Historical diamond: The Wittelsbach-Graff owned by the legendary diamond house – Graff

An introduction to the company

Graff diamonds is owned by the billionaire English jeweller, Laurence Graff. Born in 1938 to a Jewish family in the East End of London, his Russian father, Harry Graff, and Romanian mother, Rebecca Segal, lived a modest but hard-working life bringing up their son in the 1940s.

His grandmother, too, was a hugely influential character in Graff's life. She would administer advice to all the family and, despite being deeply religious, she was a shrewd businesswoman in a time when women were only just beginning to feel emancipation with the onset of World War Two.

Growing up amongst the falling bombs of the war, Graff went to school at St George's School in Shadwell and helped his mother in her sweet shop when he wasn't at school. It was through this experience of being immersed in a busy Jewish community, living near the famous Hessel Street market, that Graff learnt about the ways of day-to-day trading and he developed a keen appetite for business.

Aged only 15 years, he began his first job, employed as a jeweller's apprentice in the famed streets of Hatton Garden in London. Employed for only three months, Graff was told by his employer that 'he would never make the grade' [1]

Undeterred, Graff attended Central St Martins College, then known as Sir John Cass Art College, whilst working for a different jeweller, but again, was made redundant when the company became bankrupt. With the help of an experienced jeweller, he set up business repairing Victorian jewellery, which at the time had become very fashionable, completely taking over the business at the age of 22, when the company ran into debts and his partner had lost confidence. It was just a short while after that Graff had paid the debt and now owned his own jewellery business outright.

He designed his first piece and sold it to a dealer in a town outside of London, who sold the piece and owned another before Graff could return home. With this success, Graff's confidence grew. In 1960, Laurence started Graff Diamonds and, just 24 months later, opened his first shop in London, winning prestigious awards as he went.

Graff had a charisma which helped him form valuable relationships with the world's worthy and, with his strong eye for gemstones, he soon became a household name amongst the world's royalty and Hollywood celebrities, flying around the world to show his stones to Arabian sheikhs, kings and queens, and becoming best friends with the actress, Elizabeth Taylor, whose passion for jewellery equalled Graff's.

[1] Becker, V., Doulton, M. and Menkes, S. '**Graff',** 2015, p.30

In order to supply his clients with the best diamonds, Laurence knew he needed to be involved in the supply chain. With a successful company behind him, he purchased a share in the South African Diamond Corporation which had access to DeBeers rough diamonds. He then revolutionised the mine-to-market process by centralising all the steps into one place at his 'Technology Park'[2] in Botswana, and later became 'the largest shareholder in Gem Diamonds, owner of the highest mine in the world: the Letseng mine in Lesotho'[3], which has produced from its diamondiferous ore, some of the rarest and most amazing diamonds ever found, such as the Lesotho Promise and the Letseng Star.

With tremendous pace and success the House of Graff was grown and today there are more than fifty stores around the world. The company is a family business and Graff was keen to involve his son and nephew at an early age, both who are now fully involved in the business.

With a passion for art, wine, and of course, gemstones, Lawrence is a great philanthropist and works with several overseas charities in Africa. Awarded an OBE in 2013 and now aged 79, Laurence is still a key player in the company and he continues to invest in outstanding diamonds, whilst expanding his empire around the world.

Figure 1: Lawrence Graff holding the Wittelsbach-Graff diamond

[2] Becker, V., Doulton, M. and Menkes, S. '**Graff',** 2015, p.33

[3] Becker, V., Doulton, M. and Menkes, S. '**Graff',** 2015, p.33

The world of diamonds

The diamond is one of the most famous gemstones in the world. Its beauty and worth is renowned and the qualities that bring about this fame have been discussed and researched by people for centuries.

Before we look at the famous diamonds owned by the house of Graff, it is important to begin by looking at the qualities that make this gemstone so desirable.

Ultimately, diamonds are assessed according to four factors: famously known as the four C's. The table in Figure 2 explains what the four C's refer to and gives a summary of this grading system, and more details are given later throughout the text.

