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and

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FACETED DIASPORE

By KENNETH SCARRATT, F.G.A.,

The Gem Testing Laboratory, London Chamber of Commerce and Industry

Although a difficult stone to cut, faceted diaspore,* which appeared on the German market two to three year ago[1, 2], is now available in this country. One light greenish brown stone weighing 0.69 ct has been donated to the Laboratory by the firm of E. A. Thomson, who further supplied four others on loan, these ranging from 1.72-6.53 ct. The following is a report upon the examination of these five stones.

Their colour is one of the more interesting aspects. All five have a distinct colour change. The daylight colour is greenish brown, whilst the apparent colour under tungsten lighting is pinkish brown. The change compares favourably with that of a moderate quality alexandrite. The dichroism is also distinct, the distinguishable colours being pinkish brown and green.

The absorption spectra are similar to what one might expect to see in a sapphire. Three broad bands in the middle of the blue at

*Diaspore is aluminium hydroxide, $\alpha AlO(OH)$: orthorhombic; hardness 6½-7, but perfect {010} cleavage.—Ed.

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	Refractive Index			Optic sign & character	Density	Fluorescence			
	α	γ	β			Long-wave ultraviolet	Short-wave ultraviolet	X-rays	Crossed filters
1. Rectangular 0.69 ct.	1.703	1.750	1.722	Positive Biaxial	3.3889	Inert	Green	Green	Red
Birefringence			0.047						
2. Cushion 6.53 ct.	1.701	1.750	1.722	Positive Biaxial	3.3907	Inert	Green	Green	Red
Birefringence			0.049						
3. Oval 1.93 ct.	1.701	1.750	1.722	Positive Biaxial	3.4009	Inert	Green	Green	Red
Birefringence			0.049						
4. Cushion 3.14 ct.	1.702	1.750	1.722	Positive Biaxial	3.3903	Inert	Green	Green	Red
Birefringence			0.048						
5. Rectangular 1.72 ct.	1.702	1.750	1.722	Positive Biaxial	3.3995	Inert	Green	Green	Red
Birefringence			0.048						

TABLE 1.

471, 463 and 454 nm are easily seen. A little more difficult to see is a fine sharp line in the deep red in the region of 701 nm.

Each stone was found to be biaxial positive. The refractive indices (see Table 1.) on the whole concur with those recorded by Larson and Berman[3], 1.702α, 1.722β and 1.750γ, the birefringence ranging from 0.047 to 0.049.

The average density, obtained hydrostatically using ethylene dibromide at temperatures ranging from 14.6 to 18.8°C, was 3.3941, the lowest being 3.3889 and the highest 3.4009. These results differ from those obtained by Bank[1], who records a density of 3.35. They do however fall into the range recorded by Dana[4] of 3.3 to 3.5.

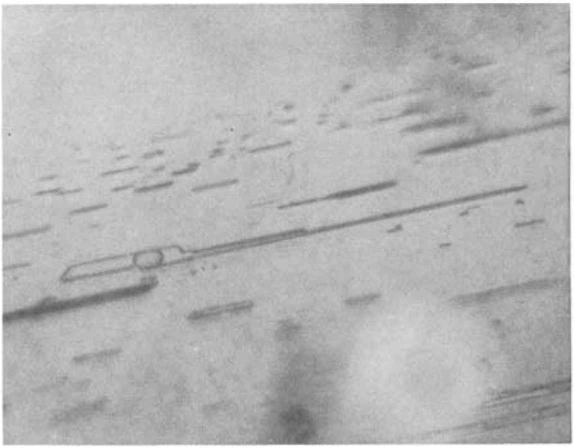

FIG. 1. Elongated two-phase inclusions in diaspore.

The fluorescence under long wave and short wave ultraviolet light and x-rays is of little diagnostic value, but for the sake of completeness we have recorded the effects in Table 1.

We can foresee no problems for the gemmologist in identifying this stone. As a mounted stone the probability is that its facet edges will become worn fairly quickly, inhibiting one's ability to obtain an accurate RI. However the massive doubling of the back facets, as can be seen easily with a 10× lens, and the distinctive absorption spectrum should be enough to ensure that this stone is not confused with any other.

The writer acknowledges with gratitude the assistance given by his colleagues during this investigation and the Laboratory is once again indebted to the firm of E. A. Thomson.

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THE OPTICAL CONSTANTS OF GGG

By K. NASSAU, Ph.D.

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Since it was first used as a diamond imitation in the early 1970s, the optical constants of Gadolinium Gallium Garnet (GGG) have usually been given as RI 2.02 or 2.03 and DISP 0.038. I myself have used these values and am sometimes quoted as the source, but have merely repeated data current in the field.

Recent precision measurements by Dr D. L. Wood of the Bell Telephone Laboratories gave the following values (rounded to five significant figures):

Refractive Index	(sodium light)	1.9698
	(G, 4308Å)	2.0043
	(B, 6870Å)	1.9597
Dispersion	(G - B)	0.0446

Rounded off, the gemmological values that should be used are: RI 1.970, DISP 0.045. There could be a small variability derived from compositional variations.

I am grateful to Dr Wood for permission to use his data.

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THE FLUORESCENCE OF BENITOITE

By R. KEITH MITCHELL, F.G.A.

When Webster first wrote on the subject of fluorescence of gem minerals*, he said that benitoite fluoresces bright blue under both long and short wave ultraviolet light. In his book, *Gems,*† he corrects this and says that fluorescence is seen only under short wave UV.

Recently I had the opportunity to check a colourless (very faint blue) faceted benitoite, which had been lent to me by Mr C. R. Cavey, of Roughgems Ltd. (There is a faint possibility that I sold the stone to Mr J. A. Fleming of that Company many years ago. I handled a few such cut specimens in about 1960, and Mr Fleming bought from me, when he first arrived here from New Zealand). Colourless benitoite is less commonly cut than the blue variety, but they occur together in the one known locality for the mineral at the head of the San Benito Valley in California.

Mr Cavey had noticed that his faceted stone fluoresced a dull red under long UV wavelengths. The fact that it was benitoite was simple enough to prove since, although the upper RI value is nearly the same as that for the refractometer contact fluid, which may sometimes cause confusion, it needs only a slight turn of the stone to bring that reading for the extraordinary ray down a little so that no confusion can then exist.

Having a quantity of benitoite rough in stock I sorted out a number of colourless and pale blue fragments of crystals and checked their fluorescence. Almost every piece showed the dull red fluorescence seen in the cut stone. Further investigation showed that this effect seen in long wave UV was suppressed more and more as one examined stones with a deeper blue colour. My faceted blues showed no sign of it. The causes of the colour and of the fluorescence is unknown, but it is of interest to note that all stones gave strong light-blue fluorescence under short wave UV. It was not possible to distinguish the colourless stones by this.

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*Gemmologist, 1953, XXII, 264, 125-6. † 3rd edn. (1975), p.271.

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THE QUEST FOR QUARTZ . . . .

By S. B. NIKON COOPER, B.D., F.G.A.

Although it has the distinction of being the most common of any material used for gems, 'quartz' is an awkward name to assign to a watertight definition. Most books avoid the issue and say simply that it derives from an old German mining term. Those who do attempt to give it a meaning succeed, but with varying degrees of probability.

For instance, one suggestion is from a German root we have been unable to verify: 'quarzen' = 'to crackle'; that quartz 'crackles' when it is crushed . . .[1] Another, from the German 'quer' = 'cross', would make the full name 'querklufterz' = 'cross-grained ore', alluding to the stringers of massive quartz one finds in various country rocks.[2] Or others, taking a more pejorative use of 'quer', i.e. 'contrary' or 'odd', would derive it from 'quer-erz' = 'worthless ore'. This could be more likely, as it would have been the gangue accompanying the pay-vein the miners searched for. Some authorities take this even further and try to establish an ultimate derivation from the German 'zwerg' ('dwarf')[3] on the similar analogy of 'pixilated' cobalt ('kobold') or bedevilled nickel ('nickel'). Seemingly those old mines were inhabited by numerous types of hobgoblin—all rather unpleasant and of no profit to the miner.

And then we came across yet another derivation—this time from Dr Werner Lieber's *Kristalle unter der Lupe*[4]—incidentally above praise for the quality of its illustrations. Under 'quartz', Dr Lieber suggests a derivation from a Slav word 'kwardy', with the root-meaning of 'hard'.

A Slav word . . ? A Czechoslavakian dictionary gave us 'tvrdy', so it was time to enlist Dr Lieber's further help. He supplied his references: Hans Lüschen's *Die Namen der Steine,*[5] which—thankfully—cited most of the derivations quoted above, and with their dates of earliest usage. It also gave this statement: 'Quartz . . . the name first appeared in the mining district of Bohemia in the 14th century, and appears to stem from a Slav root ("kwardy"—a West Slav form similar to the Polish "twardy", Czechoslovak "tvrdy"). The original meaning is "hard". . .'

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From *a posteriori* reasoning this is simple enough to be true. Bear in mind we are considering massive quartz, not rock crystal or amethyst, etc., which had been known generations before; but massive quartz in hard rock mining—the gangue which hampered the miner's progress in the lead/silver veins they followed. Another *possible* derivation then; but why should this one be more acceptable—apart from its earlier date—than any of the others? Here we are fortunate. Unlike most mineral and gem names that evolved over centuries, we can date accurately the first written appearance of the word 'quartz'. It occurs in Agricola's *Bermannus* of 1528.(6) '. . . Ancon: I see several kinds of rocks here. Bermannus: A large number . . .. Another genus is this one which is seen to be transparent at times, at times very white, light yellow or bluish grey. Our people call it quarzum . . ..'

Who was Agricola, and what was his 'quarzum'? First, let us note that both names have been Latinized. 'Agricola' is Georg Bauer, and 'quarzum', a Latinized form of 'quartz' (or 'kwardy').

Georg Bauer—or Agricola—(1490-1555) is deservedly known as the 'Father of Mineralogy'. Until his time we move in almost magical circles—of superstitions little better than old wives' tales; Agricola marks the beginning of a systematic, scientific, approach to minerals. Academics had written of precious stones before; Agricola was the first, though, to leave his 'ivory tower'—writing on other men's writings—and instead go and live and work with the miners themselves. Which, literally, he did—leaving the Rectorship of Leipzig and his studies in Italy—to become a physician in Joachimstal 'partly to test what had been written about mineralogy by careful observations of ores and the methods of their treatment.'(7)

And herein, we believe, lies the clue: he went to Joachimstal—the centre of silver mining at that date. And Joachimstal . . .? The same as the modern Jachymov—in Czechoslovakia. In Agricola's time it would have been the Kingdom of Bohemia. And the language that would have been spoken?—not by German mining officials, but by the miners themselves? A Czechoslovakian/Bohemian dialect. What more natural than that they would use their own Slav terms to describe the minerals they found?

'. . . our people call it "quarzum"'. Again, this is a Latinized form, as his work was written in Latin. We submit though: 'our people call it "kwardy"' is the original version.

And so a small town in the Czechoslovakian Erz Gebirge gave a new name to the world. Our English 'quartz', Italian 'quarzo', Danish 'quarts', Russian 'kwartz', etc. The older gem names: 'crystal', 'amethyst' and 'citrine' (again, Agricola is the first to apply this to the yellow variety of quartz) will still continue to be used—but now as varieties only of the parent rock: quartz—the 'hard' stone.

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[*Manuscript received 14th September, 1979.*]

NOTES ON THE PROPERTIES AND INCLUSIONS OF GARNETS FROM LAPLAND, FINLAND

By S. HORNYTZKYJ, F.G.A, and K. T. KORHONEN, M.Sc.

INTRODUCTION

In Lapland, northern Finland, red gem quality garnet is obtained as a by-product of goldwashing from river gravels in several areas. The garnet occurs as water-worn pebbles which after cutting mostly yield stones up to 1ct. Some time ago the authors had an opportunity of examining a number of garnets said to have come from these areas. To the authors' knowledge the properties of these garnets have been incompletely recorded in literature; therefore this chance was most welcome. The results of this study are discussed below.

ON THE GEOLOGY OF THE AREA

Geologically the areas where these garnets are found belong to the large granulite area (Figures 1 and 2).[1,1b,2] The granulite complex consists of metamorphic stones formed from sedimentary stones under high temperature and pressure. The main stone of this granulite area is the strongly orientated gneiss, the main minerals of which are quartz, plagioclase feldspar, biotite and pyrope-rich garnet. The granulite complex contains as fine stripes garnet-biotite gneisses, garnet-cordierite gneisses, biotite-plagioclase gneisses, quartzite and hypersthene gneisses. There are also some magma-stones in the granulite complex, such as norites and hypersthene containing quartz diorites.[3]

PHYSICAL AND OPTICAL PROPERTIES

In all, 157 faceted garnets (average weight 0.57ct) were studied. The refractive index of each specimen was determined using sodium light and a standard Rayner refractometer. The values obtained lay within a wide range, 1.764-1.792.

Although garnet is an isotropic mineral, a number of these garnets appeared as different colours in transmitted and reflected light. The colour was finally determined (in daylight) in transmitted light. Two different colours were dominating, brownish red (colour

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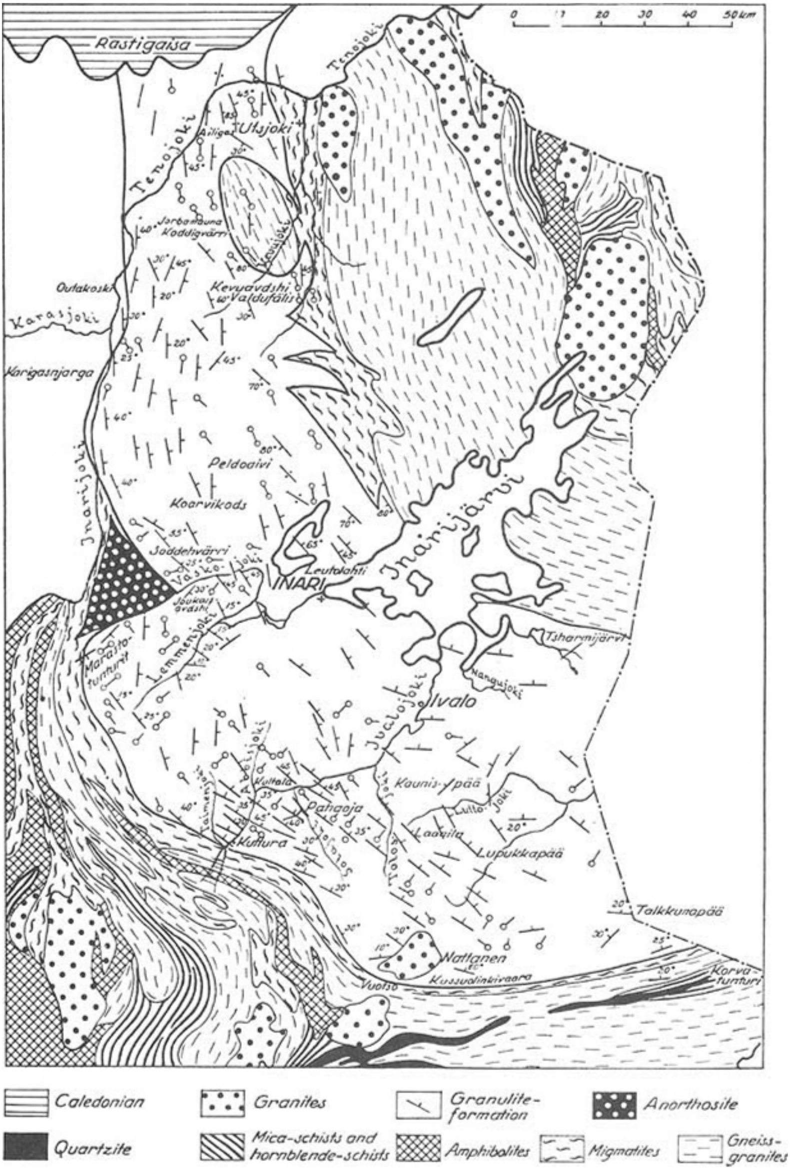

FIG. 1. Geological map of the granulite area of Lapland. *(According to E. Mikkola by P. Eskola[1,1b])*

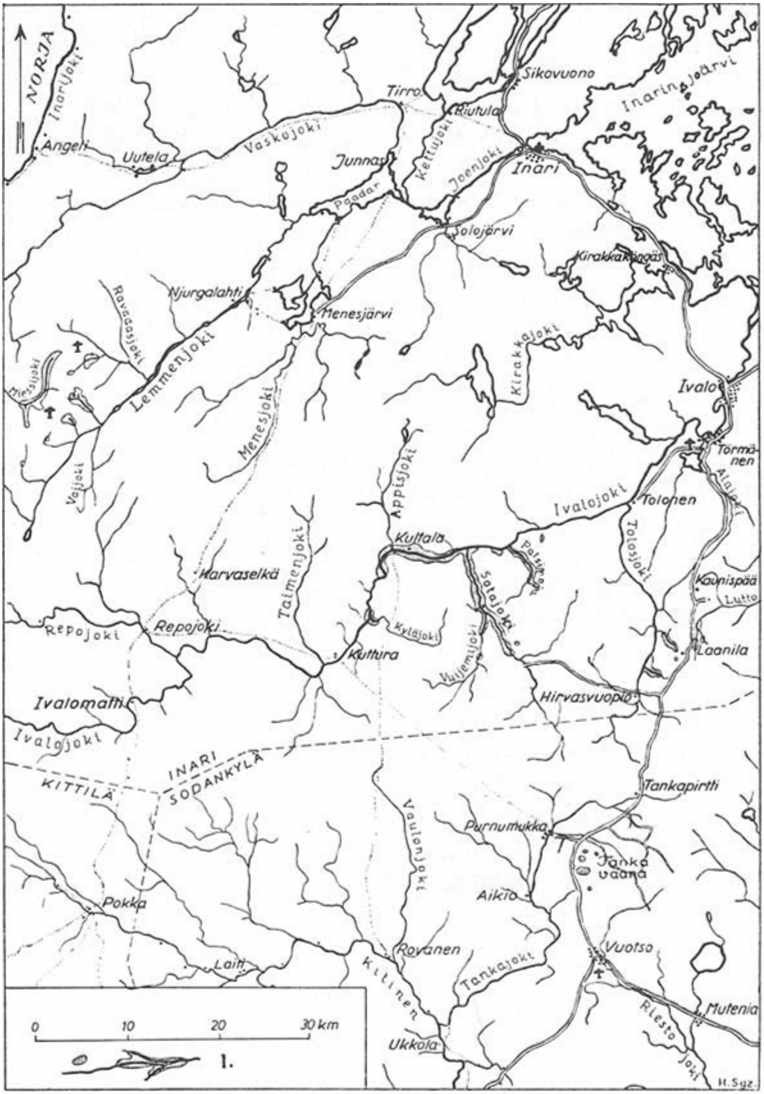

FIG. 2. Placer gold occurrences of Lapland. *(By H. Stigzelius[21])*

1. Gold occurrence

9C8) and greyish rose (colour 12B6), the figures in brackets referring to the standard colour charts shown in the Methuen Handbook of Colour.[4]

The absorption spectra of these stones were determined with a Rayner prism spectroscope. Without exception the three main absorption bands characteristic of almandine, i.e., positioned at 5050, 5270 and 5760Å, and weaker bands at about 6170 and 4620Å were observed.

