Joanna, Kowloon, Hong Kong. D. 1975
Yoda, Mitsuhiro, Tokyo, Japan. D. 1975

Ordinary

Ali, Syed J. A., London.
Amunugama, R. T. R., Morapitiya, Sri Lanka.
Anderson, Martin, Ft Monmouth, N. J., U.S.A.
Armstrong, Declan R., Hollywood, Cal., U.S.A.
Asano, Shinichi, Sendai City, Japan.
Azizollahoff, Henry, London.
Bagdasarian, Aram, River Edge, N. J., U.S.A.
Barea, Manuel P., Lyon, France.
Barea, Odette T., Lyon, France.
Bhuta, Kishore, Nadi, Fiji.
Bobe, Bernard, Paris, France.
Bourdon Destrem, H., Paris, France.
Brown, Ronald, Frankston, Vic., Australia.
Buckner, Richard A., Clinton, Tenn., U.S.A.
Burgess, John R., Southampton.
Campos, Joao P. R., São Paulo, Brazil.
Cartmel, Edna, Liverpool.
Caspi, Daniel, Stanmore.
Conrad, Donald B., East Islip, N. Y., U.S.A.
Croydon, Charles E. J., New York, U.S.A.
D'Amour, Hedwig, Bauerbach, W. Germany.
Dodson, John S., Cobham.
Doughty, Robert R., Newark, Cal., U.S.A.
Drost, Kristina R., Brummen, Gld, Holland.
Egi, Shigeo, Tokyo, Japan.
Egi, Yoshi, Tokyo, Japan.
Eldridge, Maurice W., Sheffield.
Elms, Kenneth G., London.
Eno, Takahiko, Tokyo, Japan.
Estavillo, William, San Francisco, Cal., U.S.A.

Etchen, E., Toronto, Canada.
Feld, Rainer, Marburg, W. Germany.
Fernando, Dilrukshi Y., Colombo, Sri Lanka.
Fik, Margaret M., Birkenhead.
Fitzgerald, Leslie E., Stanmore.
Fitzgerald, Patrick H., Orpington.
Fookes, Mark H., Brentwood.
Ford, Hermione D., Hereford.
Fujise, Noboru, Tokyo, Japan.
Gadot, Arnona, Tel-Aviv, Israel.
Gianforte, Carmen A., Columbia, Md, U.S.A.
Goldberg, Esther, Sun Valley, Ida., U.S.A.
Goonesekere, Premalal N. W., Lusaka, Zambia.
Graham, Peter D., Liverpool.
Gryg, Bessie, Hilton, W. Australia.
Hanley, William B., Menorca, Baleares.
Haseyama, Hiroyuki, Yokohama, Japan.
Hatanaka, Toshiaki, Kanagawa, Japan.
Heng, Tiaw B., Singapore.
Holgate, David E., Oxton.
Hori, Nagao, Tokyo, Japan.
Hotson, Roy H., Tuakau, N. Z.
Hutson, Douglas R., Hornchurch.
Ishii, Hajime, Kyoto, Japan.
Ishii, Jinko, Kyoto, Japan.
Iwabuti, Setsuko, Tokyo, Japan.
Jones, Terence G. M., Ruislip.
Kato, Kumao, Tokyo, Japan.
Katoo, Koichi, Chiba, Japan.
Kawaguchi, Masato, Fukuoka-Shi Fukuoka-ken, Japan.
Kikuchi, Isao, Tokyo, Japan.
Kinoshita, Ichiro, Kobe, Japan.
Kirinde, Harischandra W., London.
Kobayashi, Yaeko, Kanagawa, Japan.
Kodituwakku, Sugath, Colombo, Sri Lanka.
Kotelawala, Jivaka L. B., Colombo, Sri Lanka.
Kurosawa, Kyuji, Tokyo, Japan.
Laudham, Ian A., Riyadh, Saudi Arabia.
Lawson, Judith, Newcastle-upon-Tyne
Leithner, Helmut, Leerstetten, W. Germany.
Low, Bin Tick, Kuala Lumpur, W. Malaysia.
Lyall, Angus C., Dundee.
Malik, Sadik, North Wembley.
Manasseh, G., Kuala Lumpur, Malaysia.
Mazer, David M., Seal Beach, Cal., U.S.A.
Middleton, Michael S., Swansea.
Mills-Owens, Paul, London.
Mitchell, Douglas A. D., Toronto, Canada.
Miyawaki, Ichiro, Tokyo, Japan.
Miyokawa, Yoshinori, Tokyo, Japan.
Monk, Eva L., Bexleyheath.
Montane Baro, Miguel, Andorra.
Moriuch, Masana, Saiwainishi, Niigata Pref., Japan.
Morris, John M., Pahang, Malaysia.
Muraishi, Kunio, Tokyo, Japan.
Murophshy, Hiroyuqui, Tokyo, Japan.
McCord, Valerie, Greenbelt, Md, U.S.A.
Nagae, Hajime, Tokyo, Japan.
Nakazato, Tetuo, Tokyo, Japan.
O'Grady, Gabriel F., Dublin, Eire.
Oono, Kunihiro, Tokyo, Japan.
Osawa, Yukihiro, Tokyo, Japan.
Otani, Kazuko, Tokyo, Japan.
Overlunde, Anchorete J., Dehiwala, Sri Lanka.
Paddock, Orlando S., Dallas, Tex., U.S.A.
Pfersich, François A., London.
Pickering, Horace E., Burton-on-Trent.
Rajapakse, Shelton T., Dehiwala, Sri Lanka.
Ravindra, Ramiah, Colombo, Sri Lanka.
Romero de Cuesta, Carmen, Palma de Mallorca, Spain.

