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and

PROCEEDINGS OF THE
GEMMOLOGICAL
ASSOCIATION
OF GREAT BRITAIN

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OF GREAT BRITAIN
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COSMETICS AND GEM MATERIALS

By R. WEBSTER, F.G.A.

LITTLE has been recorded in literature of the possible effects on certain types of gem materials and pearls by the action of cosmetics used in beauty treatments, despite the fact that the embellishment of the natural appearance of women, and men, by the application of various preparations of mineral, animal and vegetable nature have been used since prehistoric times. The extensive use of the modern artificially made products used in beauty treatments to-day makes consideration of their effects of some importance.

It is quite clear that no harm will come to those gemstones cut from single crystals, except that the greasy components of some cosmetics may adhere to the setting and backs of the stones causing them to lose their brilliancy. This, of course, is most important with diamond, a stone which collects grease so readily, and whose optical properties depend so much on the total internal reflection of light from the rear facets. Periodical cleaning is the answer here, and as this should be done anyway, there is no problem.

Those gem materials which are to some extent porous (and, indeed, these are the gems which can be artificially coloured by stain or dye) are obviously those most likely to be adversely affected by the haphazard use of various cosmetic preparations. The most important of such gems are pearl, turquoise, opal and jade, and possibly agate and coral. Pearls are the most likely to suffer damage owing to the nature of their structure and to the fact that in

the case of necklets especially, and to some extent earrings, they, when worn, lie close to the skin or hair.

When it is realized that cosmetic preparations cover such fields as hair dyes and bleaches, depilatories, skin creams and face powders, hair-setting lotions and sprays, as well as eye shadow, lipstick and nail varnishes, and that each manufacturer has a different formula for his various products, it is obvious that any complete investigation would need the full time services of several workers. This, from economic considerations alone, would be out of the question. Some experiments and some actual cases which have been investigated and which have been reported from other workers are here recorded.

Pearls

Experience has shown that there are two distinct ways in which cosmetics can affect pearls. These are surface contamination and contamination which has worked inwardly through the string canal.

Surface contamination mostly occurs through the use of hair-setting sprays, perspiration deodorant sprays, and atomized perfumes. Hair-setting sprays often contain a synthetic cellulose derivative, such as methyl cellulose, and this, if used when pearls are worn, may give a coating of lacquer to them. Such an accidental "lacquering", as has been shown by experiment, so coats the pearls that a pin drawn across the surface will "dig-up" this coating in a similar manner to the effect shown when a pin is pressed against a solid glass type imitation pearl. Further, this coating tends to mask the "suture marks", that is the overlapping edges of the aragonite platelets, and this also tends to give the impression that one is dealing with an imitation pearl.

When this extraneous coating ages, or has collected on the pearls rather as droplets than as a complete covering, the coating may peel or flake off and give the impression that it is the pearls that are flaking away. It is well for the jeweller to be mindful of this, as it has not been unknown for a customer to complain of this "flaking" of her pearls.

The second type of contamination, inwardly, may be illustrated by an actual case where an investigation was carried out. Briefly, a cultured pearl necklet was restrung by a jeweller on behalf of a customer and after about three months had elapsed the lady brought the necklet back and complained that since the pearls had been restrung a number of pearls had turned to a blackish colour. The

jeweller's assistant who saw the lady fully agreed that some of the pearls had blackened and asked her to call again and discuss the matter with the manager. Instead of so doing the lady took the necklet to another jeweller, who had previously valued the necklet for insurance purposes. As would be expected the value now placed upon the necklet was considerably less than before, whereupon the indignant lady took the pearls to the local police station and lodged a complaint against the first jeweller.

The police interviewed the jeweller and suggested that a laboratory investigation should be made. The necklet, now in pieces, for the police had cut from the necklet all the blackened pearls, came into the hands of the writer for an investigation as to the cause of the blackening of the pearls. From previous experiments it was known that some pearls appear to darken by possible sulphiding of a metallic compound, which may have adventituously been taken up by the organic part of the pearl, or by dirty grease entering the pearl through the stringing canal. There is a further, but unlikely, contingency that silver nitrate, which is used in some hair dyes, might be the activating factor, just as it is used for dyeing pearls black.

Examination of the string of the necklet under investigation showed some grease to be present, and that the snap itself was covered by grease, and to such an extent that one of the diamonds set in it was completely covered and could not be seen. Grease was evidently the answer here, but for completeness of the investigation a test for sulphiding was carried out. This gave a negative result.

Some of the discoloured pearls were then degreased by using a Soxhlet extraction apparatus. After this treatment the pearls were found to be much whiter, and grease was recovered from the solvent used for the degreasing.

What had happened here was that grease, presumably from cosmetic creams, had entered, by capillary attraction, along the stringing canal and up and around the discontinuation layer between the bead nucleus and the outer nacreous layer. The grease had darkened, owing to ageing and admixture with dirt, and this showed through the translucent pearly outside layer and made the pearls appear dark coloured.

Turquoise and Jade

Most turquoise has been treated in some way to improve the

colour and substances used for this treatment may be affected when cosmetic preparations get on to the surface of the stone. Even good coloured non-treated turquoise may be affected by certain cosmetics. Robert Crowningshield refers to a case in which turquoises had discoloured, apparently from the effects of cosmetics. There has been no report that jades have been affected by beauty preparations, but as jadeite can be dyed, deleterious effects could conceivably occur with this material.

Chalcedony

The only case of possible attack by cosmetics on chalcedony was one referred to the writer some time ago, and for which, at the time, no decision was reached, particularly as the change seemed so fantastic. Here, a ladys' signet ring, set (presumably) with a black onyx, was submitted for investigation. The story which came with the enquiry was that the black stone was originally red (cornelian or stained agate) and had turned black. The owner of the ring was said to be a hairdresser and it was questioned whether chemicals used for hair-treatment could have caused the change of colour. No information was given as to the nature of the chemicals used, or the type of hair-dressing preparations used by this hairdresser. The only question asked was whether such an occurrence had been encountered before. To the best of my knowledge it had not, or at least had not been reported, and the matter rested there.

However, intrigued by the effect which, presumably, had occurred with the stone in the lady's ring, some experiments were carried out. A piece of cornelian, probably dyed agate, was immersed in a tube of 25% sodium sulphide and left for some time, after which it was removed and dried. No apparent effect was then noticed, but some time later, after the stone had lain on a shelf open to daylight, the stone was seen to have darkened, but admittedly did not turn black but to a very dark brown. The notion underlying this experiment was that as the colour of cornelian was due to iron, the action of the sodium sulphide might produce the black ferrous sulphide (FeS).

To perform the second experiment a small piece was broken off from the blackened specimen and immersed in a 20-volume solution of hydrogen peroxide and left for twenty-four hours. On the removal of the piece from the solution it was seen that it had returned to the original reddish colour, that of cornelian. Another piece

was broken off the darkened specimen and immersed in ordinary tap water in order to check whether the darkening was just surface deposit which could be washed off. No lightening took place even after three days immersion. Whether the hydrogen peroxide solution would return the colour when other dyes were used is a matter for debate and further experiment.

