



AMREC-PARC ASM SENSITIZATION AGJEC AND AGJEC EXPANSION WORKSHOP

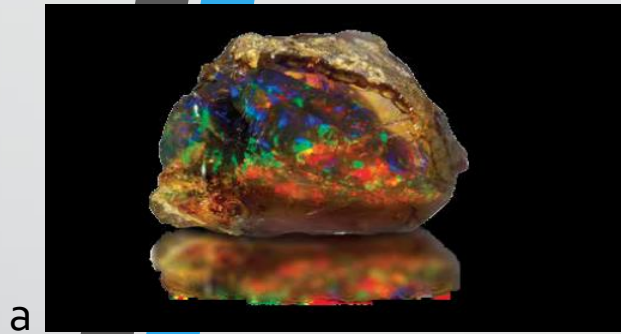
AGJEC-LAGOS

Tersoo Aga, PhD

Associate Professor, University of Jos, Nigeria

ORDER OF PRESENTATION

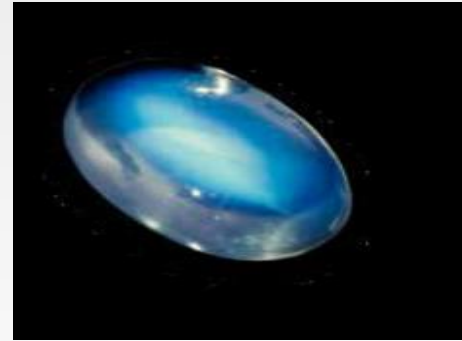
- Introduction
- Components of AGJEC Lagos
- Mentoring Programs
- Public Private Partnership
- Conclusion



a



b



c



d



e



f



g



h



i



j

- a. Rough Opal
- b. Faceted Amethyst (Emerald cut)
- c. Faceted Moonstone (Cabochon)
- d. Faceted Diamond
- e. Rough Tourmalines various
- f. Faceted Sapphire
- g. Faceted Fancy Sapphire
- h. Faceted Ruby
- i. Rough Sapphire
- j. Watermelon Tourmaline

INTRODUCTION

➤ The AGJEC Lagos is a five (5) day event.

➤ The first two (2) days are dedicated to Master Classes.

The remaining three (3) days are for opening ceremony, oral presentations, panel discussions and closing.

➤ The modules are structured to align with the nine (9) pillars of the Africa Mining Vision

