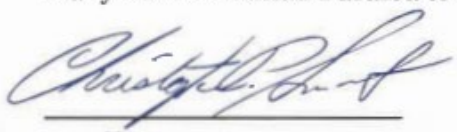
Introduction

Tourmaline is one of our industry's most exciting and enchanting gems. Its vast array of colors provides for an endless opportunity to adorn jewelry of all tastes and styles. Even though this gem and its many varieties have a long history of appreciation, it was due to a serendipitous find in the Paraiba State of Brazil in 1987 that would catapult tourmaline to unprecedented heights.

The discovery of copper-rich tourmalines of intense blues, greens and violets near the village of São José da Batalha radically altered the future perception of this area for generations of gemstone lovers. The tourmalines of Paraiba, Brazil now distinguish themselves as the pre-eminent members of the tourmaline family. Their character and intensity of "neon" color ranges have set a new standard of excellence.

Although copper-bearing tourmalines are now recovered from additional deposits in Nigeria and Mozambique, it remains that those from Brazil are heralded as the finest and the most highly sought after by knowledgeable connoisseurs.

The impressive 37.34 cts Brazilian Paraiba tourmaline detailed in this JewelFolio™ is just one of these outstanding rarities. Of significance, this remarkable gem has been spared of the low temperature heating that is so commonplace with this gem variety. The unenhanced color and quality exemplify the rarity of this gem. Additionally, Tourmalines of this color, size and quality were rarely recovered from the original Paraiba deposits during the relatively brief period after their original discovery. Such Paraiba tourmalines as this are seldom found in Brazil any longer. Most of the Paraiba-type tourmalines available in the market today are from the more recent finds in Mozambique and Nigeria. Based on the extent of the original finds, it is not likely that many more Brazilian Paraiba tourmalines of this importance will ever be unearthed.



Christopher P. Smith

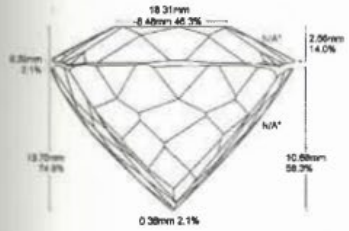
The Prestige Gemstone Report™

American Gemological Laboratories™

Imaging

Images do not accurately portray size or color.

Accu-Vu™ Imaging:



Comments:

Identification

Document No: 1122598 Validation Date: 7 July 2022

Identification

Mineral Type: Natural Tourmaline
Variety: Paraiba
Transparency: Transparent
Color Description: Blue

Carat Weight: 37.34 cts
Measurements: 19.91 x 18.31 x 13.70 mm
Shape: Cushion
Cutting Style: Modified Brilliant Cut

Comments: Paraiba is a trade term/color variety applied by the AGL to the copper-bearing variety of elbaite tourmaline, which was first discovered in the Paraiba state of Brazil.

Origin

Origin

Provenance: Brazil

Comments: Based on available gemological information, it is the opinion of the Laboratory that the origin of this material would be classified as Brazil.

Enhancement

Enhancement

Standard: No gemological evidence of heat
Additional: Clarity enhancement: None

Comments: Non-heated paraiba tourmaline is scarce. The color of paraiba tourmaline is commonly the result of a relatively low temperature heating process.

1	2	3	4	5	6	7	8	9	10
Excellent		Very Good		Good		Fair		Poor	

Enhancement Stability Index™

None	Insignificant	Minor	Moderate	Strong	Prominent
Extremely Rare	Very Rare	Rare	Uncommon	Common	Very Common

Degree of Clarity Enhancement & Relative Rarity™

General Report Comments:

M. Chaipaksa
Monnedee Chaipaksa, Senior Gemologist

Christopher P. Smith, President

About Us

American Gemological Laboratories™

America's first and most highly respected origin lab.

Founded in 1977, AGL is an internationally recognized gemstone testing facility, specializing in comprehensive colored stone analyses.

AGL has the distinction of being the first laboratory in the United States to issue Country-of-Origin reports. Our company and its principals have a long tradition of research into the detection of and reporting on gem identification-and-classification, gemstone treatments and provenance determinations.

Our staff is composed of experts in the field of gemstone testing and reporting. Our findings reflect the latest knowledge and analytical techniques to ensure the highest standards are applied on every stone we test.

AGL's testing and reporting methodology provide you with unsurpassed quality and reliability. We are committed to providing the highest level of service and reporting that our clients and the industry have come to expect from the AGL.

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GIA®

GIA GEMOLOGICAL REPORT

TOURMALINE ORIGIN REPORT

GIA REPORT 2235312598

June 11, 2024

DETAILS

Shape..... Cushion
Cutting Style ..... Modified Brilliant Cut
Transparency ..... Transparent
Color..... Greenish Blue

RESULTS

Species..... Tourmaline
Geographic Origin ..... Brazil

TREATMENT

Scan QR code for more information

Item Description:	Center stone with a client stated weight of 37.34 carats set in a white and pink metal pendant with numerous near colorless brilliant cuts of various shapes and numerous pink round brilliants.
Weight:	**50.10 grams (gross)**
Measurements:	**19.86 x 18.29 x 13.32 mm**
Comments:	This copper and manganese bearing tourmaline may be called "paraíba tourmaline" in the trade. The name "paraíba" comes from the Brazilian locality where this gem was first mined, however today it may come from several localities. Any statement on geographic origin is an expert opinion based on a collection of observations and analytical data.

Image is approximate

To learn more about how GIA determines and classifies gemstone origin, as well as maps describing localities, go to reportcheck.gia.edu to view this report.

reportcheck.gia.edu

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June 11, 2024

This letter addresses the characteristics of the greenish blue tourmaline with a client stated weight of 37.34 carats set in a white and pink metal pendant described on GIA report number 2235312598.

Tourmaline comes in a variety of colors that are directly influenced by a stone's chemical composition. This tourmaline exhibits a greenish blue coloration, caused by traces of the element copper, unique to this variety of tourmaline.

Copper bearing tourmaline was first discovered in the late 1980s in the state of Paraíba in Brazil and has been known to occur in Nigeria and Mozambique as of the early 2000s. This gemstone is commonly referred to in the trade as a "Paraíba Tourmaline," in reference to its origin of discovery. Trace element chemical analysis confirmed this is a copper bearing tourmaline consistent with material from Brazil.

Most gem quality tourmaline typically forms in a pegmatite environment that will influence the inclusions frequently seen in these stones. Internal microscopic features documented in this stone include growth tubes, fluid fingerprints, and no indication of clarity enhancement. This rare tourmaline variety is typically faceted into gemstones, but finished stones over ten carats can be considered scarce.

The combination of saturated color, rarity, and large size of this copper bearing tourmaline make this a notable gemstone.

Sincerely,

GIA Laboratory
Gemological Institute of America

GÜBELIN

GEMMOLOGICAL REPORT

Report Number
24122004

Date
4 December 2024

Item
One faceted gemstone

Weight
37.34 ct

Shape
cushion-shape

Cut
modified brilliant cut

Measurements
19.88 x 18.31 x 13.70 mm

Transparency
transparent

Colour
blue

Species
Natural tourmaline

Variety
Paraíba

Origin
Brazil

Condition
No indications of heating.

Comments
See Appendix.
See Information Sheet(s).

Important notes and limitations on the reverse.