Between crossed nicols a great number of the stones showed anomalous double refraction which was variable.

Because of the small size of the individual specimens, the specific gravities of these stones were determined by the heavy liquid method. The stones were placed in Clerici solution (they all floated at the surface), and the specific gravity of the liquid was lowered with distilled water until the heaviest stone, and after this the lightest one, remained freely suspended in the liquid. In both cases the refractive index of the liquid was measured and this was repeated several times. The average values of both measurements were then plotted on the specific gravity/refractive index graph of Clerici solution prepared beforehand by testing stones of different known specific gravities.[5] The specific gravities of these garnets were between 3.92-4.17.

Chemical Composition

Owing to the isomorphous replacement of Fe for Mg in the basic chemical composition, a whole series of garnets exists from pyrope to almandine. The garnets lying in the middle of this series, i.e., which can neither be termed pyrope nor almandine but which are intermediate between these two, form a so-called intermediate group of garnets. According to Webster[5] the refractive index of this group may be said to range from 1.75 to 1.78, and the specific gravity from 3.80 to 3.95, but as Webster states these limits are quite arbitrary.

The refractive indices and specific gravities of the examined garnets from Lapland lay within the ranges 1.764-1.792 and 3.92-4.17, respectively. These values correspond well with those ranging from pyrope-almandine intermediate series towards almandine. Our observations are further supported by Meriläinen.[6] According to him, in the coarse-grained garnet-quartz-feldspar gneisses of the granulite complex the garnet is pyrope-rich almandine (pyrope 30-35%, almandine 60-64%, grossular 1% and andradite 5%), and in the fine-grained garnet-quartz-feldspar gneisses the garnet is also pyrope-rich almandine in composition (pyrope 35-45%, almandine 55-60%, spessartine 1-2%, grossular 1-2% and andradite 2-5%). In the garnetiferous porphyritic potash granites of the granulite complex the garnet contains pyrope 25-30%, almandine 65%, spessartine 2%, grossular 1% and andradite 5%.

Furthermore, on the basis of garnet analyses made from garnets in the granulite complex around some of the goldwashing areas,[1] the mole composition of these garnets was calculated according to the method described by Deer, Howie and Zussman.[7] The average of these calculations gave us the composition: pyrope 41%, almandine 55%, spessartine 1% and grossular + andradite 5%, the variation being: pyrope 39-44%, almandine 50-58%, spessartine 1-2% and grossular + andradite 3-9%.

INCLUSIONS

The microscopic examinations were carried out with both a Wild Heerbrugg stereoscopic microscope and a Leitz SM-pol petrological microscope, and the stones were immersed in methylene iodide (R.I. = 1.742) to facilitate the study. The most typical inclusions observed in these garnets seemed to fall into six distinctive types. They are described hereunder in order of their decreasing abundance:

(1) Long thin or thicker short, sparsely packed needles intersecting each other at certain angles. They showed birefringence between crossed nicols, with bright colour changes (Figures 3 and 4).

(2) Small crystals which lay at random orientation, surrounded by brownish multifold haloes. They were birefringent between crossed nicols, with vivid interference colours (Figures 5 and 6).

(3) Orange brown, thin tabular crystals of random orientation, surrounded by a single halo. A modification of the Becke line test indicated that their refractive index was higher than that of their host. Between crossed nicols they showed birefringence with vivid interference colours. When illuminated with a mercury vapour lamp,[8] they

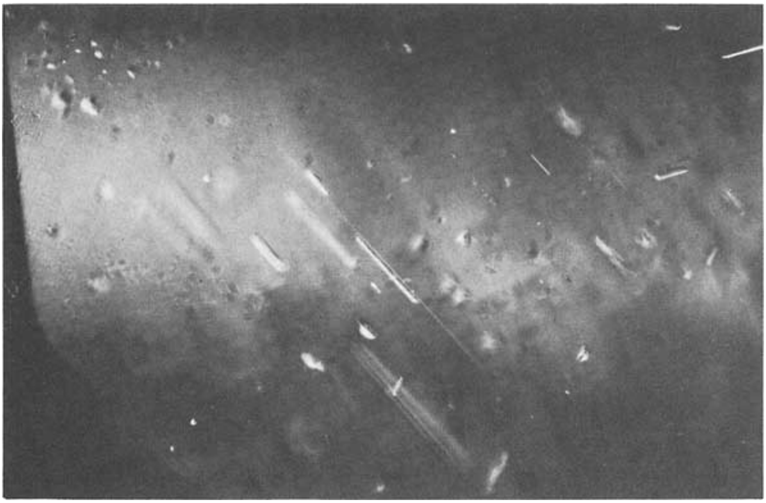

FIG. 3. Sparsely packed needles intersecting each other at certain angles. 140×.

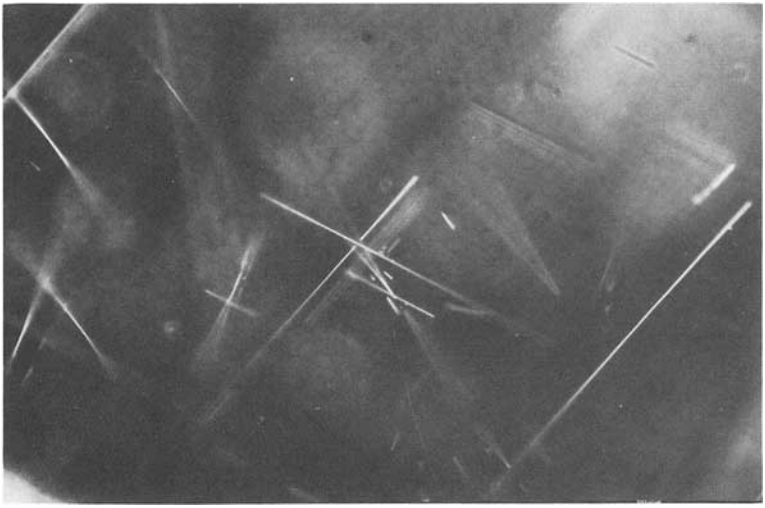

FIG. 4. Sparsely packed needles intersecting each other at certain angles. 140×.

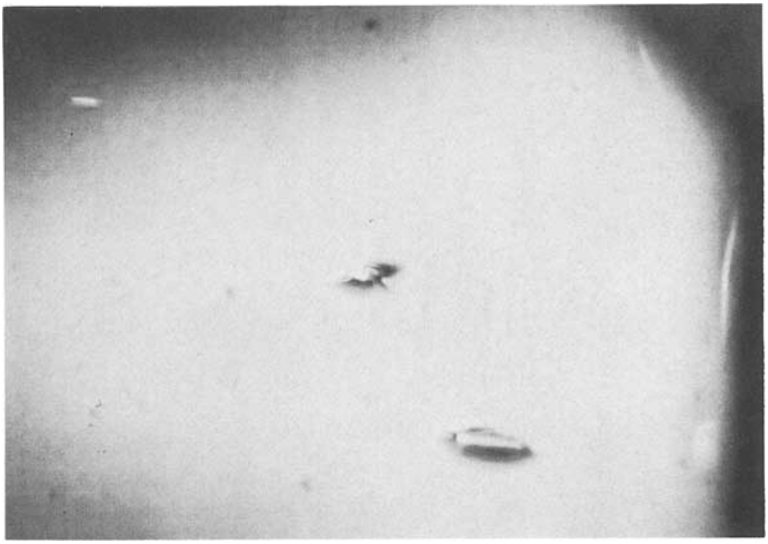

FIG. 5 Small crystals surrounded by brownish multifold haloes. 160 ×.

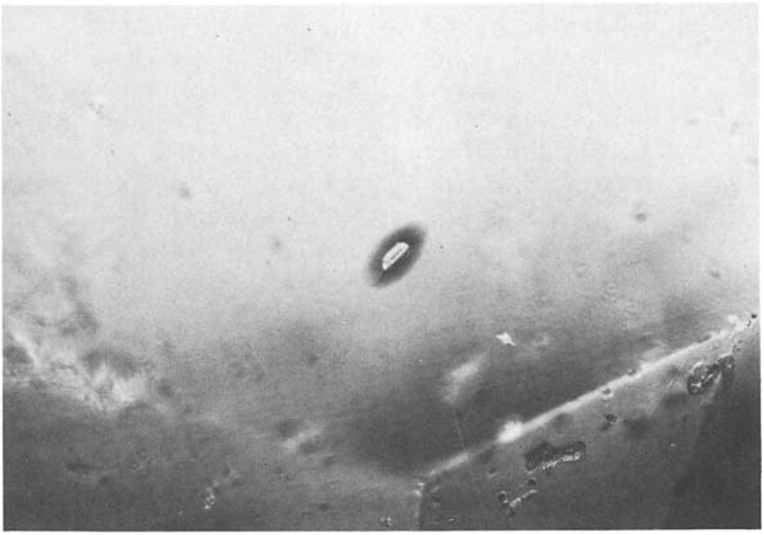

FIG. 6. Small crystals surrounded by brownish multifold haloes. 160 ×.

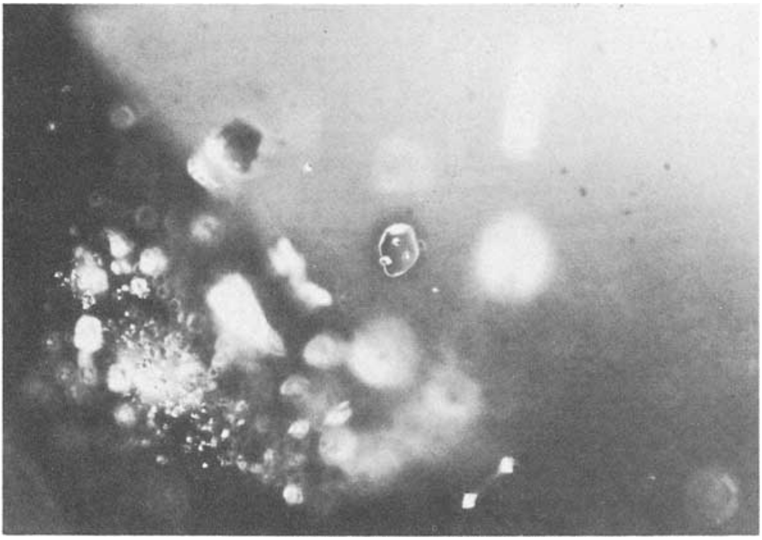

FIG. 7. Orange brown thin tabular crystal surrounded by a single halo. 160 ×.

showed a greenish colour whereas under tungsten illumination the colour was orange brown. These crystals occurred together with the aforementioned small crystals surrounded by brownish multifold haloes (Figure 7).

(4) Tube-like, transparent crystals of random orientation, some of which were slightly curved. Their refractive index was lower than that of their host confirmed by a modification of the Beck line test. They showed birefringence between crossed nicols, with bright colour changes (Figures 8 and 9).

(5) Well formed, doubly terminated, transparent prismatic crystals in which smaller crystals were observed. These prismatic crystals had a six-sided habit and were irregularly orientated. Their facet edges darkened when the focus was raised indicating that their refractive index was lower than that of their host, and this was confirmed by a modification of the Becke line test. Between crossed nicols they showed straight extinction with interference colours ranging from grey of the first order to higher colours (Figures 10 and 11).

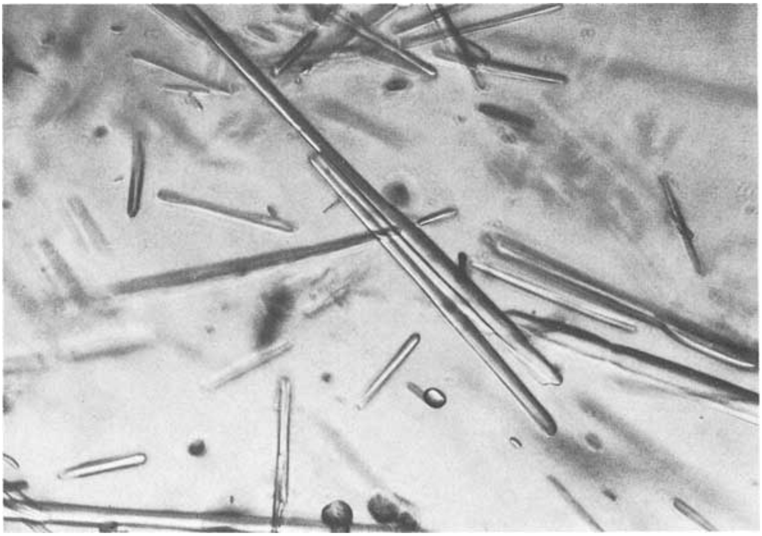

FIG. 8. Tube-like transparent crystals. 175 ×.

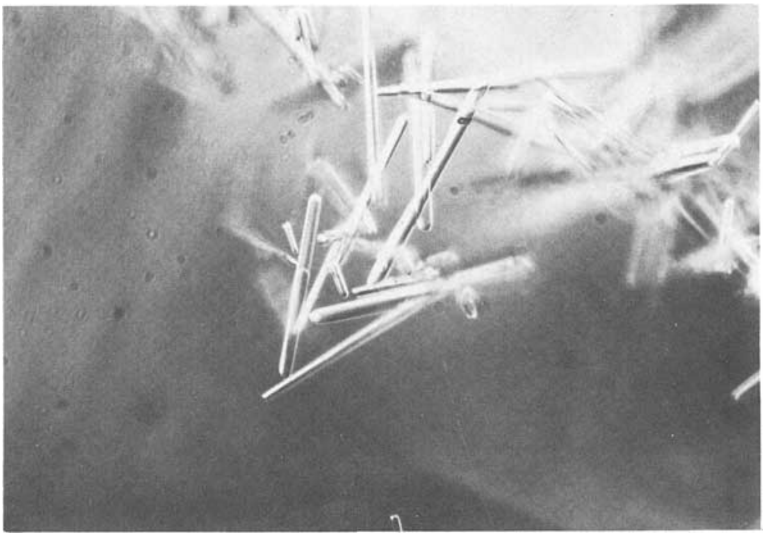

FIG. 9. Tube-like transparent crystals. 175 ×.

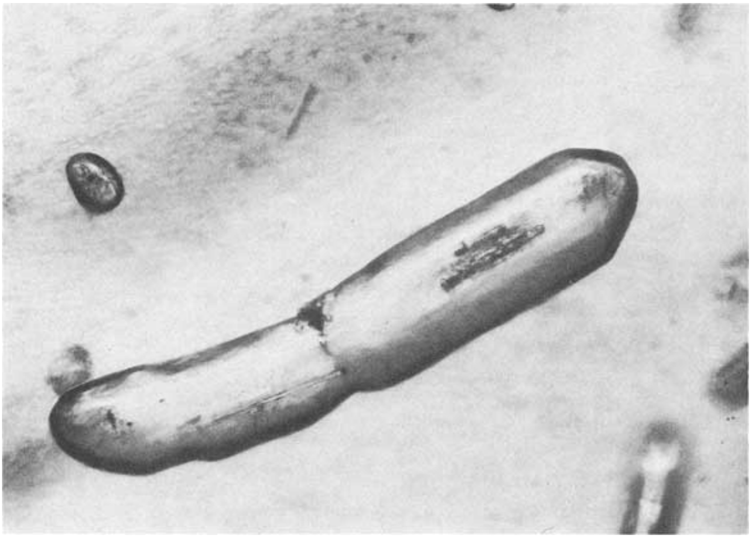

FIG. 10. Doubly terminated transparent prismatic crystal. 200×.