Figure 2: A table to explain the four C's

Condition	
Carat	Diamonds are priced in carats. However, it is important to note that price and size are not a direct correlation and certain sizes are more desirable, such as a diamond weighting 1 carat is more desirable than a diamond which weights 0.95ct.
Colour	Colour is laid out on a scale from D (colourless) to Z (distinctly yellow but not quite Fancy yellow). Fancy colours are also found in diamonds such as Fancy blue, brown-orange, pink and red.
Clarity	Clarity refers to the absence of inclusions within a diamond. This is graded from Flawless (Fl) right the way though to Imperfect (I). Clarity is graded with the use of a 10x magnification loupe.
Cut	The cut is the shape and polish of the diamond and also the quality of both these factors. Cut is systematically organised in terms of the style of cut, proportions, the symmetry and the polish.

It is important to consider these qualities as we learn about one of the most famous diamonds to be discovered. Now owned and treasured by Graff, this diamond is steeped in history and is a very important and beautiful stone: it is called the Wittelsbach-Graff diamond (as shown in figure 3)

It currently stands, after being re-polished by the House of Graff, at 31.06ct with a GIA report of Natural Fancy Deep Blue Internally Flawless. (See appendix 1, 2 and 3 for notes on colour and clarity).

Figure 3: The Wittelsbach-Graff

This gemstone has a very fascinating and detailed history. The first so-told account of the stone is dated at 1664, when the blue diamond is supposed to have been received by Margarita Teresa (See figure 4), daughter of the Spanish King Philip IV on her engagement to Leopold I of Austria, the Holy Roman Emperor, as part of her dowry. This story cannot be fully authenticated because, although the king gave large diamonds as her dowry, the word 'blue' was never documented, however, it is widely accepted by historians to be the truth.

Figure 4: Empress Margarita Teresa and her daughter Maria Antonia (1671)
by Benjamin Block, Hofburg Palace, Vienna.

On the death of Margarita Teresa only six years later, the diamond, which was believed to have been set in a hair ornament, was inherited by her husband and he, in turn, passed it along the line of his wives until the death of his third wife, Eleanora Magdalena. When she passed away, the diamond is said to have been inherited by her youngest granddaughter, the Archduchess Maria Amalia of Austria. She married Prince Charles Albert, who was a member of the Bavarian branch of the House of Wittelsbach, hence the diamond became so named.

There is again, however, some debate over how it ended up in the Royal Bavarian household. It has been theorised that the diamond in fact passed to Archduchess Maria Antonia, daughter of Margarita Teresa, who married earlier into the German royal family, and that it was in fact her dowry. This marriage was a miserable affair and Maria Antonia's husband, Elector Maximilian Emanuel, travelled overseas whilst she went back to live in Vienna. Maria Antonia's jewellery was kept at the Hapsburg court in Vienna and, on her death, Emperor Joseph took control of her possessions, and in turn, used the jewellery as a dowry for his second daughter, Maria Amalia, who married Bavarian Prince Charles Albert. This alternative theory may explain why, as discussed in the next paragraph, Maximilian II Emanuel could use the diamond as collateral.

Both events on how the Wittelsbach diamond found its way into the royal German household are merely hypothetical, and the first time the Wittelsbach is formally documented is in an inventory from Maria Amalia's wedding documents that state she will bring:

'From Vienna to Munich… a large blue brilliant encircled with small brilliants'[4]

It is documented in the book *Legendary Gems* by the author, Eric Bruton, to have been 'pawned'[5] by the royal household to pay Maximilian II Emanuel's massive debts that he had incurred to a gentleman whose name - Oppenheimer - is as famous in the world of diamonds as the Wittelsbach itself. Bruton only surmises that there may be a 'family connection to Sir Ernest Oppenheimer'. It was apparently 'redeemed from Oppenheimer for the sum of 434,377 florins when Charles Albert became Elector'[6]

The stone is mounted in Maria Amalia's crown as shown in the picture below, but it must be noted that this portrait was painted ten years after her death. It does, however, show visual reference to it once having belonged to her.

[4] `Droschel, R, Evers, J, Ottomeyer, H. 'The Wittelsbach Blue' winter 2008, published Gems & Gemmology p352

[5] Bruton, E. (2008). Legendary gems or gems that made history. Ipswich: N.A.G. Press. P 101

[6] Bruton, E. (2008). Legendary gems or gems that made history. Ipswich: N.A.G. Press. P101

Figure 4A: Maria Amalia with the Wittelsbach in the crown on the table

It remained in the Bavarian royal family and later, by order of Maria's son, was mounted into the insignia of the Order of the Golden Fleece (pictured below in figure 5). This was an impressive piece of jewellery, which was undertaken by a Munich jeweller, with the diamond set amongst 700 brilliant diamonds. It continued to pass along the Bavarian royal line until, in 1806, it was mounted into Maximilian I Joseph von Wittelsbach's crown on his coronation as King of Bavaria.