To get further information the writer approached the technical staff of Golden Ltd., the makers and distributors of the hairdressing products of L'Oreal of Paris, who were good enough to submit specimens of cornelian to treatments with some of their products. These tests involved immersion in samples of *Pastel* and *Progress* cold-wave lotions, *Ciloreal* skin-stain remover, and a number of basic chemicals used in the manufacturing of L'Oreal products, both for hair colouring and permanent waving. Tests were also carried out by the Golden technicians with a 10% sodium sulphide solution; and one stringent test was with a *Pastel* cold-wave No. 1 at a temperature of 75°C. for eight hours. On the return of the stones, in no single instance was any blackening of the stones noticed. Later, however, after the stones had been kept in a stone paper for a few months, two of the pieces did seem to have somewhat darkened in colour, but they certainly had not turned black.

It is clear from the above that any change in the colour of cornelian could only occur after prolonged treatment, as in the case of the hairdresser who could well be using cosmetic chemicals daily, and would anyway be of rare occurrence, and not an expensive item to replace, but it does illustrate what troubles can be encountered.

The object of this article is to warn the jeweller that cosmetics, when incorrectly used, may have a deleterious effect on certain types of gem materials. This is no criticism of beauty preparations in themselves when they are used with common sense, but so often ladies are oblivious to the fact that they are wearing their jewellery when completing the final touches to their make-up; then the jeweller is challenged as to the resultant changes.

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MINERAL NOMENCLATURE AND THE GEMMOLOGIST

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

GEMMOLOGISTS are well aware of the difficulty in attaching a universally accepted meaning to certain names of precious stones. "Topaz" is one outstanding example, though here at least the weight of informed opinion is all on one side, and in time the problem will be resolved by limiting the name to the rarer of the two claimants. Attractive and ancient names like "jacinth" and "chrysolite" have been virtually abandoned by gemmologists because of their ambiguity.

Terminology in mineralogy has usually been more precise and systematic, but even mineralogists have had, and continue to have, their troubles over names. Many even of the well-known species, for instance, are known by different names of almost equally respectable lineage, though it is not of course so dangerous to have two or more alternative names for the *same* species, as to have one and the same name for *different* species.

There now exists an international "Commission of New Minerals and Mineral Names", which is attempting to resolve old difficulties and to prevent new ones arising. The Council of the Mineralogical Society of America now urges authors of papers describing new minerals submitted to the "American Mineralogist" to submit any proposed new mineral names to the Commission prior to publication.

The Commission now publishes an annual review of approved and disapproved names, and also a review of agreements reached, either unanimously or by a large majority, on older alternative names. Decisions reached for the years 1959, 1960, and 1961 are summarised on pages 223 and 224 of the *American Mineralogist* for Jan./Feb., 1964.

Ekanite is the only new species name for a gem material in the period under review. Henwoodite (a name suggested for Cornish turquoise) and the unlovely "shattuckite" are names for gem materials which are now discredited.

Some decisions reached on older alternative names are of some interest to gemmologists. The following, for instance, were among those unanimously agreed:—
Feldspar, not felspar; grossular, not grossularite; hematite, not oligiste; hemimorphite, not calamine; spessartine, not spessartite; spodumene, not triphane; wernerite to be the species name, scapolite the group name. And, by a large majority, the following:— Orthoclase, rather than orthose; rhodochrosite rather than dialogite; sphalerite rather than blende. No agreement was reached concerning alternative names for idocrase, kyanite, and sphene—while iolite = dichroite = cordierite does not seem to have been discussed.

AN OLD FRENCH BOOK ON GEMMOLOGY

By A. E. FARN, F.G.A.

"C'est presque toujours du Pérou que nous sont venues les plus belles émerauds que nous voyons dans le commerce."

Thus wrote Placide Boué[1] in Paris, in the early part of the nineteenth century, in his second tome of a series on goldsmithing, the jewellery trade and gemstones.

Today, whilst not actually coming from Peru, it is true that the world's finest emeralds are found in Colombia, S. America. Discussing emerald Boué writes that it is a little harder than quartz but scratched by topaz. Emerald, he states, has a "pesanteur specifique de 2·72", which is a very readily recognizable figure for the specific gravity of emerald.

No confusion need arise between green tourmaline and emerald, he states, since the specific gravity alone suffices to distinguish it. There are literally literary gems in abundance in this discourse and he is obviously a man of very sound gemmological persuasion. Discussing the habit of applying the term "noble" to a stone free from flaws and of good colour he derides the term as meaningless and puerile—emphatically stating, "Ne point surcharger notre memoire de noms insignifiants". This, as a broad truism, could be usefully taken by some authors who have to perpetuate fancy misnomers or coin a new name for an old stone. Speaking of

peridot, Boué says "il jouit de la double réfraction à un très haut degré", which sounds very exciting compared to our distinct double refraction.

This old book is very much in accord with today's gemmological thinking. There are very many diagrams and scale drawings of carat sizes and cuts together with a full list of specific gravities and characteristics. It is a book one can pick up, open a page at random and become immersed in touchstones for testing gold or details of unusual stones specifically included to help out with a jeweller's alphabet or word manufacture. Even in those days they had trouble with U, X, Y and Z. There is little doubt that Placide Boué was something of a rarity—a learned gemmologist who was a jeweller, whereas today gemmology suffers from an overdose of scientists often out of touch with the trade which made gemmology possible.

"Une odeur aromatique très agréable" is what one discovers on burning amber, which gives the description a little headiness not unassociated with French perfumes. In those days most people quite happily rubbed their amber pieces and attracted small pieces of paper to them, and this amazing fact seemed satisfactory as proof of amber.

All told then this is a well written authoritative book, refreshingly tackled, very much in advance of its day.

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CULTURED PEARLS FROM HONG KONG

Cultured pearls from the farms established in the Tolo Channel and Port Shelter areas of Hong Kong were harvested in the first part of the year. The first farming is reported to have produced spherical cultured pearls of good quality. Blister cultured pearls were also collected.

A FEW UNUSUAL ITEMS

By G. V. AXON, F.G.A.

CURIOUSLY enough, there seems to be a tendency among jewellers, mineralogists, and some gemmologists to refer in a rather casual and slighting manner to odd stones which are often called "stunt stones" or "whims". It is queer that this should be the case, for some of these unusual stones could well find their way into jewellery, and it is a hundred-to-one against any average jeweller recognizing them for what they are.

What is more, many of them have quite a distinctive beauty, and in a world which is becoming more and more a mass-produced and mass-educated culture, it might be thought that something unusual and beautiful would be appreciated.

The fear among mineralogists seems to be that a fine crystal will be destroyed to produce an almost worthless gemstone. Jewellers may be secretly worried that they will be "taken". Gemmologists may be concerned that they will not recognize something without a great deal of testing.

Among keen lapidaries, of course, any mineral offers a great challenge, not only in the cutting but in the polishing to bring out the full beauty of the stone. Even colourless minerals with little else to recommend them may become quite attractive when correctly cut. After all, it is not too difficult to obtain a dioptase crystal, but how many cut dioptases are there? How many faceted dolomites? Or clear rhodochrosites? The answer is not very many. Faceting and polishing dioptase is surely a very highly skilled business, and it seems not unreasonable to regard a faceted dioptase with some respect.

