

TODAY'S REVOLUTION IN DIAMOND CUTTING

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RUDIMENTARY BEGINNINGS



In the very beginning of diamond history, in India, you could not wear a diamond unless you were considered to be a descendant of a God. You had to be a ruler or a high priest. This connection between diamonds and deities endured well into the last millennium. In medieval times the churches forbid diamond cutting for fear that looking into a diamond would corrupt the soul.

Around 1500 when artisans began to attempt to unleash the raw beauty engendered by diamonds a quest began to maximize the fire and brilliance they could see latent within the crystals they found.

The fact that during the early history of diamonds only royalty wore them gave them a mystique and a monetary value that remains inherent in them to this day. There is so much concentrated wealth in a diamond crystal, that a kind of dichotomy has formed in the philosophy of diamond polishing all over the world: whether to maximize weight from the crystal to save money that would be lost if more crystal were shed or to maximize beauty and forego the retention of crystal material.

THE ADVENT OF THE "IDEAL" CUT

The first noble spokesman for the latter position, that of sacrificing weight for beauty, was Marcel Tolkowsky who, in writing his master's thesis in London in 1919 – named Diamond Design – became an apologist of the beauty first order of diamonds. Tolkowsky extolled their unparalleled ability to refract light to give off fire and to reflect light back to the observer in the creation of brilliance. His work consisted of a collection of mathematical formulae based on what is known as the

"critical angle" of crystallized carbon, that angle to which facets must be cut in order to keep light inside a diamond after it enters its crown. What is desired is that light entering the crown of a diamond exit the crown also, not "leaking" through the pavilion and, thereby, making the diamond appear brilliant to the eye.

Tolkowsky took a very hard-line position about the nonsense of retaining weight from the crystal if, during the process of so doing, the consumer paled as the loser of the beauty any given diamond could possess. Tolkowsky made such an impact on the diamond industry that angles and proportions he purported to be critical to a diamond's beauty came to be called the proportions of an "ideal cut" diamond.

Since Tolkowsky could cut diamonds and was a master of physics and mathematics, his credentials lent him the ultimate credibility. Tolkowsky was a cousin of the famous Lazare Kaplan. Both Kaplan and Tolkowsky were Belgian gentlemen and one would think that the story of the ideal cut diamond would be a purely European story, not American. However, Mr. Kaplan had a group of close friends he spent most of his time with in Belgium who were all killed by a German bombing raid in his country during the First World War. Kaplan was in New York at the time doing business. Devastated by the loss of his close friends, he decided to move his business affairs to America. That is how the famous Lazare Kaplan Diamond Company came to be located in New York.

During most of the 20th century Tolkowsky's influence remained clear and strong. It was always ASSUMED that he was right and that any diamond which could be shown to have proportions approximating those of Tolkowsky was cut to ideal proportions and was as good as a diamond could be assuming it had ideal symmetry and polish as well. Tolkowsky was able to use his cousin's resources to experiment with diamonds and, later, his cousin structured his factory production to create only Tolkowsky-proportion diamonds and in the mid 1950's developed a brand of diamond known as the Kaplan® diamond. The Kaplan® diamond has, therefore, a blood connection to the first most important movement in the history of diamond polishing.

JAPANESE ENTREPRENEUR ECLIPSES TOLKOWSKY

Mr. Taruhiro Tamura



In 1977 a very wealthy and influential Japanese man – outside the diamond industry -- was approached by a diamond dealer who attempted to sell him an “ideal cut” diamond. When asked what made his diamond “ideal”, the subject of science entered the conversation (which surprised the Japanese business magnate) and the

topic switched to Tolkowski. The Japanese merchant prince had never heard of ideal cutting or Tolkowski.

The diamond dealer attempted to further his opportunity by showing an actual diamond and, as a strategy for selling, augmented his discourse by producing a chart showing proportions for ideal cutting. The Japanese tycoon, well-versed in selling strategies since he had just retired from 20 years of Sony product distribution, asked the diamond peddler to demonstrate what it was that was special about the diamond without a chart, by using a device that proved the point of his attempted sale: that ideal cutting yielded a more brilliant diamond.

“To my knowledge there is no such device,” responded the diamond dealer.

“Diamonds leave me cold,” responded the Japanese magnate.