THE NINE (9) PILLARS

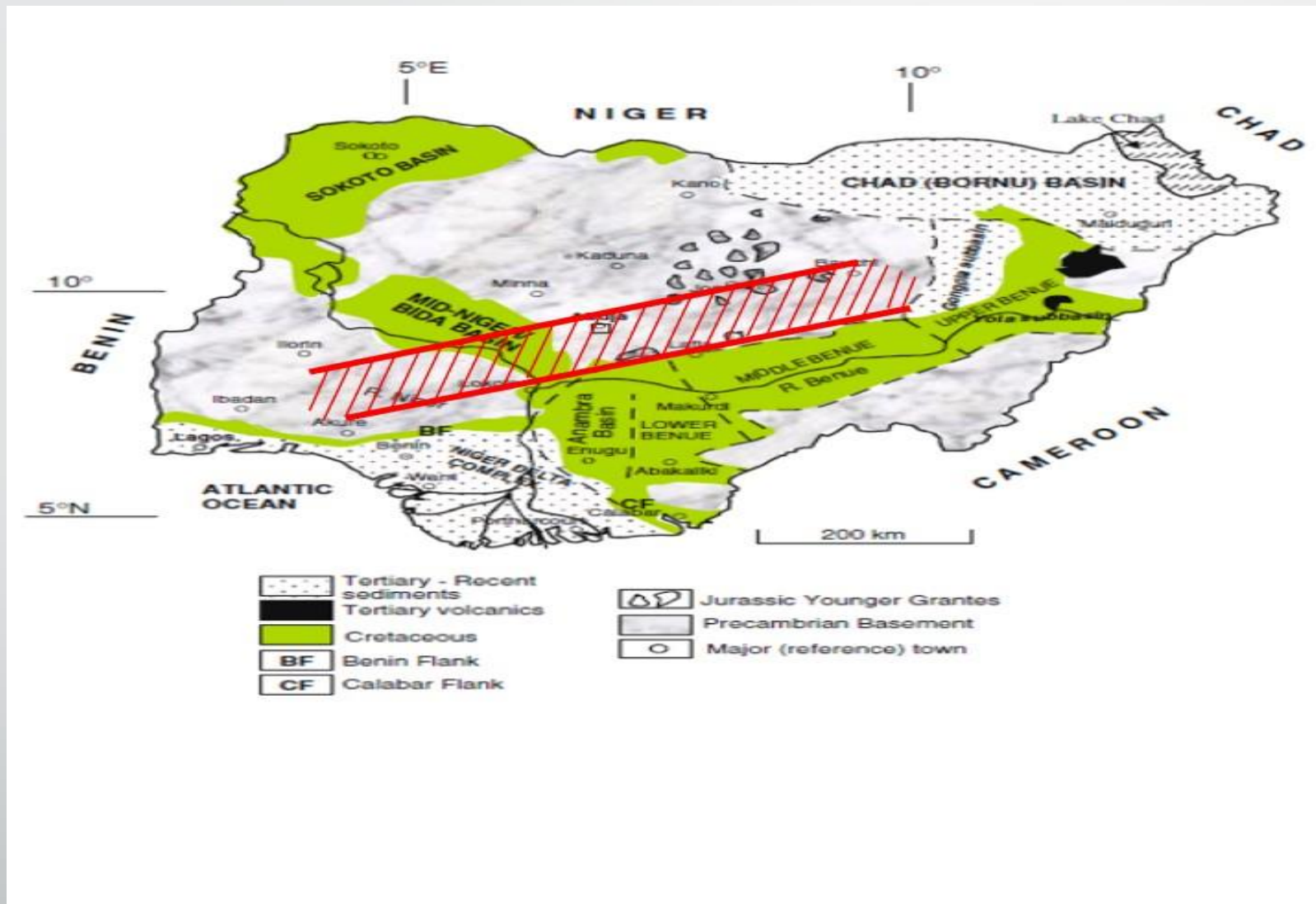
- ✓ Geological and Mineral Information Systems.
- ✓ Transparent, Equitable and Optimal Exploitation of Mineral Resources.
- ✓ Private Sector-led Development.
- ✓ Environmental and Social Sustainability.
- ✓ Value Addition and Beneficiation.
- ✓ Infrastructure Development.
- ✓ Human and Institutional Capacity Building.
- ✓ Research, Innovation and Development.
- ✓ Regional and Continental Integration.

GEM OCCURRENCE

- ✓ Generally, gems can form in different geologic environments in the earth thus giving rise to various types including hydrothermal, pegmatitic, magmatic, metamorphic and alluvial gems
- ✓ In Nigeria, these various geologic environments exist within the four distinct units viz Basement, Younger Granite Complexes, Sedimentary Basins and Recent lavas and volcanic pipes

MINERALS MAP OF NIGERIA





Pegmatite Belt of Nigeria (Modified After Obaje, 2009)

GEM OCCURRENCE

- ✓ Gemstones occur in all the federating states of Nigeria including the FCT
- ✓ They are concentrated within the 400km long and 150km wide NE-SW trending pegmatite belt of Nigeria
- ✓ Okunola (2017) identified and documented 100 sites
- ✓ Aga et al (2022) updated the list to 119. E.g. Bwina sapphire

Mine Sites

Notable mine sites along this belt include:

- ✓ Okeho, Shaki, Ijero, Ife
- ✓ Lokoja, Kabba, Oke
- ✓ Nassarawa Eggon, Gwantu
- ✓ Barkin Ayeni, Udegi, Doka, Keffi, Akwanga, Wamba, Bwina, Jema'a
- ✓ Jos, Zangun, Gurum, Pankshin, Riyom, Barkin Ladi
- ✓ Magaman Gumau, Tafawa Balewa, Dass

Hubs and Markets

- ✓ The known gemstones hub in Nigeria include Jos, Akwanga, Keffi, Abuja Leather works and Ojoo in Ibadan.
- ✓ These stones are exported to Germany, India, US (84th Street, NY), Bangkok, etc.
- ✓ 90% of the gems are sold in rough form and exported illegally
- ✓ The opportunities for employment is found when value is added to the rough gems in our Lapidaries

Gem Brokers

- ✓ Individuals who are heavily involved in the negotiations of buying and selling of gemstones are referred to as **gem brokers**.
- ✓ No one can engage in buying and or selling a product one does not know.
- ✓ Identification of natural gemstones require an understanding of their properties which include: Hardness, specific gravity, cleavage, fracture, twinning, tenacity, etc. These properties can be determined by gemological equipment.
- ✓ On a small scale, geoscientists desirous of becoming gem brokers can begin with just basic instruments including the loupe, Chelsea filter, dichroscope, refractometer, UV lamps, spectroscope and polariscope.

