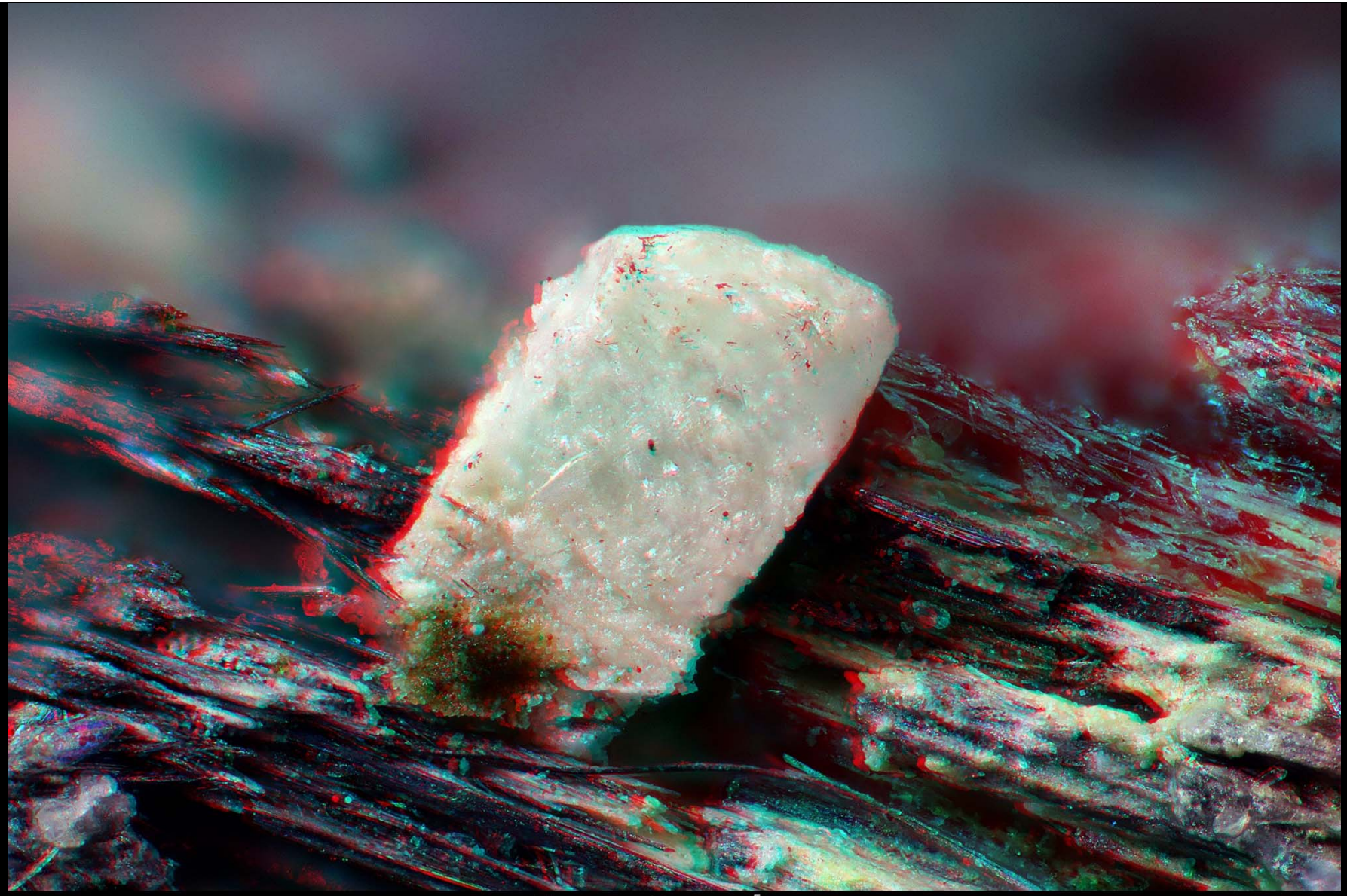


0.1 mm

Mopungite $NaSb^{5+}(OH)_6$

Field width 0.93 mm.