THE FIRESCOPE®

In 1984 the dealer returned to the office of the magnate, now a consultant, after having spent 7 years with inventors, gemologists, specialists in optics, physicists and plastics manufacturers. He had invented a device he



named the FireScope®. The same magnate who was left cold by diamonds was suddenly warmed and charmed by the new device. His response to it was:

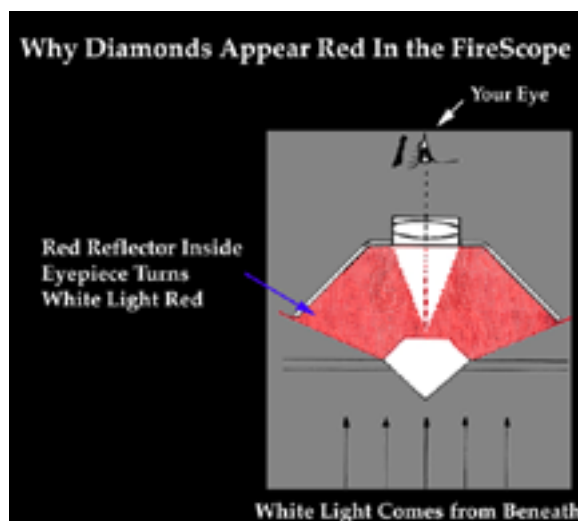
“With a shock it suddenly occurred to me that what we had here was a device that could clearly and unmistakably show how good or bad a diamond’s cut was. All that was needed was the human eye. All you had to do was look for yourself.”

HOW THE FIRESCOPE® WORKS

The FireScope® has a light source of white light that sits beneath a tray made of clear plastic which has holes of graduating sizes drilled into it that hold diamonds of varying sizes. The tray can slide back and forth beneath an eyepiece which has built into it a red reflector which receives white light, turns it red and then reflects that red light into the crown of the diamond – above the girdle of the diamond, in other words.

As you look into the eyepiece you see a three possible phenomena:

1. White
2. A series of colors ranging from pink to red
3. Black



Where you see white, light is coming through the bottom of the diamond, entering from its pavilion, in other words. Light that you see as absolutely white is, therefore,

leaking into and out of the diamond from an area where the diamond has been cut improperly.

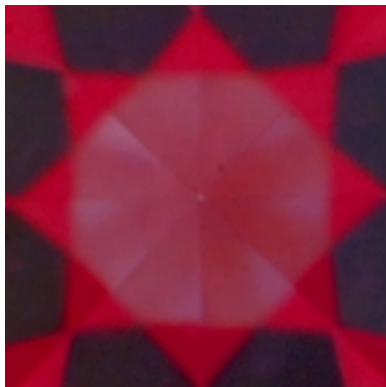
Where you see red or pink, you are seeing light which is entering the crown of the diamond from angles of incidence ranging from 40 degrees to approximately 80 degrees relative to the table plane of the diamond.

Black, like red and pink, is evidence of reflected light in the diamond also known as brilliance. The black, however, is light that is being reflected from the diamond that entered from above 80 degrees and is reflecting the lens of the eyepiece of the FireScope®. The 8 main facets of the pavilion receive their light from nearly straight up above the diamond and the black color they turn, considering that the eyepiece sits directly above the diamond, is a form of proof of this.

When viewing any EightStar® diamond in a FireScope® one sees always the same thing.

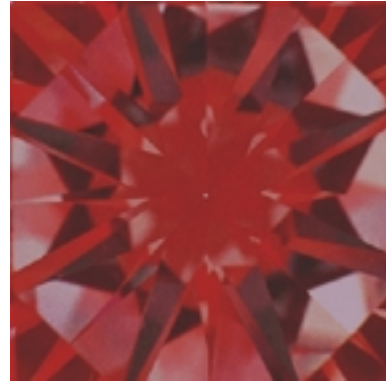
- A perfect balance of black arrows evenly shaped to EightStar® proportions conforming with our trade secret method of shaping for maximum brilliance and fire.
- An even distribution of pink and red covering all of the image with white showing only in the culet area.
- Amazingly perfect red equilateral triangular reflections of the star facets of the diamond found around the outside of the table reflection.

This picture shows pink, red and black, no leakage and perfect reflections of the star facets of this EightStar® diamond.



What is more commonly seen in diamonds, even the following example, a 14.89 carat D/IF diamond with a certificate from the GIA listing Excellent symmetry, is lack of organization in the central part of the reflection

pattern and a great deal of light leakage. Example follows:



“IDEAL CUT” DIAMONDS TURNED OUT NOT TO BE IDEAL AT ALL

Mr. Taruhiro Tamura was so changed by his experience with the FireScope® that he left his former world of business behind, switching to the world of diamonds. Several attempts to aggregate inventories of diamonds the FireScope® would show to be perfect stones failed. The so-called “ideal” cut diamond proved to be far from ideal and Tamura was the first person in the world to see it, as he was the first person to peer into the future of diamond analysis by evolving into the dimension of optical symmetry.