Parcel of Amethyst



Gem Brokers



2



Sorters

- ✓ Nigerian rough gemstones extracted from the mines where necessary and concentrated by various combinations of hand picking, washing and screening.
- ✓ Most times, picking is repeated as many times as possible and this process is referred to as sorting which is dependent upon the percentage of flaws such as inclusions in a gemstone.
- ✓ Individuals who are trained and proficient in the skill of sorting rough gems into various grades are called Sorters.
- ✓ Based on this, Nigerian gems are grouped into grades A, B, C and D in a decreasing order of purity. The term `shango` is used to describe grade D.

Sorters

- ✓ Apart from the classification based on clarity, Nigerian Sorters grade gems based on size from “yaska” to “super jumbo” (German selection)
- ✓ If properly organized, Sorters have roles that are significant in the gemstone value chain.
- ✓ The percentage of stone within a given parcel that should be faceted, carved or cabochon lies within the discretionary abilities of the Sorter.
- ✓ Lapidaries in Nigeria should upgrade the skill of their Sorters in such a way that they can comfortably use the loupe of 10X magnification.
- ✓ Functional clarity where gems are graded as “loupe clean”, “eye clean”, “almost loupe clean”, “very slightly included” and “eye clean” can be applied to grades A and B gemstones.



PRACTICUM

GEM IDENTIFICATION

(+Sorting, negotiation skills, etc)

GEMOLOGICAL EQUIPMENT

(Demonstration)

Sorting Machine



Sawers

- ✓ Certain techniques are used to remove identified stains or flaws to enhance the aesthetic values of the gemstone.
- ✓ For instance, sawing is carried out on gems to remove flaws identified during sorting.
- ✓ Such flaws may be noticed in the middle of the crystal, as observed in most Nigerian aquamarines. In such a case, the crystal is cut into two pieces along the crack line.
- ✓ A liquid such as oil or water is used to wash away debris and keep the stone and the saw blade from overheating, which could cause damage to both.
- ✓ The value of sawn gemstones increase by 10% with lapidaries rushing to buy.

Sawing Machine



Preformers

✓ Preforming, otherwise known as grinding, usually done with silicon carbide wheels or diamond-impregnated wheels, is used to shape gemstones to a desired rough form, called **perform**

✓ Preforming is similar to grinding but uses finer abrasives

✓ Its purpose is to remove deep scratches left by coarser abrasives during grinding