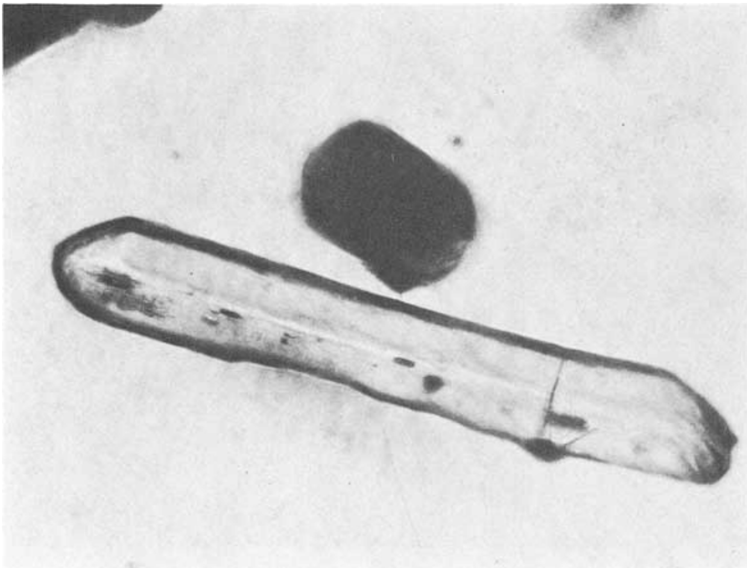

FIG. 11. Doubly terminated transparent prismatic crystal. 200×.

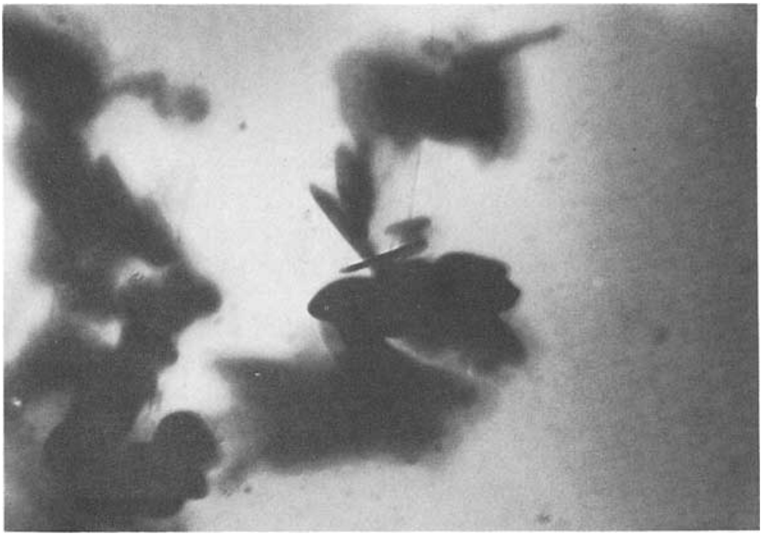

FIG. 12. Black, opaque, thin tabular crystals with a somewhat hexagonal outline. 170×.

FIG. 13. Black, opaque, thin tabular crystals with a somewhat hexagonal outline. 200×.

(6) Black, opaque, thin, irregularly orientated tabular crystals with a somewhat hexagonal outline and metallic lustre (Figures 12 and 13).

CONCLUSIONS

On the basis of the foregoing observations these six types of crystal inclusions are thought to be: 1. rutile (Figures 3 and 4); 2. zircon (Figures 5 and 6); 3. monazite (Figure 7); 4. actinolite (Figures 8 and 9); 5. apatite (Figures 10 and 11); and 6. ilmenite (Figures 12 and 13).

Eskola[1] and Meriläinen[6] have reported all these minerals as common mineral constituents in the granulite area of Lapland. Furthermore, Mellis,[9] Zwaan[10] and Gübelin[11, 12] have proved these minerals to be inclusions in garnets from various localities. However, the precise determination of these inclusions has not yet been possible for want of suitable instruments.

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PROMOTING AND MERCHANDISING COLOURED STONES

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(Being the text of a talk given to the Gemmological Association of Great Britain in the Central Electricity Generating Board Cinema, Newgate Street, London, E.C.2., on the 12th October, 1979)

It is a privilege for me to address you this evening on the subject of promoting and merchandising coloured gems, and it would be a pleasure indeed if I am permitted to do so in an informal way. By your leave I shall start, if I may, on a rather personal note. People who happen to know about the story of my life, seventeen years of which were devoted to medical studies and to the practice of medicine, often ask me with astonishment, 'How come you changed horses midstream? What made you quit this most noble, this most essential profession, to get involved in the business of coloured gems?'—these and similar transparent questions thus implying that my present activity in the jewellery trade is a comparatively futile one and that coloured gems are rather superfluous commodities. Well, not only do I immensely enjoy my present occupation, but also I happen to be very proud of it. Indeed, I do not believe that jewels are superfluous commodities. I am convinced that they satisfy one of the basic needs and that jewellers cater for one of the fundamental requirements of human nature.

As Thomas Carlyle, the nineteenth-century Scots essayist and historian said: 'The first spiritual want of barbarous man is decoration.' By this he meant self-adornment, and this is an anthropological fact, substantiated by our observation of the behaviour of primitive man of aboriginal tribes still inhabiting certain recesses of the jungle and isolated areas of our planet, as well as by various archaeological findings. Cave-man, primitive man invariably demonstrates a tendency for self-adornment by using any handy object that lends itself to this purpose. At the same time, he would attribute occult powers to articles he uses for personal decoration, whether they be perishable items such as bird feathers or plant seeds, or non-perishable objects, as for instance sea shells, animal teeth and claws, or mineral crystals. He would pierce them and then string them and wear them for their often inextricably ambivalent functions: the supernatural power of talismans and charms and the

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beautifying property of jewellery. In actual fact, excluding the other members of the genus Homo, none of the components of the animal kingdom, even the higher primates, the anthropoid apes, our closest evolutionary ancestors and collateral relatives, exhibit any marked sign of beauty appreciation. It seems that the emergence of a sense of aesthetics, sufficiently compelling to induce artificial additions to the anatomy of even sometimes minor surgical alterations of it, has occurred more or less parallel to the development of language, tools and culture.

Now, with your permission, I would like to venture a diagnosis. Jewellery enterprises that neglect the field of coloured gems, that to various degrees discard them from their inventory, are—forgive me for saying so—colour-blind. The same way an individual affected by Daltonism, that is colour-blindness, misses out on a lot of the beauty, of the glory, of the colourfulness of life and nature around him, seeing them as it were, in different shades of black and white as though he were watching a telecast on the screen of a non-colour television set, or a black and white movie picture, a jewellery concern that persists in ignoring the field of coloured gems is missing out on incalculable opportunities for profit-making.

Let me sketch out for you a very familiar sequence. When a young woman is considering buying her first piece of jewellery she will, as you know, seek the jeweller almost invariably for a diamond ring. The reason for this is twofold:

1. Diamond, the King of the gem world, is the most prestigious thing to wear, and
2. Diamonds, like pearls, can be used quite indifferently with practically any dress colour or style.

Later on, as and when affluence brings its mixed blessings into her life, this young lady will again look up the jeweller for, probably, a diamond brooch or pendant. Sometime later, she may consider changing her ring for a larger and more important diamond. To cut a not very long story short, she may eventually look for a pair of diamond earrings; and here it will very likely come to an end, the point of saturation being reached.

On the other hand, once this very same lady develops a sophisticated taste for coloured gems, something which requires a certain gratifying dexterousness, some degree of selectiveness in seasonal as well as colour matching of jewel and dress—once she starts buying and using them, this new sequence will never end. Her desire for coloured gems will prove quite insatiable, due to the enormous variety and the practically endless combinations. The point of saturation in this case is unreachable, it is elusive, unattainable. To put it in a nutshell, coloured gems constitute a dimension that extends far beyond the dimension of diamonds. We can have only one monarch: Diamond. The number of princes and barons on the other hand is theoretically unlimited; consequently, coloured gems offer, literally, a golden opportunity to the jeweller.

Now, we have to face this question: How can the individual jeweller get into the field of coloured gems, or if he is already handling coloured gems as a sideline, or even as a main line, how can he develop this branch to its maximum potentiality? In answer to this question, three factors have to be considered. These are:

1. The Inventory.
2. The point-of-sale merchandising.
3. The sales techniques.

THE INVENTORY

A carefully chosen, well balanced stock of coloured gemstones is logically the starting point. You cannot sell what you do not have—except on the rare occasions where you act as a broker and/or sell from goods consigned to you. Furthermore, sales are in the numbers: the bigger and the wider the choice in your arsenal, the greater are your chances for scoring direct hits.

However, it is not necessary to have all your inventory of gemstones mounted. There is no need to tie up more capital unnecessarily. It is, on the contrary, desirable to leave a substantial part of your stock in the form of loose stones. This way, you will be leaving the door open for the option of custom made, hand tailored pieces of jewellery that would exactly fit the taste and requirements of the eventual buyer.

All right, so you have to build up an inventory of coloured gems. What are these gems? What are the characteristic properties of gemstones? I do not propose to tax your patience or offend your knowledgeability with a detailed dissertation on gemmology; I am sure quite a number of people present are more versed than I in the topic. I intend however, to touch very briefly on certain elements of the subject. I would like first to enumerate the characteristic properties of gemstones. These are:

1. Beauty
2. Durability
3. Rarity

and 4. A property which has been somehow persistently overlooked by gemmologists and consequently its mention in gem books consistently omitted, and this is, Portability.

Beauty

A gem has to be attractive enough in order to trigger the urge to acquire it, in order to stimulate the desire to possess it, in order to incite a willingness to pay for it, to buy it.

Durability

The second property is the resistance to scratching; it is what we commonly call hardness. A gem has to possess hardness enough to retain its beauty. You see, unlike similar luxurious but perishable commodities such as fur coats and precious leather-ware, as for instance crocodile handbags and shoes, jewels are expected to be longlasting, eternal; they are meant to be handed down from generation to generation.

Rarity

The third characteristic of a gemstone, and an exponent of this quality according to the inexorable, all-pervasive, omnipresent law of supply and demand, is price. It must be rare enough in order to fetch a decent price.

Portability

Gemstones constitute value in compact size, they are a form of condensed wealth. One can carry literally in one's pockets tens, or even hundreds, of thousands of pounds in the form of a few tiny parcels of gems. In the course of history, gemstones have surreptitiously or openly crossed borders between countries, they have continuously changed hands, being bought in times of affluence and sold in times of depression. They have repeatedly served to finance a king or a prince to wage war or to buy a peace settlement; they have been used along with precious metals often to appease the appetite of an aggressive imperial power or as ransom for many a crowned head. If gemstones were to disappear overnight from the face of the earth, most people would go on living as usual, practically unaffected; but on the other hand, had gemstones never existed, many a chapter of human history would have to be rewritten.

Another point I would like to expose is one that has to do with nomenclature. Traditionally, jewels are divided into precious and semi-precious. The members of the precious class are four: first is the universally acknowledged king of them all, diamond. The other three princely members of this class are emerald, ruby and sapphire. The rest of the aristocratic members of the gemworld have been all lumped together under the heading 'semi-precious'. However, over the last few decades, this elementary classification, this simplistic terminology has been increasingly eroded by the gradual realization that the line of demarcation between the precious and the semi-precious gems is indeed a very hazy one.

The dividing line is so blurred that there is in more than one area factual confluence of the two conventional categories; because, what are we to use as a yardstick in order to differentiate between precious and semi-precious stones? Is it the first characteristic of a gem, that is, beauty? But beauty is a dual property: the objective or inherent factor related to form, colour, harmony and symmetry, and the subjective element of assessment and appreciation, which is largely dependant on fashion, taste, the times and geography. To give one example, Pliny tells us that in ancient Rome emeralds were much more appraised that rubies, whereas if we focus on Renaissance Florence some sixteen centuries later, we hear Benvenuto Cellini informing us that rubies were considerably in higher demand than diamonds and were fetching prices eight times as much. Shall we then use as a yardstick the second property of a gem, that is durability, or hardness? But emerald, a notable member of the precious group with a hardness of 7½ on Mohs's scale, is less hard than either chrysoberyl with a hardness of 8½, or topaz with a hardness of 8; both members of the semi-precious group. Is it rarity and its exponent, price, that we shall go by to distinguish between the two categories? We find that this too, does not apply to several cases—for example, a demantoid garnet or an alexandrite chrysoberyl can fetch high prices, both being rarer findings than a rather nice sapphire.

The realization of all these facts has led the participants of an international convention of retail jewellers a few decades ago, to pass the half-measure resolution of arbitrarily shifting the demarcation line between the two groups of gems to the hardness immediately above that of Quartz—that is 7 on Mohs's scale. They chose the hardness 7 because it is that of silica which is abundantly present in sand as well as in the dust suspended in the air carried by the winds, which would scratch any stone of a hardness of 7 or below, thus prematurely showing the signs of wearing. So, according to this resolution which takes into consideration only the property of hardness, all gems that possess a hardness superior to 7 are precious and all those with a hardness of 7 or below are semi-precious.

It has been quite some years now since the French members of the trade have discarded the illogical term 'semi-precious' to replace it by 'pierres fines' whose closest English equivalent would be 'gemstones'. Quite recently, at the last annual conference of the International Federation of the Jewellery Trade, 'C.I.B.J.O.', in Paris, the use of the term 'semi-precious' was considered at length, it being reported that some Scandinavian countries and West Germany had made progress by getting official acceptance of the term 'precious'. However, there were difficulties for some, it was said, particularly in respect of Customs Authorities, in redefining the expression 'semi-precious'. The U.K. delegation considered that we should do everything possible, in the U.K., to discourage the term, which is a 'down-grading' one. They believe it is better to use 'precious stones' or 'gemstones' . . . . . At long last we can see the light at the end of the tunnel and I trust the day is near when the derogatory expression 'semi-precious' will become obsolescent and the conventional classification of gems will be past history.*

Now let us focus on an important point related to the building up of an inventory of coloured gemstones, namely its investment value to the jeweller. In inflationary times like these, continuous price increases of practically every marketable item of service have become a familiar aspect of the economic landscape. Over the last decade or so, coloured gems have steadily figured among the commodities heading the list of price increases. Between January, 1969 through December, 1978, these gems, in the rough, at the sources—whether in Brazil or Colombia, Africa or Sri Lanka, Australia or Afghanistan—have undergone, across the board, increases in prices by leaps and bounds, so that at present they fetch in terms of Pounds Sterling between nine and a half to

*I had hoped that it was already practically obsolete, except as a matter of history.—Ed.

almost eleven times their prices in the beginning of 1969. Evidently the same has applied to the World gem cutting and jewel manufacturing centres, whether around the mining areas or in such traditional, or recently developed, centres as, for example, London or Birmingham here in the U.K., Idar-Oberstein or Pforzheim in Western Germany, Jaipur in India, or Bangkok in Thailand. What is perhaps even more interesting is the fact that at no point during this last decade, has the curve of price increases ever been deflected downwards, as happened in the fifties and early sixties. It is thus obvious that, even after price indexing against currency depreciation, coloured gemstones have shown a true up-valuation. It follows from this that one should not think twice to invest in coloured stones.

THE POINT-OF-SALE MERCHANDISING

It is all very good to possess an inventory that rapidly scores genuine increases in prices, that gains in value in absolute terms. However, this asset would turn into a liability if such an inventory consists of hard-to-sell items—of articles that go up in replacement price without the need for replacement—of commodities that confine themselves to registering profits on paper. The life-blood of any business is turnover.

An effective catalyst for turnover is point-of-sale merchandising, which actually boils down to proper display techniques, capable of triggering public interest in coloured gemstones with resulting sales. Effective display of the goods is cardinally important for the jewellery shop and the jewellery department in a department store, as well as in the layout at jewellery exhibitions. Space rental costs being what they are in the large City centres of the World, it is vital that every square or cubic foot should be adroitly and efficiently used in order to generate sales and profits that should stretch well beyond the break-even point.

Lighting

The first point in this context I am going to consider with you is the overriding question of lighting. Diamonds, as you know, are shown to their best when bathed in fluorescent or mercury vapour light containing a bluish hue, which would offset any off-coloration present in them. Their cold eternal fire reacts better to a moonlight type of illumination. Conversely, coloured gemstones are displayed to good advantage under ordinary tungsten spotlights which possess a subtle yellowish hue. Similar to oil paintings, their colours are shown to full glory and striking vividness under a warm solar type lighting. In an art gallery you will never find the strip lamps fitted above the paintings fluorescent, they are invariably ordinary tungsten lights.

In recent years the research work undertaken by optics physicist, Professor O. Erametsa of Helsinki, Finland has resulted in the remarkable invention of the Neochrome electric bulb. The principle of this bulb is that its glass consists of an association of synthetic crystal and of rare mineral salts. This gives it the property of substantially filtering out the yellow component of the spectrum, thus imparting sharper definition to the exposed items and accentuating colour hues and tonality, without denaturing them.

Needless to add that the intensity of the lighting should be adequate. This is especially important in case of street windows facing the sun during part of the day, in order to offset the mirror effect of your window glass whenever the sun is shining their way.