Wendi Mayerson

Wendi Mayerson

Annette Widemann-Wong

GÜBELIN GEM LAB EST. 1923 SWITZERLAND

Notes and limitations

In keeping with the tradition and high standards of the Gübelin Gem Lab (Gübelin), each Report reflects the findings and independent opinion of Gübelin. Gem testing is carried out by qualified gemmologists applying approved analytical methods and using approved instrumentation. The description given in the Gemmological Report (hereinafter called Report) is limited to a selection of identifying characteristics observed in the gemstones (henceforth including single stones as well). The findings mentioned in this Report reflect the state of the gemstone at the time of examination. The unaltered original of the Report is the only valid document. Mounted stones are tested only insofar as mounting permits. Determination of the measurements of mounted stones cannot, in most cases, match the precision achievable on loose stones. Weight indications for stones tested in a setting are estimates; weight figures indicated by the client are checked by Gübelin. Stones tested prior to mounting are subject to a re-identification when resubmitted in the final jewellery piece. It cannot be excluded that they underwent changes, such as re-polishing that could remain undetected during re-identification. The colour photograph printed on the Report serves merely as an illustration of the items under examination. The actual appearance of the items may differ from their photographic image. The descriptions of jewellery items may be shortened and simplified.

Origin. A professional opinion as to the probable geographic origin of a gemstone may be given whenever possible and if requested. Deductions as to geographic origin are based exclusively on the internal characteristics, physical and chemical properties observed by Gübelin staff, by comparison to the properties recorded from reference stones of known identity, the results of continuing research undertaken by Gübelin, and gemmological knowledge published to date. The reference stones mentioned previously are part of the Gübelin gemstone reference collection and are systematically and continuously collected, classified and characterised. Gemstones from different geological sources may reveal a tell-tale combination of characteristic inclusion patterns, absorption spectra and trace-element compositions that allows for the determination of their origin. Indications of origin provided by Gübelin are not a warranty as to the quality or value of the gemstones. They are statements of qualified opinion, and do not guarantee the provenance of particular gemstones. Rather, such statements indicate the most probable origin, based on the data collected for the gemstones tested.

The combination of data may not, in all instances, provide the necessary basis for the determination of a single origin. When such cases arise, the Gübelin Gem Lab does not comment as to the origin of the gemstone. In addition, a determination of the origin of a gemstone reflects the level of knowledge and expertise about the respective type of gemstone at the time of the analysis. As stated above, Gübelin owns a comprehensive collection of authentic and fully analysed samples from all commercially relevant mines worldwide. This is an essential prerequisite for providing credible and reliable origin determination services. However, mines in new areas and other countries are coming on stream, and Gübelin regularly travels to collect sample material from new sources and thoroughly study its characteristics. The gemstones from such new mines can possibly show gemmological characteristics which might overlap with the characteristics of stones from earlier known localities. In such case, the previously defined criteria must be reviewed to ensure the basis for the determination of the origin as described above.

Enhancement. Historically, many coloured gemstones have been enhanced to improve their appearance. Enhanced is a term used in the trade to describe any process additional to cutting and polishing that improves the appearance or durability of gemstones. Today, a variety of traditional and advanced enhancements (also known as treatments) are routinely applied to many natural gem materials. Heat treatment (also known as thermal enhancement) is commonly applied to gemstones such as rubies and sapphires, but also to tourmaline to improve colour and/or transparency (clarity). Thermal enhancement of most gemstones is considered stable and permanent under normal wear and handling conditions, and it is generally accepted by the international gem and jewellery trade.

Enhancement disclosure. Generally, the wording used in Gübelin Reports is fully compliant with the nomenclature standards defined by the Laboratory Manual Harmonisation Committee (LMHC). In keeping with international trade practices, Gübelin does not make a separate comment for every type of enhancement that is commonly applied to any of a wide range of gemstones in today's marketplace. For example, thermal enhancement is commonly applied to most tanzanite, zoisite, Paraíba tourmaline, aquamarine, citrine, topaz, zircon, and others. For these and other types of gemstones, thermal enhancement is considered the norm and is generally accepted in the trade, and the presence or absence of such treatment is not usually mentioned in Gübelin Reports. Colour stability tests on gemstone varieties known to possibly fade are generally not undertaken. Thus, Gübelin will disclose enhancements mentioned herein if it detects any. Note, though, that certain enhancements cannot be detected or can be detected only under special conditions. Any comments made regarding the presence or absence of enhancements will therefore only reflect Gübelin's findings; thus, the fact that no enhancement is disclosed or that certain enhancements are not disclosed in the Report does not necessarily mean that such enhancement is absent.

Paraíba tourmaline. 'Paraíba' tourmalines entered the international gem market towards the end of the 1980s. They immediately became prized and coveted for their vivid colouration, which ranges from rare purple to violet-blue, from blue to green and yellowish-green (including blue-green, turquoise-blue and emerald-green). The colours of these tourmalines (some of the colours sometimes referred to as *'electric blue'* or *'neon green'* in the trade) are caused by varying amounts of the elements copper and manganese. The bright vivid blue and green 'Paraíba' colours have not been seen in any other gemstone variety.

The first Paraíba tourmalines originated from a deposit near the village of São José de Batalha in the north of Paraíba State, Brazil. Later, by the mid-1990s, other occurrences were discovered in the northernmost part of Paraíba State and in the adjacent southernmost corner of Rio Grande do Norte State, near the town of Parelhas. In 2000, another source of this colour variety of tourmalines was discovered in Nigeria. More recently, the Alto Ligonha region in Mozambique joined the small and exclusive group of mining areas where Paraíba tourmalines are found. In all these areas, particular geochemical surroundings cause the formation of exceptional tourmalines in pegmatite host rocks. These surroundings are also responsible for the unique colours of the Paraíba tourmalines.

As mentioned above, the wording used in Gübelin Reports is fully compliant with the nomenclature standards defined by the LMHC. Accordingly, any elbaite tourmaline containing copper and manganese with a blue (electric blue, neon blue, violet blue), bluish green to greenish blue or green colour of medium to high saturation and tone, independent of its origin, is identified as a Paraíba tourmaline.

Report Verification No.: ia82

GÜBELIN

GEMSTONE RATING

GÜBELIN POINTS

94.6

Outstanding

24122004

4 December 2024

Variety:
Paraíba

Weight:
37.34 ct

Scan QR-Code for more information

Gübelin Gem Lab
Lucerne Hong Kong New York
www.gubelingemlab.com

Notes and limitations

The Gübelin Gemstone Rating is a comprehensive system to assess the quality, attractiveness and rarity of coloured gems expressed in a single number, the Gübelin Points. The Rating intends to provide orientation and direction for privates and professionals who wish to get a simple ranking for their gemstones, comprising a selection of characteristics considered key for coloured gemstones. The Rating can be used in combination with a gem lab report to help in the assessment of the gemstone.

The Rating comprises three domains: quality, rarity and salience. Quality is the major part, covering the visual characteristics of the gemstone, specifically its colour, clarity/transparency, and cut. Rarity includes the type of gemstone, the presence, absence or type of treatment, and the weight of the gemstone. Salience addresses the extent of exceptionality of a gemstone, it is best seen as the gemstone's capability to be particularly noticeable, conspicuous or prominent. For more details about the different characteristics comprised in the Rating, scan the QR code on the Rating document or consult our website www.gubelingemlab.com.

The Gübelin Gemstone Rating is applied on the major types of high-value, natural (i.e. non-synthetic), faceted or polished, as well as transparent coloured gemstones. Gemstones that were subjected to treatments that are generally accepted in high-value specimens, such as heat treatment and clarity enhancement, do also qualify for the Rating.

