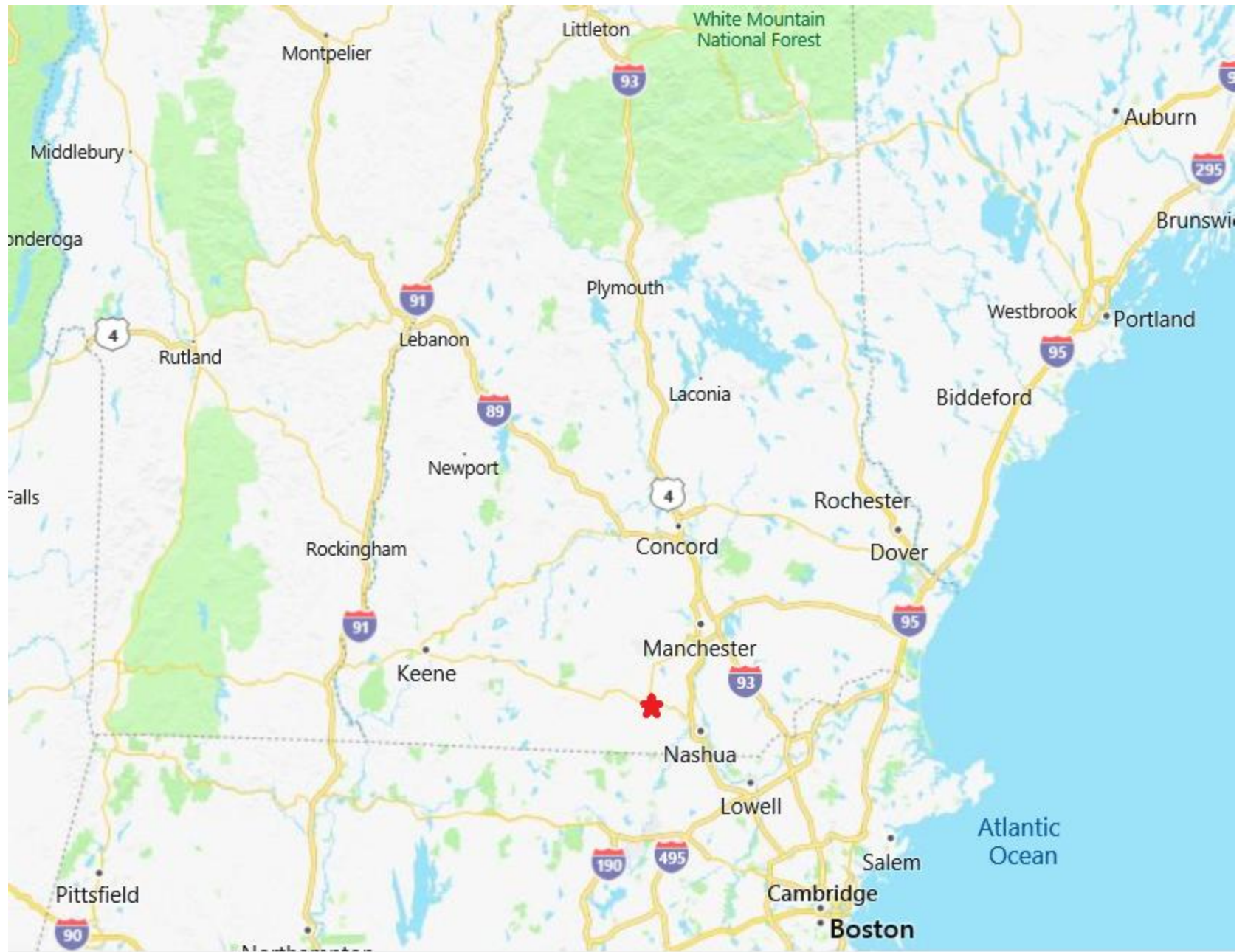
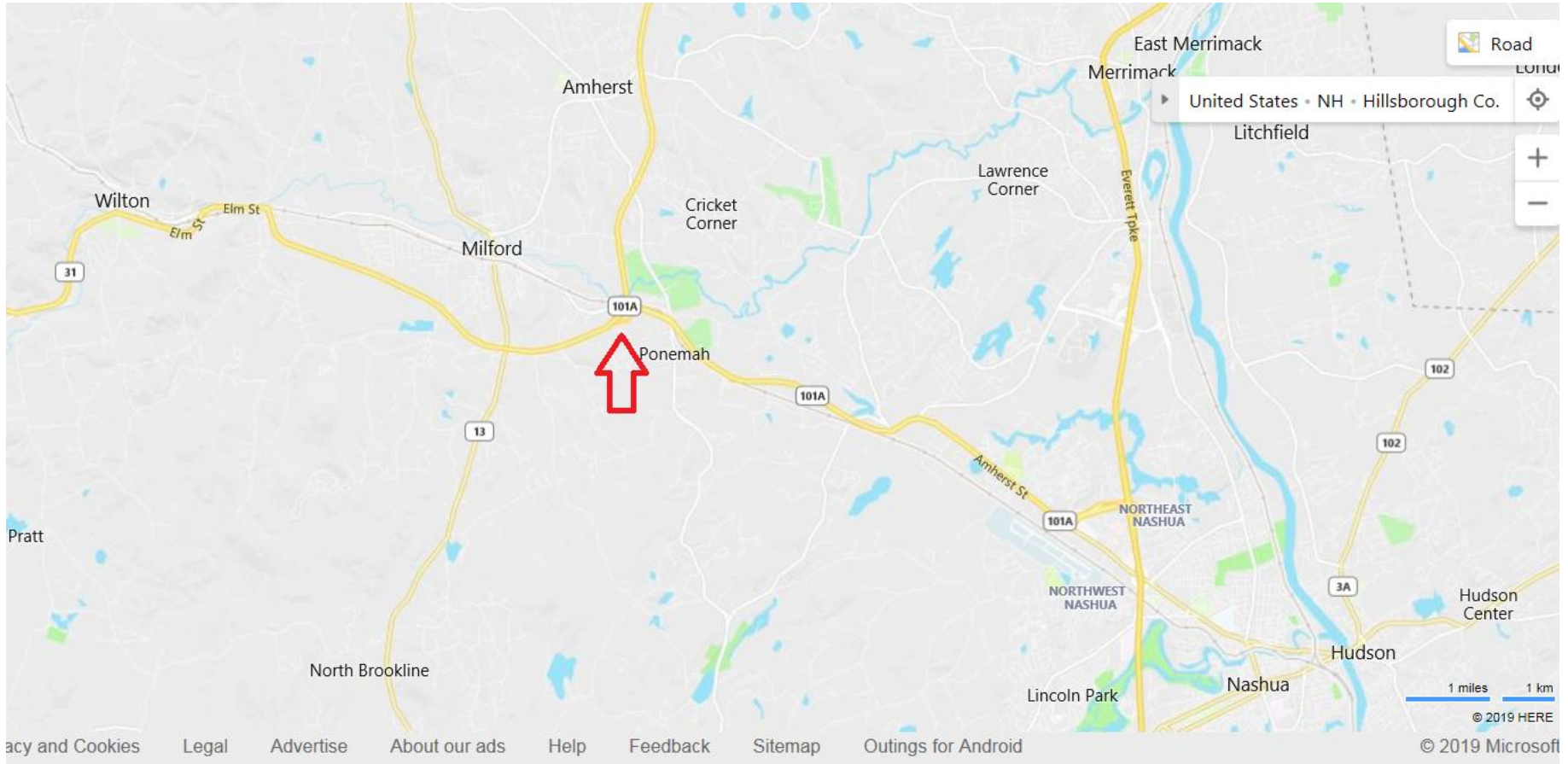


Minerals of the  
Rt. 101 – 101A Road Cut  
Amherst – Milford, NH  
Tom Mortimer







© 2018 Google

Google Earth

## History

During 1969 – 1971, a Rt. 101 bypass was constructed around the town centers of Amherst and Milford, NH

A major intersection with Rt. 101A at the Amherst-Milford boarder required the blasting of much ledge.

Mineral wise, this was a large outcrop of boring biotite gneiss.

I moved to Amherst in 1971, and rekindled my childhood interest in minerals in 1974.

In the summer of 1997, Bob Whitmore showed me a 1 cm stilbite spray from this 101 – 101A road cut.

I found nothing in the road cut ledge, but did find some nice chabazite and hematite in a blasted ledge at the end of an adjacent building parking lot.

I invited Scott Whittemore to this site on a re-visit.

On a later date, Scott did a careful inspection of the road cut ledges. He found many more species.

Subsequent visits by Scott, Bob Janules and myself built a substantial suite of minerals from this locality.



Exit Street View



© 2018 Google  
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Google Earth

Roadside problem

Exit Street View



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[Report a problem](#)