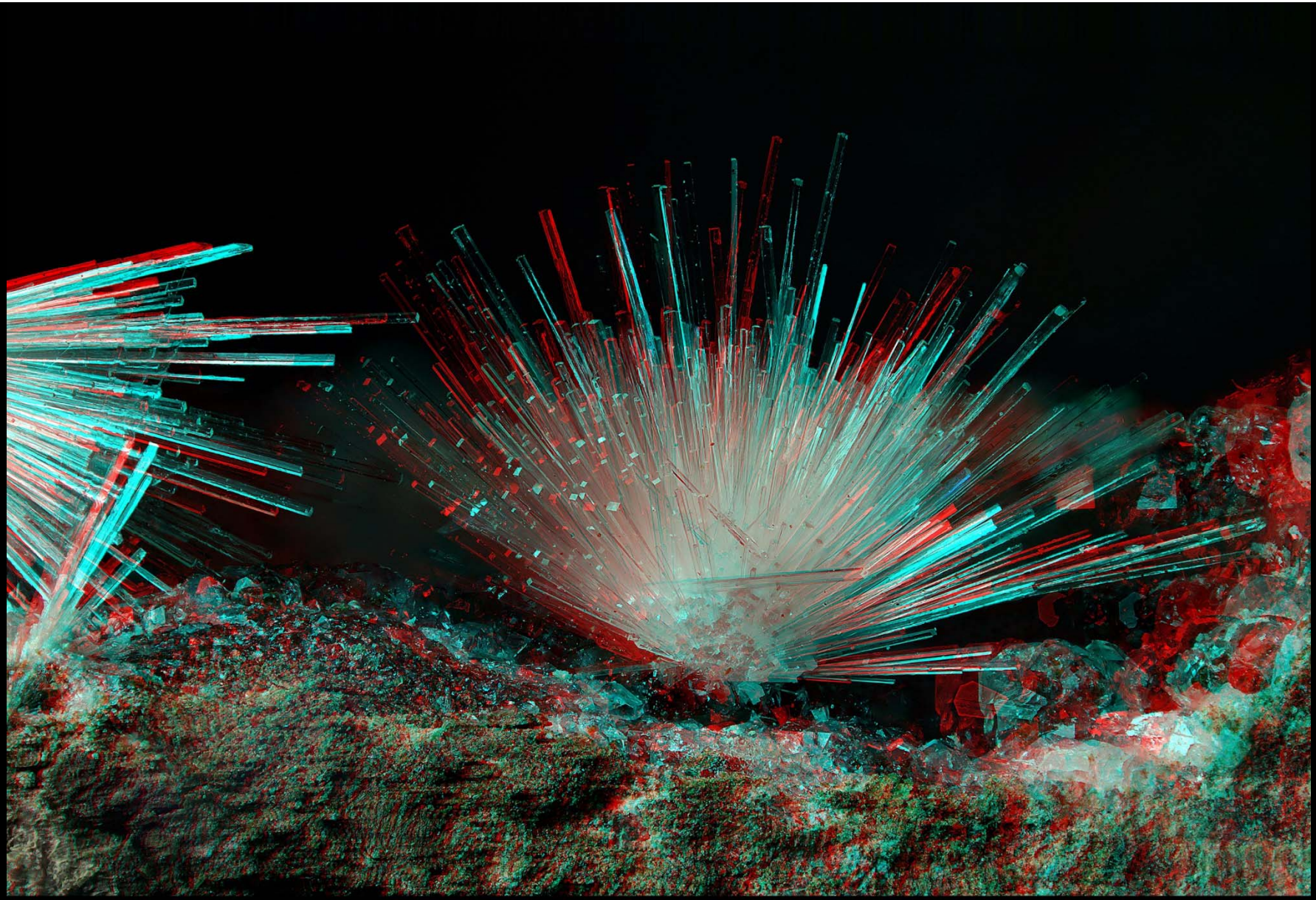
White saccharoidal textured crystals not confirmed analytically but seems probable, on fibrous jamesonite together with yellowish nadorite and an unidentified white acicular phase in upper left quadrant.

Russell's Vein SX 0098 8115, Tartar Cove, Port Gaverne, Cornwall.