The Rating is conducted by experienced and trained gemstone experts, following a highly structured procedure. Nevertheless, the Rating procedure partially is of subjective and qualitative nature and as such susceptible to inconsistencies. Consequently, the Rating and hence the Gübelin Points might differ over time for the same gemstone. The Gübelin Gem Lab is also reviewing from time to time the underlying grades and weights assigned to certain characteristics. This applies specifically, but not exclusively, to the rarity attributes, as rarity is directly affected by changes in supply and demand.

Gübelin Gemstone Ratings are not based to the same level of scrutiny as, for example, Gübelin Gemmological Reports. It is important to understand that Gübelin Gemstone Ratings do not comply with the standards specified by the Gübelin Gem Lab Seal. Owed to this difference, the result of the short visual assessment applied for the Gübelin Gemstone Rating, and hence the resulting Gübelin Points, might not be consistent with the findings stated in a Gübelin Gemmological Report for the same gemstone.

The Rating reflects the state of the gemstones at the time of examination. The colour photograph serves merely as an illustration of the gemstone. The appearance of the actual gemstone may differ from its photographic image. Gemstones set in jewellery are assessed and rated insofar as mounting permits.

GÜBELIN

GEMMOLOGICAL PROFILE

37.34 CT

BRAZILIAN PARAÍBA TOURMALINE

COMPLEMENTING
GEMMOLOGICAL REPORT

No. 24122004

GÜBELIN

GEMMOLOGICAL PROFILE

37.34 CT

BRAZILIAN PARAÍBA TOURMALINE

COMPLEMENTING
GEMMOLOGICAL REPORT

No. 24122004

ABOUT THIS DOCUMENT

This Gemmological Profile is complementing a Gemmological Report issued by the Gübelin Gem Lab. The Gemmological Profile has been issued upon request of a client, on the basis of data collected for the described stone at the time of the analysis as stated on the Gübelin Gem Lab Gemmological Report. The Gemmological Profile is only valid if presented together with the original Gübelin Gem Lab Gemmological Report.

Gemmological Profiles provide a more detailed description of a gemstone than the concentrated wording used in Gübelin Gem Lab Gemmological Reports. While Gemmological Reports primarily address the professional traders, Gemmological Profiles attempt to cater the needs of the jeweller and the layperson, who might be interested in getting explanations and background information about gems in general, and their gemstone in specific.

Gemmological Profiles are issued on request, and are available for a broad range of gemstone qualities. Hence, the existence of a Gemmological Profile does not imply any level of quality or rarity of the gemstone it describes. The language used in Gemmological Profiles is more extensive and informal. Statements about certain quality traits of the stone in the Gemmological Profile might be more detailed, and go beyond the sober scientific language deployed in the Gemmological Report. In contrast to the Gemmological Report, whose content is based exclusively on data that Gübelin staff has collected directly from the stone, the Gemmological Profile considers and contains also external, possibly uncorroborated data and information.

We refer to the information stated in the Notes and Limitations section on the backside of the Gemmological Report, and to the General Terms & Conditions. See also www.gubelingemlab.com.

CONTENT

INTRODUCTION

Gemstones are true products of nature, grown millions of years ago in the earth's crust, brought up to the surface by geological processes and eventually found by man who brings out their colour and brilliance by cutting and polishing.

The gemmologist's eye looks beyond the sparkling outer appearance of the stone, attempting to understand how it has formed. Minute crystals, fluid inclusions and subtle growth features trapped in its interior are witnesses of its formation ages ago and in tens or even hundreds of kilometres depths in the earth. This inner life allows us to detect its identity, authenticity and even its geographic origin.

This Gemmological Profile complements the Gübelin Gem Lab Gemmological Report No. 24122004. In this Profile, we present our insights and findings for this 37.34 ct Paraíba tourmaline, disclosing some of its microscopic, chemical and structural characteristics and providing valuable information about its genesis.

We intend to share with you a bit of the story that your gemstone tells us on its very individual history and personality.

On December 2nd, 2024, the Gübelin Gem Lab had been entrusted with testing the 37.34 ct gemstone presented here. The careful assessment and detailed analytical studies performed on this gemstone revealed the results provided in the Gemmological Report No. 24122004 and are described in more detail in this Gemmological Profile, the first of it's kind for Paraíba tourmaline.

HISTORY & SYMBOLISM OF TOURMALINE

The name 'tourmaline' is believed to originate from the Sinhalese word turmali or toramalli, meaning "mixed gems," a reference to the wide range of colours in which this remarkable mineral occurs. This name was adopted in the 18th century when Dutch traders first brought Sri Lankan tourmalines to Europe, where they were initially mistaken for other precious stones. Some sources suggest deeper linguistic roots in Dravidian or Tamil languages, indicating an even older appreciation for these captivating gems.

Few gemstones possess the colour diversity of tourmaline, a mineral classified as a complex borosilicate. While best known for its vivid pinks, greens, and blues, tourmaline exists in nearly every hue imaginable, from deep black to neon-bright shades. Some of the most sought-after varieties include the striking Paraíba tourmaline, prized for its electric blue-green tones due to copper traces, and rubellite, a vibrant pink-to-red tourmaline highly valued for its intensity and brilliance. Unique among gems, tourmaline crystals often display colour zoning or even multiple colours within a single stone, as seen in the mesmerizing watermelon tourmaline, which exhibits a green rind surrounding a pink core.

Tourmaline has long been attributed with mystical and protective qualities. In ancient India, it was believed to inspire insight, clarity, and spiritual awakening. Egyptian legends spoke of tourmaline traveling through a rainbow on its journey from the earth's depths, absorbing all its colours along the way. In the Middle Ages, it was used as a talisman to guard against negative energy, nightmares, and even poisoning. Some traditions hold that black tourmaline, or schorl, is a powerful protective stone, deflecting harmful influences and grounding the wearer in times of uncertainty.

Beyond its spiritual and aesthetic appeal, tourmaline is also distinguished by its fascinating physical properties. It is piezoelectric, meaning it can generate an electrical charge when heated or put under pressure. This unique characteristic led to its historical use in scientific instruments and early electrical applications.

Tourmaline's ability to capture the full spectrum of colour has made it a favorite among collectors and gem enthusiasts. Whether deep blue-green like the ocean, vivid pink like a summer bloom, or a delicate gradient of hues, tourmaline embodies both artistic beauty and scientific wonder. More than just a gemstone, it is a symbol of energy, transformation, and the ever-changing nature of light and colour.

tourmaline is the stone of energy
and protection, grounding the spirit
while igniting creativity

DESCRIPTION

Identity & authenticity

Tourmaline is a complex borosilicate mineral group, where various elements, including iron, magnesium, lithium, and manganese, can substitute in its structure. These trace elements are responsible for the wide spectrum of colours found in tourmaline, making it one of the most diverse and visually captivating gemstones. Even small variations in its chemical composition can result in distinct hues, ranging from deep greens and blues to vibrant pinks and reds, with some stones even displaying multiple colours within a single crystal.

Due to its broad colour range, tourmaline may often imitated using other minerals or synthetic materials that serve as simulants. While synthetic tourmaline does exist, it is not as common as synthetic sapphire or ruby due to the complexity of its crystal structure and growth conditions. Consequently, most tourmaline gemstones on the market are of natural origin, though treatments such as heat or irradiation may be applied to enhance their colour. Identifying whether a tourmaline has been treated or remains in its natural state is an essential factor in assessing its authenticity and value.

Among the most sought-after varieties of tourmaline are Paraíba tourmalines, which are distinguished by their striking neon blue-green hues caused by the presence of copper and manganese. These rare gems command premium prices due to their scarcity and intense colouration.