Massabesic Gneiss

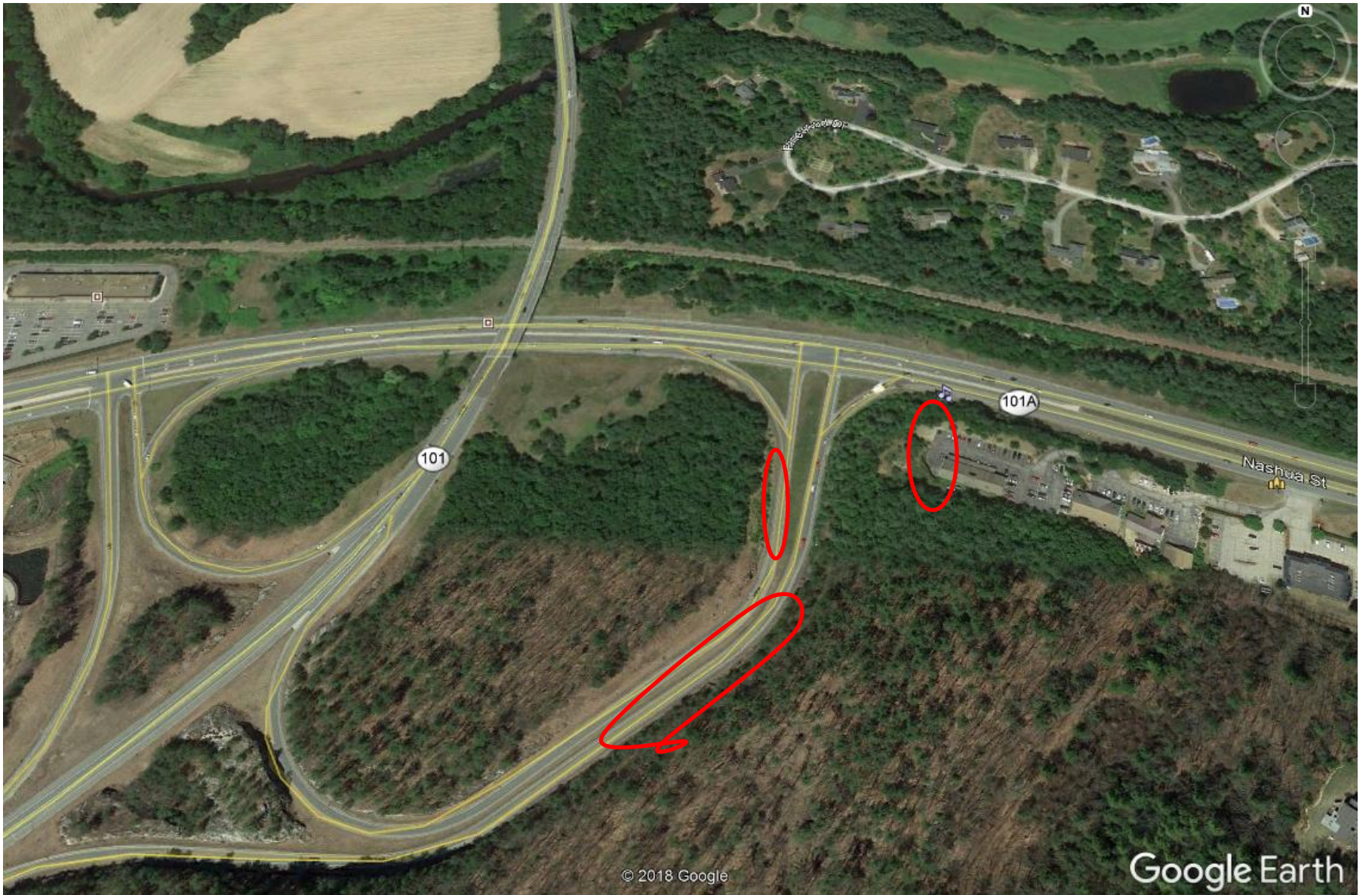




Massabesic Gneiss



Pegmatite intrusion



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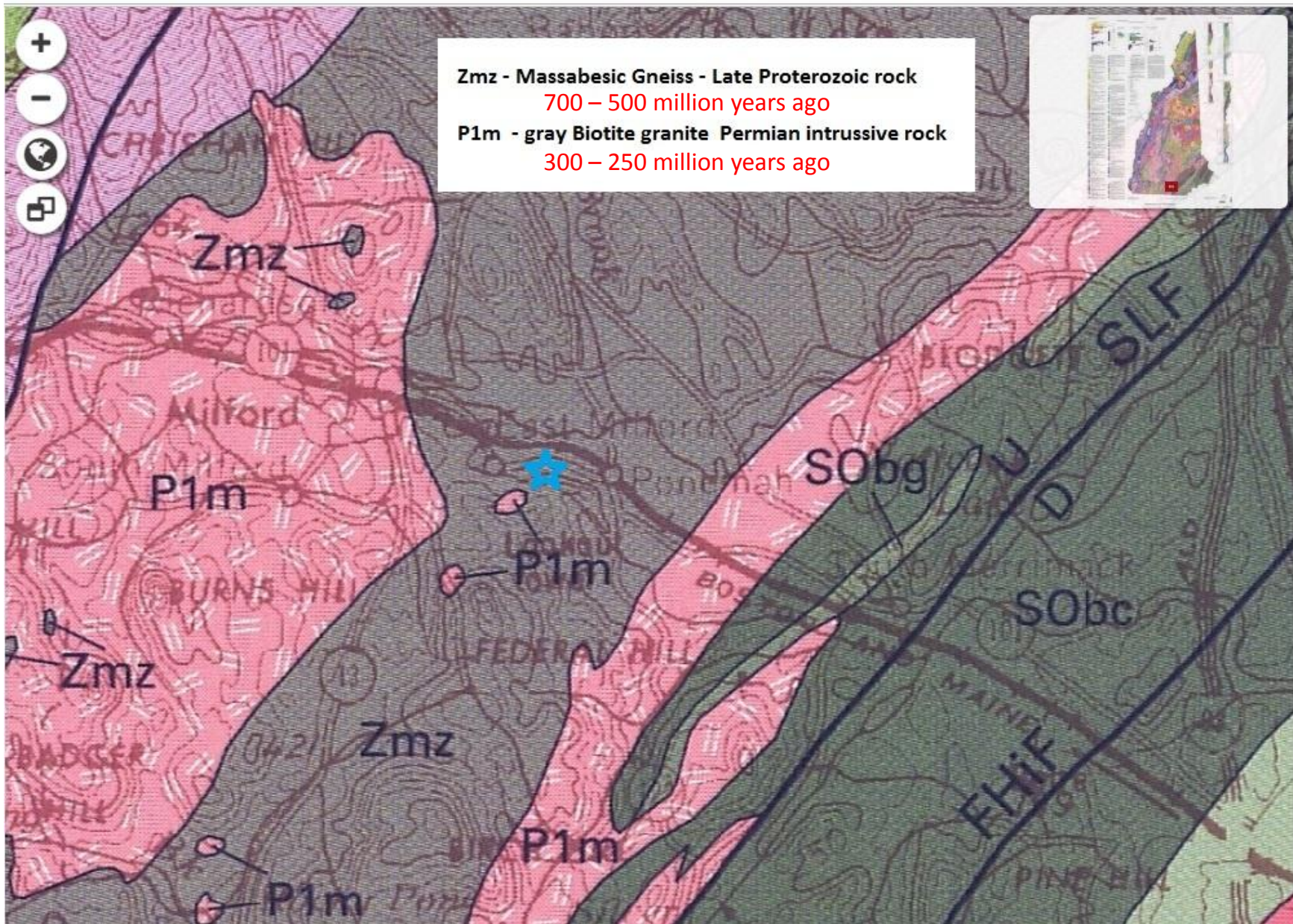
Google Earth



2018 – 2019 Off ramp modification



April 2019 Adjacent commercial building parking lot expansion

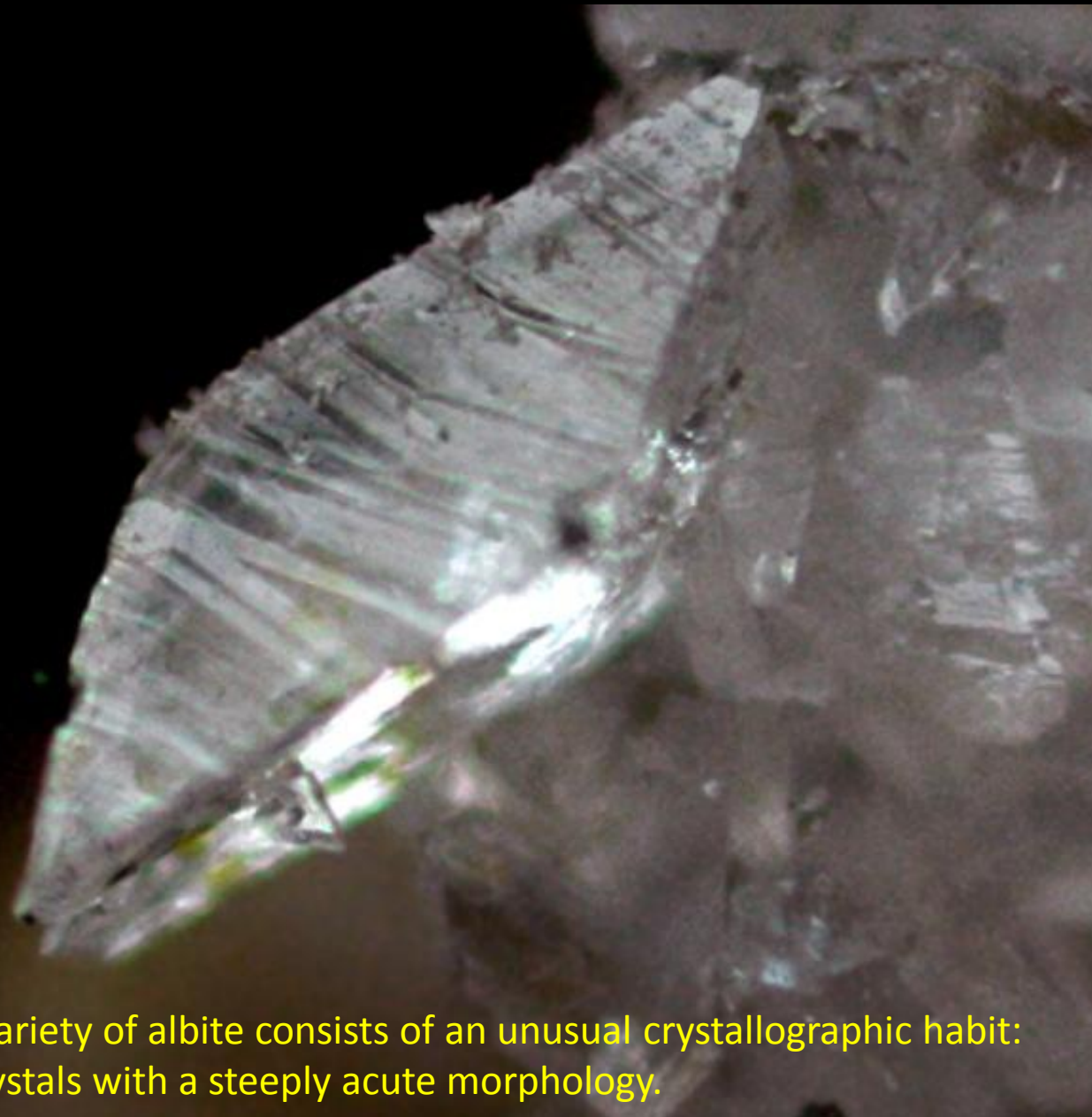


Area geology

## Minerals of the Rt. 101 – 101A road cut Amherst-Milford, NH

Albite		Prehnite
Apatite		Pyrite
Almandine		Rutile
<del>Anatase</del>		Siderite ?
Augite		Sphalerite
Babingtonite **		Stilbite #
Biotite group		Titanite
Calcite		Zircon
Chabazite #		Unknowns (2)
Clinocllore		
Epidote		
Fluorapatite		** => Only known NH locality
Fluorite		* => One of 3 NH localities
Hematite		# => An uncommon NH mineral
Heulandite #		
Laumontite *		
Magnetite		
Microcline var adularia		
Muscovite		





Zygadite variety of albite consists of an unusual crystallographic habit: tabular crystals with a steeply acute morphology.

**ALBITE** var. Zygadite    FOV 1 mm. Collected by Bob Janules. Peter Cristofono specimen & photo



**ALBITE** var. Zygadite 2 mm FOV

Collected by Bob Janules.



**ALBITE** var. Zygadite 2.5 mm FOV



**ALBITE** var. Zygadite 1 mm FOV

Collected by Bob Janules.



**GARNET – Almandine assumed**

**7 cm specimen.**



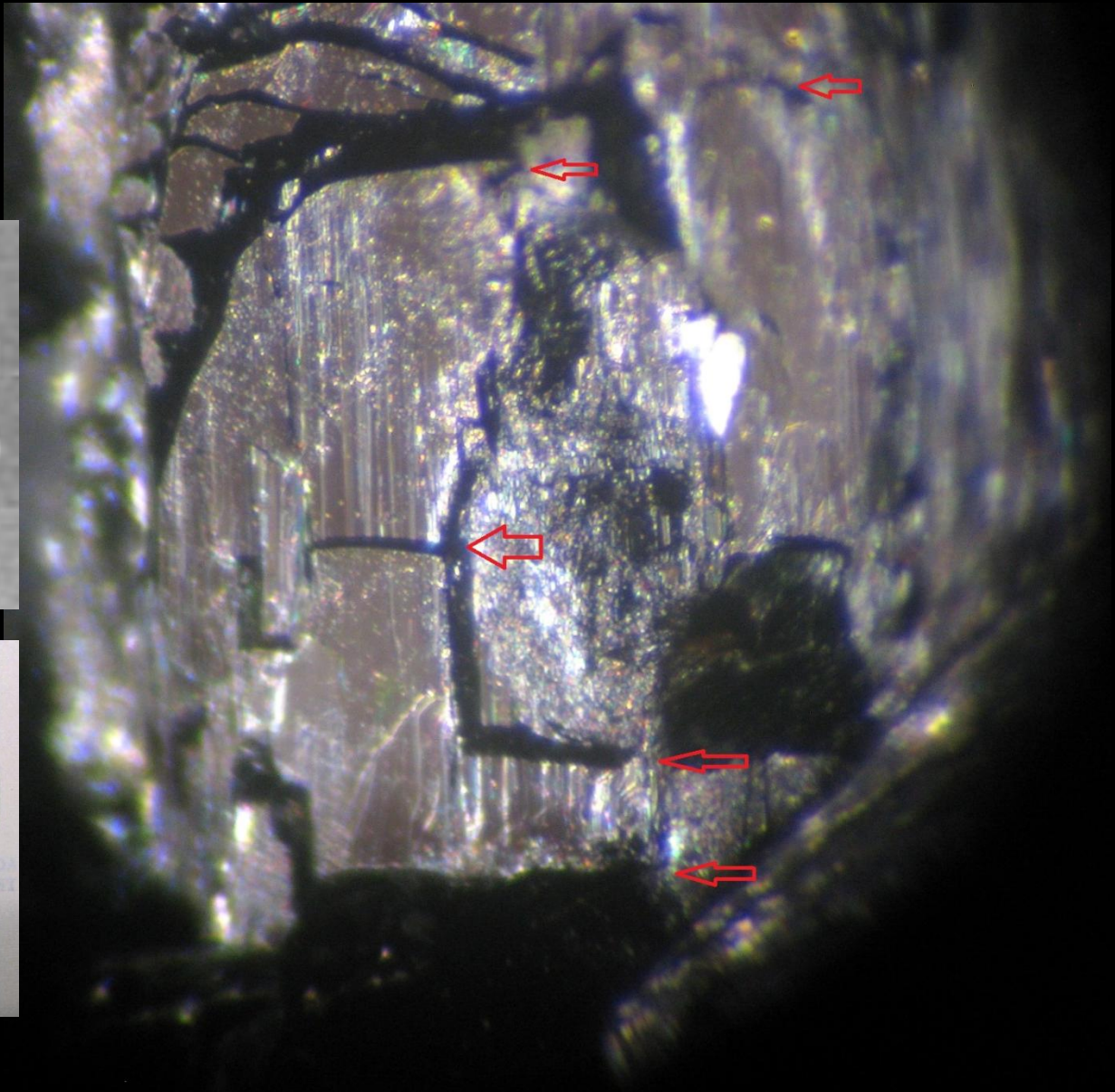
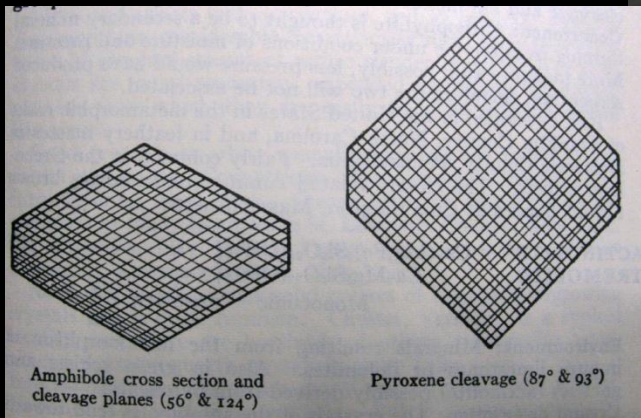
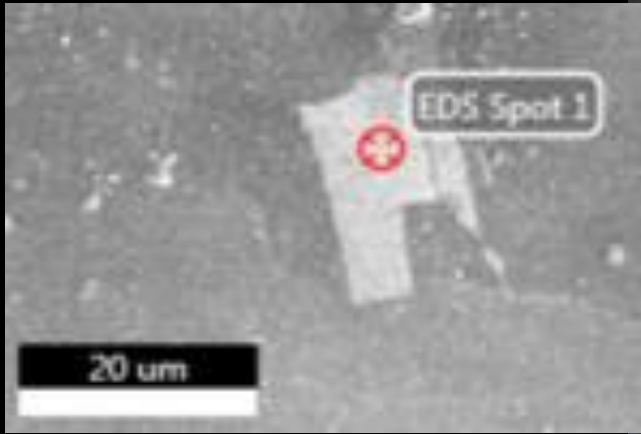
Anatase -> Magnetite