Specimen: David and Julie Green collection. Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 40 and 58 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



1 mm

Natrolite $Na_2(Si_3Al_2)O_{10}\cdot 2H_2O$

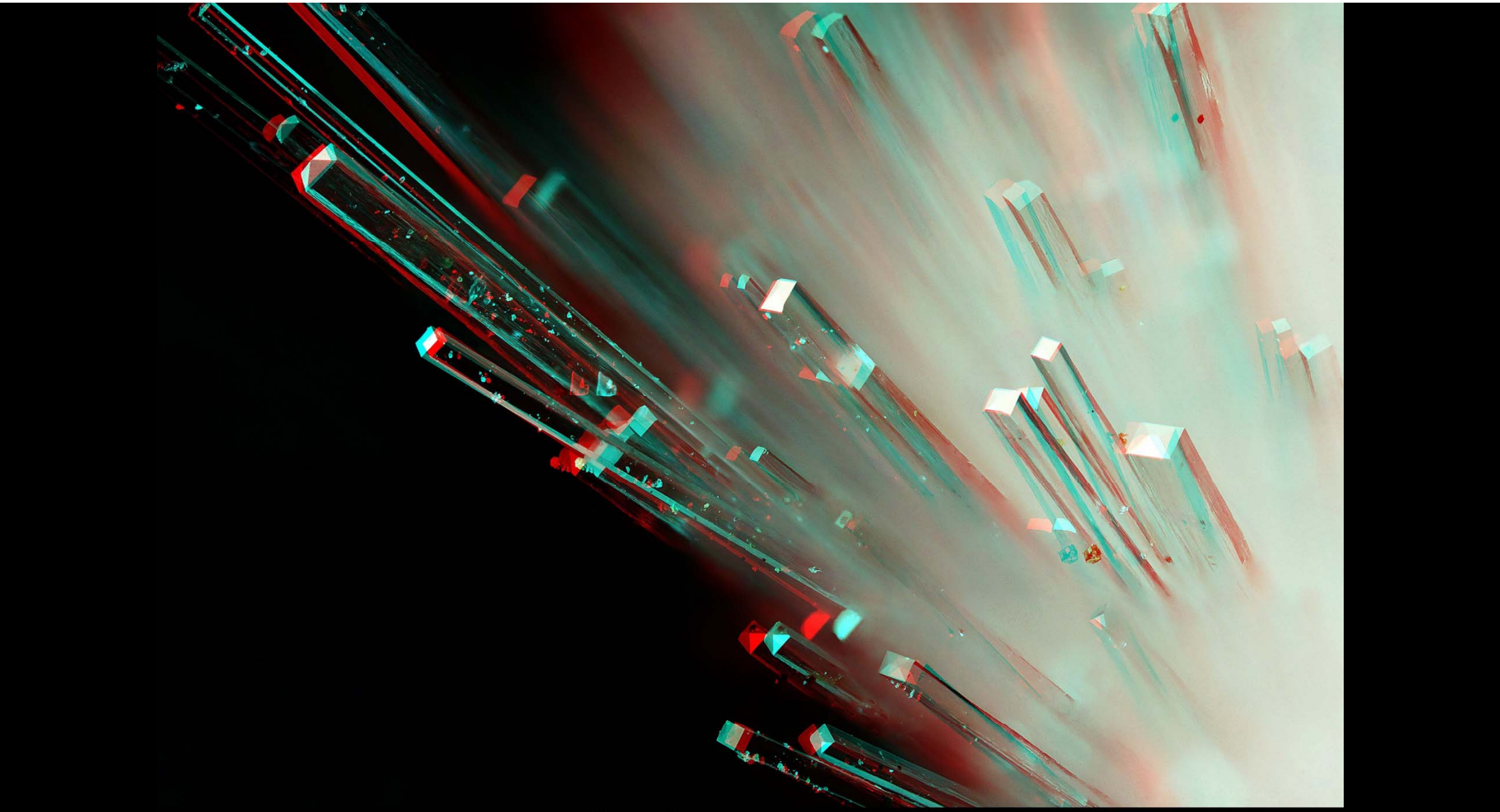
Field width 17.7 mm.

Radiating sprays of prismatic crystals on analcime.

Oisgill Bay NG 134 500, Isle of Skye.