Comments on a few recent unusual personal acquisitions are given below:

Ajoite, a copper aluminium silicate from Ajo, Arizona, is a fairly recent mineral, having been discovered about six years ago. It produces a very attractive blue cabochon hardly distinguishable from shattuckite and planchéite.

Amazonite can hardly be called a curiosity, but it certainly is a rare stone in its crystallized form. Broken Hill, Australia, seems to provide a few such crystals from time to time, and they yield smallish stones looking rather like pale emeralds.

Apatite, too, is hardly a rarity except in various varieties, such as the fine colourless crystals from the Tyrol and the bright green stones from Burma. The usual green of apatite is hardly very attractive, but the bright green more resembles a very fine tourmaline or chrome diopside.

Axinite, also, is not usually considered rare, at least in the United States, for there seems to be a fairly steady supply of crystals from Mexico which yield small flawed stones. The author was pleased to obtain two considerably larger stones—one over 7 carats, the other over 8 carats. The former is almost flawless, while the latter, although somewhat flawed, is not unattractive for it has a purplish hue in one direction.

Azurite, cut from the crystals, has been mentioned before in this journal. The cut stones are indeed curiosities, and a stone of nearly 8 carats must probably be assumed to be a rather large and unusual specimen.

Cassiterite in the form of "wood-tin" hardly seems to be available these days, so two cabochons from Mexican material were welcome. The "grain" of this massive brown variety is rather odd, but it comes also in darker material with no "grain" at all. This latter variety is not very attractive.

Coral does not qualify as rare, but these days one has to be thankful to obtain even a small specimen of the fine white Mediterranean coral.

Datolite, like petalite, comes in gem and massive form, the latter type, from the Lake Superior region copper mines, producing cabochons which could well be made into brooches. The copper is sometimes finely disseminated throughout the material, and sometimes occurs as blobs and streaks making fanciful shapes, or very attractive patterns.

Dioptase, known for its fine green crystals, not only has almost perfect cleavage in all three directions but is heat-sensitive as well. Thus usually only the finest crystals are capable of producing stones, and these are often only a fraction of a carat. Yet they are a very fine green and possibly the finest green of all gemstones.

Dolomite is hardly known as a gemstone, yet the mineral produces fine crystals which may be cut into quite sparkling stones. Its cleavage usually prevents the production of a perfect stone, so a stone of about $2\frac{1}{2}$ carat which is fairly clean must be something of a rarity as well as a curiosity.

Domeykite, too, is rather unusual, yet the mineral may be cut into fine "golden-like" cabochons which tarnish but may easily be made sparkling again by an ordinary jewellery polishing cloth. Odd, really, that a copper arsenide is capable of producing a rather attractive "golden" cabochon.

Euclase is hardly rare, yet the cleavage makes clean stones fairly rare, especially if they have a hue. Thus a clean straw-coloured euclase of over one carat made a welcome acquisition.

Fluorite is so common that only rare hues may be classified as unusual. A pink fluorite of 12·9 carats excited some apprehension until it was discovered that the colour came from having been exposed for several years to the hot sunshine of Arizona. The mine usually yields blue-green material which, on the dump, turns purple in the sunshine, then peach, then pink, and finally colourless if left for many years. Once taken out of the sun, the hue at that particular time seems to be permanent. This is rather odd, for the pink fluorite octahedra from Switzerland were formed under high temperatures. Care should be taken, therefore, when buying pink fluorite, for the octahedra are not very likely to have been cut, while the recrystallized pink fluorite from optical factories is simply not acceptable to the purist collector. It is, in fact, the air-contaminated rejected material which, while producing a deep pink stone, has simply acquired its form and hue by man's intervention. The dump material also is not as it was in the mine, but in this case it is simply not possible to produce it by the bucketful, or sweep it up from the floor of the factory. The ability to produce so many gemstones by artificial means, however, does point up the continuing need for research, for some stones, such as scheelite, now being produced artifically, are very expensive items, in large sizes, when genuine.

Friedelite was once not uncommon in the New Jersey area of the United States, but it too is now classified as something of a rarity, or curiosity, even the reddish-brown translucent material cut into cabochons. It was formerly used for all sorts of carvings, slabs, and paperweights.

Labradorite is hardly a curiosity, yet few gemstones yield a range from the colourful opaque, through the colourful translucent, to the colourless transparent. Three specimens, one of each, show the gradations effectively.

Idocrase of the golden-brown transparent variety is quite well known, yet a stone of 2·60 carat from Laurel, Quebec, must be considered in the rare or curious class even though not absolutely clean.

Jadeite is common enough, but a cabochon said to be "petrified-wood-jadeite" would appear to be something of a curiosity. A test has not yet been made, but the material is greenish and with "wood-like" bandings, so the purchase of wood, "petrified" by jadeite, may yet be substantiated.

Kyanite, too, is common enough really, yet a clean faceted green stone with a centre banding of blue is something not seen too often.

Opal which is truly black must be considered a curiosity. Coming in a cabochon, it was said to have been carefully dug out of the matrix and then cut. It appears to be rather like the dyed black chalcedony at first sight, yet it is clearly of low specific gravity.

Petalite in its transparent form is not too common, hence the owner of a crystal is likely to want to get the most out of it even if it means cutting a "fish-eye" stone. Yet even a somewhat "fishy-eyed" petalite of 1·75 carat is not to be turned down too readily.

Rhodochrosite, also, is a stone which in its fine transparent qualities is not seen too often. Thus a deep-pink faceted parallelogram of 5·50 carats cut from the author's crystal weighing some 80 carats probably may be classified as a rare curiosity. The 80-carat uneven crystal was ground down, rather than cut, into a preform of about 9 carats, and then faceted. The considerable weight loss was apparently necessary to obtain a fairly clean stone, the difficulty being due to cleavage.

Violane is not quite so common as some textbooks make out, so a small cabochon of violane in matrix was accepted with good grace. The source was given as San Marcello, Val Aosta, Italy, which is the classic source for this variety of diopside.

Willemite, of fine facet quality, is rare and usually of a bright lemon-hue. The orange variety is even rarer, so a stone of nearly $2\frac{1}{4}$ carats must be considered something of a rarity and curiosity.

Zincite, unlike proustite, is not often seen in large crystals, and the faceted stones, usually dark and not too transparent, are often rather small. Two crystals bought a couple of years ago yielded three stones the largest of which was 5·85 carats. The smallest stone, of about a carat, had in part a bright red hue showing

just what a fine stone zincite can be in its best qualities, even if not capable of being used in jewellery.

Collectors of oddities are for the most part fully aware of the beauty of crystals, and they do not usually wantonly destroy fine crystals just to obtain a faceted stone. A dealer may do just this, for in this way he takes a risk in the cutting yet gets a better price for a faceted stone than he would for the crystal, but it is not unknown for a collector to put a fine crystal in his collection and regard it as a faceted stone. Few collectors would cut a fine twinned staurolite, or a pseudocube of boléite, just to make a cabochon. Probably most lovers of fine stones are also lovers of fine crystals. The mineralogists need not worry too much.