0.5 mm crystal

u317



**AUGITE** 3.5 cm specimen with 8 mm embedded augite (u324)



**AUGITE 1 mm FOV**    **Illustrates pyroxene cleavage**    (u324)



Augite chemistry:  $(\text{Ca},\text{Mg},\text{Fe})_2\text{Si}_2\text{O}_6$

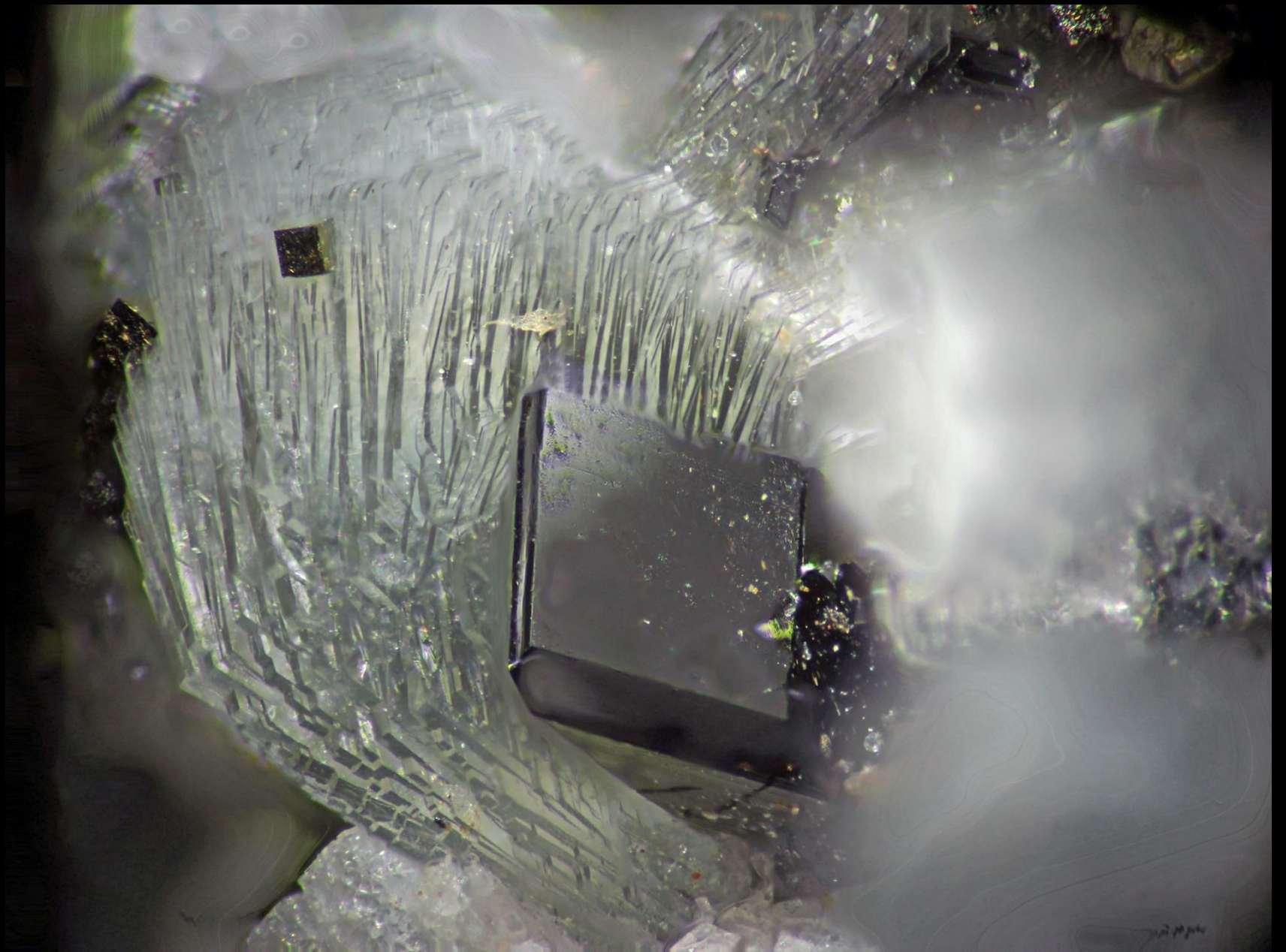
EDS analysis data with APFU normalized for 1 atoms of Ca

Symbol	Normalized APFU
Fe	.91
Ca	1.00
K	.09
Si	3.35
Al	1.14
Mg	.83
O	4.76

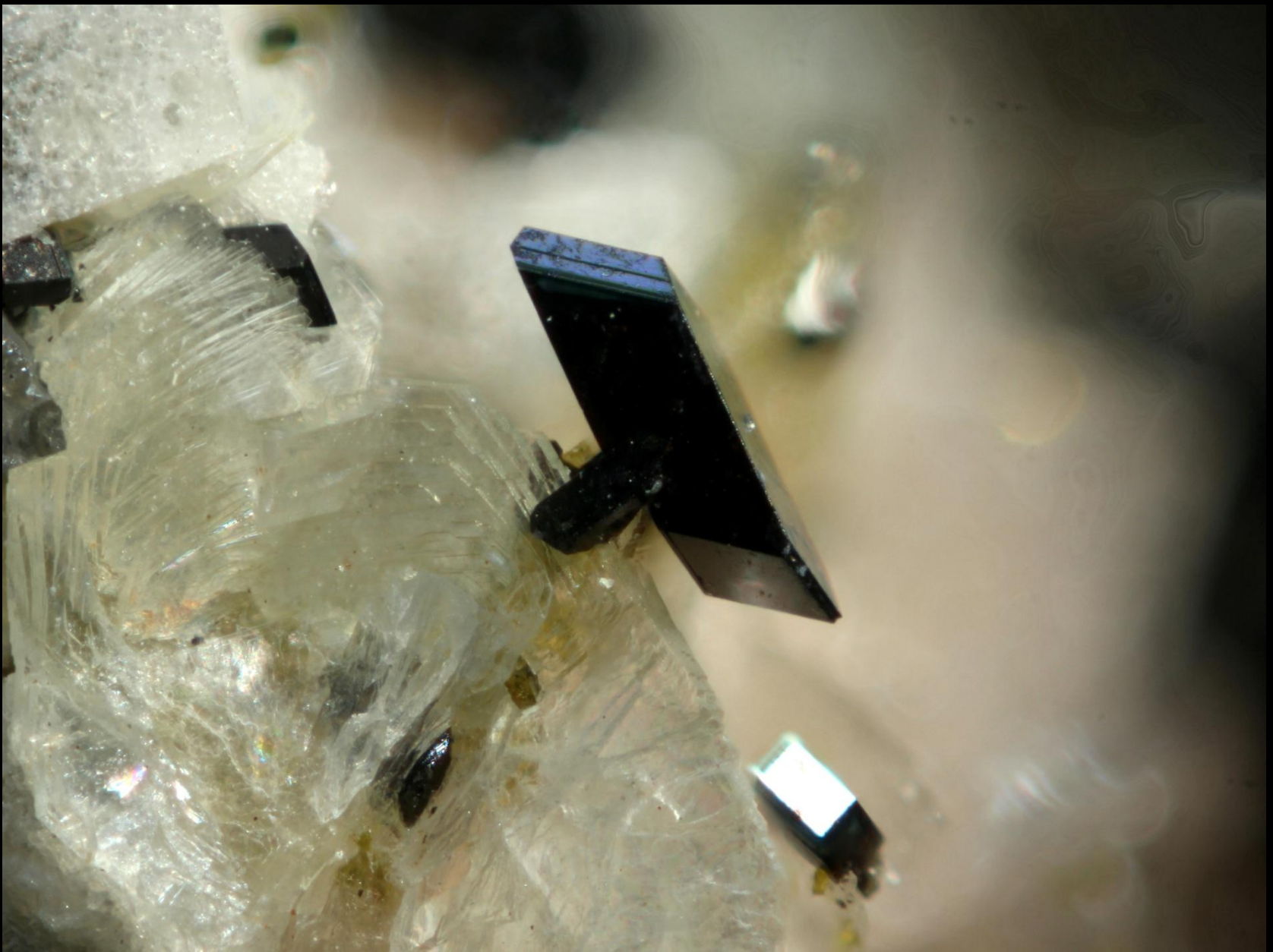
Peter Cristofono found a Bill Simmons' article on pyroxene in Brittanica.com:

*"The nature of aluminum substitution in pyroxenes varies significantly from one pyroxene to another....*

