

Diamonds

CHAPTER I

COLOUR AND ITS EFFECT ON THE VALUE OF DIAMONDS

"As for the water of the stones, I must say that, instead of using daylight, as we do in Europe, to examine the rough stones, and to judge well of their water and of the imperfections that may be found in them, the [East] Indians work at night, and in a one foot square hole in a wall they put a lamp with a large wick, by the light of which they judge of the water and of the perfection of the stone, which they hold in their fingers." Vol. iv., Book 2, *Voyages de Tavernier*.

MOST transparent minerals have, when pure, no colour at all, and diamonds are no exception to this rule.

The cause of colour in transparent minerals is not thoroughly understood.

Colour is, however, believed to be due to the presence in the mineral of relatively small amounts of foreign substances, usually metallic oxides. Iron oxide is one of the commonest of these and especially is this true of diamonds. Sir William Crookes, the noted scientist, tells us that the ash left when a diamond is burned in oxygen is largely iron oxide. The oxides that cause colour in precious stones are thought by some to exist in very minute particles, suspended, as it were, in the crystalline material (in colloid solution, a chemist would say). So small are the particles that they are invisible under the microscope, but they cause a selective action upon white light that attempts to pass through the material, so that it comes out more or less coloured; that is, light of certain colours is held up or absorbed, more than light of other colours, with the result that the light

which emerges from the material is no longer white, as when it entered.

Iron as a colourant commonly produces yellow or brown in minerals (sometimes red), and diamonds, especially, run to yellow and brown tints, a truly white diamond being very rare. Diamonds of a very light blue tint (probably caused by the presence of traces of some other metallic oxide), while scarce, are perhaps more abundant than really snow-white stones.

Now the presence or absence of colour in diamonds exerts a very great effect upon their commercial value, and the merchant who deals in diamonds cannot be too well informed or too well trained in the matter. While it is true that parcels of stones from reliable importers or cutters are usually very finely graded, yet that merchant who is best trained in detecting faint differences in colour, and who insists on buying only the better grades, will, in

the long run, be shown only the best goods and will gain a reputation in his community for carrying only fine goods that will be of value to him. Again, when goods are purchased in small or irregular lots that are less carefully graded, or when stones are taken in trade, the merchant has need for trained discrimination in the matter of colour.

Aside from those diamonds which have a pronounced and beautiful colour (so-called fancy stones), the tints of colour in diamonds are pale and pass by almost insensible graduations from a yellow or brown that is obvious, but not deep enough to be pretty, to such faint shades that the presence of colour would not be detected at all by the average person, and perhaps not even by one trained to observe colour in diamonds, unless by direct comparison with stones known to be perfectly white.

It is in the ability to detect these faint differences and to correctly determine just how much of colour a stone (or parcel of stones) carries, that success in judging stones, as to colour, lies. The commercial value that attaches to each of the numerous grades may be readily learned in the trade, and the names that are applied, while not always used in exactly the same way by different dealers, may speedily be learned, but the chief difficulty is to always be able to say definitely in just which class a certain stone or parcel belongs.

A few words indicating some artificial helps in grading may not be out of place.

One must, in the first place, be free from colour-blindness and also from the common fault of lack of vivid perception for certain colours. Much practice and training will also be necessary before great skill can be acquired. Taking for

granted these necessary prerequisites, how should one proceed to get the best results in grading?

In the first place see that you have a good *north* light, unobstructed by buildings or other objects. There must not be any coloured surface near by to reflect tinted light, as a false estimate might easily result.

In the second place, do not attempt to judge stones at all closely except in the middle of the day, say between 10 A.M. and 2 P.M. Very erroneous results may easily be had by neglecting this precaution.

Dark or dull days should be avoided also. One must have plenty of good neutral light to make fine comparisons.

It is almost impossible to make fine distinctions by artificial light. A stone that is positively yellow, even almost a fancy gem canary, in colour, will appear

All good advice in 1916.

GIA quotes Wade as saying 'do not use artificial light.' True in 1916 BECAUSE THE BULBS EMITTED MASSIVE AMOUNTS OF UV.

almost as white as a good Silver Cape by some kinds of artificial light. If any decision must be made in the evening, by all means use a tungsten filament light, as that gives the nearest approach to daylight of any of the kinds of artificial lights for indoor use.

Again, do not attempt to make decisions that count largely, in unfamiliar surroundings. If possible, always use the same place for your study of colour in stones.

Another essential is to have by you for comparison, stones whose colour you are sure of. One cannot "carry colour" in one's eye, although some people seem to think it possible. Rough distinctions may doubtless be made by those who are experienced, without the aid of a standard of comparison, but when it comes to deciding between two very fine stones or parcels of stones the absence of such

aids makes the task almost impossible.