Preforming Machine



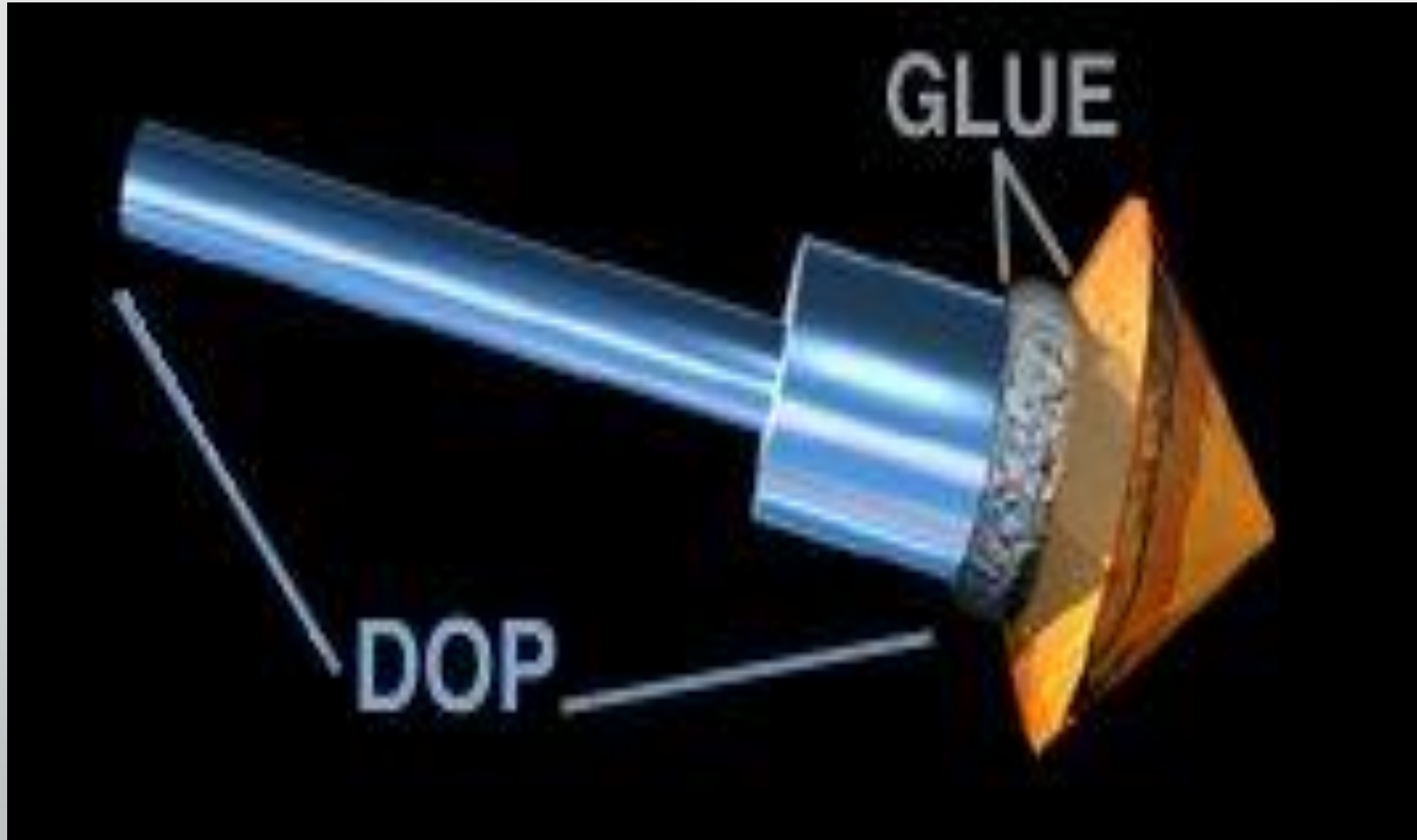
Preformed Ametrine



Dopers

- ✓ Doping is the process where a preformed stone is attached to the flat end of a dop stick with wax as a cement over source of heat
- ✓ Dop wax consists basically of a mixture of shellac and sealing wax, although quite often other ingredients such as beeswax and clay are added.
- ✓ Certain stones are susceptible to damage by heating and for these a lower temperature dop wax should be used

Doping



Calibrators

- ✓ A calibrate stone is a gemstone that has been cut to predetermined size, prior to faceting and polishing
- ✓ Care must be taken at this stage and it requires serious concentration
- ✓ Allowance of +0.2mm should be left in the sizes of the various shapes calibrated
- ✓ This is achieved through the use of Vernier calipers, etc.
- ✓ The girdle is around three percent for all the stones
- ✓ The pre-forming machine can be used for calibrating

Calibrated Sapphire



Faceters

- ✓ Faceting is the art of taking a gemstone and making flat faces (facets) on it to make the light refract and reflect from the stone better
- ✓ Individuals trained in the cutting and polishing of gemstones are called Faceters
- ✓ Their skill increases the value of a rough stone from five (5) to twenty (20) times depending on the type of cut
- ✓ Faceting could be done on large scale where for commercial cuts or can be customized and very expensive.
- ✓ In Nigeria, both the NRS facetron and Ultratec are used in faceting gems into eight common shapes in the country viz pear, round, octagon, square, oval, marquise, triangle and heart.