Up to the moment of Tamura’s discoveries the diamond industry and diamond grading institutions were based entirely on measurements of the surface of diamonds as meters of quality analysis. “Ideal” diamonds were considered those that most closely resembled a mathematical model from the early 20th century work of Tolkowsky. Tamura’s first observations about this were his words about what was referred to then as the “symmetry” of a diamond.

“The ‘symmetry’ grading on a diamond certificate takes into account only that -- the quality of the points of contact between the fifty-eight facets of the diamond. What is more important, which this method of evaluation completely ignores, is overall three-dimensional symmetry. For years, cutting firms and gemological laboratories have taken this for granted, a case of not seeing the forest for the trees, if ever there was one.”

BIRTH OF THE EIGHTSTAR® DIAMOND: 1984

All attempts to encounter a diamond that displayed perfect three-dimensional symmetry were fruitless. Tamura opened a diamond cutting factory in Tokyo the same year and, after millions of dollars in expense and more than one year of time spent in no other pursuit, created the EightStar® diamond, the breakthrough diamond that has now changed the world.

When Tamura took his diamond to the gemological laboratories in Tokyo it was clear upon first observation that it was superior to all diamonds that preceded it. It was immediately declared to be the new world standard for round brilliants. Thus 1984 became a banner year for diamonds because it marked the beginning of today's diamond cutting revolution and fits into the history of diamonds with impact not unlike that of Tolkowsky's 1919 contribution. In fact, Tamura took diamond analysis to a much higher level than Tolkowsky even dreamed of doing by using the FireScope® to determine how well a diamond was cut.

Tamura's success was immediate. The demand for EightStar® exceeded the supply by thousands. Patient Japanese people waited, some for as long as five years, to get theirs. I opened a factory in Northern California in 1990 to accommodate Tamura's backlog. We opened as an independent company with no fiscal connection to the Japanese EightStar operation and trademarked the diamond here.

The first few years were spent learning the new methods. We trained various cutters under the tutelage of the cutter who invented the process in Japan, Mr. Kiyoshi Higuchi. My wife, Alison von Sternberg, became the first female master cutter of these diamonds in the Western world. In fact, she is considered to be the most important female diamond cutter in the Western World. The EightStar® diamond became so important that it began to be copied in Japan.

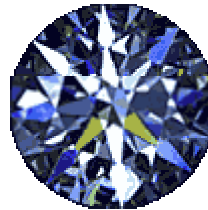


Mr. Kiyoshi Higuchi

Four years after its inception, the first copy of EightStar® was the Hearts-and-Arrows® diamond. There are now hundreds of companies making diamonds exhibiting a "hearts and arrows" pattern in viewing devices generically referred to as hearts-and-arrows scopes. All of these diamonds are mass-produced and lack the sophistication, consistency and excellence of the EightStar® diamond. We were the first to create diamonds in this medium, the first to use diamond performance as a guidance system during cutting and evaluation and continue to be the world leaders in this genre.

Hearts and arrows viewers show the detail of a diamond's main facets and give no visual data regarding the other forty-one facets (forty-two if you count the culet). The FireScope® allows the observer to see how light strikes every single facet of the diamond instantly. The FireScope® is a true gemological instrument and a cutter's guidance system while the hearts and arrows viewers are toyish by comparison. Our cutters can cut an EightStar® diamond using a FireScope® but cannot with a hearts and arrows viewer or any other instrument in the world. Such is the extremely significant supremacy of the FireScope® in the realm of the genre of reflective image technology used in diamond polishing and merchandising.

THE EVOLUTION OF A GEMOLOGIST



In 1996 we invited Mr. Peter Yantzer, director of the American Gem Society diamond-grading laboratory, to visit us and become acquainted with our diamonds and method of evaluation. It was the first time he had heard of the FireScope® or us. Yantzer was so

impressed after his two-day visit that he wrote these words:

"I am awed by the precision with which you can cut diamonds. I truly believe they are the most perfectly cut diamonds on the planet."

Mr. Yantzer was NOT speaking on behalf of the American Gem Society when he wrote these words. He came by himself to meet with us and, at that time, nobody else from his organization had seen our diamonds or the FireScope®. But Mr. Yantzer himself was clearly impressed far beyond the ordinary to have made such a superlative asseveration as he did.