In judging the colour of diamonds it is necessary to obscure the prismatic play of colours in order that the true colour of the material may be seen. This is best accomplished by dimming them with a quick, light puff of the breath and then studying the colour while dim. It must be remembered also that diamonds frequently have in them, while rough, faint differences of colour, and that the diamond cutter always tries to cut the stone so that it will "face up" to the best advantage. Consequently it is always necessary to view a stone on edge, in the paper, as well as face up, for frequently a stone will face up with a better colour than it reveals when on edge. These differences affect values and one must be aware of such differences in order to profit by them.

Some stones have so marked a variation

in colour according to their positions that they are styled "false colour" stones. They may be very blue when faced up, yet brownish or yellowish when seen at some other angle. Such stones are likely to command prices beyond their real worth unless the defect in colour is detected, and dealers should be on their guard against them. Very few, even of the high-priced, fancy blue gems, are really blue in body colour. Most of them owe their blueness to a bluish fluorescence which becomes more marked the stronger the light. In clear sunlight on a bright, dry day or by the light of an arc light, they are very beautiful, yet, the body colour being frequently slightly "off," some of these stones are inferior in beauty to pure white stones when viewed under a light which does not cause them to fluoresce. Here again caution should be exercised lest more be paid for a stone than all the cir-

cumstances, taken together, would warrant.

Another point that deserves attention is that large masses of stones appear deeper in tint than smaller masses or single stones. As is sometimes said in the trade, "Large parcels 'draw' colour." This really means, of course, that white light that has had to pass through a number of stones, all of the same tint, has had more of the light that is unlike the stones absorbed than has the light that has passed through but a single stone. Hence the light that emerges and reaches the eye appears deeper in colour. It is well to divide large lots into several smaller ones for study and comparison.

A good lens is also an essential aid in studying the colour of diamonds. By means of it one may still see clearly when the object is within an inch or less of the eye. Hence the true colour of a diamond

is more apparent when viewed under a lens, as the light from the stone is caught before it has had a chance to scatter widely. A lens of one-inch focal distance is best for all-round work. A higher power is neither necessary nor satisfactory and a much lower one is not as efficient as the one-inch.

While most diamond dealers use, as they did in the past, simple lenses, uncorrected for chromatic aberration or for spherical aberration, better results may be had from the newer triplets, which consist of three lenses, balsamed together as one, and having six polished curved surfaces so arranged as to correct all colour defects; as a result pure white light passes the lens untinted. They are also corrected for spherical aberration so that, instead of being sharply defined only in the centre, the field of view is clear from edge to edge. These triplets, while

costing a little more (about \$4 list), are so much more satisfactory that no one who has used one would ever wish to depend on a glass of the old style. The new lenses are seldom sold mounted like a watchmaker's glass, but if it is thought desirable, they can be so mounted by any one with a little ingenuity. As pocket lenses they are unsurpassed. The optical houses usually call the type referred to "aplanatic triplets."

Stones should be judged when unset, so far as is possible, and if the colour of a set stone must be determined, every caution should be observed that colour which has been reflected from the mounting be not mistaken for the true colour of the stone. Such an error might, according to circumstances, make the stone appear either better or worse than it really was. A detailed account of some of the effects of the mounting upon the colour

of the stone will be given in a later chapter.

It will be noted that no attempt is to be made here to describe the colour of "fancy" diamonds. They are much less numerous than the so-called "white" diamonds, and their price is largely a matter of what can be secured under the circumstances. There is no such stable demand for them as for the white stones. The "fancies" are really coloured diamonds and include all the well-marked colours of desirable shades. Red and apple green, violet blue and rather pale sapphire blue, absinthe green and golden brown, orange and canary yellow are some of the colours represented.

The vast majority of the diamonds that are fit for jewelry are, however, of the various tints known as white with some adjective intended to describe the amount of departure from pure snow white. As

was said above, very few diamonds are really white, most of them being more or less tinted with yellow or with brown. If these tints are not too pronounced, the diamonds having them are beautiful and valuable stones, and are surpassed only by the few stones of still greater whiteness, which command exceptional values. It is in the close grading of the many tints as to quality and depth of colour that one needs to make use of the helps cited above.

Unfortunately there is no hard and fast standard of colour to which one can refer doubtful cases. There is, however, a pretty generally accepted series of names of grades which are supposed to describe definite degrees of colour according to their value. These names are not always used by different dealers to describe the same grades of stones, and with the increase in the prices of diamonds during

the past ten years or more, there has been a well-marked tendency to degrade the grading, that is, to sell stones by a name that would formerly have been applied only to a better grade of stone than that offered.

This tendency to shift the grading, coupled with the great difficulty of adequately describing in words just what depth of colour is covered by any particular name, makes rather doubtful any attempt to give and define the system of names used in grading.