Other notable varieties include rubellite, a vivid pink to red tourmaline, and verdelite, which encompasses the green shades of the mineral. Some tourmalines also exhibit pleochroism, meaning their colour can shift depending on the viewing angle, further adding to their uniqueness and desirability.

This 37.34 ct gemstone has been identified as a natural Paraíba tourmaline, belonging to the prized category of this versatile and colourful mineral group.

Weight

Paraíba tourmalines are rare and highly prized gemstones, formed deep within the Earth under unique geological conditions. Their formation requires not only a precise balance of mineralogical factors but also specific temperature and pressure conditions. Additionally, the presence of a rare combination of chemical elements is crucial for their development.

Copper and manganese are two key elements—copper as the primary contributor to the gemstone's striking neon blue or green hues, and manganese influencing subtle variations in tone. The coexistence of all required major, minor and trace elements in the same geological environment is an exceptional occurrence, further emphasizing the rarity of Paraíba tourmalines.

Due to the conditions under which they form, Paraíba tourmalines often contain internal inclusions and structural irregularities. To enhance their brilliance and colour, skilled craftsmanship is essential in cutting the rough crystal, carefully selecting the least included sections. This process frequently results in a significant reduction in weight, often leaving the final gemstone at less than 50% of its original size.

With a final weight of 37.34 ct, the Paraíba tourmaline presented here is an extremely large specimen and thus considered rare.

Shape & cut

The final shape and cut of the gemstone is the result of a highly complex decision taken by the cutter and mainly defined by the shape and the quality of the rough crystal. The cutter tries to find a balance between maximising the colour, brilliance and transparency, while retaining as much weight of the crystal as possible.

The final shape and cut of a Paraíba tourmaline result from a highly complex decision made by the cutter, primarily dictated by the shape and quality of the rough crystal. The goal is to achieve a harmonious balance between colour intensity, brilliance, and transparency, all while preserving as much weight as possible.

Special attention is given to the perception of colour, the most defining characteristic of Paraíba tourmalines. These gemstones often exhibit variations in tone and saturation depending on the viewing angle, an effect influenced by their crystal structure. This phenomenon, known as pleochroism, is carefully considered during the cutting process to ensure the final gem showcases its most vibrant and luminous hues.

These considerations were also applied on the present crystal. It was fashioned into a cushion shape, using a modified brilliant cut style. The dimensions of the gemstone are 19.88 mm in length, 18.31 mm in width and 13.70 mm in depth.

Colour

One of the most important criteria for assessing a gemstone's quality is its colour. Paraíba tourmalines are celebrated for their extraordinary vivid and intense blue and green hues, often described as electric and neon. These mesmerizing colours result from the presence of copper and manganese, with

subtle variations influenced by their relative concentrations. While all shades exhibit their own unique allure, the most coveted among connoisseurs is a highly saturated, luminous neon blue, distinguished by its unparalleled vibrancy and brilliance.

Fine Paraíba tourmalines are universally accepted to be not only some of the rarest coloured gemstones, but also the most exquisitely beautiful.

Transparency

As a rule of thumb, the transparency of gemstones usually follows the same logic as in diamonds: the cleaner – i.e. showing few or no internal features only – the better. Tiny, usually microscopically small inclusions are a common and welcome feature in coloured gemstones. Ideally, however they should not affect the transparency of the stone.

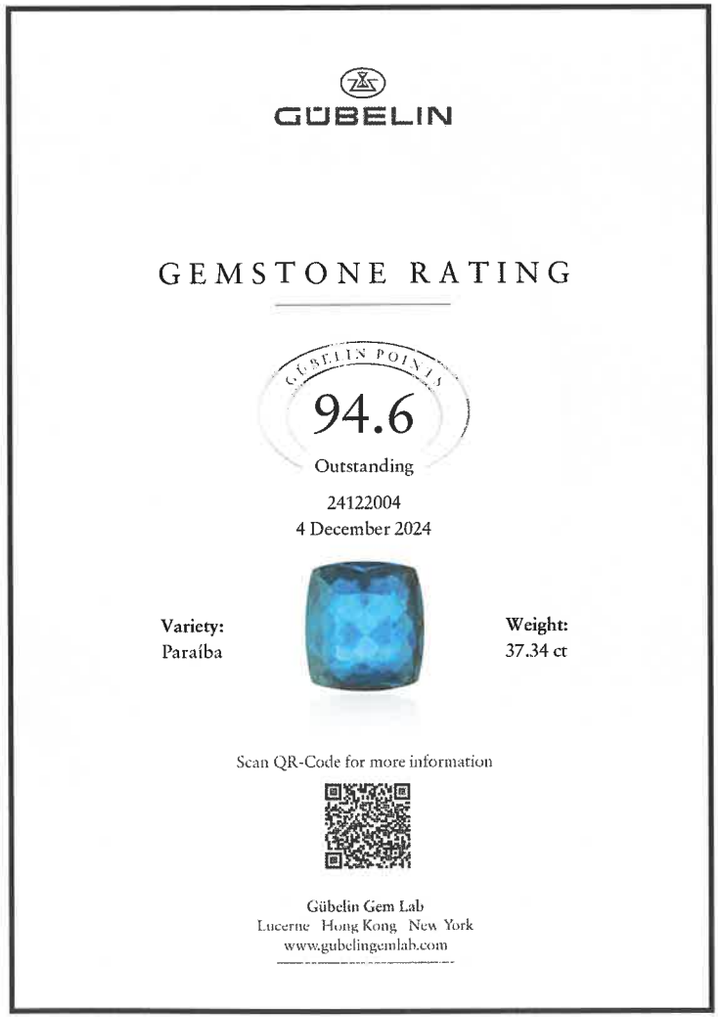
The present 37.34 ct Paraíba tourmaline is slightly included.

Overall quality assessment & Gübelin rating points

The 37.34 ct Paraíba tourmaline described in Gübelin Gemmological Report No. 24122004 is of very high visual quality. It reaches 94.6 points in the Gübelin Gemstone Rating, a comprehensive system that assesses the most relevant quality and rarity parameters. With 94.6 points, the 37.34 ct Paraíba tourmaline is considered an outstanding gemstone [1]. Only a small share of Paraíba tourmaline ever mined are of this level of quality.

At its own discretion, the Gübelin Gem Lab is awarding gemstones of exceptional beauty and rarity with an Appendix, an additional document accompanying the Gübelin Gemmological Report. A combination of outstanding characteristics qualifies this Paraíba tourmaline to be awarded with an Appendix, a distinction granted to a few, exceptional gems only. The combination of quality traits observed in the present gemstone is very rare in natural, untreated Paraíba tourmaline of this size.

[1] The Gübelin Gemstone Rating system assesses the quality, rarity and salience of a specific gemstone and translates these attributes into a simple number: the Gübelin Points. These rating points are only granted to stones reaching more than 75 points. The theoretical highest rating is 100 points. Gübelin Gemstone Rating system gives meaningful orientation and comparability for the main types of high-value coloured gemstones. See https://www.gubelingemlab.com/en/gemlab/gemstone-rating for details.



Left: Rough Paraíba tourmaline from the original deposit found in the Batalha mine in Paraíba, Brazil

photo courtesy of Brian Cook - Nature's Geometry

Right: The Gübelin Gemstone Rating for the 37.34 ct Paraíba tourmaline

PARAÍBA TOURMALINE ORIGINS

Throughout history, gemstones – in particular rubies, sapphires and emeralds – have been associated with specific countries and mining localities by virtue of their outstanding beauty and quality, as well as their very limited supply. High quality tourmalines, in nearly every colour, have been found throughout the world for millennia, on nearly every continent. However, to this date, only three locations have been blessed with the copper bearing variety known today as Paraíba tourmaline.