Specimen: David Green collection. Photography: John Chapman, February 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 100 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 123 and 116 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



1 mm

Natrolite $Na_2(Si_3Al_2)O_{10}\cdot 2H_2O$

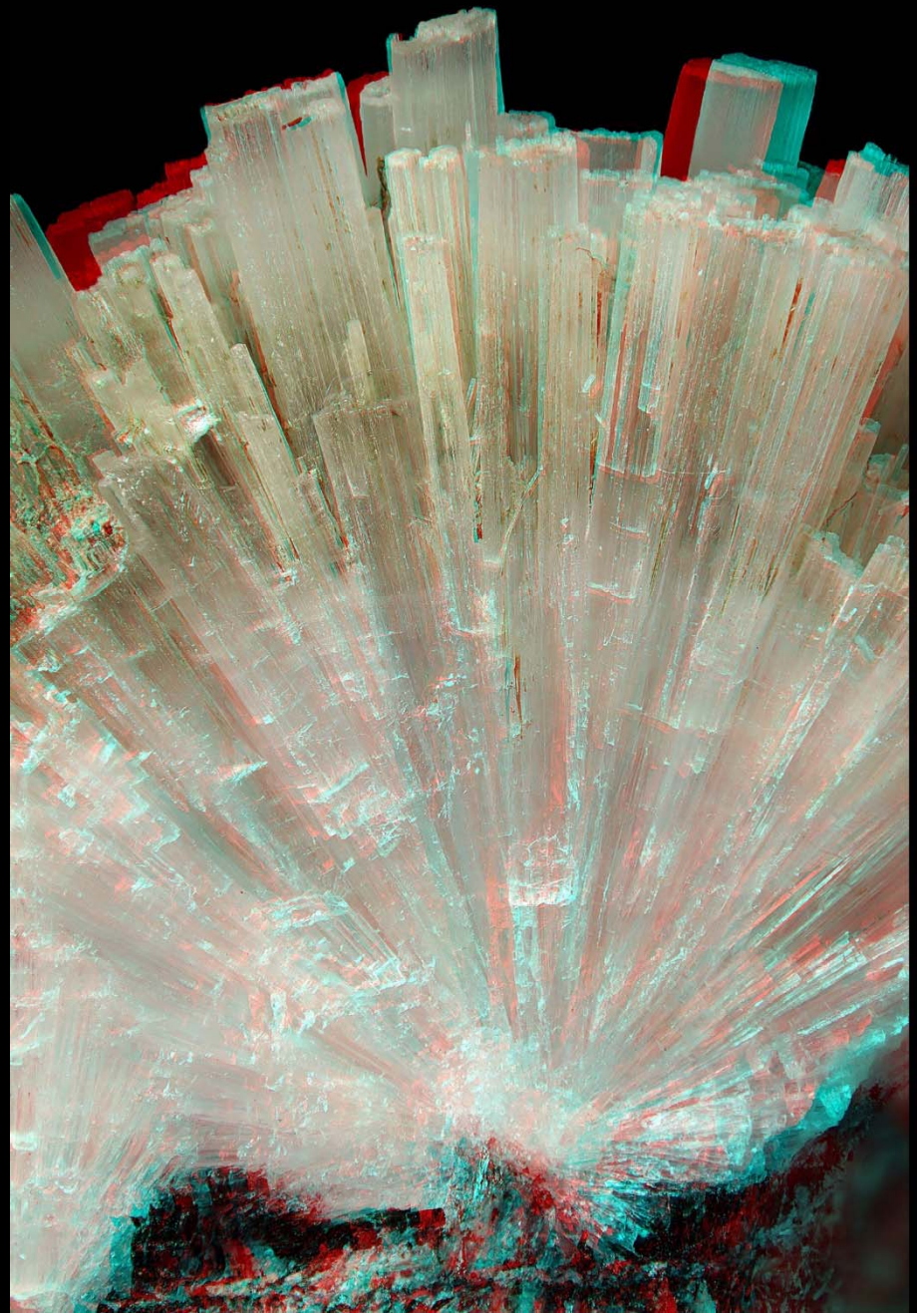
Field width 4.13 mm.

Radiating sprays of prismatic crystals on analcime.

Oisgill Bay NG 134 500, Isle of Skye.

Specimen: David Green collection. Photography: John Chapman, February 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 140 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 112 and 99 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Natrolite $Na_2(Si_3Al_2)O_{10}\cdot 2H_2O$

Divergent crystal growth.

From the boulder clay near Southport, Lancashire.

Specimen: formerly in Tony Ellis collection, No. 1048,
now in David Green collection.