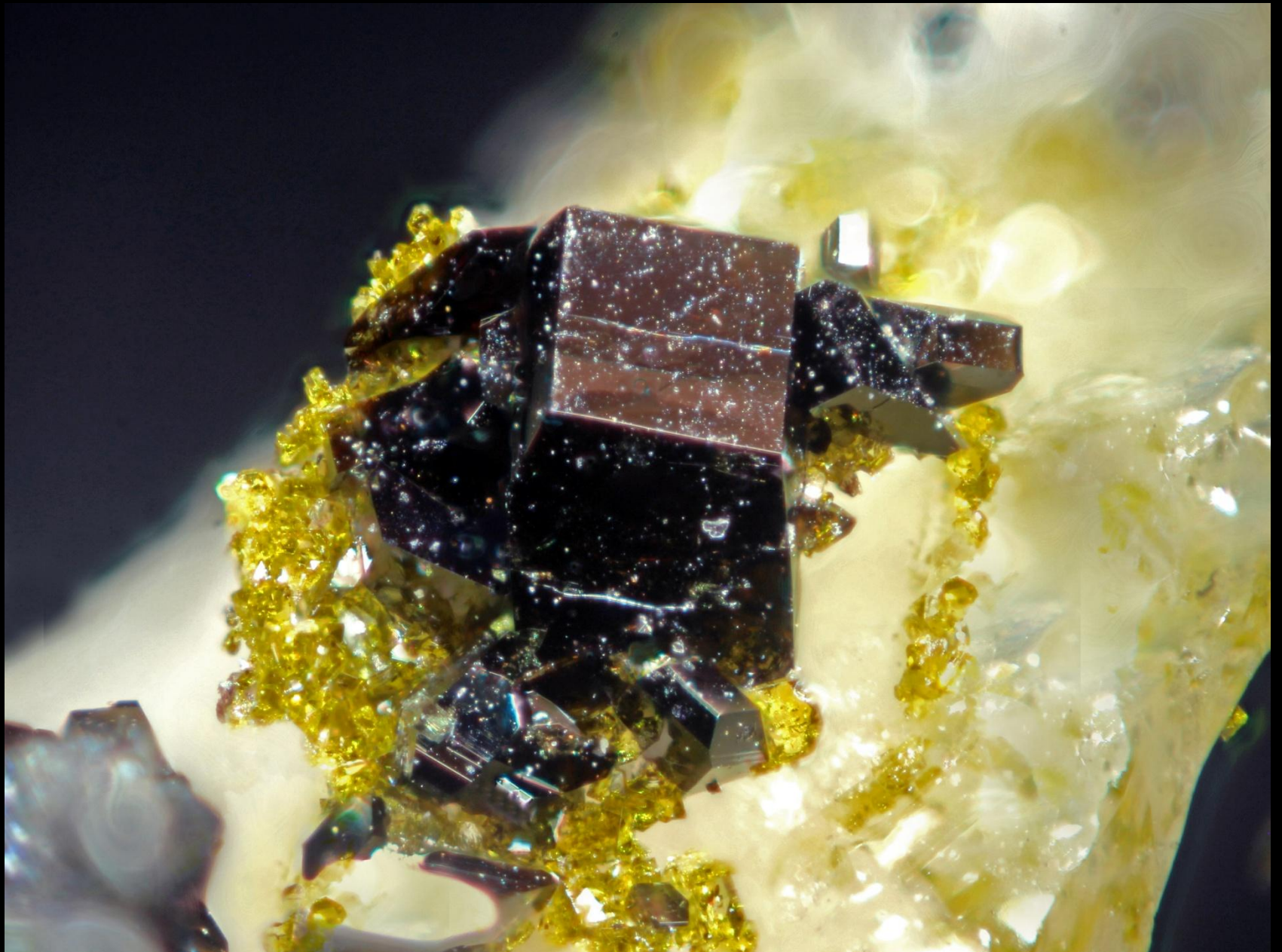
*...In augite there can be extensive substitution of aluminum for tetrahedral silicon."*



**BABINGTONITE** 0.8 mm babingtonite on prehnite fan with tiny pyrite crystal



**BABINGTONITE** 0.5 mm babingtonite on prehnite



**BABINGTONITE** 0.6 mm babingtonite on pale yellow-green epidote



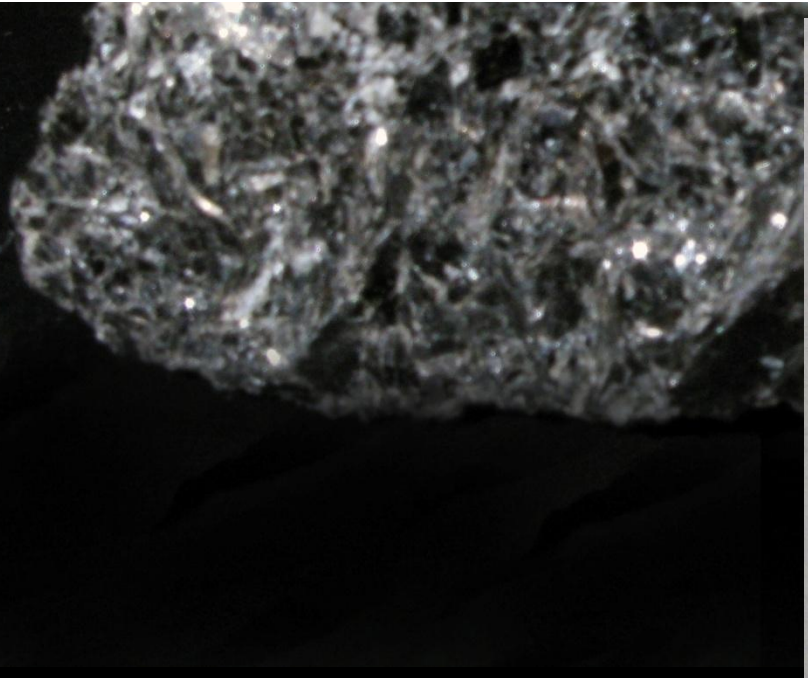
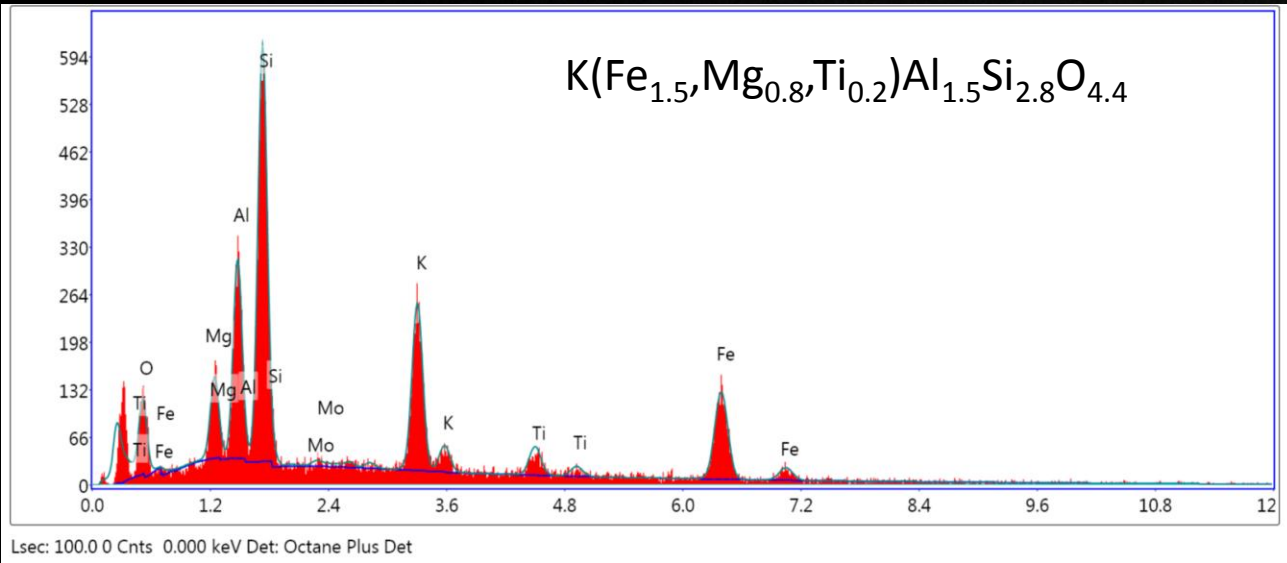
**BABINGTONITE** 4 mm field of view