Mixing of Colours

The second point in the proper display techniques is to keep from displaying your jewellery in trays of the same sets of rings, as usually done with diamonds—e.g. a tray containing emerald rings, a tray with aquamarine rings, another of ruby rings, and so on. You have an important asset: Colour! Mix them up, try to find the best combination, the optimum arrangement. Endeavour to compose a chromatic ballad, to produce a symphony of colours. A good practical tip that may help to achieve splendid results is to place complementary colours adjoining each other. Examples of complementary colour pairs are:

Red and greenish blue — Orange and cyan blue
Yellow and indigo blue — Violet and greenish yellow
Purple and green

Complementary colours possess what the physiologists call 'the property of simultaneous contrast', they reciprocally increase their vividness; they enhance each other. Incidentally, this phenomenon is taken advantage of in the street traffic lights.

Not only those already mentioned, but every colour and shade of colour has its complementary, which lies diametrically opposite it on the colour wheel. At any rate, in your efforts to find the best colour layout, take as often as possible the advice of the ladies in your sales force. I find, as a rule, that members of the gentle sex are blessed with a higher colour sensitivity than myself.

The Hidden Message of Mineral Display

The next recommendation I would like to make in merchandising your coloured gemstones is the wide use of rough crystals as a background for both your windows and in-store displays. Mineral crystals are very decorative; they are an integral part of the display theme; frequently, they can serve as props or in the place of pads for the exhibited jewels; they offer a subject of conversation; furthermore, they are marketable items.

Another suggestion I would like to offer is to spread in the midst of your rings and brooches and necklaces, some loose gems in a way that is in keeping with the general colour harmony. The importance for your image of the presence of both rough crystals and loose stones in your display is not to be slighted. It carries two implied messages: the rough stones hint to a direct link between your concern and the source—the mines, and the loose gems suggest that you are a wholesale gem importer, with contacts with gem cutting centres, who is in a position to offer the best values. In this way two new dimensions are added to the image of your establishment.

Skilful Price Tagging

It is sometimes customary for jewellers to place price tags on certain items on display. There is no harm in this, provided you apply the art of the 'inviting price tag technique'. Every one of you knows perfectly well his best selling price bracket. Put price tags on some of the pieces that fall within this bracket and, if you wish, on some of the items that are below it; but never on any article that lies in a price category above it. This may drive away the shy potential buyer, and you need the traffic. If you are going to price tag some of the loose gems on display, when the stone happens to be a fraction of a carat—say a ¾ carat diamond or a 60 point emerald—it is advisable to mark the tag with the total price of it, which will evidently be inferior to its price per carat. If, on the other hand, the gem is larger than a carat, it is preferable to put down its price per carat, which will obviously be less than the total price for the stone.

Contagious Use of Jewels

Another helpful procedure in merchandising coloured stones is what I am very fond of calling the 'animated display'. Wear coloured gems yourself; have your wife wear them. Make the members of your sales force wear them. Using coloured jewels imparts to them added life, increased brilliance, intensified fire, because with every movement of the body, they catch the light rays at a different angle, and an alternate corner, another facet springs out from the dark and shines forth in full glory. Confer on them the prestige of being used and of being useful and the compliment will be twice returned—firstly in the form of the privilege of wearing them, and secondly through a vague, inarticulate, yet strongly motivating impression at the border plane between the subconscious and the conscious mind of the potential customer. Translated into the parlance of awareness, this insidious motivation would be the equivalent to an argument along these lines: 'If you, the professional, find them worthy of being used by you, they deserve to be worn by myself.'

Birthstones of the Month

Finally, one of the important topics of the display techniques is the birthstones. The belief in the occult power of birthstones seems to have originated from no less dignified source than the Biblical story of the jewelled breastplate. This was worn by Moses' elder brother Aaron, the High Priest. Clad in vestments wrought with gold and blue, purple and scarlet, Aaron stands before the altar of God, bearing over his heart the jewelled breastplate whose twelve precious stones are each one dedicated to a tribe of Israel. They are mediums whereby God signifies his judgement of the tribes. If He is angry the stones turn dull and colourless, but, if the Israelites have obeyed His Commandments then God makes them shine forth in glorious splendour of light and colour. Later, according to Flavius Josephus in the late first century A.D. and St Jerome in the early fifth century, the twelve gems of the breastplate became linked in association with the twelve signs of the zodiac and the twelve months of the year. Each stone became related to a particular month and endowed with a peculiar virtue for those born in that particular month. The jeweller intent on developing his business in coloured gemstones must not fail to draw great promotional dividends from such deep seated popular beliefs. He should permanently devote a determined section of his most exposed window, preferably a street window when there is one, to the special display of the stone of the month. After three or four months, he will condition the habitual passer-by to expect a change in this section at the beginning of each successive month. The expectancy in itself will act as a sight-arresting mechanism.

There are two ways of displaying the birthstone. One is the simple method of showing the rough crystals in the background and some loose gems interspersed among the mounted pieces—all consisting of the stone of the month. The other procedure is a rather elaborate one, whereby you propose each month to deliver to the public a sort of graphic lecture on gemmology. It has the advantage of investing your establishment with a kind of academic aura; of heralding it as the gem-headquarters of the vicinity, thus drawing a number of appraisal business and occasionally the good bargain of estate or second-hand jewellery.

(Four slides were then shown to illustrate this technique: they are described below.)

Slide 1. The calendar label is that of February. The birthstone of the month is Amethyst. This gem belongs to the quartz group so, in the central part of the rear of the window, you should show an agglomeration of quartz crystals, clearly labelled: 'The Quartz Group'. On the left side of the front part, occupying a respectable section of the window, you have a largish amethyst geode, quite a few loose amethysts and a good number of set pieces. A label placed nearby is boldly marked 'The stone of the month—Amethyst'. To the right of the window and slightly backward, a citrine geode much smaller than that of the amethyst and three or four loose citrines with a label indicating 'Citrine', the other important member of the group.

Slide 2. The calendar label announces November. The stone of the month is Citrine. The layout is basically the same as in February with the centrally placed label and exhibit of the 'Quartz Group', except that in this month, Citrine is highlighted by the large citrine geode and quite a number of loose and mounted citrines, and its label indicates boldly that it is the stone of the month. Amethyst, the other member of the group, is pushed back to a secondary plane and is represented by only a smaller geode and three or four loose amethysts.

Slide 3. The month is March. Aquamarine, the birthstone, dominates the picture. The suggested layout is a kind of genealogical tree. The trunk bears the label 'The Beryl Group', from which branch out the following members, each clearly labelled and represented in a background position by a small crystal and two or three loose gems—morganite (pink beryl), heliodor (golden beryl) and emerald; whereas aquamarine is stressed by the presence of a larger crystal and a good number of loose and mounted stones.

Slide 4. It is May and emerald is the birthstone of the month. A few roses in the window symbolize the season and contrast beautifully with the verdant green of the emerald. The scheme is basically the same as that of March, except that emerald has sprung to the forefront with a larger crystal on matrix and more loose and mounted emeralds; whereas aquamarine has receded back to join the rest of the supporting cast that stem from the 'Beryl Group' trunk.

THE SALES TECHNIQUES

As we all know, one of the prominent features of our modern business world is the vast amount of literature and advice proffered by Chartered Accountants concerning tax shelters and methods of tax avoidance. By this, of course, I do not mean illegal practices of tax evasion. In the same vein, though in a different sphere, I now propose to sketch out a few practical points regarding sales induction without, however, infringing on the ethical considerations of consumer protection.

We are going to assume we have reached the stage of being equipped with an adequate inventory of coloured gemstones and we have managed to create the desired interest in them. The points I am about to elucidate are of help to the salesman, whether in the store or on the road. These are:

The Price Ladder

Suppose a lady walks into the shop and asks for say, an aquamarine ring. Unless she asks specifically for a particular ring on display in your window, that is, if her enquiry is vague, it is always a good policy to start by showing her the least expensive of the aquamarine range in your stock. If she says 'No, I want something better', climb up the price ladder very gradually until you sense you have reached her maximum purchasing capability and stop there! Do not go above this level, because you will be showing her a finer piece, but one which she cannot afford and you may find you have lost a sale.

The Forbidden Expressions

As we all know, quite a number of the natural gemstones have inclusions. Emerald is a notorious example. Other examples are rubellite, ruby, sapphire with its silk, etc., and this common occurrence is tolerated the same way a cloud partially obstructing the sunshine is taken matter-of-factly. This phenomenon is to such degree accepted and sometimes even expected by the relatively knowledgeable consumer, that inclusions are, I am afraid, deliberately implanted in man-reconstituted stones—e.g. the Gilson and Chatham emeralds. However, should a customer ask 'What is this thing I see inside the stone?', never describe it as a 'defect' or an 'impurity' or a 'flaw' or an 'imperfection'. These words should never be used; they are taboo. Use instead the expression 'natural inclusion' and expose the argument that these inclusions are a kind of authenticity certificate delivered by Nature to this particular stone—the visible proof that it is a natural gemstone and not a man-made imitation.

Another danger may arise from a situation like this. Suppose you show a customer a topaz, or a diamond ring, and when you tell her the price, she exclaims: 'Oh no! I cannot afford to pay that much.' Do not snap: 'Let me show you something cheaper'. The terms 'cheap' and 'cheaper' should be crossed out of the salesman's vocabulary, because of their unpleasant connotations and their negative effect on selling persuasiveness. Tell her instead: 'Let me show you something less expensive, but of very good value'. In the sanctum of your Store and by the same token, in the course of door-to-door selling, the anodyne and sometimes enticing expressions 'inexpensive' and 'low priced', 'less expensive' and 'lower priced' are to substitute the offensive adjectives 'cheap' and 'cheaper'. Needless to add that the use of the downgrading expression 'semi-precious' should be at all cost avoided. Who wants to buy a half-anything? The more logical terms 'precious stone' or 'gemstone' are the ones more appropriate and more wisely to be employed.

Knowledgeability is Vital

Know as much as you can about the commodity you want to sell, because you cannot sell what you do not know much about. Once you have established your authority and impressed your customer, across the counter, with your knowledge about the item in transaction, half the battle will be won: you will find him or her less resistant to your arguments, more receptive to your advice.

The necessity of adequate knowledge applies also to the members of your sales force. A good practice is to set the routine of regular weekly meetings of the selling department. These should be kept as informal as possible and limited to 20-30 minutes. The purpose of these meetings is to expose the staff to the items carried in stock, or newly added to it and to exchange selling experiences of the elapsed week and also to comment on impromptu arguments that helped overcome some obstacles met within the course of a sale.

There are two ways I know of to increase your knowledge about coloured gemstones:

(a) The first is to be well read on the subject and to take up a gemmology course, that is, if this has not yet been done. It is important to have at least one qualified gemmologist on the staff.

(b) The second is to take what we may describe as a post-graduate crash course. I mean by this that at least one, preferably several staff members should go to the sources and tap them for first-hand information. Intelligence gathering and/or buying trips to various mining, gem-cutting and jewel manufacturing centres should be organized and/or participated in, as frequently as possible. I know, for example, that in the hierarchically stratified Japanese market quite a few jewellery concerns in different levels of the distribution scale have been organizing for their various customers, and their customers' customers, regular buying tours to production centres, sometimes as often as once a month. In this instance, these visits to the centres represent a good short, medium and long-term investment for the organizing enterprise, as well as for the participants who belong to the trade.

(i) As an immediate dividend the sales are more considerable since they are usually achieved out of a larger stock. There is no clash of interests between supplier on the one hand and organizer or participants from the trade on the other. By prior mutual arrangement, the profits on sales made to the latters' customers are silently computed into the quoted prices.

(ii) A medium-term benefit is the image boosting effect of word spreading around, concerning the direct contacts that the organizer, and, by the same token, the trade people among the participants, maintain with the producing centres.

(iii) An added bonus is material gathered by them in the course of these visits regarding information, slides and pictures which may be used for Press releases, inserts and articles, and to illustrate public relations talks on various aspects of the jewellery industry.

(iv) Concerning the most important dividend of these gem safaris and study tours to the production centres, I can hardly urge you strongly enough to take part in them. Go to the source. Visit Brazil, Africa. Palpate with your own hands the bare facts concerning coloured gemstones. Get familiar with the amount of work and expertise needed for the mining and cutting of these gems. Back home, you will find that the jewel you offer to the customer across the counter has suddenly acquired a deeper significance, has triggered off an avalanche of memories about rubbing shoulders with the extraction and faceting and polishing processes in the course of such trips. This will find immediate expression in irrepressible enthusiasm colouring your arguments and flowing spontaneously through your selling attitudes; and as everybody knows, sincere enthusiasm is frequently a contagious phenomenon similar to yawning, but conversely, with a positive energizing effect. You will thus find that, more often than not, your enthusiasm has been communicated to your customer with no conscious effort on your part.

To summarize the main points of this talk:

(1) We have seen how coloured gemstones constitute a dimension extending far beyond the dimension of diamonds.

(2) We have found out that the current continuous increases in the price of coloured gemstones is a virtual one, over-reaching currency depreciation to realize a profit in real terms.

(3) We have reviewed various techniques in the display and selling of coloured gemstones that effectively prevent this profit from stagnating on paper and help in converting it into a healthy cash flow.

Finally, I should like to add this. Take a general textbook of gemmology, any textbook, and you will find that only one chapter or section deals with diamonds, whereas the rest of the book is devoted entirely to coloured gemstones. This gives you a gauge as to the scope of the field and an idea of the extent of the potential. According to the old legend, 'There is a pot of gold at the end of the rainbow'; by the pot of gold is meant wealth. In the light of what we have reviewed today, one may most emphatically assert that at the end of the rainbow, there is a pot of colourful, of enjoyable, of profitable gemstones.

GEMMOLOGICAL ABSTRACTS

ALTHAUS (E.). *Achat, Aufbau und Entstehung.* (Agate, structure and growth.) Lapis, **4**, 12, 26-9, 4 figs (2 in colour), 1979.

Details of the structural growth of agate are given with notes on the varying chemical composition. M.O'D.

ALTMANN (J. D.). *Suggestions for nomenclature of opals.* Aust. Gemmol., **13**, 12, 383-5, 1979.

An attempt to clarify the naming of opal, long overdue, not least in Australia. ('Fire opal' is used in the American sense of a light opal with strong play of colour. The European use is for the orange or red body-coloured opal from Mexico, with or without play of colour. The term 'crystal opal' is obscure, since opal is not crystalline. If all opal dealers would use this or a modified version of the nomenclature it would be a much needed step in the right direction.) R.K.M.

BALL (R. A.). *Synthetic opal for natural opal!* Aust. Gemmol., **13**, 12, 386, 2 figs, 1979.

A report by Hylda Bracewall suggests that synthetic opal is being offered as natural opal at mine sites. Mr Ball subsequently received a sand-coated opal from a friend in Lightning Ridge and, by electron microphotographs, proved it synthetic. R.K.M.

BALL (R. A.). *An unusual agate.* Aust. Gemmol., **13**, 12, 390, 3 figs, 1979.

An agate from Tara, Queensland, had a superficially radial structure suggesting a group of crystals, but cut to show normal agate banding. Thought to be an agate pseudomorph after ulexite. R.K.M.

BALL (R. A.), MUMME (I. A.). *Sapphire and silk.* Aust. Gemmol., **13**, 12, 379-81, 1979.

Lists work and theories of ceramicists, crystallographers, mineralogists, geochemists and gemmologists on nature of inclusions causing silk. Rutile and aluminium titanate are both possibles. The influence of gallium on colour and 'silk' formation is queried. (A sprinkling of misprints is to be regretted although the sense is for the most part clear.) R.K.M.

BANK (H.). *Orange (Padparadscha) und andersfarbige Granate aus Ostafrika.* (Orange-coloured (padparadsha) and other-coloured garnets from East Africa.) Z.Dt.Gemmol.Ges., **28**, 3, 146-7, bibl., 1979.

Variously coloured garnets from East Africa, for instance orange coloured ones, show on examination that they contain Mg and Fe as well as Mn and Ca, and are thus mixtures of pyrope, almandine, spessartine and grossular garnets. E.S.

BANK (H.). *Rosaroter durchsichtiger Väyrynenit z. T. in Edelsteinqualität aus Pakistan.* (Pink transparent vayrynenite partly in gem quality from Pakistan.) Z.Dt.Gemmol.Ges., **28**, 3, 163-4, bibl., 1979.

This mineral was first described as being found in Finland in 1954. It now also comes from Pakistan/Afghanistan; as these minerals are of cuttable quality, some details are given. The mineral is pleochroic (yellow pink/light pink/dark pink), SG 3.230±0.002, RI 1.639-1.667, DR 0.028. E.S.

BANK (H.), SCHMETZER (K.). *Spiralförmige Einschlüsse in Edelsteinen: Spannungsriss in synthetischem Korund.* (Spiral shaped inclusions in gemstones: tension cracks in synthetic corundum.) Z.Dt.Gemmol.Ges., **28**, 3, 148-9, 1979.

A pink boule had its long axis roughly parallel to the *c*-axis. After manufacture the boule was without any cracks, etc., for about 12 hours. Then suddenly cracks appeared, which were seen to be spiral cracks parallel to the *c*-axis; a few other smaller cracks appeared as well. Photographs of the cracks are shown. E.S.

BARABANOV (V. F.). *Géochimie et typomorphisme des aigues-marines zonées.* (Geochemistry and typomorphism of zoned aquamarines.) Bulletin de Minéralogie, **103**, 1, 79-87, 7 figs, 1980.

Zoned aquamarines from Cherlovaya Gora, East Baikal, U.S.S.R., were examined by various techniques. It is shown that zonality is related to tectonic variation during crystal growth. M.O'D.

BASSETT (A. M.). *Hunting for gemstones in the Himalayas of Nepal.* Lapidary Journal, **33**, 7, 1492-1520, 15 figs in colour, 1979.