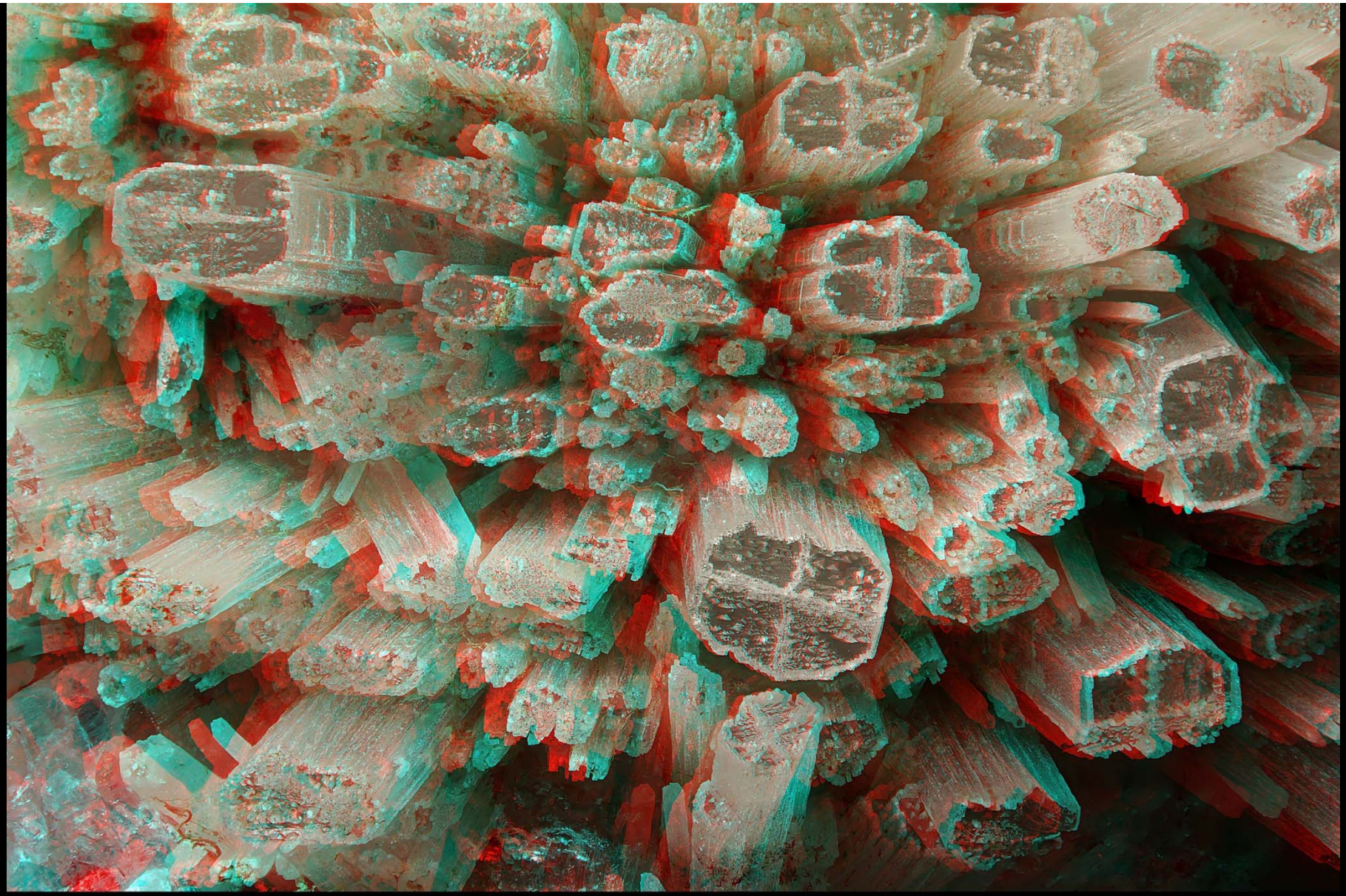
Photography: John Chapman, February 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 40 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 84 and 80 150-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

10 mm

Field height mm.