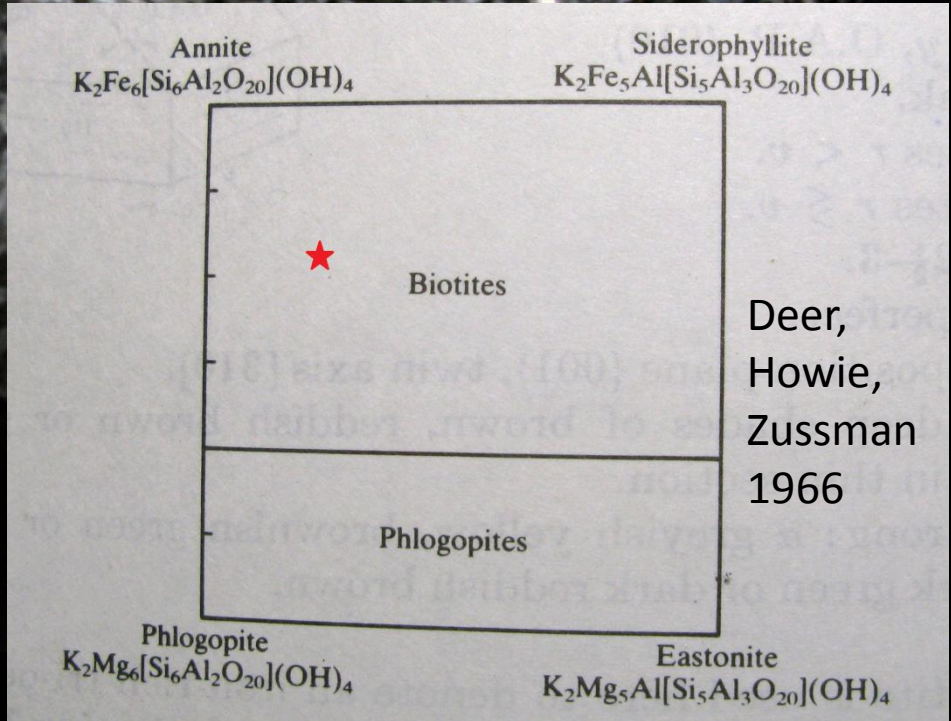
**BABINGTONITE** 5 mm crystal group



**BIOTITE** 4.5 inch specimen.



**BIOTITE** 4.5 inch specimen.







**BIOTITE** 1 mm black crystal in quartz. A Peter Cristofono specimen and photo



**CHABAZITE** 2 mm field of view



**CHABAZITE**    3 mm field of view



**CHABAZITE** 2 mm field of view



**CHABAZITE** 5 mm field of view



**CALCITE**

2.2 cm specimen, prismatic calcite with stilbite



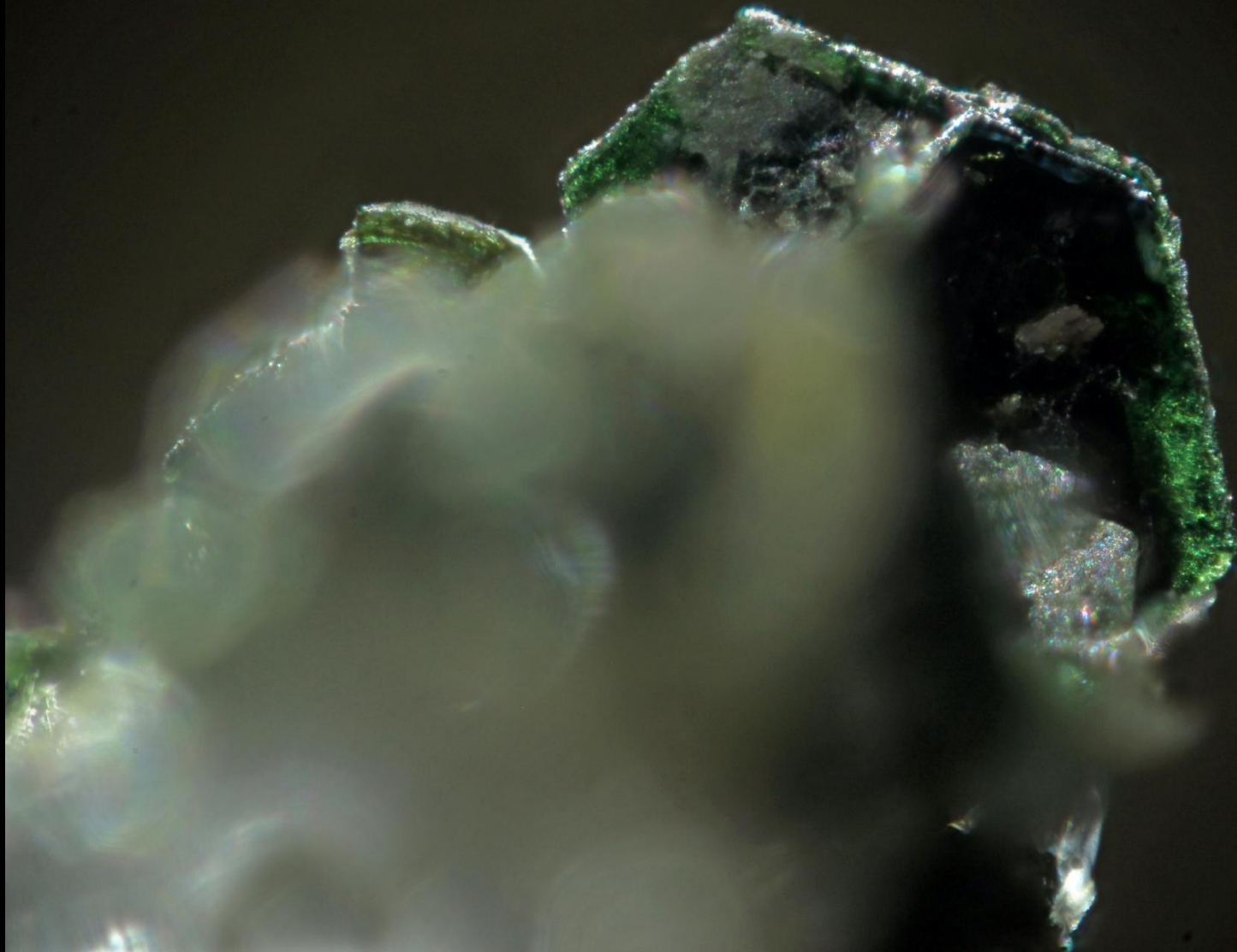
**CALCITE** 3 mm crystal



**CLINOCHLORE** 0.8 mm field of view

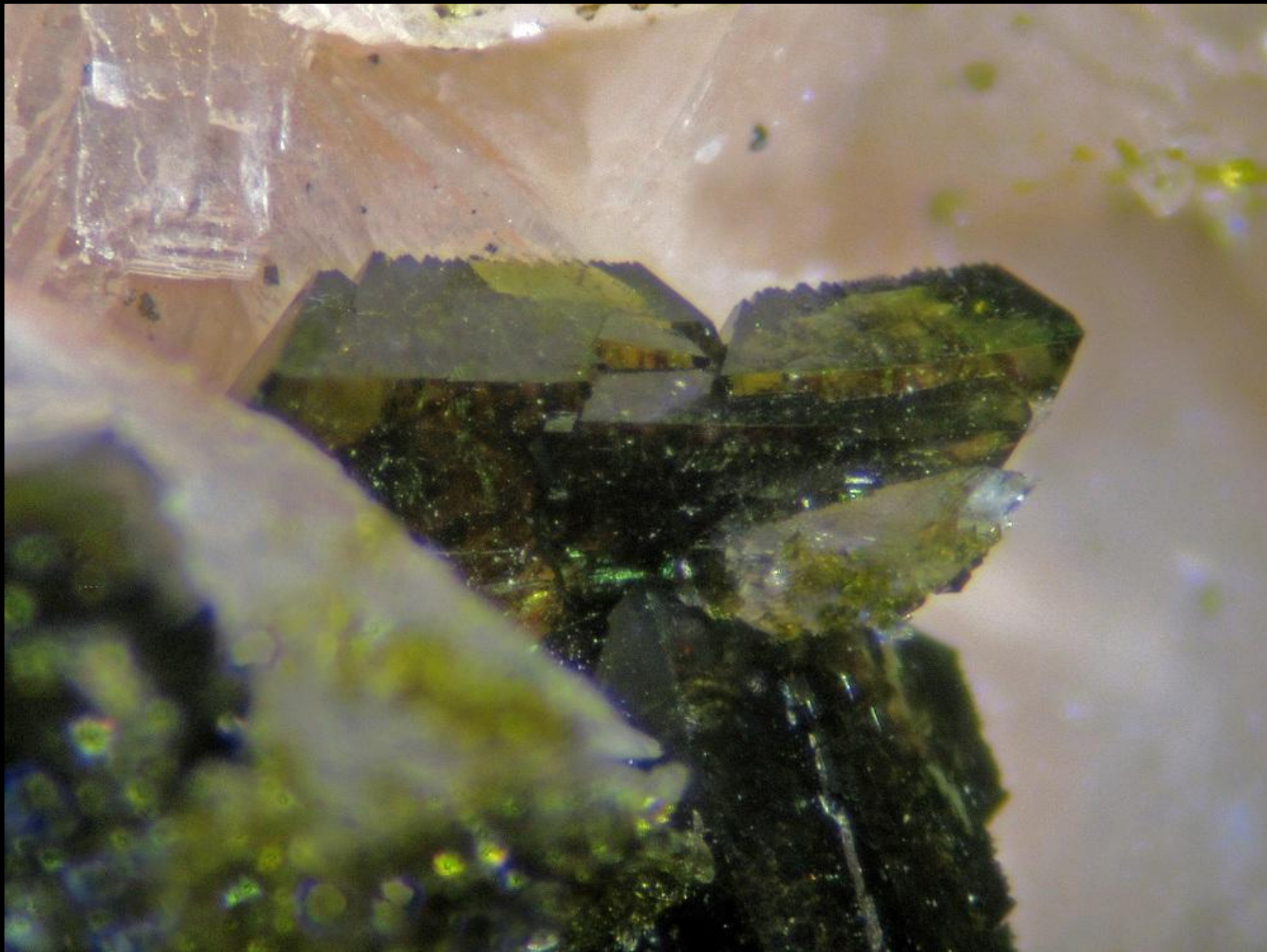
u303



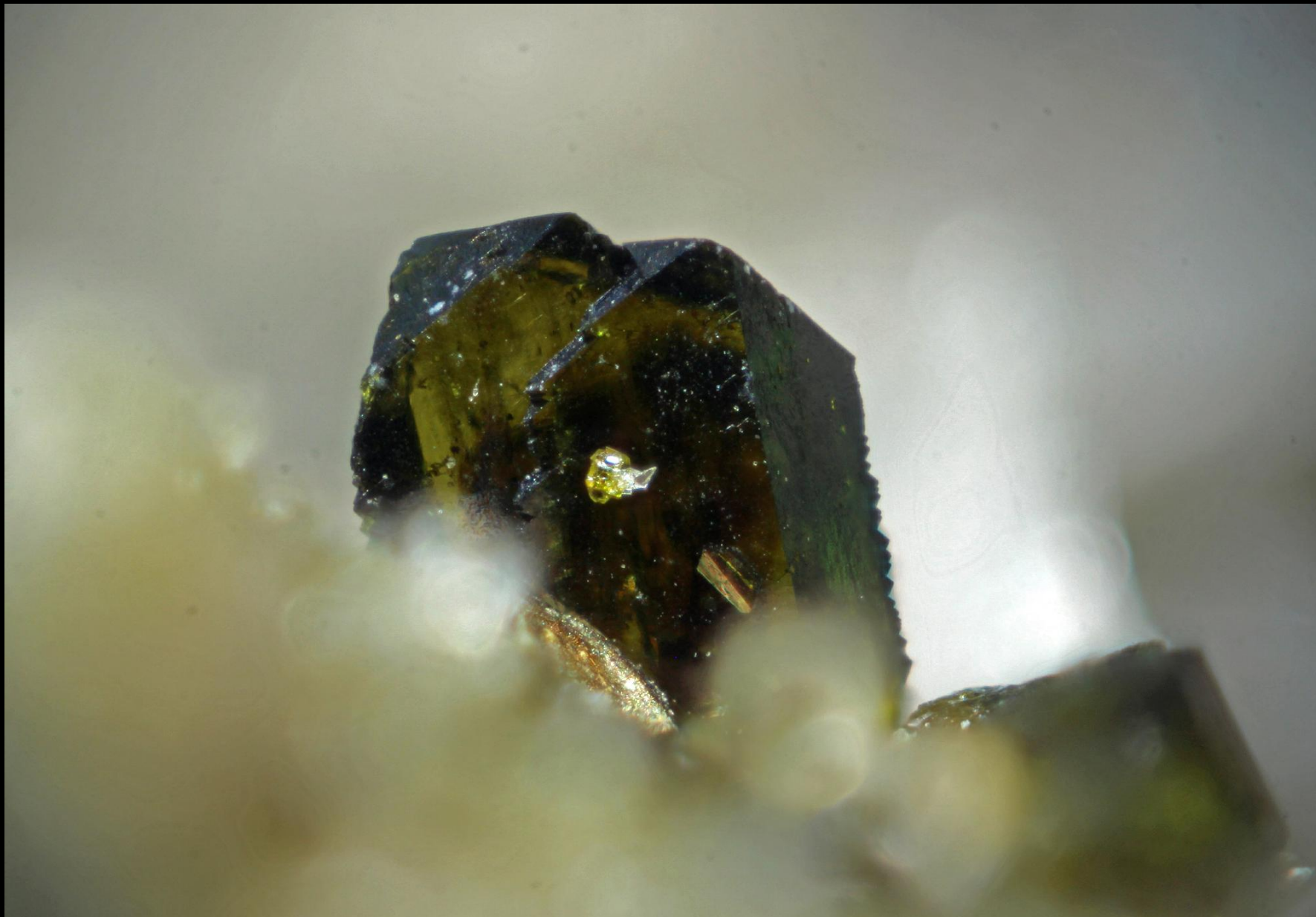


CLINOCHLORE 1 mm field of view

u303



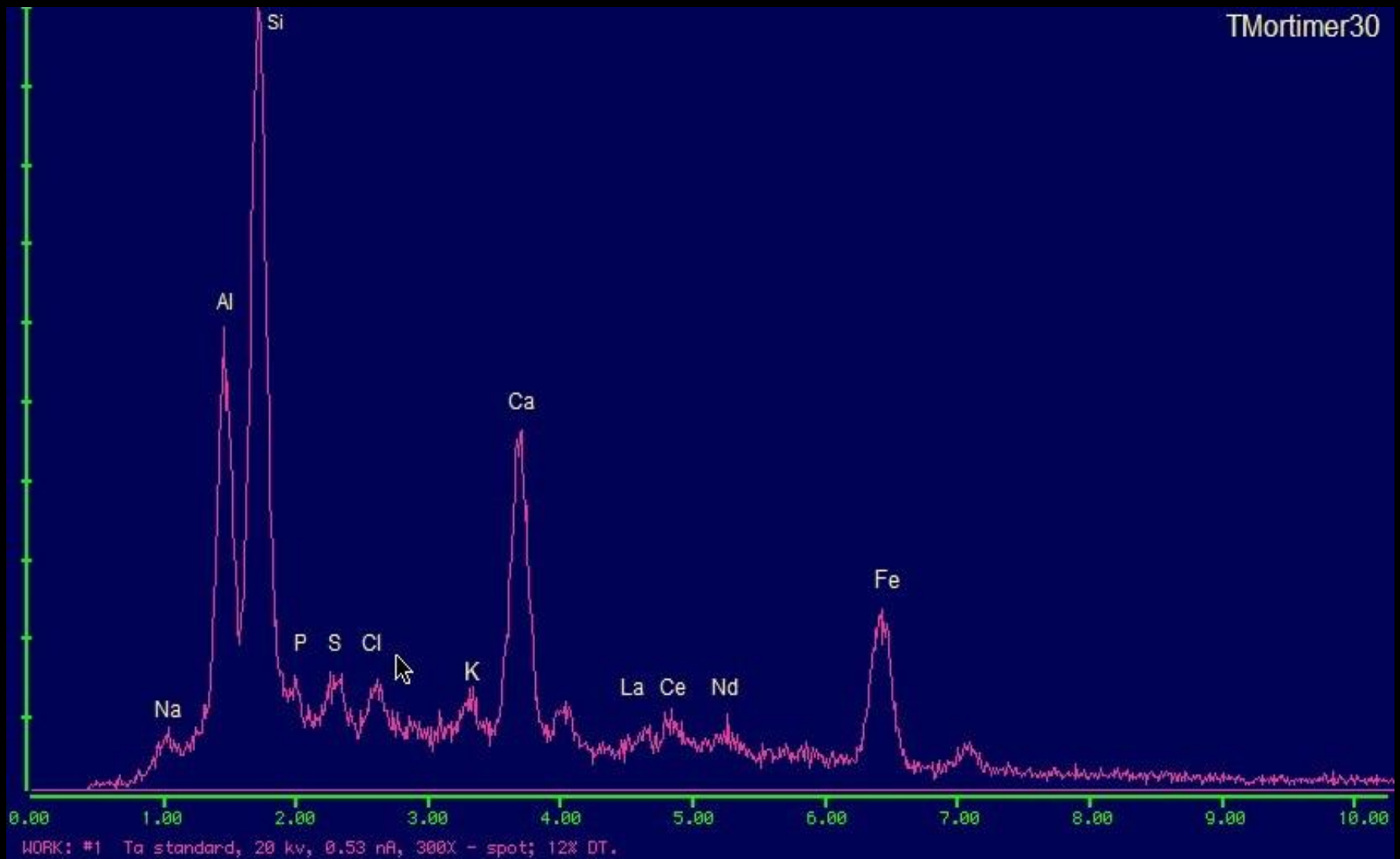
**EPIDOTE** 5 mm field of view



**EPIDOTE** 1 mm crystal pair



**EPIDOTE** 3 mm field of view. Dark prismatic epidote on adularia.

**EPIDOTE**

Chemistry:



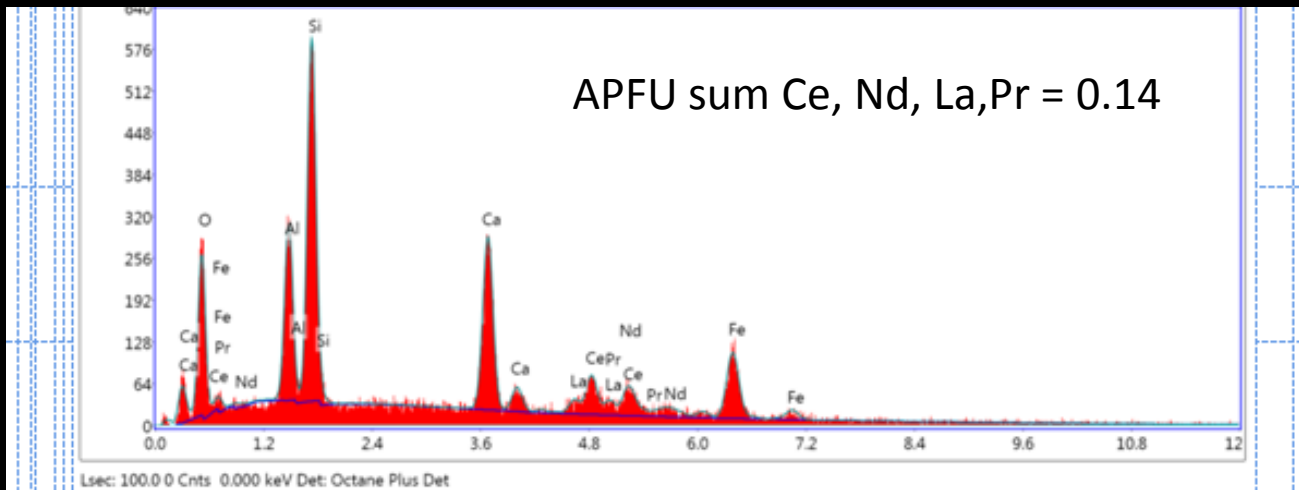
Fleischer 2008

**Allanite-(Ce)**

Chemistry:



Fleischer 2008



**eZAF Smart Quant Results**

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	R	A	F
O K	16.03	36.10	24.60	11.03	0.06	1.23	0.88	0.3	1
AlK	8.42	11.23	30.16	8.94	0.05	1.09	0.93	0.54	1.01
SiK	16.21	20.78	63.75	7.03	0.11	1.12	0.94	0.61	1
CaK	14.73	13.24	36.41	5.56	0.15	1.06	0.98	0.93	1.02
LaL	4.16	1.08	3.05	39.23	0.03	0.74	1.16	1.02	1.07
CeL	13.01	3.34	8.93	20.07	0.11	0.74	1.15	1.02	1.07
PrL	3.27	0.84	2.08	48.12	0.03	0.75	1.15	1.02	1.05
NdL	5.56	1.39	3.27	39.46	0.04	0.74	1.15	1.02	1.06
FeK	18.61	12.00	16.32	9.04	0.17	0.94	1.01	0.96	1

**EPIDOTE**

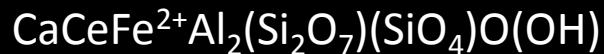
Chemistry:



Fleischer 2008

**Allanite-(Ce)**

Chemistry:



Fleischer 2008



**EPIDOTE** 2 mm field of view. Tabular epidote on adularia.

u299



**EPIDOTE** 1.5 mm high epidote on adularia.





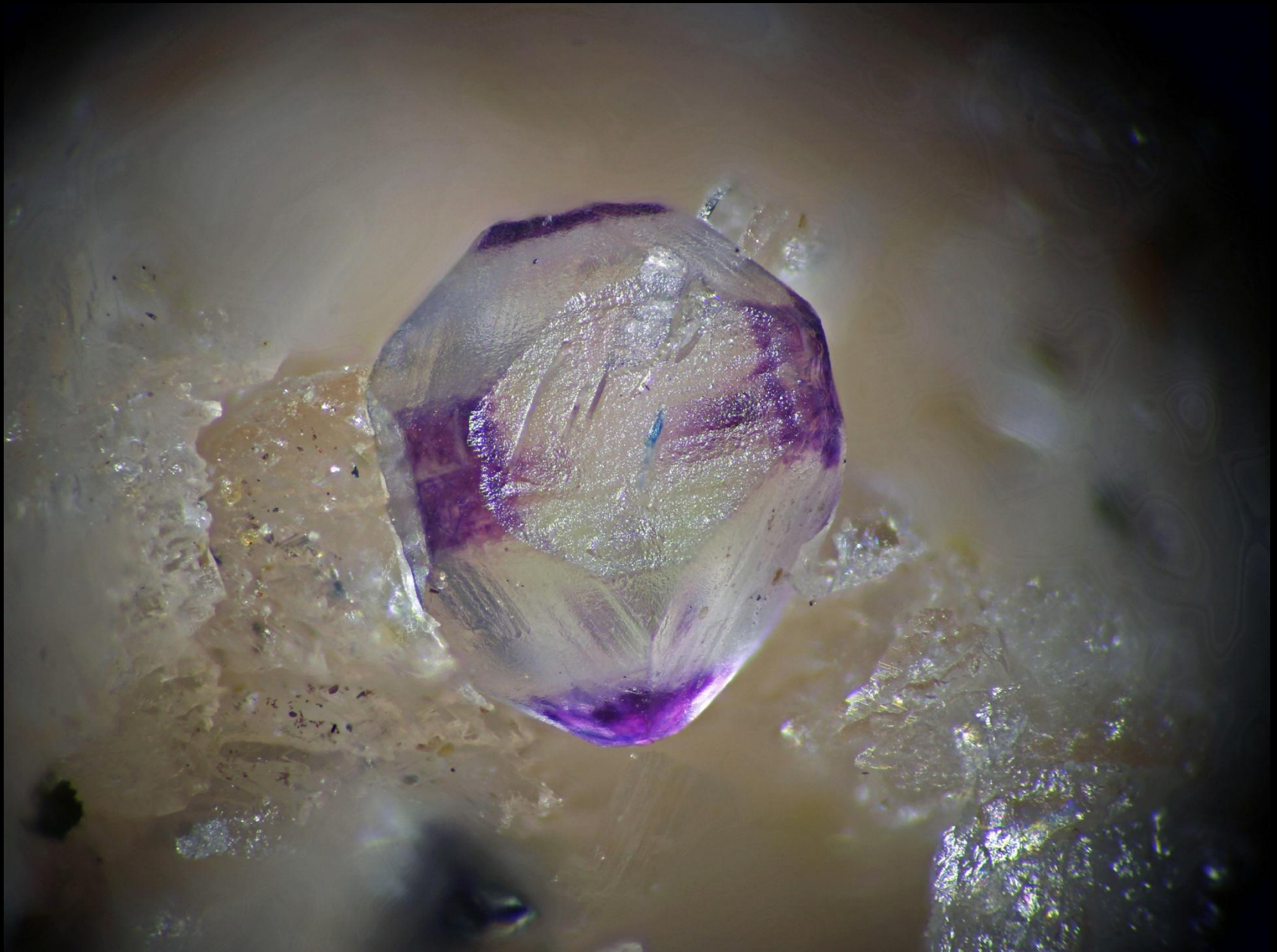
**FLUORAPATITE** 15 mm light green crystal. Fluoresces yellow-orange in SW UV  
Peter Cristofono specimen and photo