Figure 5: Wittlesbach Diamond in the Golden Fleece, Bavarian Crown Jewels

During the First World War, the Bavarian crown jewels were moved to a secure location. After the war, the German state became a republic and the monarchy was broken up. The Wittelsbach was seen for the last time at a state function in 1921 at the funeral of the last Bavarian king, Louis III. The relatives of the late king fell on hard times after the war and it was agreed by the government that the diamond could be sold to help raise funds.

A 'Munich newspaper, Munchener Zeitung, announced that...The Wittelsbach was to be auctioned in London. There is some mystery about the seller, and thereafter, it appeared to vanish'.[7]

It was offered for auction by Christies, Manson & Wood[8] (now known as Christie's) in 1931. It was said that the gemstone didn't sell at the Christie's auction and the Wittelsbach seemed to disappear from public view. It was, in fact, sold privately twice in 1951 and again in 1955. Thereafter, it seemed to drop out of sight again, but was actually sold to Romi Goldmuntz, a very famous diamond merchant in Antwerp, again removed from public view and locked away in a safe for more than thirty years. In 1961, on the death of Goldmuntz, his son asked a colleague, J Komkommer, how he should cut a large diamond he had discovered in the belongings of his father.

[7] Bruton, E. (2008). *Legendary gems or gems that made history*. Ipswich: N.A.G. Press. P101

[8] Droschel, R, Evers, J, Ottomeyer, H. 'The Wittelsbach Blue' winter 2008, published Gems & Gemmology p355

‘Thus it appears that the Goldmuntz family owned the diamond from 1932 to 1962’[9]

On recognising that the stone may be of historical importance, he told Goldmuntz that he wished to buy it and could not therefore advise on the cutting of the gemstone. After some research, Konkommer and his son discovered that the Wittelsbach’s location was unknown, and, with a group of financial backers, agreed to purchase the blue diamond in the hope that they may have possibly stumbled upon it.

With a stroke of luck, the blue diamond was indeed the Wittelsbach, and it stayed in the hands of the dealer until it was sold and purchased by a private collector. It is said that this collector was a jeweller in Hamburg, Germany, who then sold the diamond to a wealthy businessman, Helmut Horten, who had made his fortune owning department stores in Germany. He gave the diamond to his bride in 1966. In the late 1970s, the diamond was photographed by Ernst Albrecht Heiniger in a brooch designed by Harry Winston, set with white pear-shaped diamonds supposedly set to hide the oversized culet. (See figure 6)

Figure 6: The Wittelsbach diamond set by Harry Winston and photographed by Ernst Albrecht Heiniger

The Wittelsbach stayed with its owner until Christie’s once again offered the stone for auction in 2008, when it was purchased by none other than Laurence Graff, for a documented record price of £16.4 million.

Up until Graff owning the diamond, it had been graded as a VS2 Clarity (See appendix 3) and a colour of Fancy deep greyish-blue (See appendix 2) with a carat weigh of 35.56 carats from GIA when it was sold in 2008.

On purchasing the diamond, Laurence took the magnificent stone and had it re-cut to improve its clarity and colour.

[9] Black Qolfera's “Golconda Diamonds: Wittelsbach - Graff Diamond” http://blackqolfera.blogspot.co.uk/2018/01/golconda-diamonds-wittelsbach-graff.html

"It is quite a flat stone, and showed the signs of wear and tear from centuries of being set and unset. And yet if ever a gem could truly be described as a treasure, this was surely it'[10]

Laurence set about taking out the grey colour and improved its clarity, although he received much criticism. It was certified by GIA as:

'The largest Natural Fancy Deep Blue Internally Flawless diamond that they… had ever graded'[11]

Locality of the Wittelsbach-Graff diamond and whether it was from the same diamond crystal as the Hope Diamond

There has been much speculation over the centuries as to whether the Wittelsbach diamond and the famous Hope diamond were both originally part of Tavernier's famous French Blue diamond.

The Hope diamond, cut from the French Blue and now housed in the Smithsonian Institute in Washington, is a Type IIb diamond, as is the Wittelsbach (See appendix 1), and doped with the element Boron to give both stones their impressive blue colour.