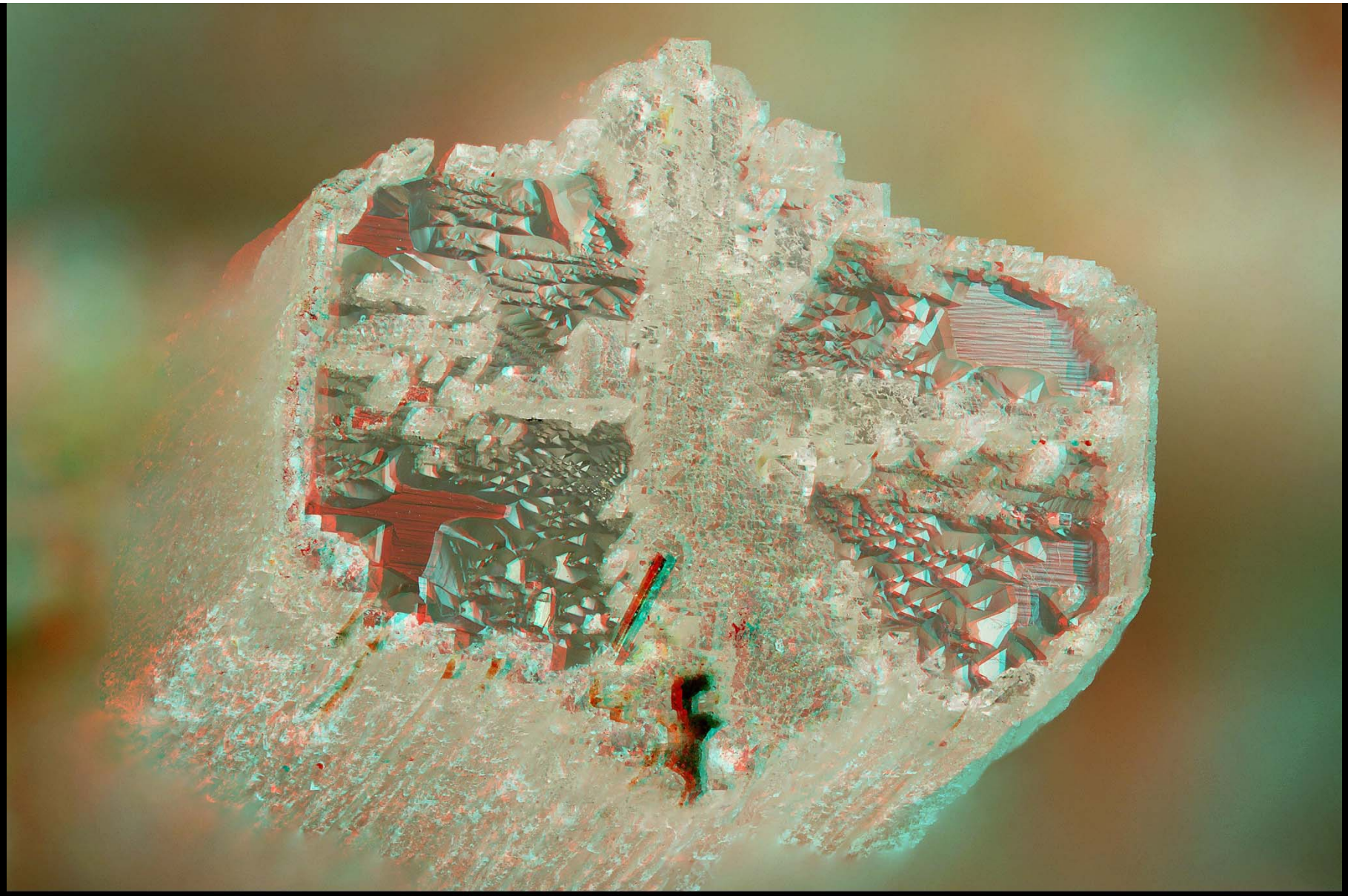
Natrolite $Na_2(Si_3Al_2)O_{10}\cdot 2H_2O$

Field width 20.75 mm.

1 mm

Divergent crystal growth with unusual cruciform terminations.
From the boulder clay near Southport, Lancashire.