**FLUORITE** 1 mm field of view A Matt Butler specimen and photo

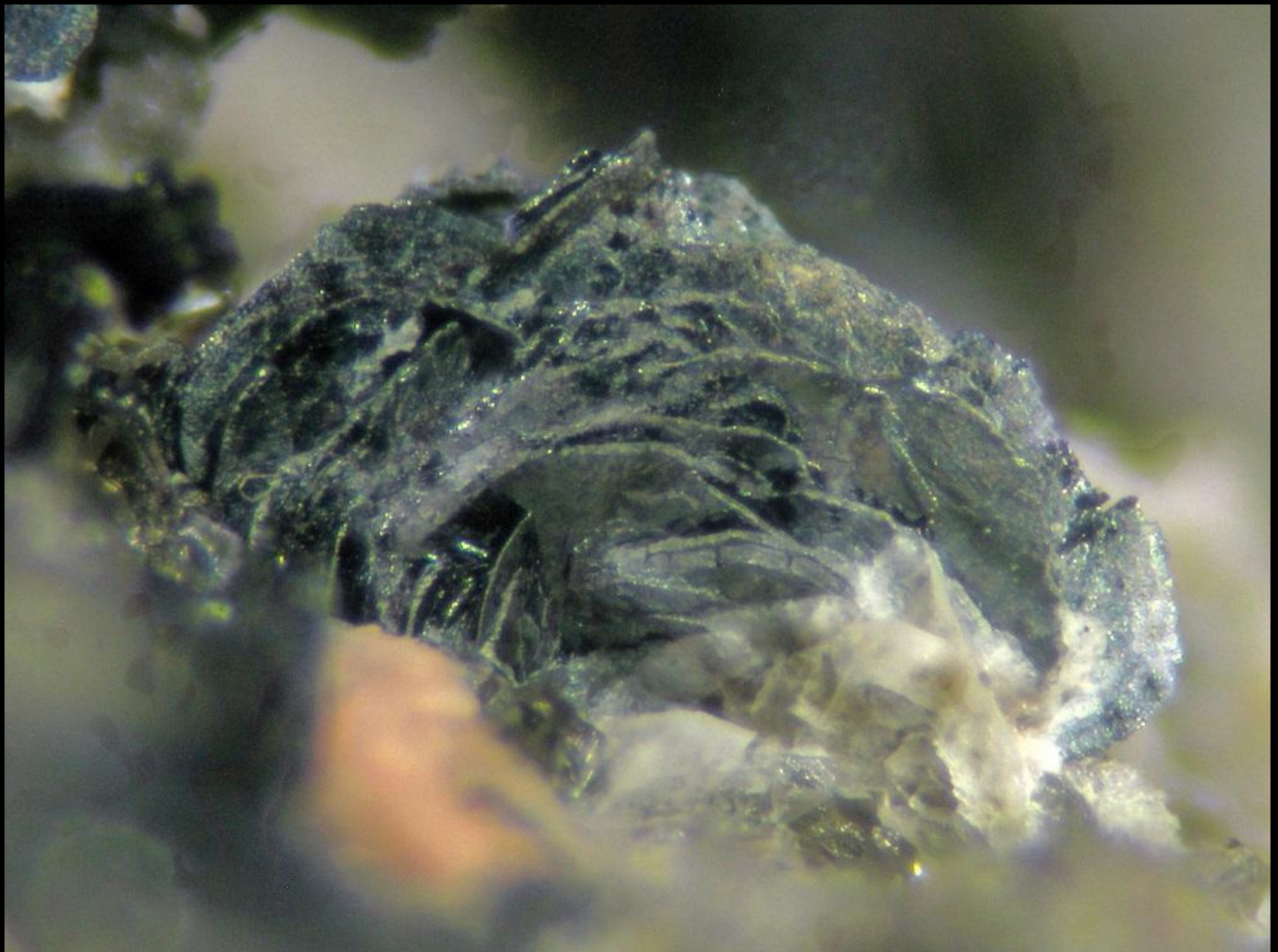


**FLUORITE** 1.4 mm field of view A Matt Butler specimen and photo

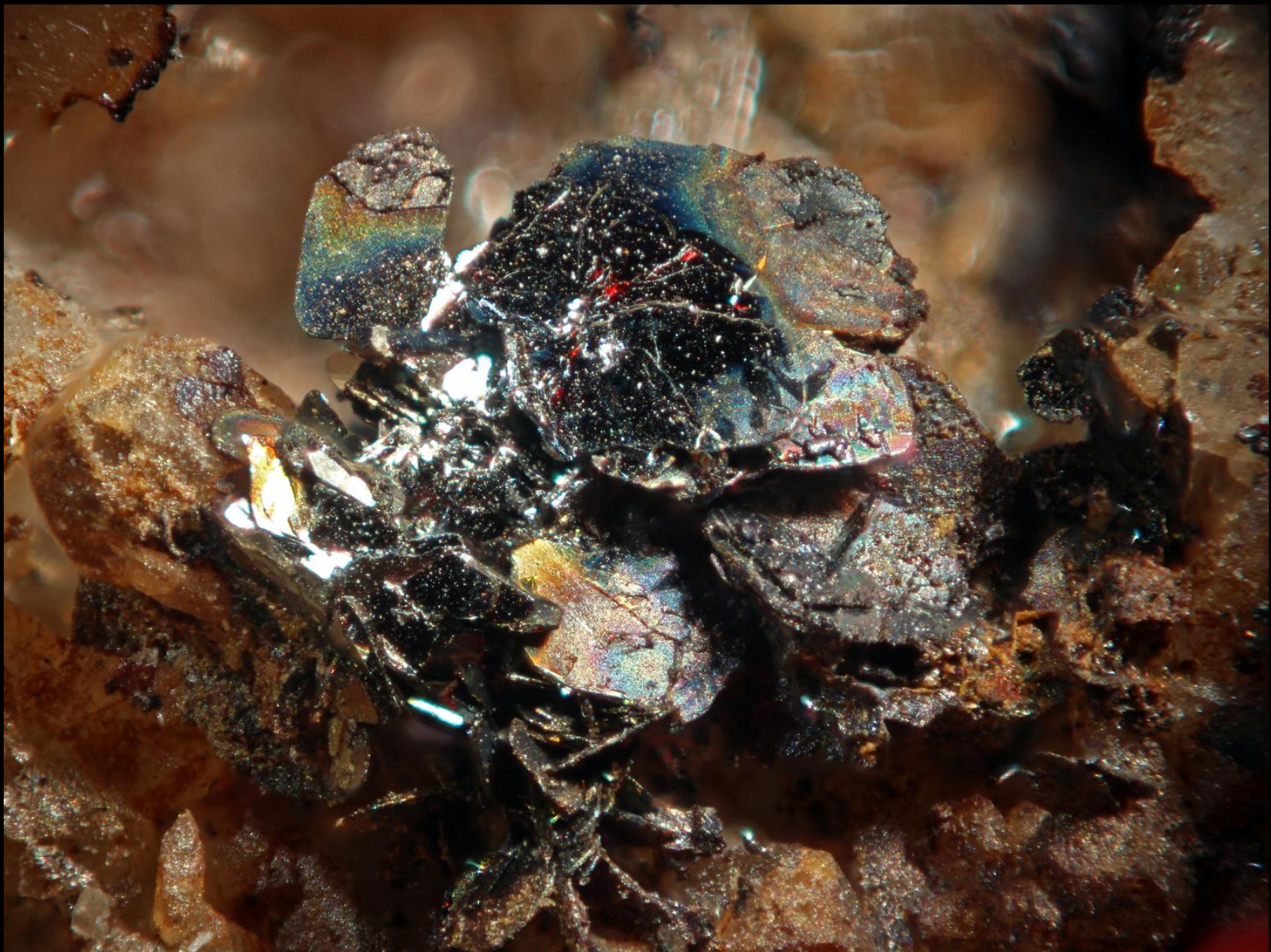


**FLUORITE** 0.8 mm crystal

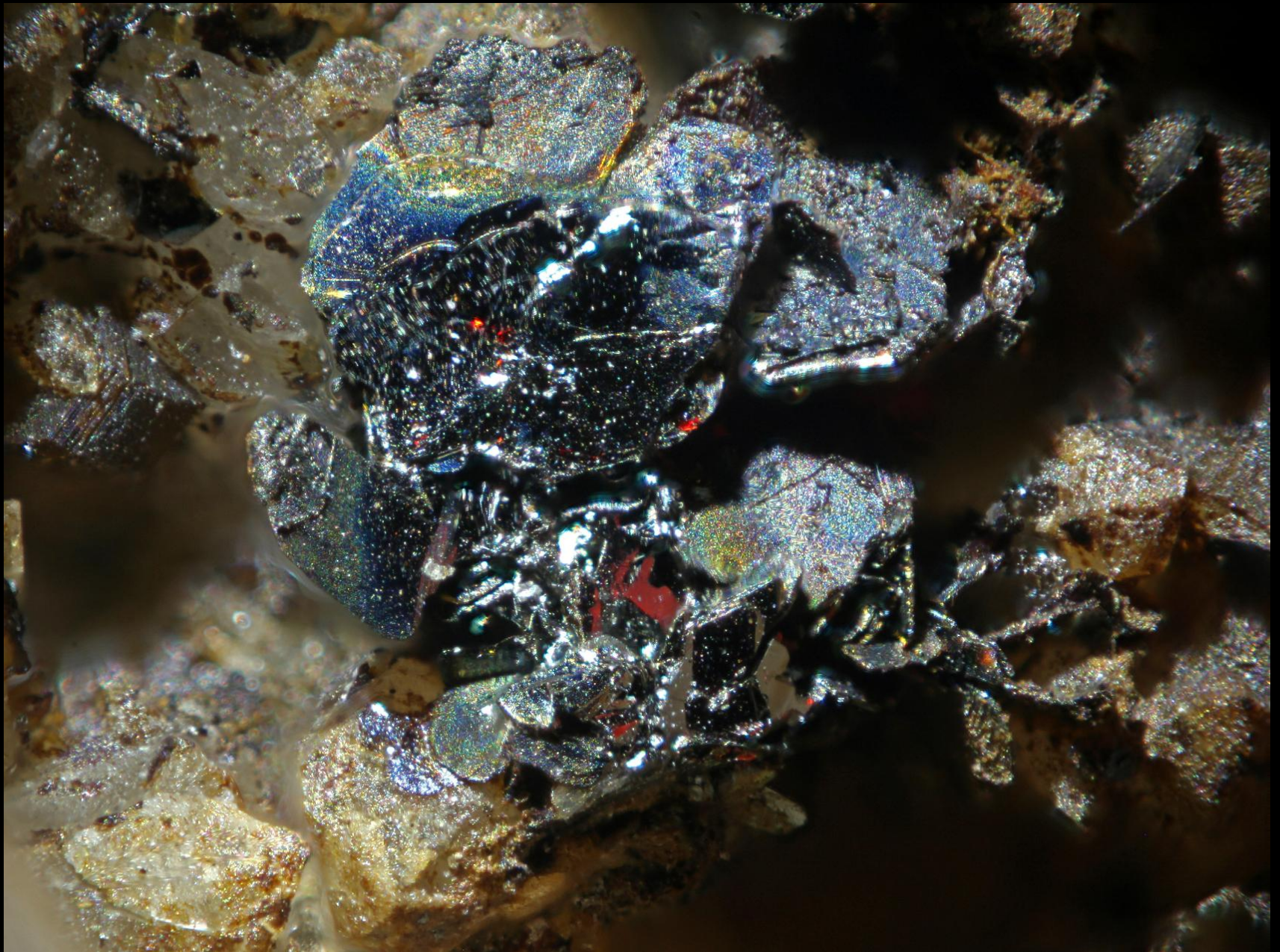
A Bob Janules specimen



**HEMATITE** 3.2 mm cluster of hematite blades



**HEMATITE** 1.5 mm cluster of hematite blades LED + SOLUX lighting



**HEMATITE** 1.5 mm cluster of hematite blades LED Lighting only



**HEMATITE** 3.5 cm specimen. Hematite black, on pink orthoclase





**HEULANDITE** 2.3 mm crystal with Babingtonite, black



**HEULANDITE** 3 mm field of view



**LAUMONTITE** 2 mm field of view



**MAGNETITE**

0.5 mm magnetite crystal

Peter Cristofono specimen and photo



**Magnetite in quartz**      3 inch specimen



**Microcline var Adularia** 8 mm field of view. With epidote, babingtonite & prehnite  
Microcline identification by FTIR spectroscopy. **June 2019 EDS clearly showed K spar**



