



# MINISTRY OF NATURAL RESOURCES AND ENVIRONMENTAL CONSERVATION

## DEPARTMENT OF GEOLOGICAL SURVEY AND MINERAL EXPLORATION

### Presentation For Gem Exploration Of Yatkanzin Taung Area Singu /

### Madaya Township, Mandalay Region

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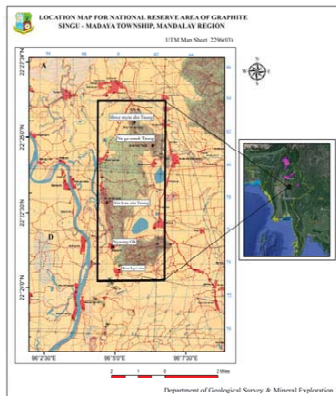


#### Introduction

- The project area of Yatkanzin Taung gem exploration is situated about 37 mile far from North of Mandalay, on the North - Western part of Sagyin Taung in Singu/Madaya Township, Mandalay Region.

-Yakansin Taung area is bounded by the Latitude 22° 21' 50" to 22° 26' 20" and Longitude 96° 04' to 96° 07' covering approximately 9 square kilometer.

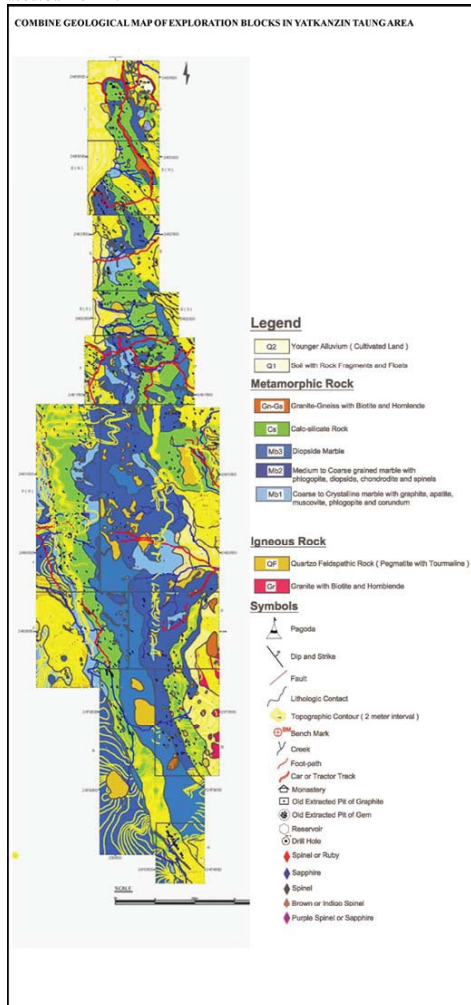
- For a period of over two-year field work was carried out from 4.6.2013 to 31.3.2014, 8.5.2014 to 31.3.2015 and 6.5.2015 to 31.3.2016.



Panoramic view of Shwe Myin Din Taung and Nagamauk Taung

#### Geology

- The detailed outcrop geological mapping of (1:1000) scale was accomplished about 3.9225 km<sup>2</sup>.



#### Petrography

- The significant rocks are composed of Marble, Calc-silicate and Granite.
- According to the petrology results and associated minerals that contributed some analytical data giving to Pegmatite, Skarn, Graphite marble, Calc-silicate marble, Biotite microgranite, Chondrodite marble, Apatite marble, Corundum bearing marble, Tourmaline bearing quartz, Forsterite - chondrodite-tremolite marble, Phlogopite - chondrodite - spinel marble, Tremolite - phlogopite - chondrodite marble.

#### Types of Gem Deposits

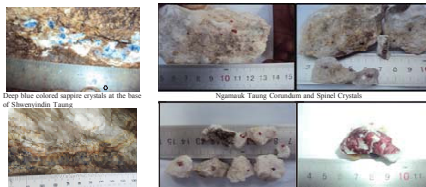
- Ruby and sapphire occur in two ways : (a) As primary minerals formed by metamorphic differentiation of argillaceous limestone, contact metamorphism of limestone and silica under- saturated intrusion such as nepheline syenite in the marbles and partly in the contact zones between marble and syenite. (b) As placers in alluvial and eluvial sediments in Mogok area
- Ruby (mostly spinel) and sapphire occur as primary deposit in white or crystalline marble at Yatkanzin Taung area where situated about 86 miles far from SSW of Mogok.

#### Tectonism and Geology of Myanmar and Mogok Metamorphic Belt

- This area is composed of the Central Myanmar Belt of Cenozoic Basin and situated in one of the segment of MMB.
- It is elongated from Southern part to Western boundry of Shan-plateau, Eastern boundry of Kachin State and trending N-S of totally 1000km length.
- Moreover it is situated continuously with Eastern Himalayan Synthesis and bended into Northern-most part of Myanmar.
- Most of these metamorphic rock units are derived from Ordovician Limestone, Silurian Sedimentary rocks and caused by Regional Metamorphism of High T-P Condition.