Specimen: formerly in Tony Ellis collection, No. 1048, now in David Green collection. Photography: John Chapman, February 2024.
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 80 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 105 and 117 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



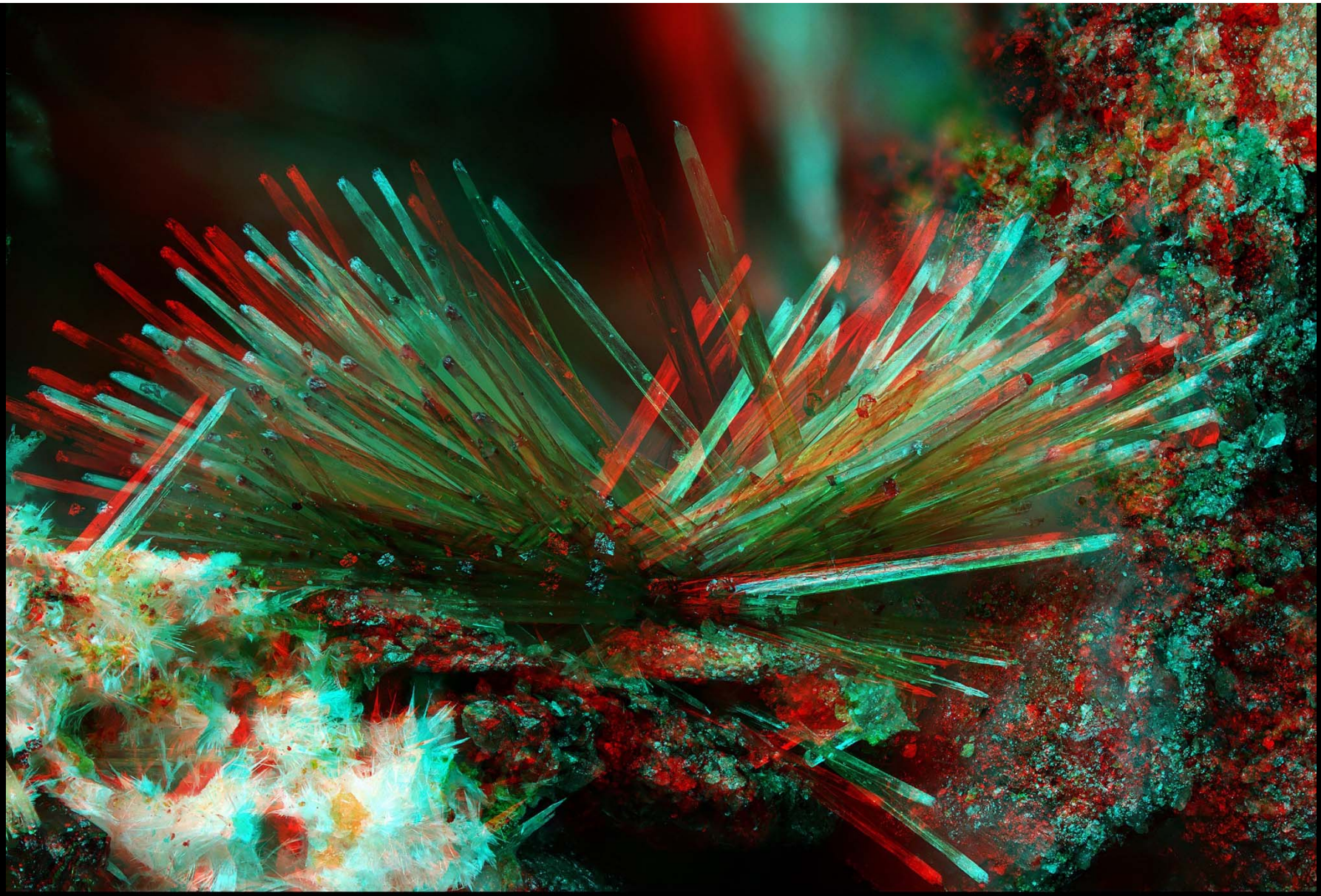
1 mm

Natrolite $Na_2(Si_3Al_2)O_{10}\cdot 2H_2O$

Field width 4.12 mm.

Termination with cruciform growth on orthorhombic sytem crystal, with green prismatic crystal, possibly diopside.
From the boulder clay near Southport, Lancashire.

Specimen: formerly in Tony Ellis collection, No. 1048, now in David Green collection. Photography: John Chapman, February 2024.
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 130 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 84 and 84 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Olivenite $Cu_2(AsO_4)(OH)$

Field width 3.57 mm.