Good quality tourmalines and aquamarines are found in Nepal; this is an account of travels in the area. M.O'D.

BODE (R.). *Rhodochrosit, Rosenfarbige Schönheit.* (Rhodochrosite, rose-coloured beauty.) Mineralien Magazin, 1, 8-13, 9 figs (8 in colour), 1980.

A well-illustrated introduction to rhodochrosite with particular reference to specimens from South African localities. M.O'D.

BRICE (J. C.). *Crystal growth from liquids at high temperatures.* Progress in Crystal Growth and Characterization, 1, 255-88, 24 figs, 1979.

Growth of crystals from liquids is explained in a simple way and all methods currently used are illustrated. M.O'D.

BROWN (G.). *Corallium precious corals.* Aust. Gemmol., **13**, 12, 391-400, 9 figs, 1979.

Part 1 discusses name origin, history, growth of live corals, composition of calcareous skeleton, harvesting and processing; Part 2, structure and gemmological properties. (Compiled with Mr Brown's characteristic thoroughness, this is unfortunately 'continued next issue' and bibliographic references made here must wait that instalment to connect up. It is hoped that it will not disappear without trace as did another paper in 1976.) R.K.M.

BROWN (G). *Diamond—true of false?* Australian Gemmologist, **13**, 11, 341-51, 354-8, 14 figs, 1979.

Summarizes most of the available tests for diamond, including one or two of doubtful reliability, but omits hardness test on a corundum plate, the one absolutely positive and instant test for diamond. Reflectometers need to be called infrared reflectometers, since they use radiation in the near infrared and reflectivity in those wavelengths differs from that for visible light. R.K.M

BROWN (G.). *New gem materials—1978.* Wahroongai News, 23-6, January 1979.

Lists 16 'new' gem materials which have 'appeared on the market in 1978'. A later statement that they have been 'presented in detail . . . in gemmological literature' for that year is nearer the truth. Some, e.g. scapolite from Tanzania, are new sources for well-known gems. Others have been known for a long time, e.g. multiple asteriated quartz from Sri Lanka (called 'unique', but the phenomenon is also known in both corundum and spinel) was described by abstracter in 1951.* Kornerupine cat's-eyes, deep blue Maxixe-type beryl (recognition data incomplete; colour stability is not just 'suspect'—it fades rapidly and is scarcely commercially viable) and deep blue topaz are all several years old. Writer discusses synthetic ruby under 'Chatham synthetic sapphire' heading, and neglects to mention that x-ray test for phosphorescence causes corundums to discolour. R.K.M.

BROWN (G.), LUND (D.). *Organic gem materials—what to look for?* Australian Gemmologist, **13**, 11, 352-3, 6 figs in colour, 1979.

Advises what to look for in suspected ivory, tortoiseshell, treated clarified amber, bone, horn and precious coral. J.R.H.C.

BROWN (G.), SNOW (J.). *Gemmology study club report— treated Brazilian opal.* Australian Gemmologist, **13**, 11, 359-61, 4 figs, 1979.

Brazilian opal is structurally different from the material used in Australian treated black opals and investigators found that the distribution of the black colorant was quite dissimilar in the two materials. The three Brazilian stones were poorly oriented and polished; all included potch and the pigment filled dendritic cracks throughout the depth of the stones which were much more translucent than the Australian stones. R.K.M.

CHRISTOPHE (M.), GOUET (G.), WYART (J.). *Synthèse hydrothermale de la bénitoite.* (Hydrothermal synthesis of benitoite.) Bulletin de Minéralogie, **103**, 1, 118-19, 2 figs, 1980.

Benitoite was synthesized from its oxides between 270 and 450°C with water. The only well-crystallized specimens were obtained at a temperature of 300°C in alkaline sodic solutions. M.O'D.

COLLINS (A. T.). *High temperature annealing of colour centres in Type I diamond.* Diamond Research 1979, 7-12, 8 figs, 1979.

A Type Ia diamond that has been irradiated and heat-treated to make it a fancy yellow is impossible to distinguish by eye from the very rare and valuable natural yellow diamond. Testing laboratories have depended on an absorption line at 595nm to identify artificially-coloured stones. It is usually assumed that annealing is carried out at 800°C. (The annealing temperature is between 700 and 800°C.) If the annealing temperature is raised to 1000°C, however, the 595nm line disappears, but the

**Gemmologist,* XX, 234, 28-29.

colour is not significantly changed. In some diamonds, high temperature annealing leads to the formation of a 536nm system previously only seen in natural diamonds. E.B.

De Brodtkorb (A.), (M.). *Rhodochrosit aus Argentinian.* (Rhodochrosite from Argentina.) Lapis, **4**, 10, 19-22, 8 figs (4 in colour), 1979.

Rhodochrosite was first discovered in Argentina in 1885 and the country still remains the chief producer of the material. Details of some varities are given. M.O'D.

Dodson (J.S.). *The statistical brilliance, sparkliness and fire of the round brilliant-cut diamond.* Diamond Research 1979, 13-17, 13 figs, 1979.

In the past, the brilliant cut has been analysed mathematically (by Tolkowsky and others), by appraisal of practical arts (Eppler and Tillander), and recently by computer analysis of light paths (Stern). The author surveys these and concludes that the traditional proportions are correct as far as 'sparkliness' and fire are concerned. Sparkliness is presumably scintillation. His definition of fire is orthodox, but his brilliance is what gemmologists call 'life' or 'liveliness'.

Proportions of a cut depend upon maximizing one of these three qualities at the expense of the others and the mix is a psychological choice. E.B.

Fischer (K.). *Orientieren und Bearbeitan der Chalcedone und Achate.* (Orientation and fashioning of chalcedony and agate.) Lapis, **4**, 12, 32-6, 8 figs, 1979.

Details of the various patterns shown by the natural mineral are given and advice on fashioning to show details to their best advantage is provided. M.O'D.

Foit (F. F.), Rosenberg (P. E.), *The structure of vanadium-bearing tourmaline and its implications regarding tourmaline solid solutions.* Am. Miner., **64**, 788-98, 1979.

Examination of a vanadium-bearing tourmaline showed that the structure was similar to that of other members of the tourmaline group and that the whole system showed a flexibility in response to cation substitution. M.O'D.

Folgueras (S.), Rodríguez Martínez (J.). *Camara de luminiscencia y transparencia de gemas frente a los rayos X.* (Use of the camera in the study of luminescence under and transparency of gemstones to x-rays.) Boletin del Instituto Gemológico Español, **19**, 11-15, 9 figs, 1979.

The Debye-Schirrer camera can be used to observe transparency of gems to x-rays, phosphorescent effects and, with the Gandolfi apparatus, to obtain powder photographs. M.O'D.

Foord (E. E.), Martin (R. F.). *Amazonite from the Pike's Peak batholith.* Mineral. Record, **10**, 6, 373-84, 13 figs (3 in colour), 1979.

Pegmatite-bearing dikes in the Pike's Peak batholith, Colorado, contain fine specimens of amazonite. Crystals show good development of prism, dome and pedion faces, and the colour ranges from very pale blue-green to deep blue-green, turquoise or green-blue. Some of these are illustrated. M.O'D.

GRAZIANI (G.), DI GIULIO (V.). *Some genetic considerations on a Brazilian aquamarine crystal.* Neues Jahrbuch für Mineralogie Abhandlungen, **137**, 2, 198-207, 7 figs, 1979.

The so-called 'rain' effect was found on prism faces and black arborescent structures occupied positions parallel to the basal plane. A sceptre-shaped inclusion was also found. 'Rain' in this context is taken to mean parallel acicular tubes with foreign crystallites; another meaning is a profusion of parallel apatite crystals. Two genetic stages could be recognized in the crystal, the first characterized by inclusions of quartz, apatite, ilmenite, epidote and corundum, with some other minerals; the second by the presence of arborescences due to infiltration of late-magmatic fluids of the hydrothermal type. M.O'D.

GRAZIANI (G.), LUCCHESI (S.). *Einschlüsse und Genese eine Vanadiumberylls von Salininha, Bahia, Brasilien.* (Inclusions and genesis of a vanadium beryl from Salininha, Bahia, Brazil.) Z.Dt.Gemmol.Ges., **28**, 3, 134-45, 6 photomicrographs, diagram, 3 tables, bibl., 1979.

An uncommon crystal of a milky, pale-green Salininha vanadium beryl and its mineral inclusions were examined. Optical tests, x-ray and electron microprobe analyses were undertaken. The inclusions were found to be calcite, talc, potassium feldspar, phlogopite and corundum. The occurrence of these inclusions suggests both the T-P range of this vanadium beryl and the chemical conditions of its environment. E.S.

GÜBELIN (E.). *Feuerachat.* (Fire agate.) Lapis, **4**, 12, 23-5, 7 figs in colour, 1979.

Fire agate which displays a play of colour in some ways similar to that shown by opal is found most commonly in Mexico, although some is mined in southwestern U.S.A. Illustrations show how the colour is arranged in bands. M.O'D.

HARRIS (J. W.). *Physical and chemical constraints in the formation of natural diamond in the Upper mantle.* Diamond Research 1979, 2-6, 3 figs, 1979.

Inclusions in diamonds enable the stones to be separated into two groups, peridotitic and eclogitic. Peridotite is the main component of the upper mantle, whereas eclogites are rare in it. Inclusions from both groups of minerals have never been found in the same diamond. On the other hand, the same kimberlite may contain diamonds of both groups. The two rock types provide clues to the likely chemical environments for diamond formation. E.B.

HEALEY (D.). *The gem scene in Sri Lanka.* J. Gemm. Assoc. Hong Kong, 1, 7-14, 1980.

An interesting description, with much detail, of a trip to Sri Lanka; gems are plentiful, though high quality material is difficult to obtain. M.O'D.

HUBER (O.). *Feueropal aus Mexico.* (Fire opal from Mexico.) Lapis, **4**, 12, 19-20, 4 figs (2 in colour), 1979.

Fire opal is found in a belt running between the states of Guanajuato and Querétaro in Mexico. The mother rock is usually a rhyolite. M.O'D.

JACOBSON (M. I.). *Mount Antero.* Mineral. Record, **10**, 6, 339-46, 15 figs (2 in colour), 1979.

Mount Antero in Chaffee County, Colorado, produces fine quality specimens of aquamarine and phenakite, together with smoky quartz and topaz. M.O'D.

KOCH (S.). *Edelopal aus Ungarn.* (Hungarian precious opal.) Lapis, **4**, 12, 21-2, 3 figs (2 in colour), 1979.

'Hungarian' opal was found in an area which is now politically Czechoslovakia, the main locality being Červenica, formerly Vörösvágás. The material is no longer mined and has historical importance only. M.O'D.

KOSNAR (R. A.). *The Home Sweet Home mine.* Mineral. Record, **10**, 6, 333-8, 9 figs (6 in colour), 1979.

The Home Sweet Home mine is in the Mosquito Range of central Colorado and is celebrated for fine specimens of rhodochrosite and fluorite, which are illustrated. M.O'D.

KUGE (S.), KOIZUMI (M.), MIYAMOTO (Y.), TAKUBO (H.), KUME (S.). *Synthesis of prismatic and tabular diamond crystals.* Mineralog. Mag., **43**, 579-81, 6 figs, 1980.

When diamond is synthesized at conditions of comparatively high *T* and *P*, the nucleation rate is high, as is the growth rate of the nuclei; consequently the product is usually an aggregate of crystals with dendritic or skeletal structure. In this study, Au or Ag mixed with a catalyst is reported to have the effect of suppressing nucleation. When a homogeneous mixture of graphite, catalyst, and additive is treated under conditions where skeletal forms and dendrites would form in the absence of additive, euhedral crystals of diamond octahedra are produced. By using a special cell assemblage for high-*P* experiments (7GPa 1700°C) in which graphite is placed inside a cylinder of catalyst coated with additive, prismatic (400 μm) and tabular (1.5 mm) crystals have been synthesized. R.A.H.

LECKEBUSCH (R.). *Comments on the luminescence of apatite from Panasqueira, Portugal.* Neues Jahrbuch für Mineralogie Mönatschefte, **1**, 17-21, 3 figs, 1979.

Luminescence arises from emission in the blue (Eu^{2+}) and in the yellow (Mn^{2+}) range. A concentric zone structure in a crystal with bright yellow and dark green luminescence showed variations in the incorporation of Mn. M.O'D.

LENZEN (G.). *Diamantengraduierung: die Feinbearbeitung oder das Finish.* (Diamond grading: accurate working or finish.) Z.Dt.Gemmol.Ges., **28**, 3, 150-62, 1979.

This article is a reprint from the newly published book by Lenzen about diamond grading, and deals with the finish of the stone, especially faults in the finish which are measurable, such as deviation from the round (only in the case of brilliants), table not level or eccentric, eccentric facets. These faults can be marked on diagrams when evaluating the stone. Photomicrographs illustrate these main faults. Apart from the measurable faults mentioned, the following must be taken into account: general symmetry faults in the crown, pavilion or girdle also additional or missing facets. The girdle must be marked according to its roughness and evenness. The culet must be examined and checked whether it is damaged, non-existent or too large. The polish must be judged, whether it has polishing marks, how strong these are and whether they lessen the brilliance. Lastly, the stone must be checked for open, rough or burnt places. All these faults are given points according to their importance and when these are added up the grade of finish can be judged to be very good, good, medium or poor. E.S.

LEVEL (D.). *Le dichroisme photographié.* (Dichroism photographed.) Revue de Gemmologie, **61**, 10-11, 5 figs in colour, 1979.

Dichroism in blue tourmaline and blue sapphire is illustrated to show the use of photography in testing. M.O'D.

LEVINGSTON (K. R.). *Gem diggings—Chudleigh Park.* Queensland Govt Mining J., **80**, 35-8, 2 figs, 1979.

Peridot, sapphire, and spinel occur on the slope of a small Cainozoic cone that produced massive basalt, vesicular flows, and lapilli tuffs. The peridot is associated with cognate mafic nodules, some with spinel which indicates crystallization at pressures of 1.0-1.8 GPa. D.J.D.

LIEBER (W.). *Der versteinerte Wald von Arizona.* (The petrified forest of Arizona.) Lapis, **4**, 12, 30-1, 4 figs (3 in colour), 1979.

Petrified wood in the Petrified Forest National Park, Arizona, is illustrated and described. M.O'D.

LIEBERTZ (J.), FALTER (M.). *Synthese von Edelopal.* (Synthesis of precious opal.) Lapis, **4**, 12, 16-18, 7 figs (4 in colour), 1979.

An account of the development of three-dimensional structures from which diffraction of light could take place, this paper covers the work of Pierre Gilson in the field of opal synthesis. No account of stabilization procedure is given. M.O'D.

McCOLL (D. H.), WARREN (R. G.). *The first discovery of ruby in Australia.* Australian Gems & Crafts Magazine, **39**, 121-5, 13 figs (10 in colour), 1979.

Ruby has been discovered in the Harts Range of the Northern Territory of Australia. The material has a good colour and is suitable for cutting into cabochons; it occurs as either well-formed tabular crystals or as ovoid masses up to 12cm long. Some smaller crystals are translucent, but very little completely transparent material has been found. Mica flakes and some zircon crystals have been seen as inclusions in the peripheral zones of some crystals. M.O'D.

MADISON (M. E.). *Nephrite occurrences in the Granite Mountains region of Wyoming.* Lapidary Journal, **33**, 9, 2008-13, 1979.

Erratic boulders of jade are found at a number of localities in this region, the most important primary source being the south central portion of the Granite Mountains core. Range of colour extends from very pale green to black (these are seen to be dark green by transmitted light). Chemical analyses are given. Paper reprinted from the 30th Annual Field Conference Guide Book of the Wyoming Geological Association. M.O'D.

MAYO (F.). *Gems of Georgia.* Rocks & Min., **54**, 148-50, 2 figs, 1979.

The following minerals are described and their localities (in Georgia, U.S.A.) are summarized: almandine, apatite, beryl (aquamarine), corundum (ruby), diamond, kyanite, lazulite, nephrite jade, quartz (smoky, clear, amethyst, rose, agate, jasper, chert), rutile, schorl, staurolite, topaz. R.S.M.

MOTEL (B.). *Les joyaux de la couronne de France au XIX^e siècle.* (French crown jewels of the 19th century.) Revue de Gemmologie, **60**, 7-13, 11 figs (2 in colour), 1979.

Jewellery of the reigning houses of France is illustrated and described; numbers and weights of the stones are given. M.O'D.

MOTIU (A.). *Rhodochrosit von Cavnic in Rumänien.* (Rhodochrosite of Cavnic, Romania.) Lapis, **4**, 10, 23-4, 5 figs (4 in colour), 1979.

Details and illustrations are given of the occurrence of rhodochrosite at Cavnic, Romania. M.O'D.

MUMME (I. A.), SEIBRIGHT (L.). *The coloration of Mount Surprise topaz by gamma irradiation.* Wahroongai News, 35-9, March 1979.

A reprint of the paper already abstracted* from the Australian Gemmologist, this version contains one and a half paragraphs which were missing from the original paper. It is therefore recorded again. R.K.M.

NASSAU (K.). *An additional note on the new Gilson 'coral'.* Lapidary Journal, **33**, 7, 1504, 3 figs in colour, 1979.

The streak of the Gilson 'ox-blood' coral imitation is red-brown and the wipe after effervescing with acid was also coloured. With natural coral of this colour both these tests would have given a white colour. M.O'D.