An extremely brief history of the Hope diamond tells of a large blue diamond being smuggled out from India by diamond merchant, Jean Baptiste Tavernier, and purchased by the French King Louis XIV in 1668.

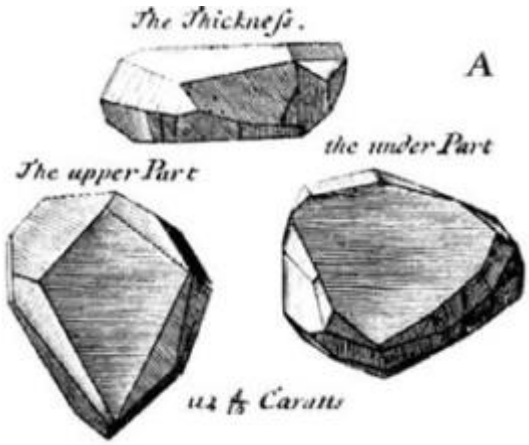


Figure 7: Tavernier Diamond

The Hope diamond is famous for many reasons; one being that the stone holds a curse which allegedly begins with Tavernier himself, who is forced back to India when his son squanders his father's fortune and is reputedly eaten by wild dogs. The Hope diamond then passes along the line of the French royal family, with each member that holds the stone in their possession living a short life, either plagued with disease or beheaded.

[10] Becker, V., Doulton, M. and Menkes, S. '**Graff',** 2015 p.116
[11] Becker, V., Doulton, M. and Menkes, S. '**Graff',** 2015 p116.

Figure 8: Marie Antoinette wearing the Hope Diamond

The stone then ends up in the hands of the French jeweller, Cartier, who sells the stone to the heiress of the Washington Post, Evelyn Walsh Mclean, whose life is also mixed with tragedy and drama. It is eventually purchased by Harry Winston for more than one million dollars. In 1958, Harry Winston donated the Hope to the Smithsonian Institution as a gift to the American people, who still to this day receive letters from the public blaming the ill-fate of the country on the diamond.

Figure 9: The Hope Diamond

It has been inferred several times, by several historians, that the Hope diamond and the Wittlesbach are cut from the same blue rough discovered by Tavernier (Balfour 2009).

It can be agreed that both stones came probably from India due to that fact that most diamonds were mined in India 'possibly at the Kollur mine in India's Golconda District'[12] during the time which they were found. Both stones have been passed down a long line of European royalty, treasured by their owners, sold and purchased to raise funds in impoverished times. They both are type IIb diamond doped with boron and both seem to phosphoresce a red-orange colour when simulated with UV light for some time after the light source is removed.

In 2010, when the two stones were finally housed under the same roof whilst being on display in the Smithsonian Institution Museum, GIA conducted a series of experiments on the two stones to come to a conclusion as to whether:

'They [the two stones] might have been cut from the same piece of rough or from stones that were once part of the same parent crystal'[13]

The two stones were colour graded, examined under a Thermo iS10 Fourier-transform infrared (FTIR) spectrometer, their phosphoresce was examined, a Diamond View machine was used and finally the stones were put under a polariscope to examine their stain patterns.

Figure 10: The Wittelsbach-Graff and the Hope diamond

The colours were graded as Fancy deep blue for the Wittelsbach-Graff cut as a modified cushion and the hope at 45.52 carat as Fancy deep grayish blue cut as an antique cushion.

[12] Droschel, R, Evers, J, Ottomeyer, H. 'The Wittelsbach Blue' winter 2008, published Gems & Gemmology p348
[13] Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough, summer 2010 p80

The cut of both diamonds is designed with oversized culets which on the Wittelsbach, at one point in its life, was married together with a faceted blue sapphire to enhance its shape, which has obviously now been removed. It was concluded that the stones' colours were very similar on comparison, with the Hope diamond noted to have very slightly less saturation of the blue and appeared to retain a shade of Gray to the blue colour, however, as documented in the GIA report and known to a gemologist, many factors affect the colour and saturation of a stone, including the cut and proportions, which is different for both diamonds.

With enhanced lighting, the colour of the blue hues was different compared to that of the stones in normal diamond grading light conditions.

When tested under the FTIR spectroscope, it was clarified and confirmed that the Hope and Wittelsbach were both Type IIb diamonds which confirmed that both diamonds obtained their colour from the element boron. The results did show:

'that both spectra showed complete absorption in the main region, which was more pronounced in the thicker Hope' [14]

In terms of the stones fluoresces, both are inert under excitation of short and long wave ultraviolet light. However, both diamonds show highly unusual phosphorescence under short wave ultraviolet light of a red-orange glow which lasts for 60 seconds once the light source has been removed.