#### Corundum of Yetkansintaung Area

- The corundum minerals are found in contact metamorphic rocks, especially in marly metamorphosed to crystalline marble which are rich of magnesium and aluminium.

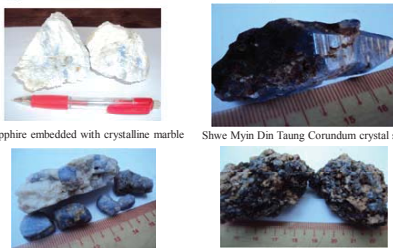


- Chondrodite is an indicator mineral of spinel and find together in this area.

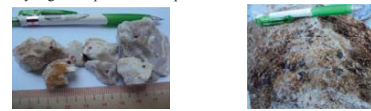


Chondrodite with purple to violet colored Spinel

- Sapphires are found in coarse to crystalline marble and embedded in the dyke in "pockets" as single or multiple module like aggregates. They are fully encased in a rim of weathered white clay - like materials.



- Corundum minerals also occur in skarn rocks or pegmatite and not only may be caused by regional metamorphism but also intrusive body. If the mineralization is associated with marble, it may be skarn type. In these area, host rock of corundum minerals might be marble (carbonate) and caused by high temperature and pressure.



Pink to red colored spinel and ruby bearing crystalline marble

Purple to violet colored spinel

- Ruby and Spinel are found mostly in white marble or crystalline marble in this area, which lies as a contact area of marble and calc-silicate. Both of them are pink to red and purple to plum colored crystals.

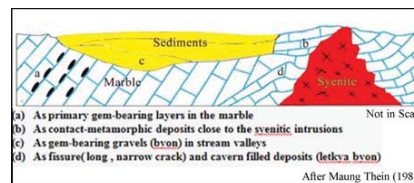


Nagamauk Taung corundum and spinel crystals

- The Yatkanzin Taung area lies a series of continuous and discontinuous of N-S to NE-SW trending ridges and valley from the West to the East.
- Moreover the brecciated marble in surface and some core lost portion of drilling is indicating differential weathering. There the mineralization should be structural controlled in this entire catchment area.

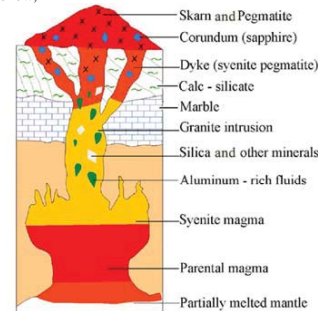
#### Modes of Occurrence of Gemstones

- Consisted dominantly of (i) As primary gem bearing layers in the marble (ii) As fissure (narrow, crack) and cavern filled deposits in this area.



#### Model of Yatkanzin Taung Sapphire

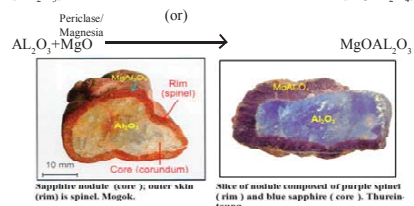
Proposed model of the formation of Yatkanzin Taung Sapphire may be as follow;



Simplified postulated model of the genesis of sapphire from Skarn and pegmatite (After Ted Themelis, 2008)

#### Result

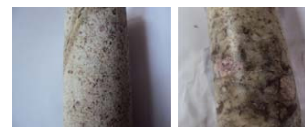
- Corundum and spinel should be considered as like this chemical composition;
- Ruby/Sapphire Chemical Reaction  $a(CaCO_3) + b(CO_2) + c(Spinel) [Al_2O_3] \rightarrow [MgAl_2O_4]$



- Although not yet found or recognized like this crystals, further more researches and field works can be assisted this type of samples to fine out in Yatkanzin Taung area.

#### Conclusion

- During the field survey of drilling works, corundum bearing portions are noted within 1.6 to 6.6 ft and 111.6 to 124 ft of two drill-hole in this area.



Corundum crystals are found in drill core samples

- Although a great deal of zeal and determination that sapphire occurs in marble as a primary deposit, need to identify and still remain under researched of hidden portions. So the exploration and research should be continued in the future as possible as we can do it.

#### References

- Maung Thein, Ph.D, 1980, Lecture note in Geology of Burma.
- Ted Themelis, January 2008, Gems and Mines of Mogok,
- Maung Maung Naing, April 2015 and April 2016, Reports on the exploration of Graphite and Gem minerals around the area of Yatkanzin Taung area (D.G.S.E)
- Ye' Myint Swe, Ph.D, April 2017, Gemstone occurrences and extraction of Mogok area (D.G.S.E)