NICHOLS (R. A.). *Opal mines of Nevada.* Lapidary Journal, **33**, 7, 1638-44, 4 figs (maps), 1979.

Various mines in the Virgin Valley area of Nevada are described. M.O'D.

NOGUÉS CARULLA (J. M.), DE LA FUENTE CULLELL (C.), MONÉS ROBERDEAU (L.), BOSCH FIGUEROA (J. M.). *Estudio del material de interés gemológica 'Angel Stone'.* (Investigation of 'Angel Stone', a gemmologically interesting material.) Gemologia, **11**, 41/42, 17-29, 9 figs, 1979.

'Angel stone' was offered in a piece of jewellery during 1979; it was a pink massive material, part of which had been fashioned into a cabochon. Investigation proved it to be palygorskite, a silicate of magnesium and aluminium with water. M.O'D.

NUBER (B.), SCHMETZER (K.). *Die Gitterposition des Cr^{3+} im Turmalin: Strukturverfeinerung eines Cr-reichen Mg-Al Turmalins.* (The lattice position of Cr^{3+} in tourmaline: structural refinement of a chromium-rich Mg-Al tourmaline.) Neues Jahrbuch für Mineralogie Abhandlungen, **137**, 2, 184-97, 1 fig, 1979.

A chromium-bearing tourmaline from Nausahi, India, had lattice constants

*J. Gemm., 1979, XVI (8), 547.

$a_o = 15.997Å$, $c_o = 7.287Å$, space group R3m and a composition according to $XY_3Z_6[(O,OH,F)_4|(BO_3)_3|Si_6O_{18}]$, where X = Na, Y = Cr, Mg, and Z = Al, Cr and Mg. Cr^{3+} and Mg^{2+} occupy both of the octahedral positions Y and Z. Cr^{3+} content in the Y-position is higher than that in the Z-position. M.O'D.

OAKLEY (S. A.). *Gems and geology in the Great Rift Valley.* Lapidary Journal, **33**, 9, 2020-3, 1979.

An account of a trip through East Africa with short notes on the geology of the area. Gemstones were more easily obtainable in Kenya than in Tanzania or Zambia. Some current prices are given. M.O'D.

O'DONOGHUE (M.). *Details on how to recognize the latest imitation gemstones.* Retail Jeweller, **17**, 423, 22, 1979.

Short descriptions are given of an opal from Japan in which the diffraction takes place from layers of monodisperse latex; of a synthetic alexandrite with good colour-change and few inclusions; of an orange zirconia from the U.S.S.R. with a padparadschah-like appearance; and of the 'Regency Created Emerald', a hydrothermal product from the United States. (Author's abstract) M.O'D.

O'DONOGHUE (M.). *Rapport sur un laboratoire complet pour l'examen des pierres précieuses.* (Report on a complete laboratory for gem testing.) Revue de Gemmologie, **60**, 4-6, 5 figs, 1979.

Translation of an article first appearing in *Retail Jeweller.*

(Author's abstract) M.O'D.

OSMAN (D.), CAULTON (C.). *Colored gems of East Africa.* Lapidary Journal, **33**, 8, 1768-71, 6 figs, 1979.

Aquamarine from Kenya, orange tourmaline, also from Kenya, and a flame orange garnet from somewhere in East Africa are among the stones reviewed. Prices of coloured stones are expected to double during 1980. M.O'D.

PANTALEO (N. S.), NEWTON (G.), GOGINENI (S. V.), MELTON (C. E.), GIARDINI (A. A.). *Mineral inclusions in four Arkansas diamonds: their nature and significance.* Am. Miner., **64**, 1059-62, 1 fig, 1979.

Enstatite, olivine, pyrrhotite + pentlandite; eclogitic garnet; enstatite + peridotitic garnet + chromite, olivine + pyrrhotite, pyrrhotite, pentlandite, pyrite + pyrrhotite, pentlandite + a nickel sulphide, diamond, are the groups of inclusions found by x-ray diffraction and EDAX analyses from four diamonds found in Arkansas. No nickel sulphide has previously been reported in diamond. M.O'D.

PETSCH (E. J.). *Rough stones.* Lapidary Journal, **33**, 5, 1216-18, 1979.

The writer lists causes explaining why the supply of rough gem-quality stones is much less profuse than in the past. The chief causes are political. M.O'D.

POIROT (J.-P.). *Sur le traitement thermique des gemmes.* (Heat treatment of gemstones.) Revue de Gemmologie, **61**, 16-17, 1979.

Briefly reviews the various techniques used to alter the colour of gemstones by heating and gives some observations on the ethical and commercial aspects of the practice. M.O'D.

POWELL (R.). *Natural and radiation induced colouration of smoky quartz.* Aust. Gemmol., **13**, 12, 373-8, 3 figs, 1979.

Traces history of theories for this not highly valued colour in quartz, ranging from inclusions of organic hydrocarbons to the now accepted coloration by irradiation, either natural or artificial. Pure silica is not affected, and it is thought that the colour needs the presence of aluminium as an impurity. (Unfortunately some parts of the paper are incomprehensible owing to printers' errors. e.g. 'This absorption colour centre...consists of a hole trapped at an oxygen-ion nearest neighbour of aluminium, the hole spending 97% of its *ime* on the oxygen and 3% of its *lime* on the aluminium.' Printing errors of this kind ruin an otherwise excellent and ambitious journal.) R.K.M.

POWELL (R.). *A note on the serpentine in Lucknow, New South Wales.* Aust. Gemmol., **13**, 12, 387, 2 figs, 1979.

A serpentine found with gold at this site proved unsuitable for gem use or for carving, due to structural weaknesses. R.K.M.

PREST (Michael). *Ashton's diamond find.* The Times Newspaper, No. 60498, p.22. 12th December, 1979.

The Ashton joint venture has announced that one kimberlite sample of about 33m³ from their Western Australian deposit yielded 47ct (four stones bigger than 1ct 1ct and one of 1.83ct): 11 samples (totalling 250m³) from alluvial deposits downstream from the Kimberlite pipe yielded 2968ct (167 stones exceeding 1 ct, the biggest being 4.6ct). No professional assessment has been made of the ratio of gemstones to industrials. J.R.H.C.

READ (P.). *Gem testing equipment.* Australian Gems & Crafts Magazine, **39**, 11-16, 12 figs, 1979.

Reviews a number of pieces of equipment used for gem testing with particular reference to reflectivity meters. M.O'D.

RITTER(A.). *Faceting Slocum stone.* Lapidary Journal, **33**, 9, 2038-41, 5 figs, 1979.

Since Slocum stone depends on inclusions for a play of colour there is no need for reflection of light from pavilion facets. Faceting hints are supplied. M.O'D.

ROLANDI (V.), SUPERCHI (M.). *Corindone e berillo: proposta di delimitazione rispettivamente della varietà rubino e della varietà smeraldo.* (Corundum and beryl: proposals for establishing limits on the varieties ruby and emerald.) La Gemmologia, **5**, 1/2, 5-11, 1979.

The paper uses accepted systems of colour grading to establish limits to the use of the names ruby and emerald. M.O'D.

SAMUEL (E. R.). *The invention of diamond polishing.* Industr. Diamond Rev., 5-7, 4 figs, January 1980.

Unlike the softer gemstones, which could be polished by hand, diamond polishing only became possible with the invention of a high-speed lap which could be rotated smoothly on a belt-driven spindle. The author traces the introduction of this version of the belt-driven machine tool back to the small spinning wheel, which came to Northern Italy from China (by way of India, Egypt and Syria) in the 12th century. Italian craftsmen subsequently adapted the principle of the continuous belt drive to grinding and polishing. Spectacle lenses were the first mass-produced results of this adaptation, and soon the technique was used to polish gemstones. Its use in diamond polishing occurred seventy years later with the raising of the lap speed and the use of pulverized diamond for the abrasive, which was mixed with a viscous oil to enable it to remain on the lap in spite of the higher centrifugal force. P.G.R.

SCHÄFER (W.). *Val Vigezzo-Tal der Maler. Neue Smaragdfundstellen.* (Val Vigezzo-Tal der Maler. A new emerald location.) Mineralien Magazin, **3**, 7, 367-72, 11 figs (10 in colour), 1979.

The location lies between Donodossola and Locarno on the Italian side of the Alps. Emerald of a yellowish-green colour and largely opaque is found in a pegmatite. M.O'D.

SCHMETZER (K.), BANK (H.). *Schlossmacherit, ein neues Mineral, benannt nach Prof. Dr Karl Schlossmacher, dem Ehrenvorsitzenden der Deutschen Gemmologischen Gesellschaft.* (Schlossmacherite, a new mineral, named after Prof. Dr Karl Schlossmacher, the Hon. President of the German Gemmological Association.) Z.Dt.Gemmol.Ges., **28**, 3, 131-3, bibl., 1979.

The author was examining a piece of ceruleite from Guanaco in Chila, probably north Chile, and discovered a new mineral with it which he called Schlossmacherite. Details of the new mineral are to be published shortly. The main constituents are H_2O, CaO, Al_2O_3, SO_3 and As_2O_5 as well as small quantities of other oxides. It belongs to the alunite-jerosite series. A photograph shows a piece of ceruleite with chenevixite and green schlossmacherite, the piece being about 70×47mm. E.S.

SEGNIT (E. R.). *Australien, Land des Edelopals.* (Australia, land of the precious opal.) Lapis, **4**, 12, 10-12, 5 figs (4 in colour), 1979.

A general review of the opal locations in Australia with notes on the fashioning of opal. M.O'D.

STALLARD (M.). *Florida coral.* Rocks & Min., **54**, 147, 3 figs, 1979.

Coral replaced by chalcedony is found in many parts of Florida. The resulting specimens are usually colourful geodes (blue, yellow, black) which often contain quartz crystals. Specimens occur in Tampa Bay, in the Perry area, and in the Withlacoochee and Suwannee Rivers. R.S.M.

SUPERCHI (M.). *La gemmologia come scienza accademica a sè stante, non una parte della mineralogia.* (Gemmology as an independent science, not as a section of mineralogy.) Rend. Soc. Italiana Min. Pet., **35**, 1, 199-215, 1 fig, 1979.

Gemmology has developed as an independent study and should no longer be considered merely as an appendage to mineralogy. Colour measurement is only one of the new techniques which will be applied to gemmological studies in the future and the arrangement of gemstones in collections will be undertaken on a unified basis with international agreement. M.O'D.

TENNYSON (C.). *'Struktur' und Farbenspiel des Edelopals.* (Structure and play of colour of precious opal.) Lapis, **4**, 12, 13-15, 8 figs (4 in colour), 1979.

An explanation of the cause of the play of colour in opal is given with illustrations of the cristobalite spheroids responsible. M.O'D.

TENNYSON (C.). *Zwillings strukturen.* (The structure of twinning.) Lapis, **5**, 2, 12-15, 16 figs (3 in colour), 1980.

The atomic structure of twinned crystals is discussed with diagrams. M.O'D.

VENDRELL-SAZ (M.), NOGUÉS CARULLA (J. M.). *Medición directa de los indices de refracción.* (Direct measurement of refractive index.) Gemologia, **11**, 41/42, 35-41, 4 figs, 1979.

Reviews various instruments now on the market which will identify stones with high refractive index. M.O'D.

VERBRAECK (Y.). *Diamant.* (Diamond.) Natuur en Techniek, **47**, 10, 542-59, 16 figs (9 in colour), 1979.

A description of the chemistry, structure, working and mining of diamond for the reader with a scientific background. M.O'D.

VISHWESWAER (M.). *Mining pink corundum crystals.* Lapidary Journal, **33**, 8, 1858-61, 1 fig, 1979.

Describes mining for corundum at a location in Mysore, India. Pink corundum occurs embedded in kyanite. M.O'D.

WEINER (K. L.). *Ein modellar tiger Diamant-Zwilling.* (A type of diamond twinning.) Lapis, **5**, 2, 19, 2 figs in colour, 1980.

A yellow twinned crystal of diamond, weighing 7.36ct and displaying interesting form is illustrated. Twinning gives an overall hexagonal outline. M.O'D.

WEINER (K. L.). *Zwillinge.* (Twinning.) Lapis, **5**, 2, 6-11, 7 figs in colour, 1980.

The various types of twinning are described and illustrated. M.O'D.

WEINER (K. L.), HOCHLEITNER (R.). *Rhodochrosit, Portrait eines Minerals.* (Rhodochrosite, portrait of a mineral). Lapis, **4**, 10, 7-11, 7 figs in colour, 1979.

The crystal structure, properties and main locations for rhodochrosite are discussed. M.O'D.

WILKS (E. M.), (J.). *Light scattering in diamonds and their mechanical reliability.* Industr. Diamond Rev., 8-13, 9 figs, January 1980.

Perfect diamonds should give rise to virtually no scattering of a beam of light in the body of the stone, but most diamonds, in practice, produce readily detectable scattering with an intensity which varies considerably from stone to stone. The authors' experiments show that the light scattering power of a diamond can be correlated with its mechanical reliability, and, for rounded dodecahedral diamonds, with their natural surface appearance. This scattering of light is thought to be caused by differing concentrations of small inclusions of the order of 1 micrometer (micron) in size. The results of the experiments provide a criterion for selecting rough diamonds for mechanical soundness, the better performance, both for industrial use and for gem polishing, being given by stones producing the least scattering. P.G.R.

ZECCHINI (P.). *Étude de l'absorption infrarouge de quartz d'origine naturelle ou de synthèse.* (Study of the infrared absorption of natural and synthetic quartz.) Revue de Gemmologie, **60**, 14-18, 17 figs, 1979.

Infrared absorption patterns of natural and synthetic quartz differ noticeably and are reproduced. M.O'D.

ZEITNER (J. C.). *Synthetics, imitations and more.* Lapidary Journal, **33**, 8, 1684-90, 5 figs, 1979.

Lists the synthetic and imitation gemstones currently encountered. M.O'D.

Aus der Untersuchungspraxis. (From the gem-testing practice.) Z.Dt.Gemmol.Ges., **28**, 3, 165-70, 1979.

H. Bank describes a highly refractive glass with RI 1.760 which was mistaken for garnet as well as a synthetic emerald which was found to be a colourless quartz covered (after Lechleitner) with synthetic emerald; he also mentions that glass was offered on the market as Gilson synthetic emeralds. H. Bank with J. Maes and A. Dos Santos tested a 'peridot' which turned out to be a garnet-glass doublet. A thin red layer of garnet for the table and crown facets was stuck on a thick layer of green glass. E.S.

BOOK REVIEWS

ANDERSON (B. W.). *Gem Testing.* 9th edn. Butterworths, London and Boston, 1980. pp.(14), 434. 142 figs (black-and-white), frontispiece and 11 plates in colour. £12.00 (U.S. $27.00).

This very well-known textbook, which started life as a slim volume (*Gem Testing for Jewellers*) in 1942, has now reached its ninth edition, still, amazingly, from the pen of its original author. In the intervening 38 years it has grown to become a standard, indeed *the* standard work on Gem Testing. Mr Anderson, himself, emphasizes that it *is* this and not a general work on Gemmology. It is pre-eminently a practical text and is not overweighted with theoretical facts which could destroy its essential usefulness.

If one excepts the very early years, when all was challenging, the years that have elapsed since the eighth edition was published in 1971 have seen more new challenges than any similar previous period. 'The Ninth' has been awaited with considerable anticipatory interest and pleasure. We all know Mr Anderson's clear and precise prose which seems so effortless, but which, in fact, involves much writing and re-writing, and meticulous research through his own vast store of work-notes accumulated in 46 years of dedicated gemmology as Director of the Gem Testing Laboratory of the London Chamber of Commerce, as well as the work of other gemmologists, world wide, where this is relevant. It is a point of honour to acknowledge fully when his information is from other sources, a gesture which could be reciprocated more often.

He has added to the chapter on 'Refractive Index and its Measurement' a description of the new ER602 Riplus instrument, which, using a strontium titanate prism and a heated 'waxy substance' for contact fluid, can measure refractive indices up to 2.21 and also birefringence. This came on to the market just as the book was going to press.

The new infrared reflectometer is also included in this chapter: it does not measure refractive index or even lustre in the visual sense, but its function justifies its inclusion here rather than in a separate chapter. The spinel refractometer is referred to but is no longer made. (The reviewer understands that using cubic zirconia as its prism is projected, but will lose a major advantage of the spinel model owing to its much higher dispersion. Similarly a recommendation of Velox printing paper for short-wave UV immersion contact photography is out of date since this brand has been off the market for some time.)

The reviewer is relieved, but not surprised, that the author has not followed another writer in denigrating the still extremely useful dichroscope and Chelsea Filter.

'Use of Microscope', quite logically, has been brought forward and now precedes the important and greatly enlarged chapter on 'Detection of Synthetics, Imitation and Composite Stones'. The latter now includes 'skull melt' production of cubic zirconia. Mr Anderson has called my attention to the fact that the O and H entry tubes are unfortunately reversed in the diagram of the Verneuil furnace. Flux-melt corundums from the Chatham and the Kashan Laboratories are described. Rather surprisingly the description of the Gilson emerald, now manifestly a better product than that of Chatham, is not expanded. Yet the statement* of intent to include some iron in this product is by now a fact: to be fair, this is dealt with adequately elsewhere in the book. Dr Kurt Nassau's work in the infrared absorption tests for flux-fusion synthetic emeralds is described. Synthetic green beryl of emerald colour using vanadium in place of chromium is also mentioned. Cubic zirconia, the most successful of the diamond simulants is dealt with in detail. Synthetic alexandrite, turquoise, opal and 'synthetic' lapis lazuli are all additions to this chapter. The author has resisted the temptation to acclaim automatically many substances produced primarily as possible laser materials, or in semiconductor research, as new 'gem' synthetics when these have little hope of acquiring any real gem-trade significance. Slocum stone is included as a clever opal imitation, while some clever and deliberately deceptive new doublets are described in considerable detail. A very valuable chapter!