However, that those unfamiliar with this part of the business may have what help a description can give, the following list of grades and description of each grade will be ventured.

The list begins with the higher grades and proceeds through grades that are of less and less value, other things being equal:

1. Rivers. 2. Jägers. 3. Blue Wesseltons. 4. Wesseltons. 5. Top Crystals. 6. Crystals. 7. Very light brown. 8. Top Silver Capes. 9. Silver Capes. 10. Capes. 11. Yellow. 12. Brown.

Probably the finest white diamonds are those classed as "Rivers." These stones are either snowy white or bluish white in their body colour as well as when faced up. They are exceedingly snappy and brilliant when well made. The finest of the old Indian and Brazilian diamonds, when recut to proper proportions, belong in this classification. A small percentage of the African stones, especially some of those from the "river" diggings, grade with these. To test the colour of a stone in order to see if it is really in the River class, put it beside a cut piece of purest rock crystal. It should not suffer in the least by the comparison, whereas the best Crystals, or even Wesseltons, will

hardly stand the comparison. Such diamonds owe their remarkable brilliancy to the fact that they absorb very little of the light that enters them, passing most of it on to dazzle the beholder. A simple test of this property of absorption may be made by holding a diamond in forceps with the table of the stone close to the eye and observing the filament of an incandescent electric lamp through the stone. If now a second diamond is held opposite the other eye and the filament observed simultaneously through both stones, a direct comparison of the absorption of the two stones is secured, the degree of brightness of the filament giving a means of telling which stone absorbs more light. Those stones which would be rated as Rivers will be found by this test to pass far more light than stones of inferior colour; and it is largely to this fact that the River stones owe their superior

brilliancy: This being the case, one may by using this test judge somewhat of the fineness of a stone even by artificial light.

Another similar test may be made by daylight. Standing, perhaps, ten feet from a window that opens into a well-lighted space, hold the two stones to be compared close to the two eyes and turn the stones about until the sash of the window is seen clearly through each stone (the direction in which the sash appears may be very far from its actual position, the cut stone acting as a prism through which the edge of the sash is viewed). The image of the edge of the window sash will appear in rainbow colours—that is, we have in such a case a spectral image of the object. Now a very fine stone will display under such circumstances a much more vivid colour image than an inferior stone, and by using two stones at one time before the two

eyes there may be had a direct comparison of the stones with respect to the quality of the prismatic play which they reveal. Some little patience and steadiness of nerve will be required at first to get the knack of thus comparing two stones, but once the skill is acquired, speedy results may be obtained.

A third, and perhaps simpler, method of comparing the degree of absorption and the vividness of spectral display of two stones is to hold them both in direct sunlight and to throw the prismatic colours from each onto the same *opaque* white card held in the direction of the sun. By gently moving, now one and now the other stone, the source of any particularly attractive group of coloured images may be ascertained, and thus one may promptly learn which stone will, under all conditions, probably be the more pleasing and snappy.

Next after the Rivers, come, perhaps, the so-called "Jägers." These, named after the Jägersfontein mine, which yielded some especially fine stones, are bluish white stones (even in their body colour). They are, perhaps, a bit more steely and less snowy in the *quality* of their colour (not in *degree* of colour) than the Rivers, but there is really very little difference between some blue-white Rivers and some fine Jägers, and values are closely similar and very high for either class. Stones that have in them a faint tint of yellow are sometimes called Jägers, but the term should properly be reserved for stones of pale, steely-blue body colour, not deep enough to be classed as a "fancy blue."

After the Rivers and Jägers come the Blue Wesseltons and Wesseltons. These would not appear to have any yellow if by themselves, and they even appear bluish

beside the lower grades of diamonds, but comparison with a River stone may make them appear the least bit yellowish in body colour as seen on edge in the paper. They are, however, exceedingly desirable stones and command very high prices. The public would call them the finest of blue white diamonds, and comparatively few are stocked, except by large dealers, in large cities, as the values are so high. As the order of the grades suggests, the finest of the Wesseltons are called Blue Wesseltons. The name is derived from that of one of the South African mines, which furnished some stones of this character, but stones from any other source, when of sufficiently good colour, would be similarly named.

After the Wesseltons come the two grades of Crystals. These are the "fine white" or "blue white" stones of the retailer. In this instance again, however,

many dealers use these terms to describe stones less fine than standard Crystals.

The tint in Crystals is yellow and it is sufficiently marked to be readily noted by any one with a good eye for colour, when compared with rock crystal, or synthetic white sapphire, in the paper and dimmed. Faced up and undimmed, however, good Crystals appear white and they are highly desirable stones. The prices they command are now so high, when perfect and well made, that they represent about the best stones that the general public can afford.