LECHLEITNER SYNTHETIC EMERALD

It has been reported that Johan Lechleitner, of Austria, is now producing stones consisting of layers of white beryl with a tablet of synthetic emerald between the layers. The whole is then covered with a synthetic emerald overgrowth. The emerald tablet is at least two millimetres thick and approximately fifteen millimetres in diameter.

The method of production would appear to be that several very thin layers of identical oriented white beryl are placed in the growth chamber and synthetic emerald is then produced so that the spaces between are filled. This method produces the depth of colour which was lacking in the earlier Lechleitner stones. These first stones had a synthetic emerald overgrowth on a faceted pale beryl.

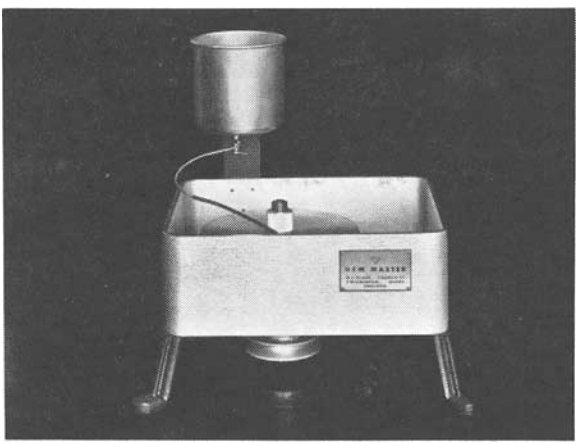
THE BEACH GEM MASTER

A FELLOW of the Association, Mr. M. L. Beach, of Twickenham, has designed and produced an inexpensive yet high quality gem-cutting machine for the stone collector.

The Beach Gem Master is a serious attempt to produce a machine that will give years of profit or pleasure for the stone collector. Compact and easily handled it is essential to any efficient workshop. Jewellers will welcome the usefulness of such a machine. Geologists will find it invaluable and technical schools will appreciate its quietness and safety.

The diamond-charged grinding wheels supplied with the machine ensure trouble free cutting. Unlike normal grinding wheels there is little noise, no mess or loose grits and no danger to the fingers. Stones can safely be held in the fingers and shaped directly on the diamond wheels—if too small or extra care is needed they are cemented onto the wooden dop sticks with the cement supplied and handled with ease.

Built onto the machine is an anodized one-pint aluminium water can with special tap and feed pipe. The necessary water lubrication, needed during cutting, is supplied by turning on the tap so that it drips slowly onto the wheel.



Three 6″ diameter diamond-charged wheels are supplied with the machine, a coarse one for roughing out, a medium for shaping and a fine for semi-polishing. The life of these wheels is surprisingly long and only the coarse wheel is subjected to heavy wear. Even so, with moderate care, this wheel will last for the cutting of many hundreds of stones before it needs recharging and this can be done at a very nominal price.

The convenience of diamond wheels has to be experienced to be appreciated. With these modern diamond wheels it is necessary only to replace one wheel with another, the diamond powder being locked into the wheel.

The felt wheel and polishing powder supplied will be found suitable for most gemstones. Quick results are possible and by using the softer gem materials cabochons can be cut and finished in minutes. A carborundum wheel is supplied for rough shaping of coarse specimens.

Great attention has been given to the finish and durability of the machine and substantial bearings and accurately made parts aid its long life. It is easy to set up and to clean. To run it a 1/6 to 1/3 H.P. electric motor is needed and there are many suitable inexpensive makes on the market.

The Gem Master is not intended for high class professional lapidary work. For the amateur who just wants a pleasant hobby it has much to offer. Many can derive much enjoyment from turning gem mineral pebbles into attractive objects.

Gemmological Abstracts

CANNAWURF (C.). *Die Frühgeschichte der Smaragdsynthese.* Early history of emerald synthesis. Zeitschr. d. deutsch. Gesellsch. f. Edelsteinkunde, 1963, 46, pp. 7-11.

Synthetic emerald was first produced in 1848 by Ebelman, the director of the Sèvres factory near Paris, by heating boric acid with powdered emerald; the colour was produced by the addition of chromic oxide. Hexagonal prisms resulted, but these were too small to be used commercially. The next synthesis also only produced crystals of 2 mm length. This was in 1889 by Hautefeuille and Perrey. Colourless beryl was synthesized in 1894 by Traube. In 1924 H. Espig started his experiments, but it was not until 1935 that they were successful. In the meantime Prof. R. Nacken produced cuttable crystals by the hydrothermal method. It was only after the 2nd world war that with Chatham's success synthetic emeralds became commercially available, and since then various other producers have brought synthetic emeralds on to the market.

E.S.

Fortschritte in der Edelsteinsynthese. Advances in gemstone synthesis. Zeitschr. d. deutsch. Gesell. f. Edelsteinkunde, 1963, 46, pp. 11-20.

A summary of papers read at a meeting of the mineralogical group of the Geological Society of Germany in February 1962. The original papers were published in the Berichte Geol. Gesellsch. DDR Vol. 7, 1962, pp. 447-568. The papers were: (1) H. Espig, Synthesis of the emerald and various other minerals. (2) C. Barta, Tendencies in the development of the Verneuil process. (3) J. Zemlicka, The synthesis of large corundum crystals. (4) R. Baumgärtel, Some colour effects in corundum crystals after production by the Verneuil method. (5) A. Neuhaus and P. Brenner, Growth, habit and colour in rubies produced by the hydrothermal method and their relation during the synthesis to the pressure used. (6) J. Smid and J. Kvapil, A few notes on the hydrothermal synthesis of single quartz crystals.

E.S.

. . . Das Polariskop von Rayner, London. *Rayner's polariscope.* Deutsch. Goldschmiedezeitung, 1964, 62, 3, p. 196.

Short article with illustration explaining the use of the polariscope. It mentions that the stone to be examined should be viewed from various angles, and that in the case of cut and polished stones best results are obtained if they are viewed with the table facing down.

E.S.

ROEMER (W.). Polieren und Auffrischen von Edelkorallen. *Polishing and reconditioning of corals.* Deutsch. Goldschmiedezeitung, 1964, 62, 3, p. 184.

It is common practice to dye inferior corals with red wax; these corals soon loose their colour when they are worn. But also good corals become matt in the course of time, although they stay a deep red. These corals can be reconditioned by polishing them first with emery paper, then with a soft leather, using a little tripoli compound. No ammonia should be used. Instead of tripoli a little corundum can be used. After the polishing process, the corals must be oiled.

E.S.

EPPLER (W. F.). Ein neuer synthetischer Smaragd. *A new synthetic emerald.* Deutsch. Goldschmiedezeitung, 1964, 62, 3, pp. 183-184.

A new synthetic emerald has been produced by Walter Zerfass. This synthetic stone has D. of 2·66 (natural 2·71, Chatham synthetic 2·65, Lechleitner 2·7) and especially low values for its RI, i.e. 1·561, while its double refraction is very high. Under the microscope one finds small liquid inclusions which are feather-like and are arranged along the c-axis like honey-combs. Some photomicrographs of these are shown. Rarely can one also find phenakite crystal inclusions.