Brazil- the birthplace of Paraíba tourmaline

The first discovery of Paraíba tourmaline occurred in the Paraíba state of Brazil, near the village of São José da Batalha. These rare gemstones quickly gained global recognition for their electric blue and turquoise colours, often described as possessing an internal glow.

After the initial discovery of Paraíba tourmaline in the late 1980s in Paraíba state, geologists and miners later found similar deposits in Rio Grande do Norte, particularly in the areas of Parelhas and Currais Novos. These sites are located within the Borborema geological province, which extends across both states.

Brazilian Paraíba tourmalines tend to be the most vividly saturated, making them some of the most valuable and coveted gemstones in the world.

Nigeria

In the early 2000s, copper-bearing tourmalines were discovered in Oyo and Borno states, Nigeria. Initially, traders were unsure if these gems would be comparable in terms of quality to their Brazilian counterparts. Testing confirmed the presence of copper, linking them to the coveted Paraíba variety.

While Nigerian Paraíba-type tourmaline shares the same copper-bearing composition, its colour intensity varies, with some stones exhibiting the sought-after neon blues and greens, while others lean toward paler shades. Despite this, Nigerian material contributed significantly to the global supply, offering a more affordable alternative to Brazilian specimens.

Today, the supply of Nigerian Paraíba tourmaline has diminished significantly. While some small-scale mining continues, most of the accessible deposits have been depleted, leading to a decline in production. Nigerian Paraíba tourmalines are now primarily available in the secondary market, where collectors and dealers trade previously mined stones.

Mozambique

The most significant breakthrough in Paraíba tourmaline mining came with the early 2000s discoveries in Mozambique's Alto Ligonha region. This new deposit produced a steady and abundant supply of copper-bearing tourmline, transforming the market and ensuring greater availability of these brilliant gemstones.

Mozambique's mines are larger and more productive than those in Brazil or Nigeria, yielding bigger crystals with strong colour saturation. Many of these stones bear a striking resemblance to Brazilian specimens, making them highly sought after in the international market. The availability of larger sizes has also allowed for more impressive jewellery designs and auction pieces. Today, Mozambique is the leading source of Paraíba-type tourmaline, with its material dominating high-end jewellery collections and gem auctions. The steady supply has helped maintain interest in these extraordinary gemstones offering the market more selection.

North slope of the Batalha Mine, in Brazil, the original source for Paraíba tourmaline

photo courtesy of Brian Cook - Nature's Geometry

GEOLOGY & AGE

The formation of Paraíba tourmaline is a rare geological phenomenon, requiring a precise combination of chemical elements, pressure, and temperature over long periods of time. Unlike other tourmalines, the vibrant neon blues and greens of Paraíba tourmaline are due to trace amounts of copper and manganese, a composition rarely found in tourmaline formations elsewhere in the world. These gemstones formed under distinct geological conditions in Brazil, Nigeria, and Mozambique, each shaped by unique tectonic and magmatic events.

Brazil

The journey of Brazilian Paraíba tourmaline began around 500 to 600 million years ago during the Neoproterozoic Era in what is now the Borborema Province of northeastern Brazil. At that time, South America was part of the supercontinent Gondwana, and intense tectonic activity, known as the Brasiliano orogeny, shaped the region. During this period, deep-seated magma intrusions cooled and released high pressure fluids, rich in volatile and rare elements such as lithium, boron, and copper. These fluids forced their way into the overlying rock where they cooled to form pegmatites.

These pegmatites, enriched with unique elements, cooled slowly over millions of years, allowing for the formation of copper-bearing elbaite tourmaline—what we now call Paraíba tourmaline. However, the host rocks containing these gems remained buried for hundreds of millions of years before erosion, uplift, and weathering slowly exposed them at the surface.

Nigeria

The Nigerian Paraíba tourmalines were formed under different conditions, likely between 150 and 200 million years ago, during the Mesozoic Era when the Atlantic Ocean was beginning to open. Unlike Brazil, where tourmaline formed in ancient, deeply metamorphosed rocks, the Nigerian deposits were formed within younger pegmatitic veins cutting through Precambrian basement rock.

These pegmatites crystallized in a more stable geological setting, where copper and manganese-enriched hydrothermal fluids infiltrated fractures in the crust. The result was the growth of small but vividly coloured Paraíba-type tourmalines. Over millions of years, weathering and erosion exposed these gems, which were eventually found in alluvial deposits, carried downstream by rivers and deposited in sedimentary layers. While the colours of Nigerian Paraíba tourmaline can be striking, the deposits tend to yield smaller and more fragmented crystals compared to Brazil and Mozambique.

Mozambique

Paraíba tourmaline from Mozambique formed in a geological setting somewhat similar to Nigeria but on a much larger scale. The gem-bearing pegmatites in the Alto Ligonha region of Mozambique crystallized around 180 to 200 million years ago, during the same period of continental drift that affected Nigeria. However, the Mozambican deposits were subjected to greater tectonic activity and metamorphism, which allowed for the growth of larger crystals.

Over time, uplift and erosion exposed these pegmatitic bodies, leading to the formation of both primary and secondary deposits. Unlike Brazil, where mining is restricted to deep, weathered pegmatites, Mozambique's deposits are extensive and accessible, allowing for a steady and substantial supply of material.

NIGERIA

BRAZIL

MOZAMBIQUE

TREATMENT

Thermal enhancement

Thermal enhancement, otherwise known as heating, has been applied for centuries, and even millennia, to improve both the colour and clarity of many types of gemstones. References in Pliny show a diverse knowledge of various mineral treatments in the Roman period and explicit literary references to the heat treatment of sapphire are found in early mediaeval Arabian and Renaissance European texts.

Generally, heat treatment offers a way of turning some less desired quality stones into more attractive gems. Treatment is thus an important way of overcoming the enduring under-supply of aesthetically appealing gemstones. However, each treatment must be properly and accurately disclosed, as the presence and the type of treatment influences the value of a gemstone significantly.

The resulting small number of natural precious gemstones of good colour and transparency, compared with their heated and otherwise treated counterparts, underlines their rarity.

Paraíba tourmalines are typically heat-treated at relatively low temperatures, often between 300°C and 550°C, to enhance their vivid blue and green hues. This thermal enhancement process modifies the oxidation state of trace elements like manganese, reducing brownish or purplish tones and bringing out the desired intensely saturated colours, characteristic of these gemstones. The specific temperature and duration of the heat treatment can vary depending on the initial colour and composition of the tourmaline. It should be noted that the overwhelming majority of Paraíba tourmalines have undergone some level of heat treatment to enhance their colour.

Detecting thermal enhancement in Paraíba tourmaline combines visual inspection for altered inclusions with analysis of the absorption spectra. Often however, the best Paraíba tourmalines are extremely clean, thus making it difficult to conclusively detect treatments. The Gübelin Gem Lab's policy is that without evidence of treatment a Paraíba tourmaline will be considered as NTE, meaning no evidence of thermal enhancement has been found.

The present gemstone is a rare such Paraíba tourmaline showing no evidence of thermal enhancement (NTE).