Figure 11: Hope Diamond and Wittelsbach-Graff Diamond Phosphorescence Compared, with the Wittelsbach on the left and the Hope diamond showing on the right

[14] Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough, summer 2010 p84

'The Wittelsbach-Graff's phosphorescence was a bit more intense, lasted slightly longer and was perhaps more orange'[15]

This is an extremely rare phenomenon, which these two natural blue diamonds possess, and the length of time which the phosphorescence lasts is the 'longest to have been seen to date'[16]

When the gemologists place both diamonds into the DiamondView machine, the same fairly strong blue emission of light was admitted in a 'mosaic pattern'[17]. This pattern is typical in type II diamonds and was stronger in the Wittelsbach-Graff diamond and is associated with plastic deformation (see appendix 8 for definition) within the stones.

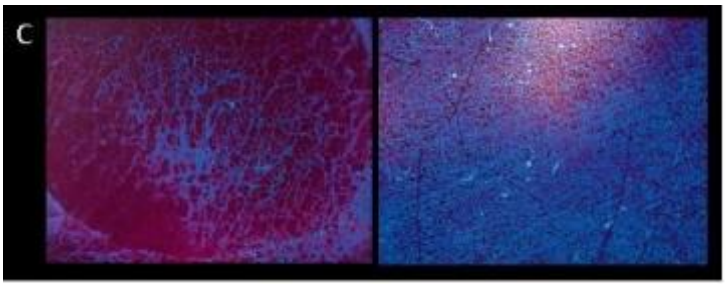


Figure 12: shows images from the DiamondView, showing the texture of the mosaic pattern finer in the Hope diamond (shown on the right)

[15] Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough, summer 2010 p84
[16] Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough, summer 2010 p84
[17] Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough, summer 2010 p86

Finally, the diamonds were tested for strain under a polariscope, and both stones showed internal strain patterns within their crystal structure.

'the Wittelsbach-Graff displayed a typical "tatami" pattern (two direction of strain lamination), with gray and blue interference colours visible in all direction through the diamond. The Hope, on the other hand, showed a distinctly coarser banded internal strain pattern, predominantly in a single direction with blue, orange and red interference colours… strain is caused by plastic deformation'[18]