E.S.

PATEL (A. R.), GOSWAMI (K. N.) and RAMANATHAN (S.). *Spiral patterns on synthetic diamonds.* Proc. Physical Soc., 1963, Vol. 81, pp. 1053-1055.

Spiral growth patterns on the faces of synthetic diamonds are discussed.

R.A.H.

GOMON (G. O.), KARAPETYN (G. A.) and YUDIN (D.). *Paramagnetic resonance in diamonds.* Zap. Vses. Mineralog. Obshch., 1963, 92 (5).

Diamonds from various deposits, differing in type, colour and other properties were studied for EPR. These and other diamonds, which were irradiated in a cyclotron and nuclear reactor, did not give any signal in the EPR spectrum for colourless stones, and the spectrum for coloured diamonds and stones irradiated with neutrons defied analysis. In come instances the colouring, luminescense and EPR spectra had some relationship. S.P.

GNEVUSHEV (M. A.) and FUTERGENDLER (S. I.). *Traces of magnetic melt trapped by diamond crystals.* Zap. Vses. Mineralog. Obshch., 1963, 92 (5).

By an X-ray study of a diamond crystal from the Yakut area it was found that these crystals consisted of large ($\approx 10\text{-}^3$ mm) disorientated blocks ($\approx 5\text{-}6^\circ$). On Laue photographs many of these were observed as a series of rings. The inter-plane distances of these rings corresponded closely to the inter-plane distances of the olivine crsytallographic lattice. There is the likelihood that the olivine in the composition of the diamonds studied is the result of the crystallization of glass of ultrabasic origin, i.e. the magnetic melt trapped by the rapidly grown crystal. S.P.

SUSSE (C.), EPAIN (R.) and VODAR (B.). *Synthèse du diamant dans un appareil a pistons profiles.* Bull. Soc. française Min. Crist., 1963, Vol. 86, pp. 437-438.

Using tungsten carbide pistons in conjunction with compressible pyrophyllite joints, a pressure of 65 kilobars is applied, the graphite-nickel mixture is heated to 1850°C at the centre of the chamber (corresponding to 1580°C at the level of diamond formation) and this temperature is held for 8 minutes, before the heating is stopped and the pressure slowly dropped. Black diamonds up to 0.7 mm in size have been produced. R.A.H.

Matrixopal gefärbt, ein Ersatz für schwarzen Opal. *Dyed matrix opal, a substitute for black opal.* Zeitschr. d. deutsch. Gesell. f. Edelsteinkunde, 1964, 47, pp. 16-20.

This communication, from Miss Verena Theisen of Dr. E. Gübelin's laboratory at Lucerne, points out that dyeing can be

detected with a lens. In contrast to genuine black opal, the surface is not of a homogeneous structure but contains dark grains or dust which can be dissolved in hot sulphuric acid.

W.S.

BUTCHER (J.) and WHITE (E. A. D.). *A study of the hydrothermal growth of ruby.* Mineralog. Mag., 1964, 33, 266, pp. 974-985.

Experiments to determine the optimum conditions for the hydrothermal growth of ruby show that the most rapid growth on seeds of corundum takes place in a normal solution of rubidium carbonate. To obtain the necessary purity the autoclave must be lined with platinum. The deep pink ruby colour is produced by adding potassium dichromate, to give ruby with a chromium content of about 0.1%. Compared with flame-fusion ruby, the hydrothermal crystals show a more uniform distribution of chromium as opposed to the large scale inhomogeneities of the former. Growth is slow, rarely exceeding 1 mm. over a period of 14 days.

R.A.H.

Die Systematik der Perlen. *Systematic cataloguing of pearls.* Gold und Silber, 1964, 7, pp. 16-17.

The article subdivides pearls and explains various differences between them.

E.S.

Vorsicht beim Röntgen forbiger Perlen. *Care must be taken when x-raying coloured pearls.* Gold und Silber, 1964, 7, p. 19.

There is a certain danger of causing damage, such as brownish spots, when subjecting coloured pearls to the x-ray diffraction method. It is therefore advisable to use straight x-ray methods or ask permission of the owner before use of diffraction method.

E.S.

Farbe und Farbänderung beim Topas. *Colour and colour changes of topaz.* Gold und Silber, 1964, 7, pp. 33-34.

Commercially unimportant, but of great minerological interest, is the occurrence of topaz in Saxony. In 1757 some of these stones were accidentally burned and lost their colour, becoming glass-like in appearance. Colourless topaz is often found in nature and is sometimes known as "pingos d'agoa"—water drops. The topaz

found in Saxony is yellowish, occasionally greenish, while the stones found in Brazil are mostly yellow or brownish-yellow. Brazil still yields most topaz but many beautiful stones are found in Ceylon. In Russia topaz is found in many colours. Brazilian stones which are dark brown are heated to 450°C, lose their colour, but become pink to purple when they are cooled. The difference between naturally pink topaz and topaz which are pinked by heating is a strong pleochroism of the latter.

E.S.

WEBSTER (R.). *The fading amethysts.* Watchmaker, Jeweller & Silversmith, pp. 127 & 133, September, 1964.

Discusses the cause of fading in amethysts. The suggestion is made that the cause is usually due to adventituous heating, and gives a warning to working jewellers to take care when working with jewellery set with amethysts.

P.B.

THEISEN (V.). Achtung voe kunstlich schwarz gefärbtem Opal. *Warning—artificially coloured black opal.* Deutsche Goldschmiedezeitung, 1964, 62, 8, p. 679.

Poor opal material is cut en cabochon, heated and then put into a sugary solution. The sugar is impregnated in the opal. Then the cabochon is dipped into sulphuric acid, which blackens the sugar in the opal. Under a lens it is easy to see this deception, as the dark parts are irregularly distributed and one can still see parts of whiteish opal. When a suspicious opal is cut, one can see that the coloured layer is only acout 2 mm. deep.

E.S.

SALLER (X.). Schace der Synthese. *Stalemate to synthesis.* Deutsche Goldschmiedezeitung, Vol. 62, No. 8, Aug. 1964, pp. 663-664.

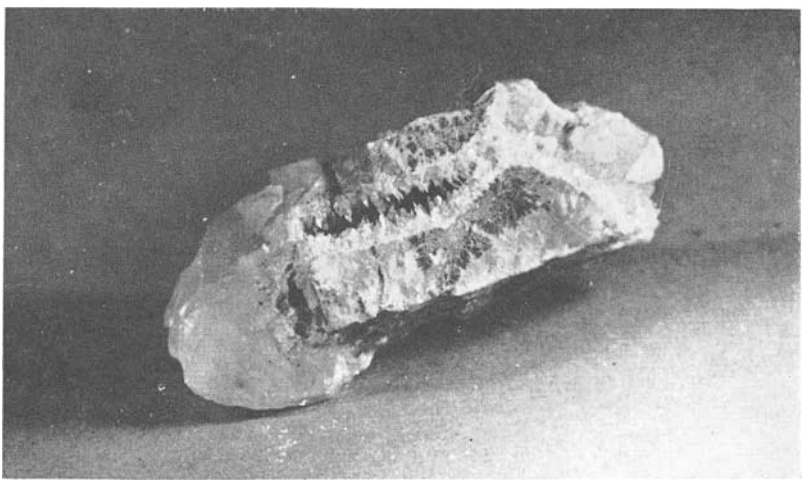
An extract of a lecture read by the author to the annual meeting of the Gesellschaft der Edelsteinfreunde in Wiesbaden. The author warns of the increasing influence of synthetic stones. He contends that there is no such thing as a synthetic mineral, as a mineral must have a specific lattice, a definite chemical formula and must have evolved naturally.