The spectroscope, which the author, with C. J. Payne, introduced in British gemmology many years before it was adopted by some overseas laboratories, is also an expanded chapter. It is interesting to see that wavelengths are still quoted in

*8th edn, p.103: 9th edn, p.133.

Ångströms, which Mr Anderson prefers to the S.I. nanometres recommended by the Royal Society. The International Bureau of Weights and Measures (BIPM) also wants to see the ending of the metric carat.* The Trade should fight both changes. One welcome innovation in this edition is a concession to the American version of the absorption spectrum which is the reverse of the conventional 'red on the left' used in most other countries (Fraunhofer did label his 'lines' alphabetically from left to right!). Blocks of spectrum illustrations are therefore printed in pairs, with the conventional spectra on the left-hand page and the American version, as an inverted mirror image, on the right-hand page. Regrettably, the publishers have failed to invert the latter on page 189, so that it does not 'tie in' with its numbering or its caption. On the whole the reversed versions, from new drawings, have printed with slightly greater clarity than the conventional ones, possibly due to the risks of off-set printing, on which the error may also be blamed.

The second half of the book deals with the identification of gems, and the main changes here consist of additions either to possible gem species or of imitants and synthetics which have appeared since the eighth edition. Information on testing diamond abrasive powders, although scarcely gemmology, is given here since hardly any literature on the rather special procedures developed by the author has been published. Irradiated coloured diamonds are dealt with, but this is a fast evolving market and it is not easy to keep pace with its developments.

Australian doublets using natural sapphire tops with synthetic sapphire or ruby bases are deliberately made to deceive and are discussed in detail. Deep blue (irradiated) topaz and beryl (Maxixe type and liable to fade) are also added to the chapter on identification of sapphire.

The several Gilson synthetics have been added under appropriate chapters, and new and clever opal doublets are also described. In all cases methods of recognition are given as fully as possible. Kornerupine cat's-eyes are new, while ivory and its imitants have been added to the chapter on organic materials.

Illustrations are good although some of the older black-and-white blocks seem to have suffered slightly in transit from the eighth to the ninth edition. This certainly is the fault of off-set methods. Page proofs were checked with very great care, but these were 'messy' to an extreme and the task a difficult one.

Colour plates are quite good, although Mr Anderson has privately expressed disappointment with some of the new ones by comparison with the brilliant transparencies from which they were taken. Pagination in the table of contents is incorrect for these, again a publishers' error.

The general colour-based lay-out of the book has always lent itself to a degree of repetition. This is largely deliberate and means that essential information for a given stone may be found under more than one possible heading; an advantage, not a failing. In one or two instances constants quoted for given stones vary slightly in another part of the book; very few misprints have been found, and those quite minor.

The author is to be congratulated on personally seeing so many editions of this excellent textbook into print. May he be spared to 'do' a Tenth! It is a book which will never outlive its usefulness.

One sad note; C. J. Payne, to whom every edition has been most faithfully dedicated as collaborator with Anderson in all the earlier research, died a short while after this edition appeared. R.K.M.

*See K. Nassau, *The International System of Units and its Application to Gemmology,* J.Gemm., 1977, **XV** (5), 243.—Ed.

ANDERSON (B. W.). *Gemme al microscopio.* (Gems with the microscope.) Boringhiere, Turin, 1979. pp.433. Illus. in black-and-white and in colour. Price on application.

The title notwithstanding, this is an enlarged translation of the eighth edition of *Gem Testing,* published in 1971. Many illustrations from that work are reproduced, mostly on a larger scale, and there are some full-page illustrations in colour. Illustrations additional to those in the original consist in the main of instruments, crystals and diagrams illustrating the commoner styles of cutting. M.O'D.

AUSTEN (R. L.). *Gems and jewels.* Evans, London, 1979. pp.128. Illus. in colour. £10.50.

A well produced book with illustrations of above average quality (and new), this deserves a wide sale, especially in view of the low price (for these days). Although there are some slight infelicities of style and awkwardness in some of the scientific descriptions, these are of little importance and do not mar a simple and pleasing guide to the gem and jewellery world. M.O'D.

BARDSLEY (W.), HURLE (D. T. J.), MULLIN (J. B.), ed. *Crystal growth: a tutorial approach.* North-Holland Publishing Co., Amsterdam, 1979. pp.ix, 408. Illus. in black-and-white. $(US)53.75.

This compilation represents the proceedings of the third International Summer School on Crystal Growth, held at Durham, N.C., U.S.A. during 1977. Particular interest will be shown by readers of the *Journal* in the paper by Brandle on the Czochralski growth of large oxide crystals (including lithium tantalate, gadolinium gallium garnet, YAG, lithium niobate and corundum). Other papers include notes on the criteria for selecting a particular method of growth and on the latest developments in growth techniques—these include the hydride process and solid-state epitaxy. Papers include questions which readers will enjoy trying. M.O'D.

BOSCARDIN (M.), DE MICHELE (V.), SCAINI (G.). *Itinerari mineralogici della Lombardia.* (Mineralogical journeys in Lombardy.) Museo Civico di Storia Naturale, Milan, 1972. pp.124. Price on application.

Prime place among the minerals of the region (in which over 160 species have been established) must go to the demantoid garnets of the Lanzada commune in Sondrio—the area is better known under its general heading of Val Malenco. Fine pyrite, other forms of garnet, some zircon, topaz and tourmaline also occur in Lombardy. Since the areas are described in alphabetical order of commune, the presence of an adequate index, comprising species and localities, is fortunate. There is also a bibliography. M.O'D.

CAVENAGO-BIGNAMI MONETA (S.). *Gemmologia.* (Gemmology.) 4th edn. Hoepli, Milan, 1980. 3 vols, pp.lxxiv, 1734. Illus. in black-and-white and in colour. L150,000.

Even before the advent of this huge work, previous editions of *Gemmologia* bid fair to be the largest books on gemmology. The previous edition had two volumes; this has three, although one is less that half the size of one of the other two volumes; one could say that the size of the work has increased by roughly 25%. Many of the plates and much of the text remains unchanged; but the advent of new man-made products and the use of many previously 'non-gem' materials as vehicles for fashioning (manganosite is included, which is always very small) has meant that an increase in size was inevitable, if only to keep pace with the development of the science. The bibliography has been enlarged, though not very extensively and the tables too have been expanded to accommodate new entries.

Almost the whole of the book is devoted to the materials themselves, and their man-made counterparts are included with them, where they exist. Introductory chapters deal with mineral characteristics and testing methods. This area however is but a curtain-raiser to the stones themselves; the material on each is so complete that it would be hard to find fault with it; nearly 300 pages are devoted to diamond alone—including a lengthy table of celebrated stones. An attractive full-page colour plate shows a variety of fluorescence types. Excellent colour photographs show inclusions in various types of synthetic ruby and a particularly good page displays the characteristic structure of Gilson opal. The section on emerald includes so many good photographs of inclusions that it would make a useful monograph on its own—and this is the pattern shown by the other sections. Minor criticisms could (in future) include the strength of the binding (the paper is heavy) and the need for a separate index—but it is hard to see how this could be avoided. Altogether a superb work and relatively cheap for what you get. M.O'D.

CLARK (A.). *Minerals.* Hamlyn, London, 1979. pp.128. Illus. in colour. £1.95.

This small, attractive book represents real value for money. Part of the Hamlyn 'nature guides' series, it depicts about 200 of the commoner minerals and gives composition, common habit, SG and hardness, together with brief details on mode of occurrence. Locations are not given. Introductory matter explains basic crystallography and geology. M.O'D.

COOK (R. B.). *Minerals of Georgia; their properties and occurrences.* Georgia Geologic and Water Resources Division, Atlanta, 1978. pp.vi, 189. $5.00.

Georgia is a richly mineralized state, and apart from important gold deposits there are also fine rutile crystals in the Graves Mountain area, blue sapphires at Hiawassee and aquamarines at La Grange. The book is arranged in chemical order and is written at the level of the mineralogist rather than the amateur mineral collector. M.O'D.

GELDART (G.). *Hand lapidary craft.* Batsford, London, 1980. pp.vii, 144. Illus. in black-and-white and in colour. £6.95.

Quite a pleasant book, re-working some material which will be of interest mainly to the amateur faceter, for whom it is intended. Good illustrations, capricious glossary, shaky science and easily-assimilated empirical craft notes place the book near the top of its class. The colour illustrations are oddly divided between the quite good and the dreadful; the index places orthoclase and feldspar separately with feldspar at both locations but with different references, a feat not unknown with this publisher, whose editors are not nearly critical enough. M.O'D.

GILI (Joan), ed. *Lapidari.* (Lapidary.) Dolphin Book Co., Oxford, 1977. pp.xxiii, 49. £2.50.

This is a 15th-century treatise on precious stones in Catalan. The text is not difficult to understand for those with some linguistic knowledge; line numeration is provided and there is an introduction as well as a glossary. M.O'D.

HARSHAW (L.). *The rubies of Cowee Valley.* New, revised edn. Hexagon Co., Asheville, N.C., 1978. pp.72. Illus. in black-and-white and in colour. $2.75.

This small book describes the sites in the vicinity of Franklin, North Carolina; they are celebrated for the occurrences of corundum, which is occasionally found in good quality specimens. Details of the individual mines (which are mostly worked for amateur collectors) are given. M.O'D.

LIEBER (W.). *Menschen, Minen, Mineralien.* (Men, mines, minerals.) Christian Weise Verlag, Munich, 1979. pp.224. Illus. in black-and-white and in colour. Price on application.

This book is a general survey of the history of mineralogy, the occurrence and finding of minerals and of testing methods. The history includes biographical notes on some celebrated mineralogists (Haüy, Mohs, Werner, etc.); at the other end of the historical scale there are notes on the electron microscope and similar instruments. Highly recommended as a lucid overview of the subject. M.O'D.

PALACHE (C.). *The minerals of Franklin and Sterling Hill, Sussex County, New Jersey.* Franklin-Ogdensburg Mineralogical Society, Franklin, N.J., 1974. pp.6, VI, 135. Illus. in black-and-white. Price on application.

This mineralogical classic is a reprint of U.S. Geological Survey Professional Paper 180, first issued in 1935. The location is especially famous for fluorescent calcite, willemite and other minerals, as well as for the only translucent facetable zincite found anywhere in the world. M.O'D.

PERRY (N.), PERRY (R.). *Gemstones in Australia.* A. H. & A. W. Read Pty Ltd, Sydney, 1979. pp.158. Illus. in black-and-white and in colour. Price on application.

A most uneven book with some hideous misprints, attractive illustrations and useful locality information, this latest offering from Australia needed expert revision to get it into some logical order. The general impression left is one of the enthusiastic amateur—who else would omit the cause of colour in precious opal (in an Australian book of all places) when explanations are given for asterism in corundum? The account of locations appears good, as does the section on lapidary work. The chapter on synthetics would have been better omitted—existing pages could be stuck together without lessening the value of the book, which, at best, is derivative. It does not need much searching to discover the source of much of the information; this reviewer would prefer writers to describe testing, optical phenomena and similar topics in a fresh and arresting way—or to have the basic sources re-written. Bibliography totally inadequate, index and glossary poor. M.O'D.

ROSENBERGER (F.). *Fundamentals of crystal growth, I.* Springer, Berlin, 1979. pp.x, 530. Illus. in black-and-white. $(US)44.30.

This monograph forms no. 5 in the Springer series in solid-state sciences. Intended to be the first of three volumes on crystal growth, it covers macroscopic equilibrium and transport concepts, the following volume being intended to deal with morphological and kinetic crystal growth and the last to introduce growth techniques. Based on the theory that crystal growth can be called the science of controlled phase transitions, this book investigates the phase equilibria and diagrams, mass transport and heat transfer, with a section on crystal growth itself. Problems are given, and there is a general review section at the end of the book. M.O'D.

STRUNZ (H.). *Mineralogische Tabellen.* (Mineralogical tables.) Akademische Verlag Geest & Portig K.-G., Leipzig, 1978. pp.vi, 621. 101 figs. M54.

This is by now a standard mineralogical text since the first edition was published in 1941. This issue is described as the seventh edition, but is in fact an unaltered reprint of the sixth, which in turn merely tidied up the fifth edition without substantially altering the text or adding new species. However the book is still very useful, giving necessary data on minerals in a concise and easily-managed form. No details of localities are given, but important references are provided. Serious students will find this fills the gap between Fleischer's list of mineral species and the much more exhaustive treatises such as Dana's *System* or Klockmann. M.O'D.

TAYLOR (R. E.), ed. *Advances in obsidian glass studies.* Noyes Press, Park Ridge, N.J., 1976. pp.viii, 360. Illus. in black-and-white. $32.00.

This comprehensive study covers both archaeological and geochemical aspects of natural glass. Chapters are by different authors and each one includes its own bibliography—the whole book is essential for anyone working in the field. M.O'D.

VAN LIEU (Mai), SCHAEFFER (P.-J.). *Ivoires de chine.* (Ivories from China.) Editions Dereume, Paris, 1978. pp.139. Illus. in black-and-white and in colour. Price on application.

This handsome book surveys the use of ivory in China from the earliest times to the present day. It is not intended as a scientific treatise but rather as a set of examples of fine work in ivory with a commentary rather than a text. This gives a certain breathlessness to the style, but in any case it is to the fine illustrations that the reader will turn. Neither index nor bibliography is provided. M.O'D.

WALENTA (K.). *Mineralien aus dem Schwarzwald.* (Minerals of the Black Forest.) Franckh'sche Verlagshandlung W. Keller & Co., Stuttgart, 1979. pp.127. Illus. in colour. Dm24.00.

A pocket-sized guide, illustrated entirely in colour and reasonably priced, is now becoming as rare as the minerals likely to be described in it. Important species from the area include gold (found in quartz), pale blue apatite, azurite and malachite in attractive forms, with a variety of other minerals of interest especially to the micromounter. Arranged in chemical order but with an index. M.O'D.

Mineralogiya i kristallofizika yuvelirnykh raznvidnostii kremnezema. (Mineralogy and crystal physics of quartz made for jewellery.) Nedra, Moscow, 1979. p.148. 9 colour plates. 90 copecks.

A guide in Russian to the manufacture of the various types of quartz crystals with gemmological application. M.O'D.

ASSOCIATION NOTICES

GIFTS TO THE ASSOCIATION

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

Mr John R. Fuhrbach, B.Sc., F.G.A., G.G., Amarillo, Tex., U.S.A., for a parcel of peridot material from the Kilbourne Hole, New Mexico, U.S.A.

Mr Milton R. K. Lu, of Taiwan, for a round cubic zirconia, royal brilliant-cut (144 facets), very light brown in colour, weighing 4.28ct.

Mr A. E. Thomas, F.G.A., Johannesburg, S. Africa, for a complete set of Botswana 'Definitive issue' 1974 stamps depicting gem minerals, and a complete set of mint and used South West Africa 1979 and Kenya 1978: also for a sphene crystal found in Kariba area (Zimbabwe) in 1978.

NEWS OF FELLOWS

On 10th March, 1980, Messrs Eric Bruton, John Croydon, David Kent and George Pragnell, FF.G.A., who were visiting China in a study group organized by the *Retail Jeweller,* were entertained to dinner by the officers of the Gemmological Association of Hong Kong, the hosts present being Dr David Healey, F.G.A., Chairman, Mrs Anne Paul, F.G.A., Treasurer, Mrs Katherine Barcham, F.G.A., Assistant Treasurer, Mr Louis Lo, F.G.A., Secretary, Mrs Susan Hughes, F.G.A., Publicity Director (English), Mrs Winnie Nootenboom, F.G.A., Publicity Director (Chinese), and Pieter Nootenboom, Publications Director.

On 8th March, 1980, Mr Peter Read, C.Eng., F.G.A., held a seminar comprising a one-day series of illustrated talks for students of gemmology in Colombo, Sri Lanka, on subjects which included new gem-testing instruments and techniques, colour in diamonds (including artificial coloration), diamond mining and automation in diamond sorting, diamond simulants and computer-aided gem identification.

On 26th April, 1980, Mr Read gave a talk on diamond simulants to the Wessex Branch of the N.A.G. at the Wessex Hotel, Bournemouth.

OBITUARY

Mr Cecil James Payne, F.G.A. (D.1939), London, died on 20th April, 1980. A full obituary notice will appear in a later issue of the *Journal.*

Mrs Eileen R. Riddell, F.G.A., (D.1960), Armagh, N.Ireland, died on 29th March, 1980.

Mr Henry J. Whitehead, F.G.A. (D.1959), Edinburgh, gemmology course instructor, died in March, 1980.

MEMBERS' MEETINGS

London

On 26th March, 1980, at the Central Electricity Generating Board Cinema, Mr Peter Read, C.Eng., F.G.A., gave a talk entitled 'Modern Developments in Gem Testing'. Mr Read exhibited and demonstrated a number of the instruments which have been produced and marketed in recent years. Also displayed was a prototype of a Rayner Diamond Tester, a new instrument to be produced in the near future.