Saito, Tadaaki, Bangkok, Thailand.
Sakonji, Mayumi, Chiba City, Japan.
Salvador Moll, Angel Lorca, London.
Sapieha, Teresa J., Nairobi, Kenya.
Satya, Magasalingam, Colombo, Sri Lanka.
Shibagaki, Hironobu, Tokyo, Japan.
Shindler, Bernard D., Wembley Park.
Shiraki, Yoshiki, Tokyo, Japan.
Silva, Sembukuttiarachchige, Miriswatta, Katana, Sri Lanka.
Smith, Brian D., London.
Sofocleous, George, Orpington.
Stevens, David M., Watford.
Stevens, John B., Birkenhead.
Stonebanks, Judith M., Hong Kong.
Suzuki, Yusaku, Tokyo, Japan.
Takebe, Tokiko, Tokyo, Japan.
Tan, Grace J., Singapore.
Teakle, Simon J., Lewes.
Thomas, Richard N. C., Redcar.
Thomas, Sean J., Donegal Town, N. Ireland.
Thomson, Paul R., Hobart, Tas., Australia.
Tlush, Betty, Meadowbrook, Pa, U.S.A.
Tomita, Pacita P., Tokyo, Japan.
Towhill, Peter E., Tehran, Iran.
Trevino-Ayala, Rodolfo, Monterrey, N. L., Mexico.
Tschudin, Françoise, Lausanne, Switzerland.
Van der Lelie, Otto, Leiden, Holland.
Verch, Ulla, London.
Wallis, Keith, Surbiton.
Watanabe, Kimiko, Tokyo, Japan.
Wavish, Constance E. D., Hong Kong.
Wee Soon Cheng, Anthony, Penang, Malaysia.
Weldon, Martin, Dublin, Eire.
Wellinghoff, John J., Miami, Fla, U.S.A.
Windsor, Dharmadasa, Magalle, Galle, Sri Lanka.
Winter, Julie, Dorking.
Wolf, Geoffrey, Coppet, Switzerland.
Wong, Lily, Hong Kong.
Woodhall, Jon W., Home Hill, Qld, Australia.
Yamamoto, Kenichi, Yokohama City, Japan.
Yamamoto, Masakazu, Kochi-ken, Japan.
Yamamura, Matuo, Tokyo, Japan.

XVth INTERNATIONAL GEMMOLOGICAL CONFERENCE

The Fifteenth International Gemmological Conference was held in Washington, D.C., U.S.A., from the 5th to the 9th October, 1975. Twenty-six speakers in all gave talks upon various matters of gemmological interest. One or two husbands were accompanied by their wives, and three women gemmologists were present, but only one spoke, Mlle Dina Level, formerly of the Paris laboratory.

On Tuesday, 7th October, there was a reception and dinner at the Smithsonian Institution*, which was followed on Wednesday, 8th October, by a behind-the-scenes tour: and a farewell luncheon terminated the proceedings on Thursday, 9th October.

The working sessions began on Monday, 6th October, with an introductory talk by Mr Richard T. Liddicoat, Jr, President of the Gemological Institute of

* The Smithsonian Institution was founded by act of Congress in 1846 to use the endowment provided for the purpose by the residuary bequest of James Smithson, F.R.S., (1765-1829), a natural son of the 1st Duke of Northumberland.—Ed.