E.S.

THE DRAGON'S MOUTH

ALTHOUGH small, this is an excellent example of a drusy cavity in a mineral vein. Here there was room for well-formed crystals to grow. The crystals are calcite having scalenohedral habit, a form known as "dog-tooth spar". The surrounding rock is limestone and on the exposed surfaces are dentritic patterns made by another mineral, which may well be pyrolusite (manganese dioxide). On each end of the specimen are larger ill-formed crystals of calcite.

A feature of this specimen is the beautiful luminescence seen when it is irradiated by ultra-violet light and by x-rays. Under the long-wave u.v.l. lamp the calcite crystals glowed with a lovely rose-red colour, with the edge forming the border to the crystals, and the limestone rock was outlined with a yellowish-white fluorescence, which showed a green phosphorescence when the rays were turned off. Under short-wave ultra-violet radiation the rose-red glow of the crystals was less strong but the whitish border produced a more intense and persistent phosphorescence. Under x-rays the calcite, as usual with this form of calcium carbonate, glowed strongly with an orange light, and, further, showed a strong and very persistent phosphorescence of similar hue. After irradiation with x-rays for about two or three minutes this phosphorescence persisted for about 45 minutes, and the calcite at the point where the rays had impinged had photo-coloured to a faint brownish colour, but this faded as the phosphorescence diminished.



ASSOCIATION NOTICES

GEMMOLOGICAL ASSOCIATION OF SWITZERLAND

The Gemmological Association of Switzerland, presided over by Mr. E. Frischknecht, held their Annual General Assembly and ensuing Instruction Course on 8th, 9th and 10th June, 1964 at Villars sur Ollon, above the Rhône Valley.

In order to clarify the rather confusing recommendations suggested by the French delegation at the last meeting of the International Confederation of Jewelry, Silverware, Diamonds, Pearls and Stones, held in Paris on 27th April, as a compulsory ruling, the Swiss Association affirmed its own ruling that a magnification of 10 × should be used as a standard for grading the purity of diamonds of any size and consequently stated on certificates that may be issued by traders.

The Instruction Course was mainly devoted to imitations of any kind and synthetics. The lectures on the first day dealt with the various processes of production, the diagnostic properties and the reliable methods of testing. On the second day practical exercises in gem-testing were carried out and this gave the members numerous opportunities of becoming acquainted with all kinds of man-made stones and of comparing them with their genuine counterparts. Later in the day Dr. E. Gübelin described the gem deposits of Thailand and their mining methods by means of descriptive colour slides which he had made on his last visit to those deposits in January and February of this year. On the morning of the third day the Association visited the near-by and important factory of synthetic stones owned by Mr. A. Djevahirdjan. He explained the greatly improved processes of production in his highly modernized plant, while in the well equipped laboratory, the development of new controlling instruments, as well as amazing experiments with ruby lasers and sapphire window discs, were demonstrated. This most instructive Course found its worthy conclusion in a visit to the remarkable old treasure of the Monastery at St. Maurice.

COUNCIL MEETING

A meeting of the Council of the Association was held at Saint Dunstan's House, Carey Lane, London, E.C.2, on Tuesday, 30th June, 1964. Mr. F. H. Knowles-Brown presided.

The following were elected:—

ORDINARY MEMBERSHIP

Anthony, I., London
Azzopardi, J., Malta
Blick, R. C., Guildford
Fink, A. B., Virginia, U.S.A.
Griffin, Mrs. F., Radcliffe
Hack, Miss E. O., Birmingham
Howard, D. D., New Orleans, U.S.A.
Jhaveri, J. C., Hong Kong
Larcher, D. M., Sheffield
Lyons, D., Leicester
van Moppes, M., Basingstoke
Reid, Mrs. R., Salisbury, Rhodesia
Taniji, J., Kobe, Japan

PROBATIONARY MEMBERSHIP

Fuchs, R., Frankfurt
McDowell, B. M., Wellington, N. Zealand
Montague, J. C., Wellington N. Zealand
Strange, R. L., Romford

The Council agreed that candidates should not be permitted to sit for the preliminary and diploma examinations in the same year unless approval be given by the Council.

Mr. P. W. T. Riley was invited to serve on the Council as a co-opted member.

The Council agreed to review the gemstone nomenclature approved by the Association and, at the same time, to consider a request from the National Association of Goldsmiths regarding the use of the term "flawless" when applied to diamonds.

GIFTS TO THE ASSOCIATION

The Council of the Association is indebted to the South Australian Branch of the Gemmological Association of Australia for samples of rough opal from Coober Pedy, Andamooka and Lightning Ridge, and three pamphlets on opal and the gemstones of South Australia, and to F. N. Hudson, Esq., for a booklet on gem localities of Scotland issued by the Scottish Mineral Lapidary Club.

Mr. Karl A. Sack, F.G.A., of San Diego, California, U.S.A., has kindly presented the Association with several twin crystals of twinned "chrome" sphene, from the San Simon district of Baja California, together with samples of associated minerals.

POST-DIPLOMA GEMMOLOGY CLASS

Students in the London area who have passed their Diploma examination are reminded that there is a Post-Diploma class available to them which is held from 6 to 9 p.m. on Monday evenings at Northern Polytechnic, Holloway Road, N.7.

In this class they are able to gain valuable experience in practical gemmology, a wealth of cut and uncut specimens being provided for examination. There are also periodic lectures which deal with recent developments, or which cover a wider field than was possible in the Diploma course, since there is no longer any need to conform to a rigid syllabus.

Many gemmologists have attended these classes for a number of years in succession, since they have enjoyed the informal atmosphere and the regular contact with fellow-enthusiasts, as well as benefiting professionally from the knowledge gained.

The Post-Diploma class is conducted by Mr. B. W. Anderson, assisted by Mr. A. E. Farn. The 1964 enrolment dates at the Polytechnic (to whom all inquiries should be made) are:—Tuesday, 22nd September and Wednesday, 23rd September, 5.30—7.30 p.m. (Telephone: North 6767).

TALKS BY MEMBERS

COOP, Miss N. "Gemstones", Blackheath Townswomen's Guild (N. Kent section), 14th July, 1964.

KENNEDY, N. "Gemmology", St. Andrew's Parish Church, Bebington, Cheshire, 30th June, 1964.

OBITUARY

Leonard C. Trumper (D. 1948), July, 1964.