Faceting Machine



Faceted Gemstones



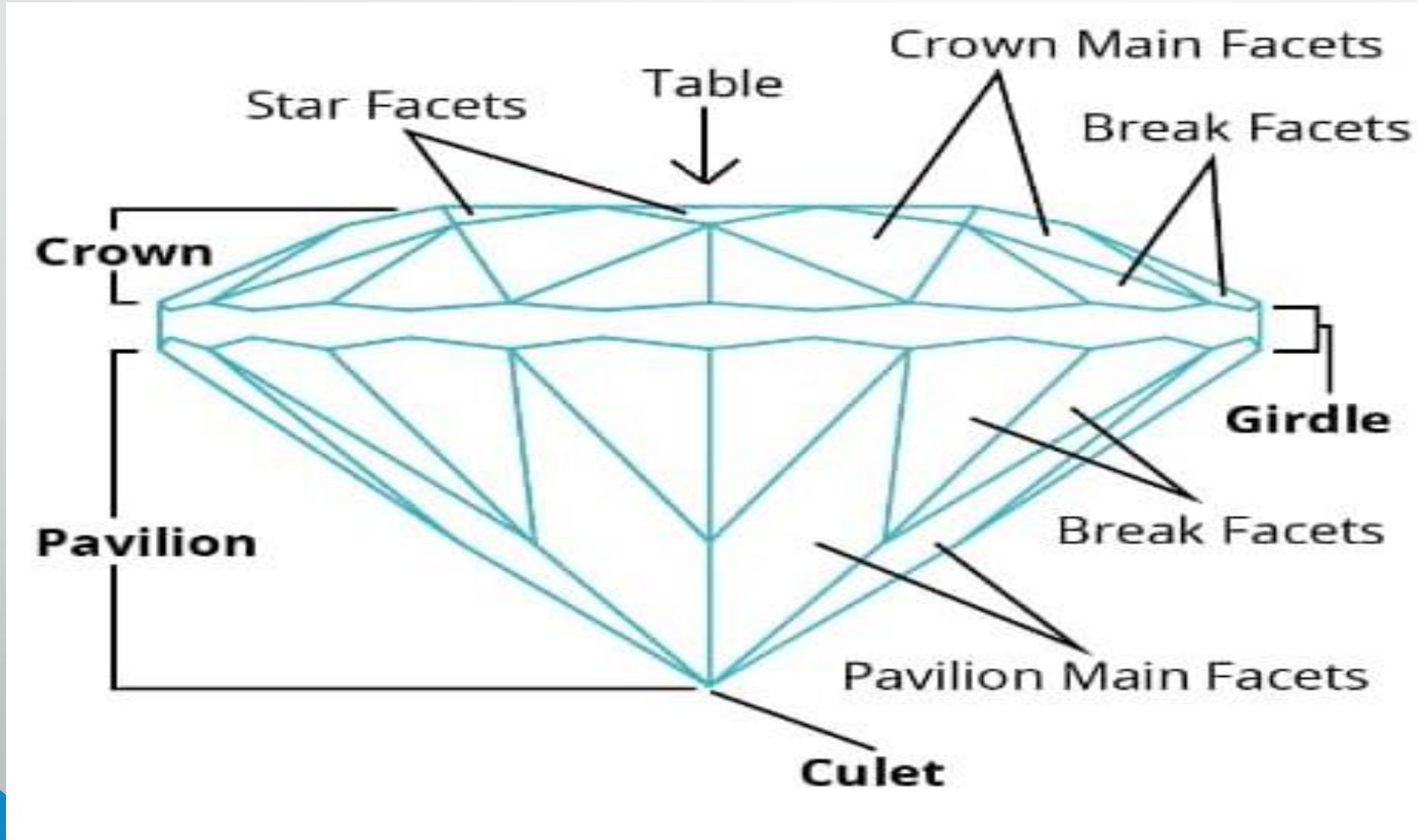
Quality Control Managers

- ✓ They ensure the overall quality of the finished stone for international market
- ✓ Cutting and polishing of the table which must be fifty percent is achieved with the use of a table polisher
- ✓ Polishing is meant to remove all small quantities of stone and can be used, especially when faceting small stones, to do ultrafine shaping of the stone
- ✓ Sometimes this is not achieved due to some errors like: less-meet, over-meet, unbalanced girdle, small table, large table, double facet, lap mark, quilet and girdle chips.
- ✓ The role of the Quality Control Managers in a Lapidary is to ensure that These errors are corrected by re-faceting, careful sanding, re-lapping and/or repolishing

Quality Control Managers

- ✓ They also ensure final clarity checks to meet international market specifications.
- ✓ The faceted stones are then categorized into internally flawless (IF), very very slightly included (VVS1/VVS2) and very slightly included (VS1/VS2).
- ✓ For colored stones, some inclusions are tolerated if they do not detract the beauty of the stone.
- ✓ However, the hue, saturation and distribution should be part of the job description of the Quality Control Managers.