America and director of the GIA Los Angeles laboratory. Mr P. E. Desautels, of the Smithsonian Institution, followed with a description of the collection and policy of the museum, which houses the National Collection of Gems.

Dr H. J. Nairis, F.G.A., (Sweden) gave a short illustrated talk upon possible diamond occurrence in Sweden.

Professor Dr H. Bank, F.G.A., (Idar Oberstein, W. Germany) showed selections of some very rare gemstones and gave a second talk mainly illustrative of Tanzanian gem deposits.

Mr H. M. Forth (Ontario Gem Lab) provided samples and colour-slides of gem apatite from Canada. He also gave an account of a previously abandoned mine being re-opened forty years later—originally a mine for phosphates used as fertilizers, but now a gem deposit. Mr Forth described the first cut stone as a deep blue-green apatite of 65 carats.

Mlle Dina Level (Paris) gave a description of some antique items in the Louvre collection. Prase, a quartz-family mineral containing chromium, was her chief talking-point.

Dr K. Nassau (Bell Laboratories, New Jersey) gave a masterly summation of the causes of colour in gemstones. He also stated that Maxixe-type beryls which have masqueraded as aquamarines *all* fade to some extent—some more quickly than others.

Mr X. Saller, F.G.A., (Munich, W. Germany) gave warnings on dyed jadeite and the continuing struggle over nomenclature of jade, jadeite and nephrite. (In the London Chamber of Commerce Laboratory the terms "nephrite-jade" and "jadeite-jade" are used.)

Mr E. B. Tiffany (Canada) spoke of his visit to attempt to value the Iranian Crown Jewels. A series of colour slides served to emphasize the amazing variety of this fantastic collection of jewels and jewelled ornaments, gemstones, pearls and precious metals.

Dr P. C. Zwaan, F.G.A., (Leiden University, Holland) described with colour photography visits to Sri Lanka, Thailand and India.

Dr K. Nassau followed with a second discourse on "irradiation-induced colours in gem materials." Neutrons, gamma-rays, electrons, x-rays and ultra-violet short waves were discussed.

Mr Pete J. Dunn, F.G.A., (Smithsonian Institution) gave a talk upon tourmalines from Newry (Maine), a very exciting find in type locality.

Professor R. Franco (Brazil) spoke on morganites from Barra de Salinas and the variation of quality of change in pink beryls from varying localities.

Dr H.-J. Schubnel (Paris) spoke on Abbé Haüy, the "father of gemmology" —Haüy was an early worker on the geometry of crystallization.

Mr A. E. Farn, F.G.A., Manager of the Gem Laboratory of the London Chamber of Commerce and Industry, followed with a talk on pearls. After mentioning the strong milky greenish fluorescence (and perceptible phosphorescence) of non-nucleated cultured pearls from Lake Biwa (a fresh water product) and the fluorescence of normal cultured pearls due to a trace of manganese in the m.o.p. nucleus made from the non-iridescent shell of a Mississippi mussel (fresh water again), he pointed out that the real difficulty for to-day's laboratories lies in the production of cultured pearls from large oysters—such as Pinctada Maxima —from mainly Australian waters: we now have these large oysters from sea waters producing huge very thick-skinned round cultured pearls and large somewhat smooth baroque non-nucleated cultured pearls, both types being non-fluorescent, the former because the thick outer skin of natural pearl masks what fluorescence there is and the latter because it is a product of sea-water with no trace of manganese.

Dr E. H. Gübelin, F.G.A., (Switzerland) spoke on recent conflicts over famous—or infamous—diamonds which have been treated. He also referred to a difficult stone which had been handled also by the London Chamber of Commerce Laboratory and invited comments from Mr Farn: London lab's findings were supported by Dr W. F. Eppler and Mr C. Schiffmann, F.G.A., (Switzerland).

Mr H. Tillander, F.G.A., (Finland) gave a concise history of the Hope Blue Diamond and provided a specially printed pamphlet.

Mr G. R. Crowningshield, F.G.A., director of the GIA New York laboratory spoke on "observations from the Gem Trade Laboratories," and referred to the exchange of information and the accord which exist between the laboratories.

M. J.-P. Poirot, director of the Service Public du Contrôle des Diamants, Perles Fines et Pierres Précieuses (Chambre de Commerce et d'Industrie de Paris), gave a useful account of some curiosities seen in the Paris laboratory and the dangers in interpreting short-wave effects seen in synthetic blue sapphires.

Mr Richard T. Liddicoat, Jr, also showed photomicrographs of synthetic and imitation gemstones.