MEMBERS' MEETINGS

1964	
21st October	Midlands Branch dinner, Birmingham.
26th October	Presentation of awards, Goldsmiths' Hall, London. Mr. A. E. Shipton, F.G.A., President of the British Jewellers' Association, will present the awards.
13th November	Midlands Branch meeting, Birmingham. Mr. T. Solomon, F.G.A. will talk about antiques.
1965	
22nd January	Midlands Branch meeting.
11th March	Conversazione, Goldsmiths' Hall, London.

GEM DIAMONDS EXAMINATION

The Gem Diamonds Examination of the Association was held in Birmingham at the School of Jewellery and Silversmithing, Birmingham, on Wednesday, 3rd June, 1964. The following is a list of successful candidates arranged alphabetically:—

Richard J. Collick	Solihull, Warwicks.
John E. Dowse	Solihull, Warwicks.
Roger Francis	Birmingham, Warwicks.
Paul H. Higgs	Walsall, Staffs.
Fay V. McCarty	Birmingham, Warwicks.
Nigel Marshall	Birmingham, Warwicks.
Robert Reekie	Stratford-upon-Avon, Warwicks.
Paul A. Thurlby	Birmingham, Warwicks.
Leslie N. Wells	Abergavenny, Mon.

GEMMOLOGICAL EXAMINATIONS, 1964

Centres for the 1964 examinations of the Gemmological Association of Gt. Britain were established in Australia, Canada, Ceylon, Germany, Holland, Hong Kong, India, Japan, Kenya, Malta, New Zealand, Nigeria, Norway, Portugal, Sierra Leone, South Africa, Southern Rhodesia, Sweden, Switzerland, United States of America, apart from the United Kingdom. 273 candidates sat for the Preliminary and 139 for the Diploma examinations.

Upon the recommendation of the examiners the Tully Memorial Medal and prize have been awarded to Mr. F. G. Dowie, of Christchurch, New Zealand. The Rayner Prize has been awarded to Mr. F. Riding, of Preston, Lancashire.

The following is a list of successful candidates, arranged alphabetically:—

Diploma Examinations

Tully Memorial Medal

Dowie, Frederick Gordon, Christchurch, New Zealand

Qualified with Distinction

Algar, Forbes, Hamilton, Canada
Dowie, Frederick Gordon, Christchurch, New Zealand
Larcher, David Marshall, Sheffield
Snider, James Ralph, Willowdale, Canada

Qualified

Adshead, Christine Violet, London
Bagi, Julius, Toronto, Canada
Baguley, Kenneth, Liverpool
Barker, Brian Michael, Pinner
Barrett, Robert Clive, Cuckfield
Beckwith, John Martin Emmerson, Middlesbrough
Bjørn-Hansen, Eva, Oslo, Norway
Bond, Cecil Allen, Waltham Abbey
Bradburn, Gwendoline, Sydney, Australia
Burslem, William Arthur, Liverpool
Calmus, Michael, Nottingham
Chambers, Edwin Joseph, Dagenham
Climie, Robert, Newtown St. Boswells
Colclough, Albert Cecil, Rainham
Cornish, Stanley, Birmingham
Davis, Margaret, Wembley
Greene, Jane Bannard, Princeton, U.S.A.
Harris, Stephen James Grey, London
Hartley, Mary Louise, Liverpool
Hunt, Elyane Marguerite, London
Hunton, Andrew S., London
Johnson, Arthur William, London
Johnson, Donald Haskall, Kitwe, Northern Rhodesia
Kelly, Hugh, London
Kerry, Stewart Michael, London
King, Michael Leslie, Freetown, Sierra Leone
Knox, Christine Gray, Hamilton, Canada
Koller, Tibor, Forest Hill, Australia
Kothari, Ramesh Rasiklal Madras, India
Lechleitner, Paul A., Lucerne, Switzerland
Major, Keith Roy, East Grinstead
Marshall, M. Sheila, Ibadan, Nigeria
Miles, Richard Stanley George, Nottingham
Myers, Julia Helen, Double Bay, Australia
Nilsson, Carl Allen Gunnar, Boliden, Sweden
Pearce, William M., Athens, U.S.A.
Reid, Wilmet P., Kitwe, Northern Rhodesia

Richardson, Kenneth, Birmingham
Rowley, Robert Edward, Tapworth
Schiffman, Charles A., Geneva, Switzerland
Schriber, Urs, Lucerne, Switzerland
Wain, Edward Hollis, Ipswich
Walters, George Christopher, Leicester
Wyer, Philip George, Birmingham

PRELIMINARY EXAMINATION

RAYNER PRIZE

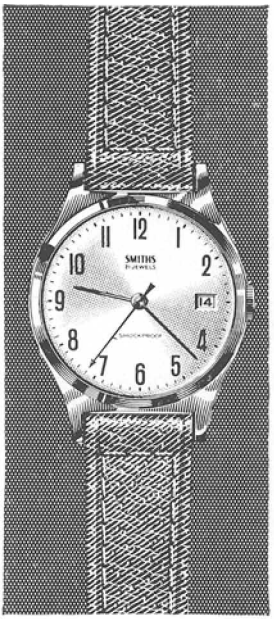
Riding, Frank, Preston

Qualified

Algar, Forbes, Hamilton, Canada
Allan, Ian Edward, Birkenhead
Allsopp, Royston A., Toronto, Canada
Armour, Anthony James, Beckenham
Ash, Grahame David, London
Azevedo, M. Arthur, San Francisco, U.S.A.
Azzopardi, Joseph, Malta
Bailey, Charles Hunter, Wallasey
Baker, Antony R., Warrington
Balhatchet, Frederick William, Sutton Coldfield
Bana, Homi Ratansha, Bombay, India
Baugerod, Gunnar, Porsgrunn, Norway
Beadle, John Christopher, Sunderland
Beaman, Ronald David, Birmingham
Beaumont, Gordon, Huddersfield
Bergseth, Idar Conrad, Burnaby, Canada
Bernet, Edith, Arth, Switzerland
Billingham, Roger, Birmingham
Blackburne, James William, Liverpool
Borrini, Lucia, Horw, Switzerland
Borrmann, Björn, Fjellhamar, Norway
Boruszak, John K., Blackpool
Bradburn, Gwendoline, Sydney, Australia
Bridgen, John Stephen, London
Brookes, John Anthony, Birmingham
Bulley, Michael John, London
Burnett, Douglas Norman, Edinburgh
Butler, June Iris, Waltham Abbey
Carr, Philip, Blackburn
Chernencoff, Wade J., Coquitlam, Canada
Clarke, John E., London
Collard, Edwin, Bridgwater
Collins, Michael John, Plymouth
Conway, Stephen, London
Cook, Murray Ernest, Vancouver
Cooper, Sydney Bernard Nikon, Staines
Cruthers, Margaret T., Glasgow
Cutting, Derrick Charles Ambrose, Wakefield, Canada
Deakin, Brian, Powick
Douglas, David Norman, Manchester
Drew, Frank Henry, Wanganui, New Zealand
Drew, William Henry, Wellington, New Zealand
Dunkley, Peter John, Coventry
Dunne, Michael Bernard, Marple
Ekanayake, Oswald D. W., Dehiwala, Ceylon
Evans, John, Birmingham
Ewart, Myra, Glasgow
Falcon, Lionel James, Leicester
Fancett, Paul, London
Farley, Peter Frederick, Reading
Fassnidge, Ray Denis, Leatherhead
Feakes, Raymond Howard, Middlesbrough
Fehrmann, Justus Johannes, Cape Town, South Africa
Fillan, Ian, Huddersfield
Fournet, B., Hong Kong
Frizzell, Alan, Motherwell
Frost, Allan Robert, Cardiff
Fruitman, Lawrence, Toronto, Canada
Gamble, George Brian, Bradford
Gatward, Anna Bradly, Hitchin