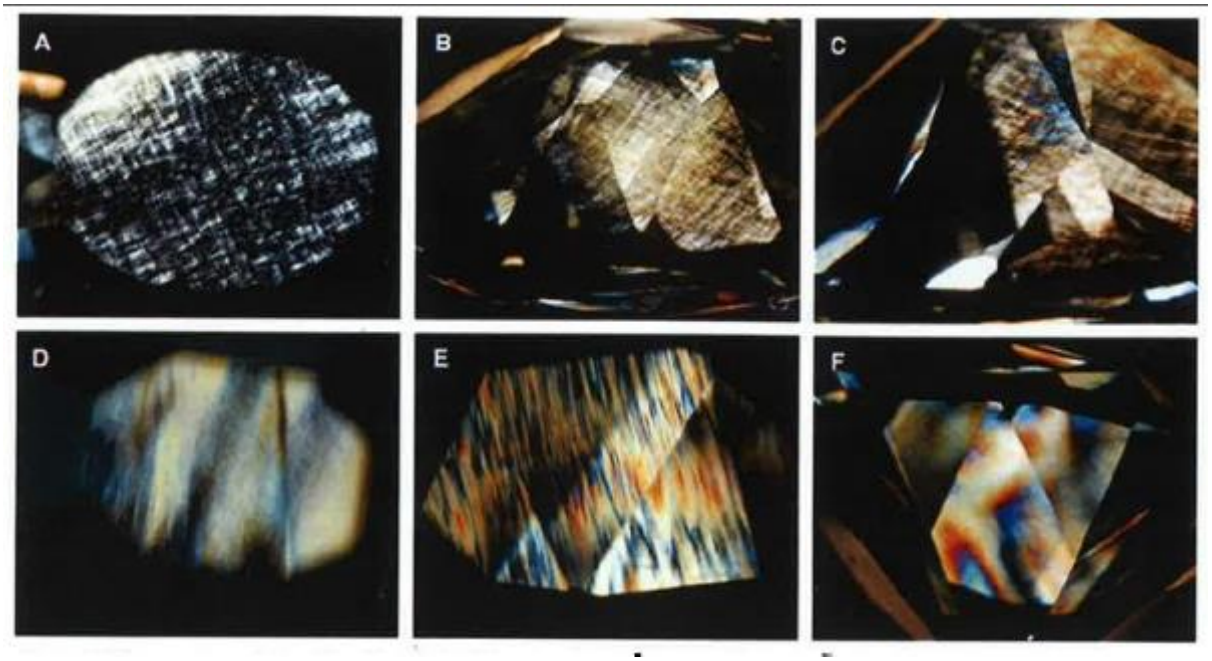


Figure 13: 'Shows images when the Wittelsbach (top row) and Hope (bottom row) were placed under crossed polarized filters. The two stones show internal strain but the Wittelsbach displays typical tatami patterns whereas the Hope has banded strain'

Photomicrographs by W.Wang. Text taken from same document as picture.
Please see picture bibliography for references.

After conducting these tests, it was concluded that the Hope diamond and the Wittelsbach-Graff are not identical or from the same rough crystal, but instead share very many similarities which means that the stones were discovered in the same locality, India, and grew in similar volcanic geological conditions.

[18] Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough, summer 2010 p86

In conclusion

Graff own some of the most famous diamonds ever mined; a company built from one man's hard work, determination and a little bit of charisma and luck. As previously referenced, Laurence buying the Wittelsbach for such a record-breaking price at auction shows his appreciation for this famous and extremely beautiful blue diamond. The Wittelsbach is steeped in history, passing through the Bavarian royal household and then disappearing for over thirty years, before being rediscovered in Antwerp. A story of adventure, misfortune and secrecy which the stone itself will never be able to tell us about fully, but which has journeyed through time to become a piece of extraordinary history itself. Safely housed within the vaults of Graff, it is a delight to imagine Laurence every so often taking it out to play with and admire the diamond.

It is also a real treat to learn about the stone's origin thanks to the in depth study conducted by the GIA on a single night due to security. The final piece of the mystery has now been settled concluding that the stone doesn't share the same crystal with the equally famous Hope diamond, and yet it was probably mined from the same mine, both stones sharing a lot of similarities that will forever make them two diamonds of extreme fame and beauty.

Researching this paper has been a delight and education and I only hope that the Wittelsbach-Graff continues its journey through life with as much vigour as it has done for so many years. I am sure, in the hands of Lawrence Graff, that it will continue to do so.

Appendices

Appendix 1

The table below shows the types found in diamonds. The Wittlesbach-Graff is a Type IIb

Types of Diamond:	
TYPE I	Nitrogen (N) is present as an impurity.
Type Ia:	Nitrogen is present as pairs or small groups called aggregates giving them a yellow tint seen in most diamonds. These are called the Cape series diamonds.
Type IaA	Nitrogen is present as pairs of nitrogen atoms. These diamonds are colourless.
Type IaB	Nitrogen is present as aggregates of four nitrogen atoms: these diamonds are colourless.
Type IaAB	Nitrogen is present as aggregates of three atoms. These diamonds absorb blue and are white to yellow in colour.

Type Ib	Nitrogen is present is isolated atoms. These diamonds are yellow to orange as they absorb the violet, blue and green colours.

TYPE II	No significant amount of nitrogen.
Type IIa	These diamonds have no trace elements and colourless if there are no other defects like plastic deformation.
Type IIb	Boron is present and appears blue as they absorb colours in the green, orange and red.

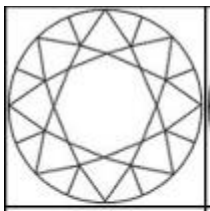
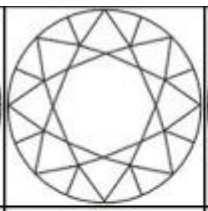
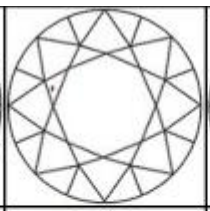
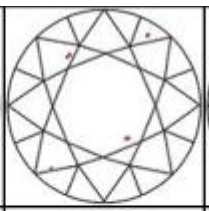
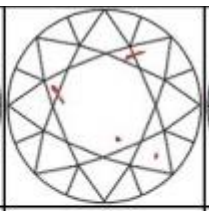
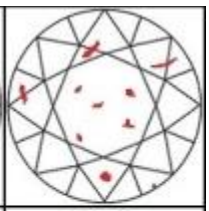
Appendix 2:

Blue diamonds are classed as Type IIb diamonds which means that boron atoms are present as isolated atoms and therefore absorb green, orange and red bands of light making their appearance blue. The Wittlesbach-Graff Diamond is a boron bearing type IIb diamond, which are semiconductive and usually phosphoresce. The Wittelsbach-Graff Diamond phosphoresces a strong red-orange colour, which will last for one minute after exposure to short wave ultra-violet light.

It is important to note that, although the Wittelsbach-Graff diamond is coloured by boron, some blue diamonds are coloured blue by the presence of hydrogen and these diamonds do not conduct electricity.

Appendix 3:

The table below gives a very quick summary of diamond clarity as detailed by GIA

					
FL	**IF**	**$VVS_1 \mid VVS_2$**	**$VS_1 \mid VS_2$**	**$SI_1 \mid SI_2$**	**$I_1 \mid I_2 \mid I_3$**
Flawless	**Internally Flawless**	**Very Very Slightly Included**	**Very Slightly Included**	**Slightly Included**	**Included**
No inclusions visible when magnified 10 times	No inclusions visible when magnified 10 times, tiny blemishes on the surface of the diamond	Tiny inclusions and blemishes visible to a trained grader when magnified 10 times	Minor inclusions and blemishes are easy to spot when magnified 10 times	Inclusions and blemishes are easy to see when magnified 10 times, sometimes even visible to the naked eye	Inclusions and blemishes are visible to the naked eye. I_3 diamonds are so included that their brilliance and durability are affected

Reference for image: https://davidashton.co.uk/diamonds-need-know-part-2-clarity/diamond-clarity-chart-gia-the-finest-jewellery-handmade-in-london-bespoke/

Appendix 4:

Brilliance:

Is the brightness of reflections seen from within a diamond in contrast to its surrounding darkness. When the viewer looks at a diamond, they will notice the reflection of internal light reaching their eye when the stone is in a face up position, this gives the diamond a visual appearance of dark and light patches in the gemstone. It is a static light effect and is affected by the polish of the stone, the reflective index and critical angle, the transparency, the cut and symmetry and finally

the cleanliness of the stones. Diamonds have a higher degree of brilliance over a greater range of viewing angles than most other transparent stones.

Fire:
Fire is the spectral colours produced by the dispersion of the stone, i.e. when you see spectral colours, you are not seeing dispersion, but fire produced by dispersion. The dispersion of a gem is always the same, but that doesn't mean that all gemstones exhibit the same amount of fire. The amount of fire seen is dependent on:

- Simultaneous bright/dark contrast
- Distance of the light source, the further away the light, the purer the colour
- Distance of the observer, the further away the observer, the purer the colour
- Size of the facets
- Angles of incident
- Brightness.

Scintillation:
Refers to flashes of light seen as a sparkle effect from the movement of the observer, the light source or the gemstone. It is a light effect caused by total internal reflection.

Appendix 5:
The table below gives a summary of diamond colour grading:

GIA	CIBJO	General Appearance
D	Exceptional White + (EW+)	Table up colourless Table down colourless
E	Exceptional White (EW)	Table up colourless Table down colourless
F	Rare White + (RW+)	Table up colourless Table down colourless but not as bright as above
G	Rare White (RW)	Table up colourless Table down colourless but not as bright as above
H	White (W)	Table up colourless Table down very slightly tinted
I	Slightly tinted white (STW)	Table up very slightly tinted Table down slightly tinted
J	Slightly tinted white (STW)	Table up very slightly tinted Table down slightly tinted
K	Tinted white	Table up slightly tinted Table down obviously tinted
L	Tinted White	Table up slightly tinted Table down obviously tinted
M-Z	Tinted Colour (TC)	Table up obviously tinted Table down very obviously tinted
Fancy	Fancy Colour	Table up definitely colour

Table from Gem-A diamond notes chapter 13 page 3.

Appendix 6:

Diamonds which are deemed as Fancy Colour are not graded the same as colourless-tinted yellow diamonds, instead their hue, tone and saturation is graded.