Midlands Branch

On 28th March, 1980, at the Society of Friends, Birmingham, Mr Peter Read, C.Eng., F.G.A., repeated his London talk (see above) under the title 'New Gemmological Instruments and Techniques'.

North-West Branch

On 13th March, 1980, at Church House, Hanover Street, Liverpool, Mr W. Hartshorn and Mr D. Alderson, of Isis Minerals, displayed crystals and minerals and gave a talk on the various sites where some of these have been collected in this country.

On 8th May, 1980, Mr Peter Read, C.Eng., F.G.A., gave a talk on 'Diamond Simulants and Artificial Coloration of Diamonds'. His own complete set of diamond simulants was on display.

COUNCIL MEETING

At a meeting of the Council held on Wednesday, 27th February, 1980, Dr R. R. Harding, B.Sc., D.Phil., F.G.A., was appointed as an Examiner in Gemmology and Mr E. Bruton, F.G.A., was appointed as an Examiner for the Gem Diamond Examination (Practical).

The following were elected to membership:

FELLOWSHIP

Abayasingha, Amaranath, Colombo, Sri Lanka. 1979
Avasia, Rohinton K., Bombay, India. 1979
Berggren, U. B. Marie, Oslo, Norway. 1979
Blondel, Nigel C., Guernsey, C.I. 1979
Bontekoe, Marÿke, Steenwÿk, Netherlands. 1979
Cleiman, Catherine G., Silver Spring, Md, U.S.A. 1979
da Costa, Michael S., Toronto, Ont., Canada. 1979
Dixon, Stanley C., Horsham. 1927
Douglas, Brian S., Toronto, Ont., Canada. 1979
Edmunds, Roger A., Accrington. 1979
Fagerstig, Björn O., Staltsjöbaden, Sweden. 1979
Franks, William, Bowdon. 1979
Geikler, Patricia J., Sewickley, Pa, U.S.A. 1979
Glorioso, John T., Baltimore, Md, U.S.A. 1979
Groenenboom, Peter, Arnhem, Netherlands. 1979

Hartzman, Mark J., Bronx, N.Y., U.S.A. 1979
Inamdar, Geeta, Newmarket, Ont., Canada. 1979
Kizirian, Vahe A., Pasadena, Ca, U.S.A. 1979
Kleibrink, Marion, Middleburg, Netherlands. 1979
Lalonde, Ernest R., Los Angeles, Ca, U.S.A. 1979
Langeraar-Litjens, Rose C., Leiden, Netherlands. 1979
Moody, Kenneth O., Cheltenham. 1979
Nilsen, Tore, Oslo, Norway. 1979
Ou Yang, Chiu Mei, Hong Kong. 1979
Schippers, Maria J. C., Velp, Netherlands. 1979
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Seed, Moira J., Ottowa, Ont., Canada. 1979
Senaratne, Upali N., Nugegoda, Sri Lanka. 1979
Shelley, Jessica, Toronto, Ont., Canada. 1979
Sweaney, James L., Santa Monica, Ca, U.S.A. 1979
Thornton, Peter J., Newcastle, N.S.W., Australia. 1979
Truyens, Simone M. C., Amsterdam, Netherlands. 1979
Velthoven, Nicolaas, Bergschenhoek, Netherlands. 1979
Vonk, Philippe A. J., Rotterdam, Netherlands. 1979
Wechgelaar, Didrich J. H., Gr Driebergen, Netherlands. 1979
Yokowo, Naoya, Tokyo, Japan. 1979
Yost, Dara E., San Diego, Ca, U.S.A. 1979

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Yoshizawa, Atsuko, Tokyo, Japan.
Yoshizawa, Keiko, Tokyo. Japan.
Young, William R., London.
Zawadzki, Antoni, Edinburgh.
Zoysa, Edirimuni G. G., Delft, Netherlands.

PRESENTATION OF AWARDS IN JAPAN

On 28th November, 1979, at a ceremony kindly arranged by the Gemmological Association of All Japan at the Imperial Hotel, Tokyo, Mr R. P. Martin, the Cultural Counsellor and British Council Representative in Japan, presented their Diplomas to those persons who had qualified at the Diploma Examination of the

Mr R. P. Martin presenting a Diploma.

Mr Yamada addressing the company.

Gemmological Association of Great Britain held in Tokyo in 1979. Mr Martin congratulated the recipients on having undertaken their difficult studies and obtained a qualification that was obviously going to benefit them in the future.

Professor I. Sunagawa, of Tohoku University, President of the Gemmological Society of Japan, thanked Mr Martin for his kindness in presenting the Diplomas. He said that 21 candidates had entered for the examination in Tokyo and 16 had qualified. This was a very high proportion and showed how seriously they had undertaken their studies. However, obtaining the Diploma to qualify for the Fellowship of the Gemmological Association of Great Britain should not be regarded as the end, but should rather be considered as the first step on the way to the profound world of gemmology.

Mr W. Yamada, Chairman of the Gemmological Association of All Japan, then expressed his congratulations to the successful examinees on obtaining their Diplomas and said that the knowledge they had acquired could be put into practical use and would be of the greatest help to them in the future.

XVIIth INTERNATIONAL GEMMOLOGICAL CONFERENCE

(Report received from Mr A. E. Farn, F.G.A.
Manager of the London Chamber of Commerce Gem Testing Laboratory)

This conference was held in Idar-Oberstein, the European gemstone and cutting centre, a 'natural' for such a venue. The conference lasted from a reception on Sunday, 23rd September, until the farewell luncheon on Thursday, 27th September, 1979. From first to last it was a smooth running, well organized and enjoyable, friendly conference. We had a tour of the lecture rooms of the German Gemmological Association with practical examples (briefings) of their teaching methods. A conducted geological tour of the immediate countryside under the animated leadership of Professor Dr Herman Bank, F.G.A., our host, made what was in any case a scenically beautiful tour much more interesting, even to non-geologists, because we were shown faults and flows which would normally be looked at casually instead of with interest. It was obvious that a lot of work and preparation had been accomplished by our German hosts and from the commercial side of Idar-Oberstein as well, i.e., Mayoral address and welcome followed by a book presentation and buffet supper. Idar-Oberstein is a single-subject town—the subject, of course, being gemmology in all its stages, rough, cut, polished, stained, carved, organic, amorphous, ornamental, etc., and basically commercial. There are many large and many very small firms and individuals actively engaged in all aspects of gemstone promotion. I still think that the most impressive features of gemmology, arrived at by the requisites of Beauty, Rarity and Durability, are best exhibited by the uncut crystals and crystal groups—nature's art exposition.

The gemmological side of the conference consisted of a series of papers which were read, sometimes accompanied by colour-transparencies and/or photographs, drawings and diagrams exhibited by use of the epidiascope. Speakers from world wide sources gave lectures, most of a short duration with questions following. The whole of the time the lecture room was occupied the outer ante-rooms were set up with modern gem-testing equipment and books from all four corners of the world (which sounds a little square!). To avoid the use of the term 'the broad spectrum' it is easier to describe the talks in alphabetical order of the names of lecturers.

As the assembled gemmologists, mineralogists, geologists, physicists, etc., sat ready to begin this XVIIth series of talks, lectures, etc., the host member, Professor Bank, asked us all to stand and observe a minute's silence in memory of Gordon Frederick Andrews, F.G.A., late Secretary of the Gemmological Association of Great Britain, Tully Medallist, former editor of the *Journal of Gemmology*. Gordon Andrews, like his fellow colleague Robert Webster, left an indelible mark in and on the world of gemmology. Those of us who were privileged to know him remember him for his warmth, friendliness and dry humour.

Dr C. S. E. Arps, F.G.A., collaborated with fellow gemmologist Professor Dr P. C. Zwaan, F.G.A., both of Leiden University (literally A-Z in Netherlands gemmology) in a talk on 'Properties of Gem Scapolites from Different Localities.

Professor Dr J. M. Bosch-Figueroa described methods of observing fluorescence in diamonds.

Professor S. Cavenago-Bignami gave a brief account of black and greenish-black cultured pearls from Tahiti, in which the colour is due to the molusc and not to staining. Diffraction x-rays will prove the cultivation and will not alter the colour.

Professor A. Chikayama, F.G.A., gave a documented map illustrating the present coral industry of Japan.

Mr Robert Crowningshield, F.G.A., of G.I.A. New York Laboratory, spoke with considerable authority on problems and observations in the identification of fancy-coloured diamonds.

Mr P. E. Desautels, of the Smithsonian Museum, Washington, D.C., gave a talk, illustrated with slides showing great dissimilarities in structure of Jadeite. His theme was that Jadeite being a rock makes it difficult to describe specifically in fixed terms. His title was 'Further Studies in Jade'.

Mr A. E. Farn, F.G.A., (following in alphabetical progression) read a paper entitled 'The First Impact of a Gemstone'. (I had a series of very fine colour transparencies illustrating my talk, kindly loaned from the Institute of Geological Sciences.)

Professor Dr E. Gübelin, F.G.A., now retired from commercial life but working just as hard as ever, gave brief descriptions of some new or recent gemstones, comparing them in their positions in the family patterns and links.

Mr Alan Jobbins, B.Sc., F.G.A., gave an illustrated discourse on 'The Opal Deposits of Piaui State, Brazil'.

Dr J. Kanis, of South Africa, gave a review of some of the effects on production of gemstones caused by internal unrest, guerrilla activities, smuggling, etc.

Mlle Dina Level gave a typically animated and enthusiastic talk with some beautiful slides showing the effects of side by side observation of coloured gemstones viewed using polaroid in opposed directions. It is a gemmological treat to listen to this First Lady of French gemmology.

Mr Richard T. Liddicoat, jr, F.G.A., President of the G.I.A., gave a résumé of instruments, ideas and findings currently happening in their new research centre.

Miss Julia Myers, F.G.A., F.G.A.A., of Sydney, Australia, a well-known and much-travelled representative of the Australian scene, showed a series of interesting slides illustrating tough conditions in the search for and recovery of Australian Diamonds.

Dr H. J. Nairis, F.G.A., Geological Survey of Sweden, gave us all a copy of his booklet on 'The International Precious Opal Nomenclature and Grading Standards (IPON)'. This consists of a useful summary and definitions of types, colours, patterns and a point indication system—a very useful general guide to stock control and (although I detest the word) grading.

Mr H. S. Pienaar, F.G.A., of South Africa, gave a very interesting talk on new coral discoveries off the coast of South Africa, these corals having very distinctive structures which hall-mark them. He also told us of inconclusive tests on a green-stone which may yet be a new gem.

M. J.-P. Poirot, (Chambre de Commerce et d'Industrie, Paris), gave a well prepared talk on the heat treatment and detection of treatment in sapphires. M. Poirot deserves credit for his interest and tenacity in following up the challenge of *proving* heat treatment in sapphires.

Dr F. H. Pough talked authoritively upon Obsidian glasses and imitations showing us some interesting examples.

Mr H. Reymer under the heading 'Canadian Gem Report' produced exciting slides and samples of a limited supply of ammonite fossils with a play of colour. They have a natural hard shale backing and are not doublets—a most interesting and very unusual form of gem material. Basically aragonite, it is a collector's item, being very attractive.

Mr J. Roux, well-known personality of De Beers, gave a short, interesting account with maps of diamond re-recovery from working over old dumps with modern methods—an apparently profitable exercise.

Mr X. Saller, F.G.A., of Germany, won universal approval by altering his 'Farewell to Gemmology' and intimating that he hoped to be at the next Conference.

Mr E. Sasaki, F.G.A., of Japan, discussed the heat treatment of corundum in Thailand, whose main produce is tin, and the discovery of diamonds in 1930. An informative talk on aspects of rough coke ovens, cutters and smuggling.

Dr J. M. Saul, of France, gave details of euclase from Morogoro, East Africa, green sphalerites in an emerald parcel, colour-change violet spinels, etc., an intriguing glimpse of the mineral gemstone wealth of East Africa.

Mr Charles A. Schiffmann, F.G.A., of the Gübelin Laboratory, Lucerne showed graphs illustrating the variation in transmission of ultraviolet lamps and the decline in efficiency of their filters over a period. He mentioned the varying strength ratio of 5040/4980 and 4980/5040 (most of this is fully detailed in K. Scarratt's article in *J.Gemm.*, 1979, XVI(7), 433-47). Most gem laboratories are following on similar lines of study of treated diamonds, the spectroscope being the prime reason.

Professor Dr H.-J. Schubnel gave a talk in rather rapid French but, of course, with considerable erudition. His talk was not noted in advance and we had no paper to follow. The lecture was given in a darkened room to accentuate the diapositives. The talk was entitled 'Travaux à la Sonde Laser-Raman'.*

Professor Dr Strunz gave an extremely erudite talk on the morphology and atomic structure of gemstones.

*Sir C. V. Raman, M.A., F.R.S., noted Indian scientist and Nobel laureate in physics, well known for his work on the fluorescence of diamond.

Professor Dr I. Sunagawa, of Japan, gave a most concentrated talk on 'Natural and Synthetic Emerald' and the methods of growth of crystals with hints on crystal surface structures and viscinal faces. He described Japan's Verneuil plants for star stones, the Czochralski process for GGG and YAG, Linobate etc. plus synthetic olivine grown for study and research purposes. A method of infrared heating—by concentrating from two opposing elliptical mirrors, producing 1300-2000°C—can be used to produce alexandrite chrysoberyl doped with vanadium. He showed *plastic* opal based upon the natural structure of opal with characteristics which fortunately miss those of natural opal.

Dr M. Superchi (Italy) did not offer a title or intend to speak but belatedly introduced a paper on the subject of colour grading of gemstones by the use of colour comparison charts—a subject sure to raise gemmological temperatures, particularly for those of the 'Chromium Criterion for Emerald' school.

Mr E. B. Tiffany gave his usual interesting résumé of the gemmological scene by showing slides and talking of some important but little-known historic diamonds which were Golconda stones looted from India by Iran.

Mr Geoffrey Toombs, F.G.A.A., (Sydney, Australia) gave further interesting facts on the heat treatment of sapphires. 1700-1750°C seems to be the optimum region. Thais use ovens of packed coke and forced airfeed for 5 hours and allow 18 hours for cooling. It is said that Ceylon and Thai stones revert after treatment and that Australian stones lose their 4500Å complex. Successful heat treatment of sapphires requires very careful choice of material for the process.

Professor Dr P. C. Zwaan, of Leiden, Netherlands, gave the details of his and fellow researcher Dr C. Arps's work on 'Properties of Gem Scapolites from Different Localities'.

These conferences, which take place every two years, afford opportunities for the reception and interchange of knowledge among gemmologists. We become friendly and human, we realize that F.G.A.s can rub shoulders with Drs and Profs, each profiting from the contacts. Whilst the world becomes smaller and the use of gemmological knowledge is employed in devising new artefacts requiring considerable technique and equipment, we must not lose sight of the fact that we are gemmologists—gemmologists *first*—and that, just as the basic gems are still much with us, it is also the basic equipment which, used with knowledge, continues to score. As a trade gem testing laboratory gemmologist brought up in the trade I continue my advocation of the continual use of the *10× lens*.

TENTERDEN, Kent

An adult education centre in the Tenterden area is considering setting up evening teaching classes in gemmology. An Instructor is required. Will anyone interested please communicate with the Association Secretary at Saint Dunstan's House.

CORRIGENDA

In J.Gemm., 1979, XVI (7), 473, line 4, (reference for abstracted paper by Francesconi *et al.*) for 'Gemologia, 22, 43, 53-63, 1 fig, 1978.' read 'Gemologia, **22**, 43/44, 53-63, 1 fig., 1976.'

In line 2 on p.119 above (in reference for abstracted paper by Ball *et al.*) for '13, 10, 363-6, 1979.' read '13, 11, 363-6, 1979.'

Historical Note

The Gemmological Association of Great Britain was originally founded in 1908 as the Education Committee of the National Association of Goldsmiths and reconstituted in 1931 as the Gemmological Association. Its name was extended to Gemmological Association of Great Britain in 1938, and finally in 1944 it was incorporated in that name under the Companies Acts as a company limited by guarantee (registered in England, no. 433063).

Affiliated Associations are the Gemmological Association of Australia, the Canadian Gemmological Association and the Rhodesian Gem and Mineral Society.

The *Journal of Gemmology* was first published by the Association in 1947. It is a quarterly, published in January, April, July, and October each year, and is issued free to Fellows and Members of the Association. Opinions expressed by authors are not necessarily endorsed by the Association.

Notes for Contributors

The Editor is glad to consider original articles shedding new light on subjects of gemmological interest for publication in the *Journal*. Articles are not normally accepted which have already been published elsewhere in English, and an article is accepted only on the understanding that (1) full information as to any previous publication (whether in English or another language) has been given, (2) it is not under consideration for publication elsewhere and (3) it will not be published elsewhere without the consent of the Editor.

Articles published are paid for, and any number of prints of individual articles may be supplied to authors provided application is made on or before approval of proofs. Current rates of payment for articles and terms for supply of prints may be obtained on application to the Secretary of the Association.

Although not a mandatory requirement, it is most helpful if articles are typed (together with a carbon copy) in double spacing on one side of the paper, with good margins at sides, top and foot of each page. Articles may be of any length, but it should be borne in mind that long articles are more difficult to fit in than short ones: in practice, an article of much more than 10 000 words (unless capable of division into parts or of exceptional importance) is unlikely to be acceptable, while a short note of 400 or 500 words may achieve early publication.

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