After the two grades of Crystals (the finest of the Crystals being separated as "top" Crystals) would probably come the very light brown stones. Brown is a colour that is very undesirable if it is deep enough to be perceptible, as brown stones absorb so much light that they appear dark under artificial lighting. Hence

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stones with a perceptible amount of brown colour are usually valued at a lower rate than any others. The very light brown stones which we have just listed as being next to Crystals in desirability have so slight a brown tint, however, that they do not thus absorb light. They are very lively and pretty stones. Faced up they appear white; on edge, in the paper, when beside a fine Wesselton, it would be seen that the body colour was slightly off and that it was off on the brown rather than on the yellow. As most people who are looking for colour in diamonds are expecting to find yellow, the very light brown stone often passes for better than it is and such stones are thus sometimes more easily sold than those that are perceptibly tinted with yellow.

After the very light brown stones come in value those called Silver Capes.

These are divided into Top Silver Capes and Silver Capes. The amount of yellow in these stones is such that a well-trained eye will perceive it even when faced up and undimmed, yet the general public would regard them as nice white stones, and probably more stones of this grade than of any other are sold in this country. They are not too expensive for the public and they are not yellow enough for the colour to be perceptible to the ordinary person unless on close inspection or on comparison with the finer grades.

After the Silver Capes comes the grade known as Capes. These are sometimes known to the public as "commercial white" stones. They are perceptibly off colour to any one who has an ordinarily good eye for colour. By artificial light, however, they appear nearly as well as whiter stones, and as diamonds are worn more in the evening than at other

WADE ALSO WAS AWARE OF WEARING DIAMONDS IN THE EVENING WHEN BEING VIEWED IN ARTIFICIAL LIGHT.

HE IS SAYING THE YELLOW COLOR, WHILE LESS EXPENSIVE, CAN BE MARKETED AS LOOKING BETTER IN LIGHTING ENVIRONMENTS WHICH SET THE STONES OFF. HOWEVER, THEY WERE NOT VALUED THAT WAY.

times, especially by women, many such stones are marketed. That is becoming increasingly the case with the advance of prices. As many kinds of artificial light are rich in yellow rays, these yellowish stones are sometimes more brilliant under such conditions than fine blue stones. The latter do not find by such artificial light the conditions which set them off to the best advantage.

Stones poorer in colour than Capes do not find a ready sale in this country. The next grade would be called yellows, or by-waters, and when it is thus admitted in the title that there is yellow in the stone, one may expect to find considerable colour in evidence. These yellow stones are yellow enough for the colour to be markedly and undesirably perceptible and yet not yellow enough to be pretty. Many of them have yellow of a muddy, murky tint, not of a clean, clear tint such as is

seen in a fine canary diamond. It may be said here that in the case of each of the grades above mentioned one should be as careful to seek a clean, clear *quality* of yellow as to exactly determine the quantity that is present. Avoid the muddy yellows. A stone of deeper tint, but of cleaner quality of colour, would be more desirable.

Last among the "white" stones, if white is still applicable, come the "browns." This grade usually is made to include stones of all degrees of brown except the very light browns mentioned already, and the deep, fancy browns, which are in a class apart. Of course, values vary with the degree of brown, but in general brown stones are cheap and undesirable, because dark by artificial light and dirty looking by daylight. They would not be carried at all in a high-class stock, and the American customer,

who is the most critical of any nationality, will not buy them largely, even in these days of high prices for diamonds.

We have now completed the description of the principal grades of white diamonds. It may be added that great care should be used by the jeweller not to mix the various grades in his stock or in the show window, lest an observant customer of moderate means be made dissatisfied with a stone the price of which is within the maximum he had decided to expend and with the quality of which he would have been entirely content if he had not seen the brilliant beside one of a higher grade. Similarly, in displaying stones, try to find out about what the customer has in mind, and, if anything, begin slightly below his price and work up in quality rather than reversing the process.

In all that has been said it has been assumed that perfection and make were

equal in all cases. We will next consider the effect upon values of the presence of imperfections and will attempt to describe the various kinds and degrees of imperfection. In a later chapter "make" will be discussed.

CHAPTER II

THE EFFECT OF FLAWS ON DIAMOND VALUES

"They will hardly bring you a single paper of stones containing as many as a dozen but that there will be found therein four or five with some flaw, or some spot, or some defect in a corner."—*Voyages de Tavernier*.

"The safest and most efficacious criterion for detecting flaws in brilliants, or, in a word, faulty diamonds, is *tact*, resulting from vigilant attention and habit."—*A Treatise on Diamonds*, by John Mawe, 1823.

I N the preceding chapter the effect of colour upon the value of diamonds has been discussed without mention of the presence of flaws or other defects in the stones. This was done in order to give as good an account as possible of the influence of colour upon value.

In actual practice, however, defects are almost always present and their influence