Clarity enhancement

In addition to thermal enhancement, Paraíba tourmalines may also be subjected to clarity enhancement. Induced by the geological conditions during their formation, Paraíba tourmalines often contain fissures. Depending on their size, number, and placement, these fissures can affect the transparency, brilliance, and overall visual appeal of the gemstone. To mitigate these effects, clarity enhancement is often applied, where substances such as resins, oils, or polymer-based fillers are introduced to fill surface-reaching fractures. This process reduces the visibility of inclusions and enhances the gemstone's clarity. As clarity enhancement is considered a treatment, it must be disclosed in gemmological reports that accompany Paraíba tourmalines.

The present Paraíba tourmaline is a fine example of a stone which has not undergone any clarity enhancement.

WITHIN PARAÍBA TOURMALINE

Careful study of the internal features and properties gives valuable insights into the identity, authenticity and sometimes the origin of a gemstone. All these characteristics are the result of the individual history of this specific gemstone, providing a patchy and fragmented – but very personal – diary from its growth in the inner parts of the earth, its uplift to the surface, to the mining process and finally the processing by man. The first chapter of this diary, on the growth of the crystal, reveals insights to the geological setting in which the mineral formed, the pressure and temperature conditions and the specific chemical environment prevailing at that time. To unravel these secrets from this 37.34 ct Paraíba tourmaline, the scientists at the Gübelin Gem Lab have scrutinised its microscopic features, analysed its detailed chemical composition and its physical-structural properties.

Microscopic features

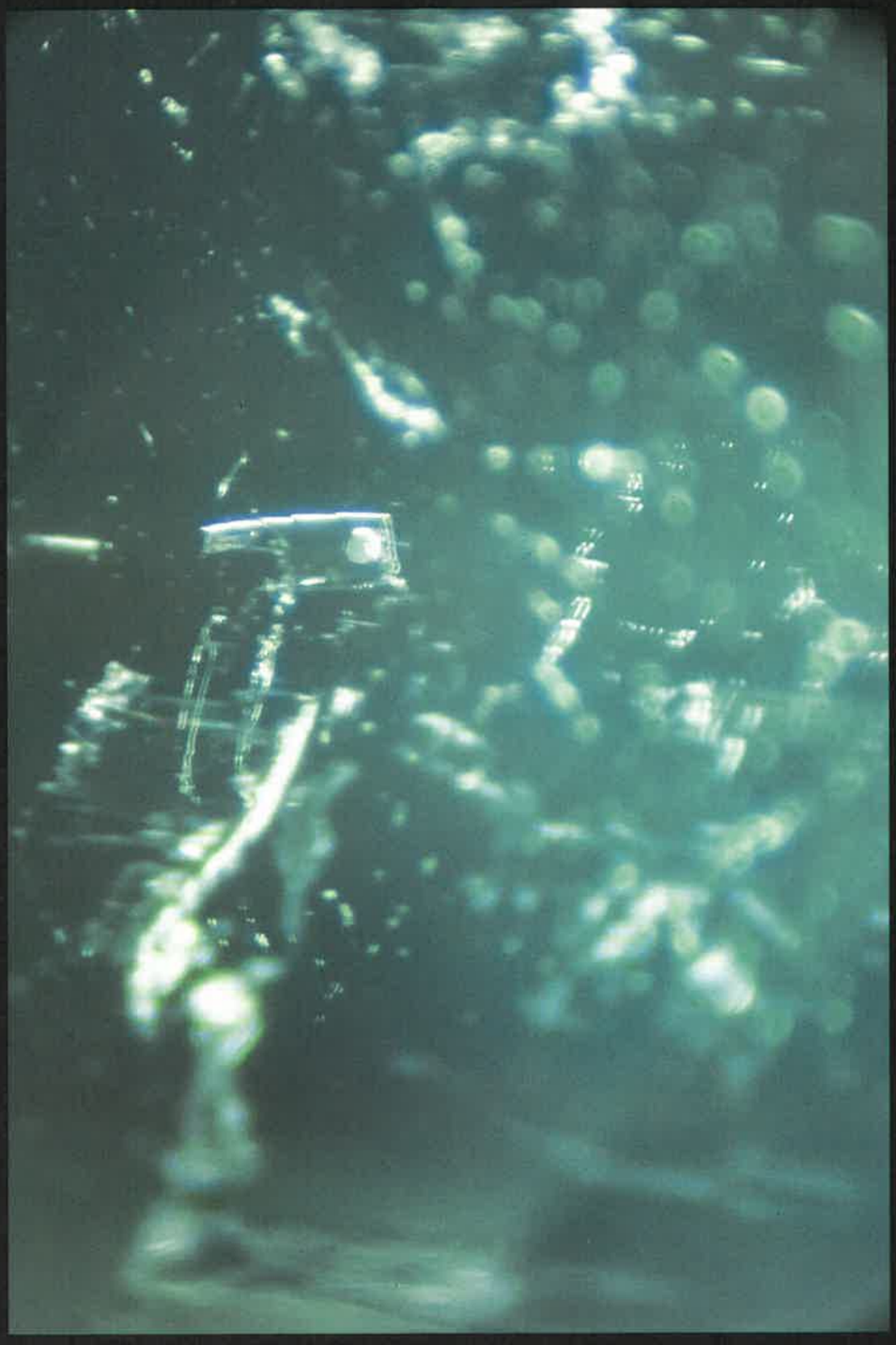
In combination with the magnifying aid of a microscope, the experienced human eye provides an extremely sensitive, powerful and versatile analytical tool. The determination and description of the microscopic characteristics found in a gem – ranging from tiny crystals, fluid inclusions and particles, to growth features and minute fissures – provide a comprehensive qualitative survey indispensable for any gemmological conclusion.

Paraíba tourmalines typically contain a variety of inclusions that are characteristic of their unique geological formation. Because tourmalines are doubly refractive, with a relatively high birefringence, they often have a blurry appearance, or doubling, when looked at, and photographed under the microscope. Common inclusions include needle-like structures, liquid-filled cavities, and growth tubes, which can appear as fine, thread-like features running through the crystal. Additionally, irregular fractures and wispy veils are often present, sometimes forming intricate patterns within the stone. These inclusions are potentially helpful indicators in determining a gemstone's authenticity, country of origin, and treatment.[2]

Some of the internal features recorded in this 37.34 ct Paraíba tourmaline include small liquid inclusions and fissures.

[2] For more information about the inclusions in gemstones contact the Gübelin Academy or consult 'Photoatlas of Inclusions in Gemstones'

Liquid inclusions are often seen in Paraíba tourmaline such as the present gemstone



Typical liquid inclusions as seen in this 37.34 ct Paraíba tourmaline.

Chemical features

In addition to microscopic features, a number of technologically advanced analytical methods are deployed to contribute to a secure determination of a gemstone's authenticity and origin. These more sophisticated methods can be grouped into spectroscopic and chemical methods. Both types give hints to the type of rock in which the gem formed and might also reflect alterations imposed by a possible treatment process.

Sophisticated analytical techniques[3] measure the concentration of chemical elements in gems. Aside from the main and minor elements, gemstones also contain other elements present in even smaller concentrations of a few parts per million.