Gauntlett, Gillian, Haslemere
Gow, William Frederick, London
Grant, Christopher Stanley, Burgess Hill
Gray, David Melvyn, Newbiggin-by-Sea
Griffin, Fiora, Radcliffe
Grusd, Alan Ivor, Cape Town, South Africa
Gunn, David Michael, Dover
Gunn, Raymond Diamond, Glasgow
Hallett, Martin A., Bristol
Hallett, Timothy Robert, Purley
Hanebach, Stanley, Scarborough, Canada
Harley-Mason, Robert John, Nairobi, Kenya
Harrison, John Christopher, Liverpool
Hilton, John David, Macclesfield
Hodge, A. D. B., Birmingham
Hogervorst, Lia Angelique, Gouda, Holland
Holmes, Milton J., Owen Sound, Canada
Hooker, Grady Andrew, Cheshunt
Howarth, Harry, Altrincham
Hudson, John David, Woodford Green
Huish, Diana, London
Hunton, Andrew S., London
Imai, Taichiro, Tokyo, Japan
Johnsen, Birgen Odd Brekke, Moss, Norway
Johnson, Donald Haskall, Kitwe, Northern Rhodesia
Jones, Robert John, Ross-on-Wye
Kamino, Toky, Toronto, Canada
Kawaguchi, Hiro, Toronto, Canada
Knox, Christine Gray, Hamilton, Canada
Lechleitner, Paul A., Lucerne, Switzerland
Leech, Alan Gerrard, Heywood
Lewis, Leslie, London
Lloyd, Philip Samuel, Chester
Lord, John Graham, Bournemouth
McCallum, Rosemary Jeanette, Perth
McCorquodale, Iain Douglas, Perth
McCubbin, Robert Andrew, Chesham
Marshall, M. Sheila, Ibadan, Nigeria
Mayhew, Coral Jennifer, Lucerne, Switzerland
Mendis, Balapuwaduge S. V., Badulla, Ceylon
Millar, Maurice Alan, Dannevirke, New Zealand
Mole, Christopher John Sherwood, Birmingham
Moore, Martin Cale, Birmingham
Moore, John H., Solihull
Morgan, Peter, Toronto, Canada
Morley, George Keith, Sutton Coldfield
Munt, Bisley John, London
Myers, Julia Helen, Double Bay, Australia
Myers, Leah Miriam, Double Bay, Australia
Nilsson, Carl Allan Gunnar, Boliden, Sweden
O'Donnell, Arthur, London
Oesterlin, Wilhelmina Pearl, Mosman, Australia
Ogden, Glendower Morritt, Harrogate
O'Grady, Royston Joseph, London
O'Shea, John Partick, Orpington
O'Sullivan, Timothy, Dublin
Parker, Lovell Wilfred, Dublin
Pearce, William M., Athens, U.S.A.
Podhorodeck, Josef, Nottingham
Popper, Madeline C., London
Pratt, William Norman, Kingston-on-Thames
Priestman, Arthur, Manchester
Prince, Michael John, London
Prior, Ernest Fairbairn, Faversham
Pushkar, Miriam, London
Quick, Rodney John Anthony, Torquay
Randle, Rodney Charles, Birmingham
Ratnavira, H. V. Banton, London
Reid, Wilmet P., Kitwe, Northern Rhodesia
Reid, Renee, Salisbury, Southern Rhodesia

Resner, Raymond Arnold, Hove
Rice, R., London
Riding, Frank, Preston
Robb, Cyril Mallach, Christchurch, New Zealand
Rodger, Gerald Eyre, Birkenhead
Rossiter, John Maxwell, Weston-Super-Mare
Rush, Hazel S., Cincinnati, U.S.A.
Scott, Annie Murray, Perth
Shaw, John Reginald Marshall, Northampton
Shires, James Richard, Dewsbury
Simmonds, Stephen Maurice John, London
Smith, Stephen Spencer, Doncaster
Smout, William Walter, Rhyl
Snider, James Ralph, Willowdale, Canada
Spring, Peter Edward, Weston-Super-Mare
Sprott, Elizabeth Ferguson, Monkton
Stern, Marion Judith, Wembley Park
Stocker, Christobel, London
Taylor, Andrew William, Newton Abbot
Taylor, Lynne Duncan, Cape, South Africa
Tenbroeck, Sophia, Bangalore, India
Theisen, Vereno, Lucerne, Switzerland
Thomas, Graham Anthony, Mold
Thompson, Peter Lindsay, Nottingham
Thomson, Harry, Lichfield
Thornton, Brian Steele, Huddersfield
Tillander, Ulla Marita, London
Tilston, Arthur Albert, Wallasey
Toole, John Lewis, Stouffville, Canada
Tutchener, Derek A., Bury St. Edmunds
Ungar, Michael, Ruislip
Utian, Yvan Leo, Johannesburg
Van Eekelen, M. T. W., Hamilton, Canada
Ward, George, Manchester
Watson, Diane Margaret, Whitecraigs
Weare, Roy, Harrow
Wheeler, Jennifer Mary, Bristol
White, Patrick George, Dartford
Wild, Walter Frederick, Liverpool
Wilkins, Anthony Edmund, Bridgwater
Williams, Wanda Frances, Wanganui, New Zealand
Winterson, Martin Richard, Bristol
Woodward, James Raymond, Nottingham
Wren, Michael Francis, London
Young, Simon, Fife
Zoutman, Sake W. J., Apeldoorn, Holland



more winners from SMITHS

Two more thoroughbreds from the Smiths stable. The new 21 jewel Cambrian and the restyled Slimline Astral ranges.

The watches in the Cambrian range have twenty-one fully functional jewels and are offered at unbelievably low prices. Shown is the Chepstow, a gold-plated calendar model retailing at only £6.6.0 on strap, or £7.10.0 on expanding bracelet.

The Slimline Astrals have all the precision and accuracy which made the name Astral famous for value—and now they are restyled in line with modern trends with handsome slim cases and goodlooking dials. An excellent example is the model ST.152, at £7.19.6 on strap, or £8.19.6 on fully expanding gold-plated bracelet.

Last year Smiths watch sales were up 40%—simply because the Smiths reputation for quality keeps pushing sales up. And these two new watch ranges prove it yet again.

SMITHS **CLOCK & WATCH DIVISION**

Sectric House, Waterloo Road, London NW2

SMITHS PLANNED TIME

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