**MUSCOVITE** 5 mm field of view. Sharp hexagonal books of muscovite to 1 mm

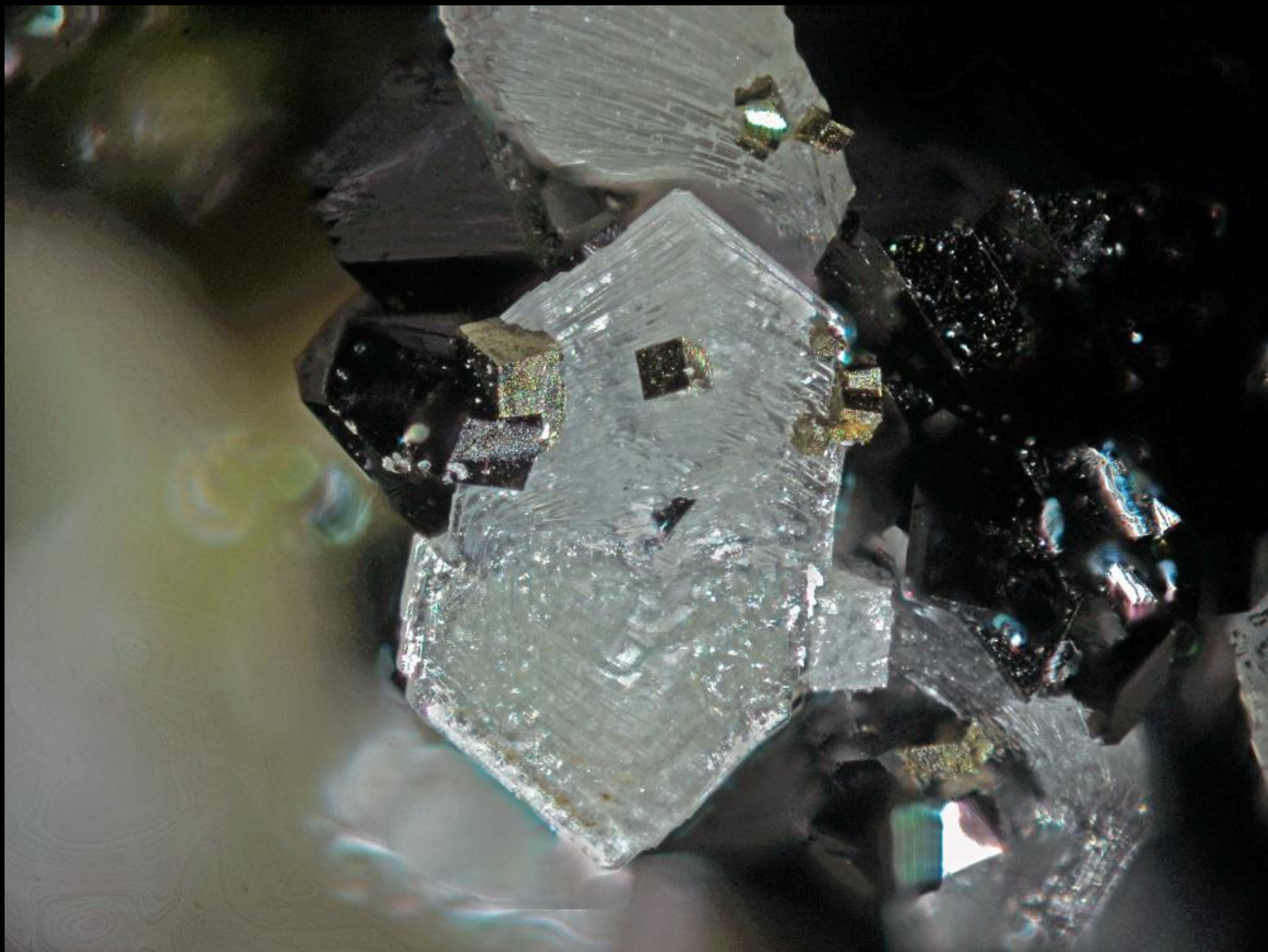


**MUSCOVITE** 2.5 mm field of view. Hexagonal books of muscovite to 0.8 mm

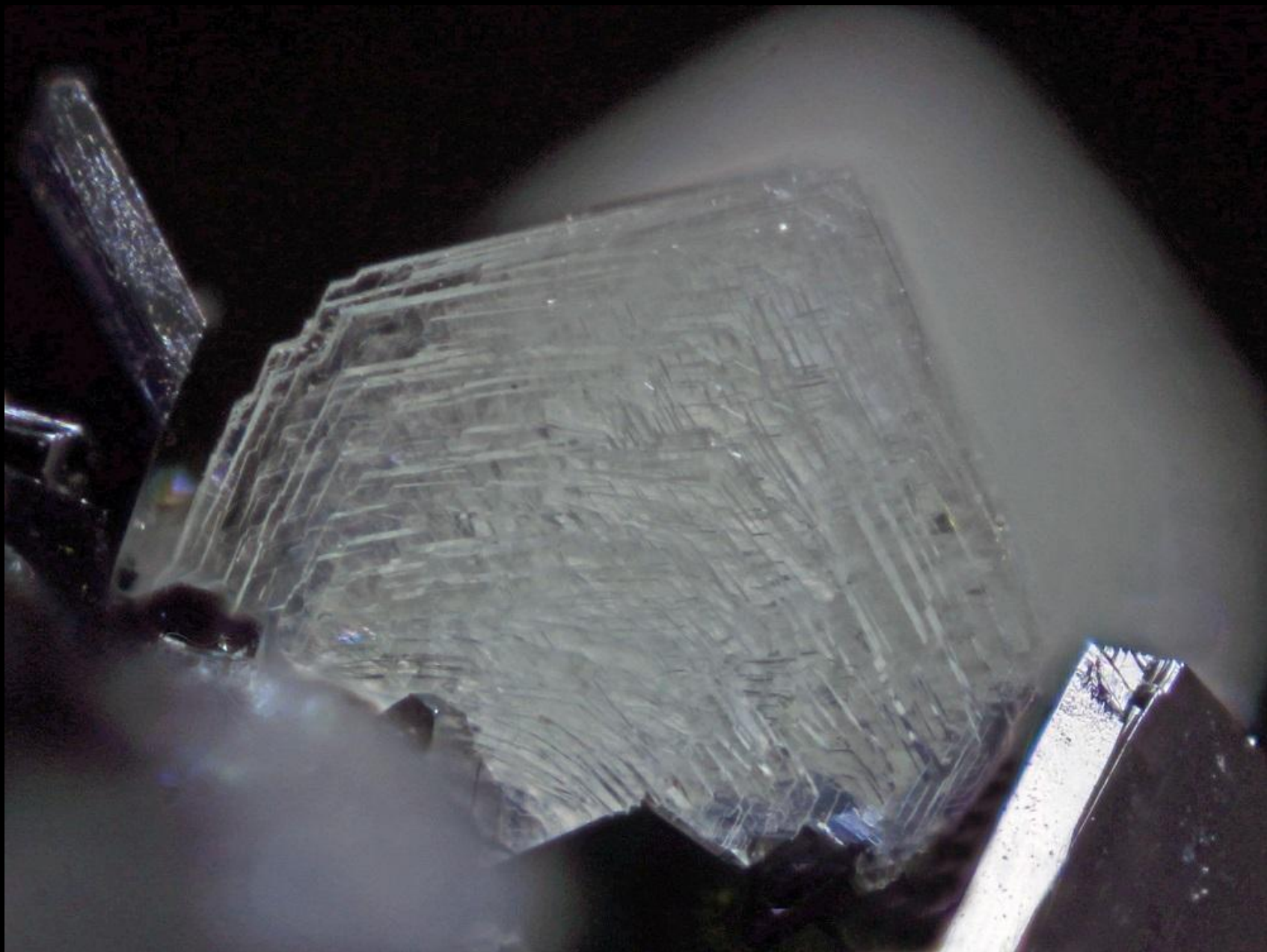




**PREHNITE** 7 cm specimen with glassy pale-green prehnite crystals



**PREHNITE** 1.8 mm prehnite bow-tie with tiny pyrite crystals and babingtonite.



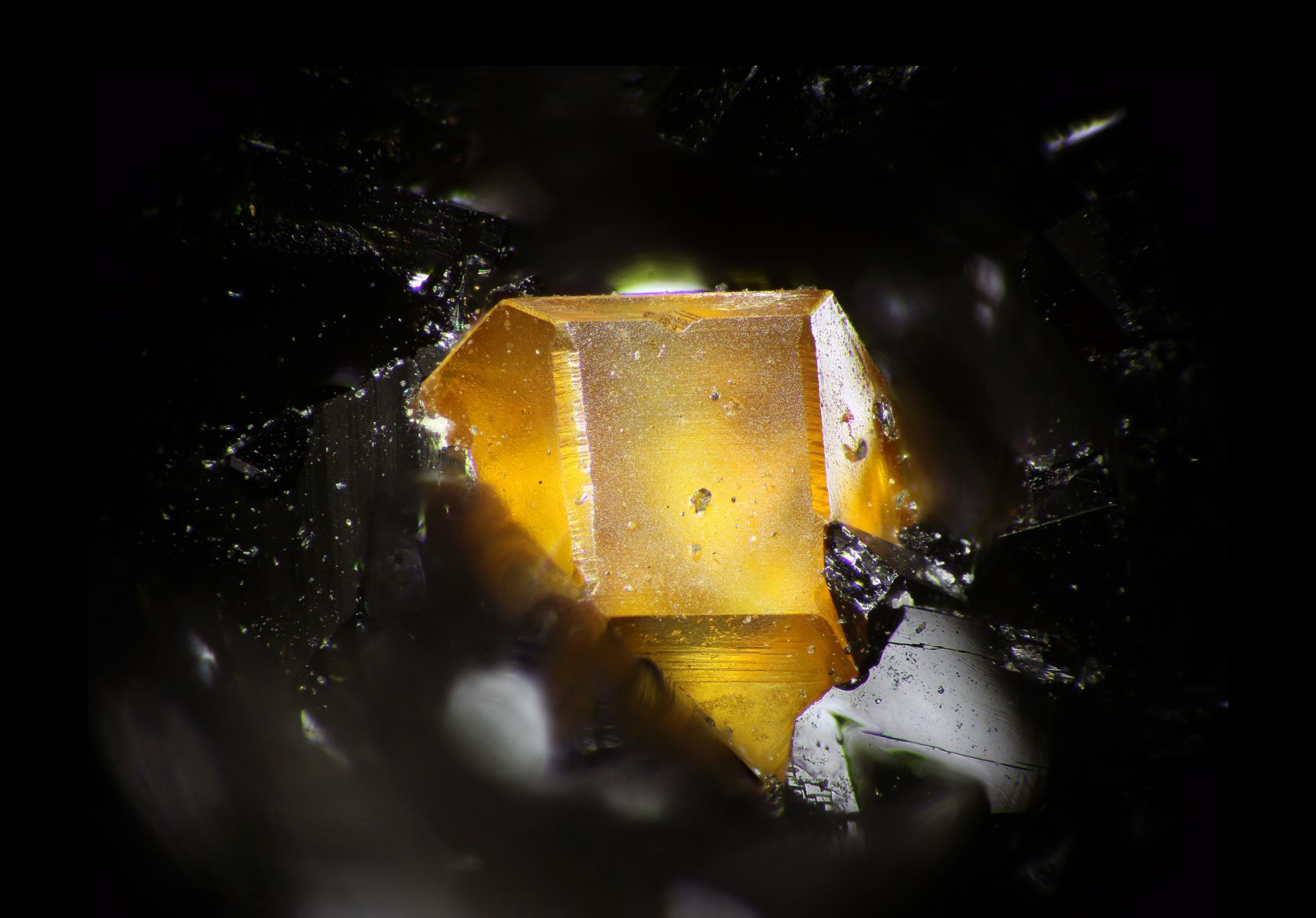
**PREHNITE** 1.8 mm prehnite fan.



**PYRITE** 1.5 mm pyritohedrons. Left one altering to limonite

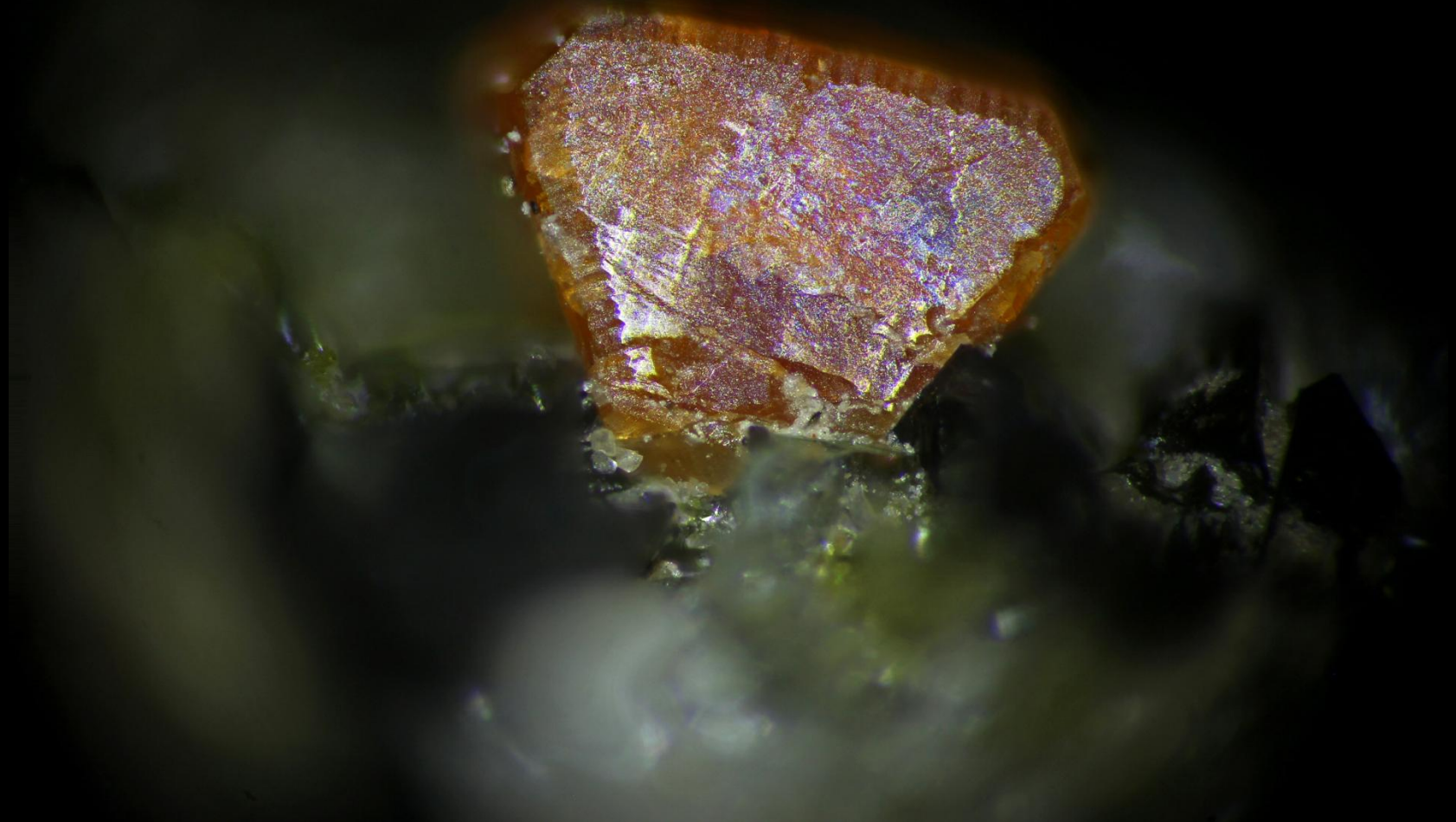


**RUTILE** 0.7 mm rutile crystal section on quartz crystal . Only example found



**SPHALERITE** 0.9 mm crystal on babingtonite.

A Bob Janules specimen



**SPHALERITE** 0.8 mm crystal on babingtonite.

A Bob Janules specimen



**SPHALERITE** 1.0 mm crystal on babingtonite.

A Bob Janules specimen





**STILBITE** 3 cm specimen of chalk-white Stilbite crystals



**STILBITE** 1.4 cm stilbite group with calcite crystals



**STILBITE** 4 mm field of view



**STILBITE** 0.5 mm simple orthorhombic prism



**TITANITE** 1.3 mm titanite crystal A Bob Janules specimen



**TITANITE** 1 mm group of tan titanite crystals



**TITANITE** 1 mm group of tan titanite crystals



**TITANITE** 2 mm group of tan titanite crystals





**ZIRCON** 0.5 mm high crystal Peter Cristofono specimen & photo

# END

Final comments

A pdf of this presentation will be available at <https://mindatnh.org>