Mr E. Sasaki, F.G.A., (Japan) spoke on the use of x-ray diffraction equipment in gem testing.

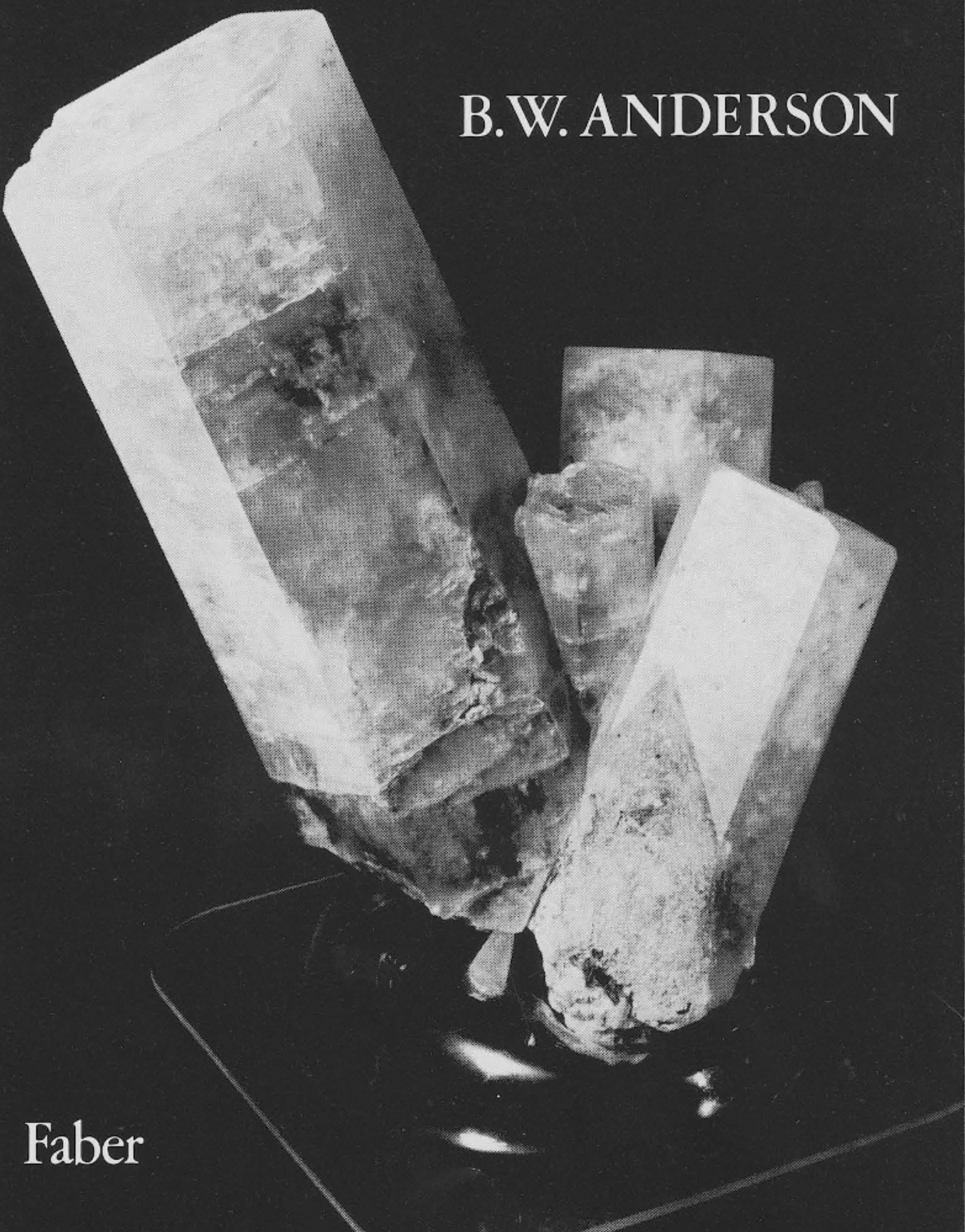
Mr H. S. Pienaar, F.G.A., (Stellenbosch, S. Africa) talked about a new cut for diamond, which seems to consist of a round stone with an emerald-cut top and brilliant base. The new cut is called the "Barion Cut."

Dr J. Kanis (Rhodesia) gave a talk on "Gemstone News of Southern Africa," comparing various mining districts, rock faults, emerald mines and the terrifying background dangers in places such as Angola.

The last "lecture" was in fact a film, depicting readings obtained from investigations on jade substitutes by powder analysis.

A. E. F.

Gemstones for Everyman



B.W. ANDERSON

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