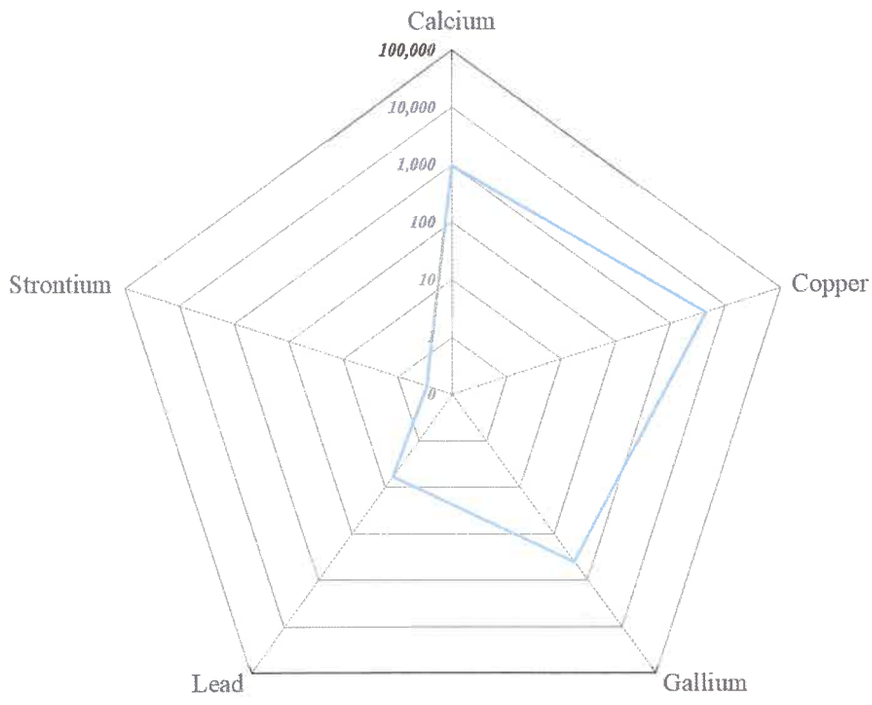
These trace elements typically do not have any significant influence on the appearance of the gemstone, but they shed light on the environment in which it grew thousands, millions or even billions of years ago, and are helpful in telling a more nuanced story of a gemstone's formation and history.

The trace element concentrations of this 37.34 ct Paraíba tourmaline vary slightly to the Gübelin World Paraíba Reference[4], as shown in the trace element diagram. The chemical fingerprint measured in the present gemstone displays the characteristic deviations we expect from these gemstones.

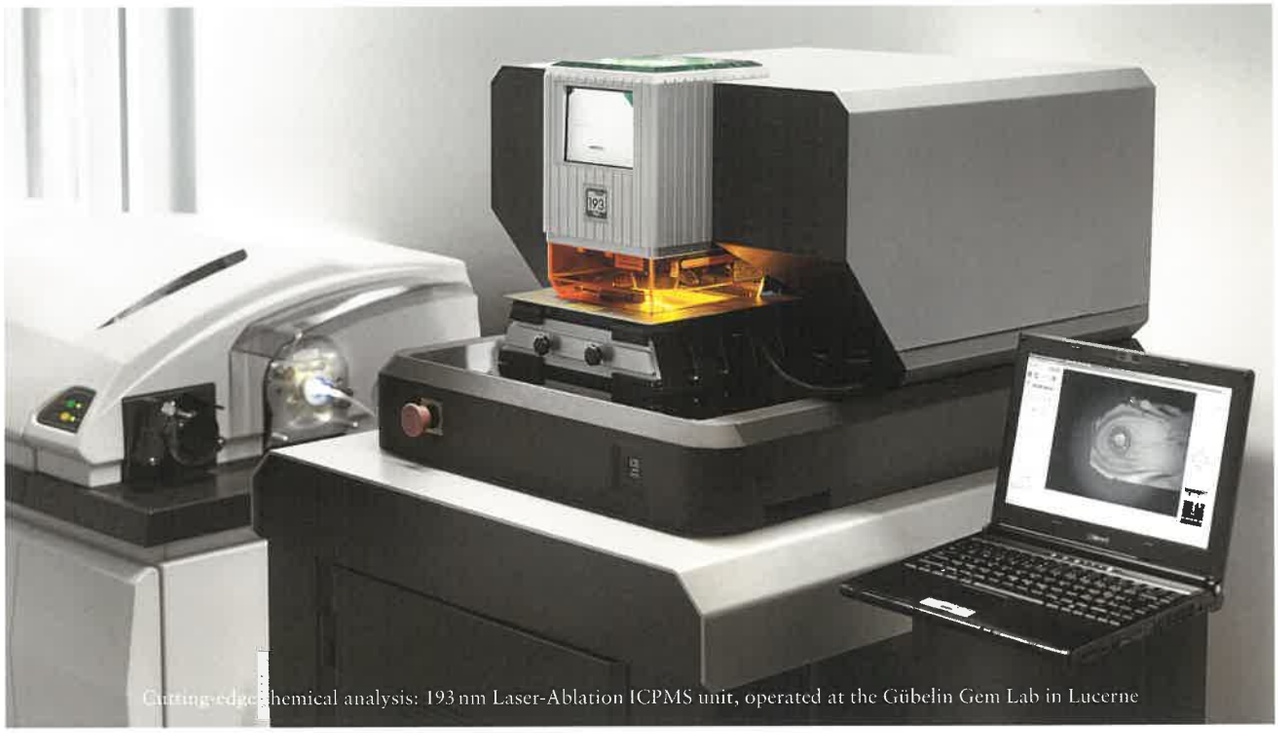
This chemical fingerprint is individual and unique for this 37.34 ct Paraíba tourmaline, exactly like the genetic DNA is individual and unique for a specific creature.

3 For more information about the applied analytical methods visit www.gubelingemlab.com

4 The Gübelin World Paraíba tourmaline Reference is an empirical trace elemental composition of an assumed Paraíba tourmaline with the averaged and weighted concentration of potentially indicative elements, comprising all commercially relevant deposits worldwide.



Trace element pattern for the 37.34 ct Paraíba tourmaline, gathered by energy dispersive X-ray fluorescence (ED-XRF) spectrometry. The box shows the deviations of a selection of trace element concentrations in comparison to the normalised Gübelin World Paraíba Reference



Cutting-edge chemical analysis: 193 nm Laser-Ablation ICPMS unit, operated at the Gübelin Gem Lab in Lucerne

Spectroscopic features

Different methods of spectrometry are applied to help determining possible treatments and the origin of a gemstone. These analytical techniques apply electromagnetic radiation that interacts with the gemstone, providing information about its chemical and structural constituents (i.e. elements, molecules, crystallographic properties) through the characteristic absorbance of visible, infrared and/or ultraviolet light.

Spectroscopy applying ultraviolet to visible light can provide clues on potential heat treatment of Paraíba tourmaline as well as indication of whether or not a tourmaline is copper-bearing.

The present 37.34 ct gemstone shows spectroscopic features typical for tourmaline containing copper.

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GEMMOLOGICAL REPORT

Report Number
24122004

Date
4 December 2024

Item
One faceted gemstone

Weight
37.34 ct

Shape
cushion-shape

Cut
modified brilliant cut

Measurements
19.88 x 18.31 x 13.70 mm

Transparency
transparent

Colour
blue

Species
Natural tourmaline

Variety
Paraíba

Origin
Brazil

Condition
No indications of heating.

Comments
See Appendix.
See Information Sheet(s).

Important notes and limitations on the reverse.

Wendi Mayerson

Wendi Mayerson

Annette Widemann-Wong

GÜBELIN

INFORMATION SHEET

to Report No. 24122004

Paraíba tourmaline

The so-called 'Paraíba tourmalines' entered the international gem market towards the end of the 1980s. They immediately became prized and coveted for their vivid coloration which ranges from violetish-blue to greenish-blue to green (including blue-green, turquoise-blue, and emerald-green) with medium-light to high saturation and tone. The colours of these tourmalines (sometimes also referred to as 'electric blue' or 'neon green' in the trade) are caused by varying amounts of the elements copper and manganese. The bright vivid blue and green 'Paraíba colours' have not been seen in any other gemstone variety.