The significance of Mr. Yantzer's visit and his response could be easily missed. Yantzer left EightStar's factory almost in a state of shock. He suddenly realized that all he had been taught to believe about diamond analysis was naive. It was not unlike a marksman from the 19th century, one accustomed to using a tiny sight on the front of the barrel of a rifle to target his prey, suddenly being teletransported to the 21st century and handed a rifle with a laser sight. Mr. Yantzer saw that he was in a position to enhance the quality of all diamonds, to create the conditions that could become a boon to all diamond consumers, by letting the world know that there was a better way to cut diamonds, a better way to analyze them, evaluate them, a superior way to perform quality analysis. He knew that he could take from us a message to all the diamond cutters of the world about the value of reflective image technology in diamond quality analysis.

THE AMERICAN EVOLUTION OF EIGHTSTAR®

As a result of our research into diamond analysis, which has evolved far beyond where we began in 1990, we have created new technology which we feel will also affect the rest of the diamond cutting world. We have applied for patents on two instruments which will provide badly needed scientific and objective answers to performance questions which we feel cannot be answered by devices which depend on electronic analysis, digitization, or devices which need calibration of any kind. We have devised one tool for brilliance and scintillation analysis and a second one for the fanning of colors in a diamond through the dispersion of white light, the phenomenon known commonly as fire.

Our instruments map and chart the light path in every diamond analyzed. With our instrumentation we are able to track a diamond's performance facet-by-facet and create a scale based on a diamond's optical properties. We have concluded that there is a three part process that constitutes the beauty of any given diamond. That process is now referred to as a

diamond's "Performance Triangle" to use the words of the head of my Research and Development division, Mr. Michael Cowing. A diamond's beauty depends on three things:

4. The quality of the cut
5. The placement of the observer
6. The source of light for the diamond

Diamonds look radically different as these three things change. The diamond grading system of the future will take into account a diamond's performance triangle.

Our contribution, beginning with Mr. Tamura in Tokyo and continuing with von Sternberg, Gilbertson and Cowing in the United States, has been to introduce to the world the importance of a diamond's performance, the method of evaluation that takes into account three-dimensionality. In so doing we have evolved beyond

Tolkowsky's equally significant contribution to diamond analysis and cutting.

Dr. Ilene Reinitz of the research division of the Gemological Institute of America has stated it this way:

"The research performed by Tolkowsky is not adequate to fully understand the relationship among the different appearance attributes related to cut, which are brilliance, fire and scintillation. He looked at a TWO-dimensional model. Yet light bounces around in a diamond in a THREE-dimensional way"

These words of Dr. Reinitz appeared in print in 1998. Let us now revisit the words of Mr. Tamura that date back to 1984 to see how amazingly avant-garde his thinking was, how incredibly focused he became once he looked into the FireScope®

"The 'symmetry' grading on a diamond certificate takes into account only that -- the quality of the points of contact between the fifty-eight facets of the diamond. What is more important, which this method of evaluation



completely ignores, is overall three-dimensional symmetry. For years, cutting firms and gemological laboratories have taken this for granted, a case of not seeing the forest for the trees, if ever there was one.”

What Tamura saw became the future of diamond cutting. When he taught my wife, Alison, to make diamonds this new way he inculcated into the Western world the stuff of change that has now spread from us to the heart of the diamond industry. Tamura spread the first seeds of change. We grew them here and planted them in Peter Yantzer. Over the years they grew until the American Gem Society has now come to embrace our method of analysis as the method of the future.

In December of 2001 the following press release was sent out by the American Gem Society and published in many trade publications. Here is how it was written in the Jewelers Circular Keystone:

A JCK Exclusive: AGS and Eightstar sign research and development agreement

-- 12/14/01

The American Gem Society (AGS) has finalized an agreement with Richard von Sternberg of Eightstar Diamond Company for exclusive use of technology and instrumentation for the AGS development of a cut grading system for fancy shaped diamonds.

“We strongly believe that a quantifiable cut grade for fancy shaped diamonds is now within reach,” states Robert W. Bridel, AGS executive director and CEO. “Richard von Sternberg’s knowledge of diamonds and Eightstar’s technological advances will help AGS bring this project to a timely completion.”

AGS will use data from the physical analysis of fancy shaped diamonds to construct a new performance-based cut grading system. The research will be conducted at the new AGS Laboratories facility on the AGS Campus in Las Vegas.

“We are very pleased to be able to contribute to this historical venture,” says Richard von Sternberg, president of Eightstar. “We believe that a diamond’s performance can be quantifiably graded no matter what the shape. This anticipated AGS grading system is a further example of the American Gem Society’s dedication to protecting the consumer through the provision of complete information on all four C’s.”

THE EIGHTSTAR® WEB SITE

For more information about this subject, you are invited to investigate further at our website:

www.eightstar.com