Hue describes the body colour for example with the Wittelsbach: Blue

The tone describes how light or dark the colour is on a scale of white to black

The saturation describes the strength of the colour: pale to vivid

The stone is graded face up through the crown

A colour grade is then added to the stone as show in the table below:

Taken: Gem-A diploma 2014 notes chapter 13 page 6

Colour Grade term	Description
Faint	Refers to a barely-perceptible hint if colour or tone
Very light	Low saturation and light in tone
Light	Low saturation and slight tone or slightly more saturated than very light
Fancy light	Not as saturated as fancy
Fancy	Saturated colour
Fancy intense	strongly saturated
Fancy vivid	Very strongly saturated
Fancy deep	Both strongly saturated and with a dark tone
Fancy dark	With a dark tone but not very strongly saturated

Appendix 7:

FTIR spectrometer:

Is a spectrometer that uses the infrared part of the spectrum. The initials stand for Fourier Transform Infrared spectrometer and will appear in most gem lab reports. The machine causes the molecules in the matter to vibrate and the results are plotted in a graph which, with the help of a data bank, can be analysed to tell what TYPE the diamond is, i.e. Type IIb, and whether the diamond is synthetic and/or treated

Diamond View:

This machine uses Short Wave Ultraviolet Light to show fluorescence in the diamond. Depending on the diamond type, a florescence pattern can be seen and this image can then be used to identify if the stone is HPHT synthetic by the cubo octahedral patterns typically seen in this stone.

Polariscope is a portable machine that uses crossed polarised filters to examine strain in the stone.

Appendix 8:

Plastic deformation is a fault in the diamond's atom structure whereby the crystal structure has been dislocated by direction sheer pressure upon the crystal in a particular direction

Plastic means the dislocation of the atoms is permanent.

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IMAGE 1: ANONYMOUS 'Lawrence Graff holding the Wittelsbach-Graff diamond' www.langantiques.com/university/Graff (19/04/2018)

IMAGE 2: A table to explain the four C's, adapted from the Gemmology Diploma notes

IMAGE 3: GIA 'The Wittlebach-Graff' http://4cs.gia.edu/en-us/blog/allure-of-an-oval-diamond/146684-690x460-wittelsbach-graff-diamond/

IMAGE 4: WIKIWAND 'Empress Margarita Teresa and her daughter Maria Antonia (1671) by Benjamin Block' http://www.wikiwand.com/en/Margaret_Theresa_of_Spain

IMAGE 4A: Wikimedia Commons 'Maria Amalia of Austria, Holy Roman Empress' commons.wikimedia.org/wiki/File:Maria_Amalia_of_Austria,_Holy_Roman_Empress.jpg (25/04/2018)

IMAGE 5: Pinterest, attributed to Frankie Flexter 'Royal Crowns, Tiaras and The family Jewels, www.pinterest.co.uk/pin/210965563764452750/ (20/04/2018)

IMAGE 6: Pinterest, attributed to Katwill70 'Royal and Vintage jewellery'www.pinterest.co.uk/pin/259871840976170167/ (20/04/2018)

IMAGE 7: Wikipedia 'Tavernier diamond' https://en.wikipedia.org/wiki/Tavernier_Blue (20/04/2018)

IMAGE 8: LEE. R. “Is the Hope diamond curse real?” http://en.paperblog.com/is-thehope-diamond-curse-real-400774/ (18/04/2018)

IMAGE 9: SMITHSONIAN INSTITUTE “hope diamond” http://www.si.edu/encyclopedia_si/nmnh/hope.htm (18/04/2018)

IMAGE 10: SMITHSONIAN INSTITUTE “hope diamond and Wittelsbach diamond” ttps://mineralsciences.si.edu/collections/hope/details/the-hope-and-wittelsbach-graff-diamonds.htm (18/04/2018)

IMAGE 11: Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. ‘Hope Diamond and Wittelsbach-Graff Diamond Phosphorescence Compared’ ‘The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough’, summer 2010 published Gems & Gemmology (20/04/2018)

IMAGE 12: Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. Images from the DiamondView, showing the texture of the mosaic pattern finer in the Hope diamond ‘The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough’, Summer 2010 published Gems & Gemmology (20/04/2018)

IMAGE 13: Gailou, E., Wang,W, Post, J. King, J, Butler, J, Collins, A, Moses, T. ‘The Wittlesbach-Graff and Hope diamond: NOT cut from the same rough’, Summer 2010 published Gems & Gemmology (20/04/2018)