Parts of Faceted Stones



CURATOR OF GEM

- ✓ A curator of gemstone exhibits in Museums
- ✓ Nigeria does not have one single gem museum where our tourist can visit
- ✓ There is a huge opportunity for geoscientist to become gem tour guides if established
- ✓ Such museums will set a very good tone for Nigeria to become center for gem shows in no distant future

GEM MUSEUM



GEM EDUCATORS

- ✓ Gem educators help determine the accurate value of gems, history and significance
- ✓ They can find placements in the Nigerian Customs Service (NCS), Nigerian Immigration Service (NIS), Nigerian Ports Authority (NPA) and the Federal Airport Authority (FAAN) to increase gem surveillance and mitigate gem smuggling
- ✓ They could also be employed by the Nigerian Correctional Services (NCS) to train inmates on gem identification and faceting.
- ✓ This will make such inmates easily integrate into the society without hitch after serving their jail terms

MENTORING

- ✓ Girls are selected from High Schools to participate at AGJEC. (**Girls 4 Mining**)
- ✓ Intentional mentoring programs are developed at WIM State levels.
- ✓ There is an increase in the enrolment of girls and women in STEM.

Role of Geoscientists

- ✓ Geoscientists in the Academia has a responsibility of updating curriculum in line with minimum academic standards set by NUC and COMEG.
- ✓ Economic Geology courses at the undergraduate senior level should be expanded to include gem identification and faceting.
- ✓ At the Post Graduate level, gemology and Lapidary studies can be developed into full content courses at the PGD, MSc and PhD levels.
- ✓ The Nigerian Society of Economic Geologists (NSEG) now has the opportunity to lead campaign efforts towards the establishment of a National Lapidary and Gem Certification Centre (NLGCC).
- ✓ The society has enough intellectuals that will serve as a think tank for the ideation, conceptualization and actualization of NLGCC project.

Role of Geoscientists

- ✓ I will like to strongly recommend geoscientists and mining engineers that actively teaching and/or involved in the gemstone sector must as a matter of urgency establish the Gemological Society of Nigeria (GSN) or Gemological Association of Nigeria (GAN).
- ✓ The proposed GSN or GAN should thereafter seek affiliation with the Nigerian Mining and Geosciences Society (NMGS).
- ✓ This will further strengthen NMGS as an umbrella body and COMEG as a regulatory agency to motivate practitioners in the extractive industry towards policy formation

Role of Government


- ✓ The Government of Nigeria through the Ministry of Mines and Steel Development (MMSD) must be commended for its recent training of forty (40) Nigerians in the art of jewelry design
- ✓ This efforts should be followed with the establishment of NLGCC in the short term and expansion of it variant in the six (6) geopolitical zones of the country
- ✓ The State Governments in the long term will extend it to the thirty six (36) states of the federation
- ✓ Apart from reducing the high levels of employment, Nigeria will become the gem hub of West Africa and eventually that of the African continent

Role of Private Sector

- ✓ The Private Sector should take advantage of ease created through the Mining Cadastral Office (MCO) to establish gem buying centers and set up standard lapidaries
- ✓ Such lapidaries can create huge opportunities to absorb entrepreneurs with the ten (10) skills highlighted earlier to add value to Nigerian gemstones
- ✓ With proper regulations in place, three (3) months certification programs could be approved at designated Lapidaries for Nigerians desirous of acquiring identification, prefaceting and faceting skills

CONCLUSION

- ✓ Some of the insights gained from this workshop will help us improve in the next edition of AGJEC.
- ✓ Example: Deepen our conversation on traceability to include certificate of origin and nanotagging.
- ✓ Nigeria is inspired to give our contribution in the development Africa Gemstone and Jewellery Curriculum (AGJC)



**THANK YOU FOR
LISTENING**