The first 'Paraíba tourmalines' originated from a deposit near the village of São José de Batalha in the north of Paraíba state, Brazil.

Later, by the mid-nineties, other occurrences were discovered in the northernmost part of Paraíba state and in the adjacent, southernmost corner of Rio Grande do Norte state, near the town of Parelhas. In 2000, another source of this colour variety of tourmalines was discovered in Nigeria. More recently, the Alto Ligonha region in Mozambique joined the small and exclusive group of mining areas where 'Paraíba tourmalines' are found.

In all these areas, particular geochemical surroundings cause the formation of exceptional tourmalines in pegmatite host rocks. These surroundings are also responsible for the unique colours of the 'Paraíba tourmaline'.

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APPENDIX

to Report No. 24122004

The so-called 'Paraíba tourmalines' entered the international gem market towards the end of the eighties. They immediately became prized and coveted for their vivid coloration which ranges from rare purple to violetish-blue, from blue to green and yellowish-green (including blue-green, turquoise-blue, and emerald-green). The colours of these tourmalines (sometimes also referred to as 'electric blue' or 'neon green' in the trade) are caused by varying amounts of the elements copper and manganese. The bright vivid blue and green 'Paraíba colours' have not been seen in any other gemstone variety. In the trade, there seems to be a preference for bright, saturated blue as well as turquoise- and violetish-blues rather than 'pure' green colours.

The first 'Paraíba tourmalines' originated from a deposit near the village of São José de Batalha in the north of Paraíba state, Brazil. Later, by the mid-nineties, other occurrences were discovered in the northernmost part of Paraíba state and in the adjacent, southernmost corner of Rio Grande do Norte state, near the town of Parelhas. In these areas, particular geochemical surroundings cause the formation of exceptional tourmalines in pegmatite host rocks. The special genetic environment is not only responsible for the unique colours of the 'Paraíba tourmalines', but also for the relatively small size of the crystals in comparison to other colour varieties of tourmaline found elsewhere in the world. Faceted gem-quality tourmalines from the Paraíba / Rio Grande do Norte mining areas rarely surpass 10 carats.

The 37.34 ct tourmaline from Paraíba described in the above mentioned Gübelin Gem Lab Report is one of these exceptional rarities. Besides its large size, this extraordinary gemstone possesses a saturated and homogeneous pure blue colour, combined with a very high degree of transparency. A pleasant shape and finely proportioned cut provide numerous vivid reflections of a vibrant blue colour, and the high purity of the gemstone makes it virtually eye-clean.

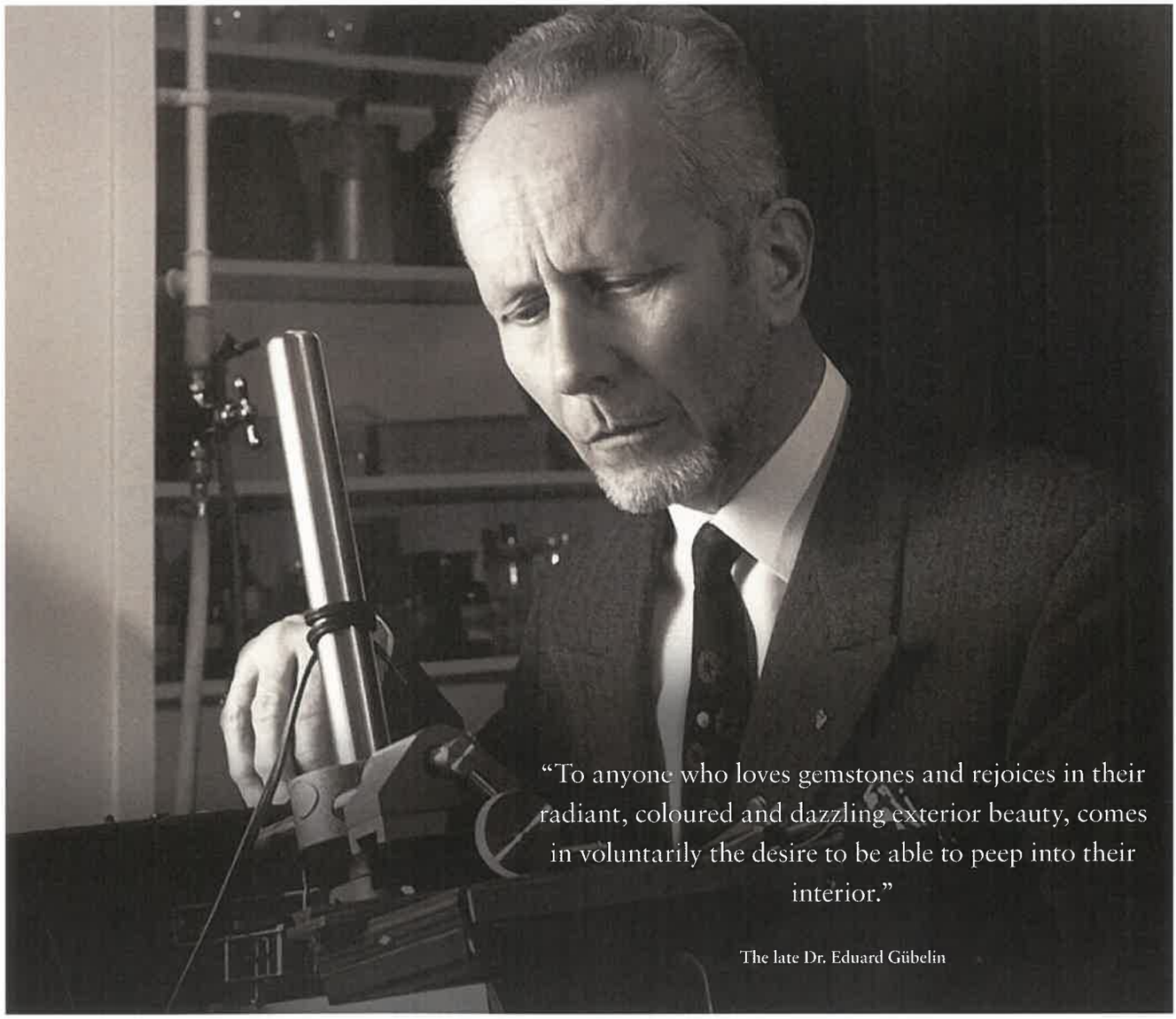
Gübelin Gem Lab, 4 December 2024

Wendi Mayerson

Annette Widemann-Wong

ABOUT GÜBELIN GEM LAB

The roots of the Gübelin Gem Lab go back to the 1920s. The laboratory's standard of excellence and tireless devotion to the science of gemmology, pioneered by the late Dr. Eduard Gübelin, soon came to be rewarded with international esteem and recognition. Today, the team of the Gübelin Gem Lab is composed of highly trained and experienced professionals who share a passion for the treasures released by the earth and entrusted to our hands by our clients. We combine state-of-the-art analytical techniques, expertise and extensive practical skills when it comes to interpreting gemmological and geological data and rendering a professional opinion on diamonds, coloured stones and pearls. We are committed to maintain the integrity and reliable service that our clients have come to expect from the Gübelin Gem Lab.



ADDENDUM

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Gübelin Academy

Gübelin Academy was established in 2013 to offer unique, fast-track training into the wonderful world of coloured gems. Designed for professionals as well as enthusiasts and connoisseurs, courses cover the basics as well as the advanced history, gemmology and psychology behind the most precious and colourful commodities in the world.

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