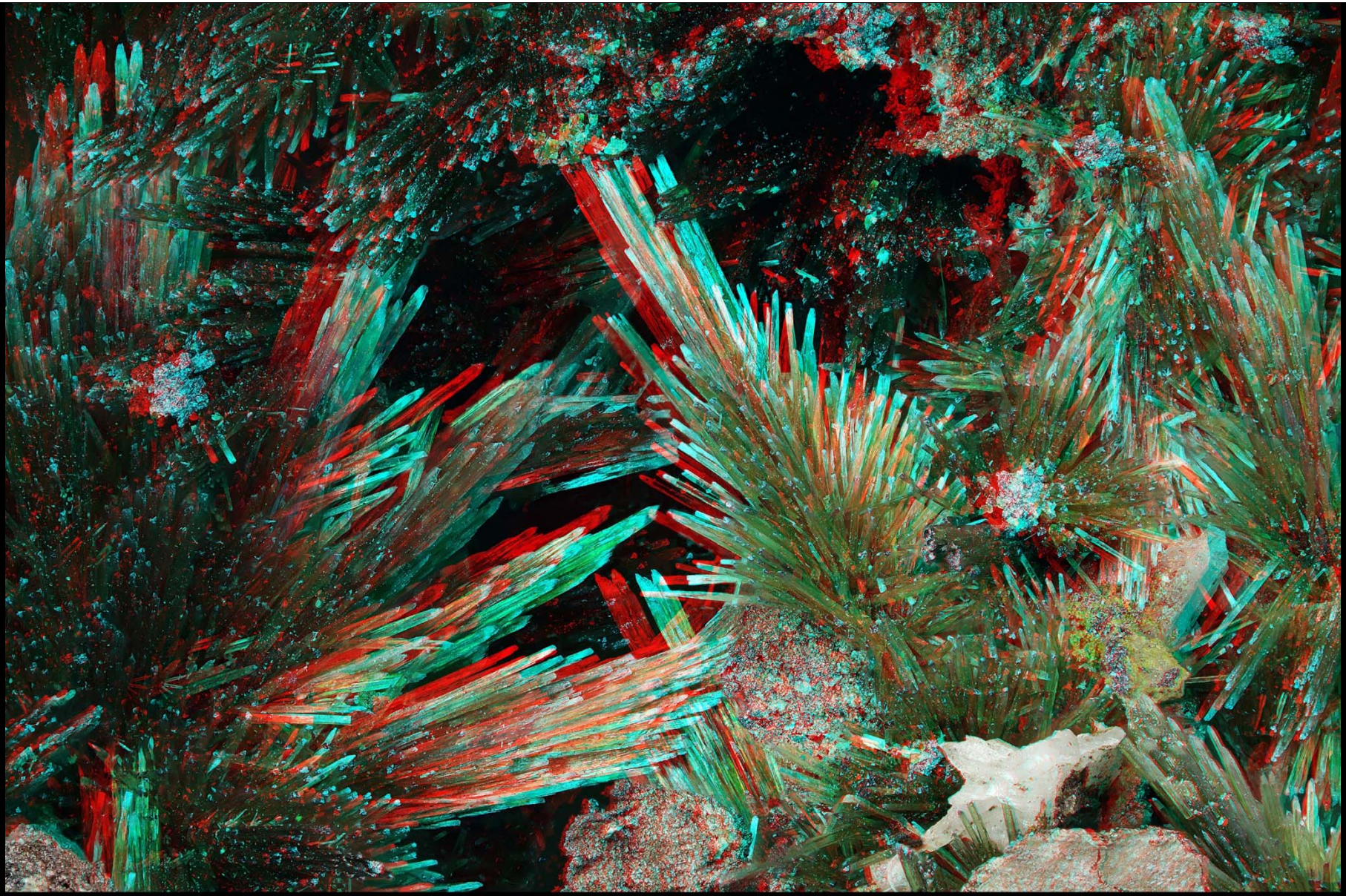
Dark pine-green sprays possibly with minor agardite on a rather hematite-coated quartz matrix.

Tincroft Mine, Illogan, Cornwall.

Specimen: David Green collection, ex-Don Alderson. Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 158 and 143 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Olivenite $Cu_2(AsO_4)(OH)$

Field width 10.8 mm.

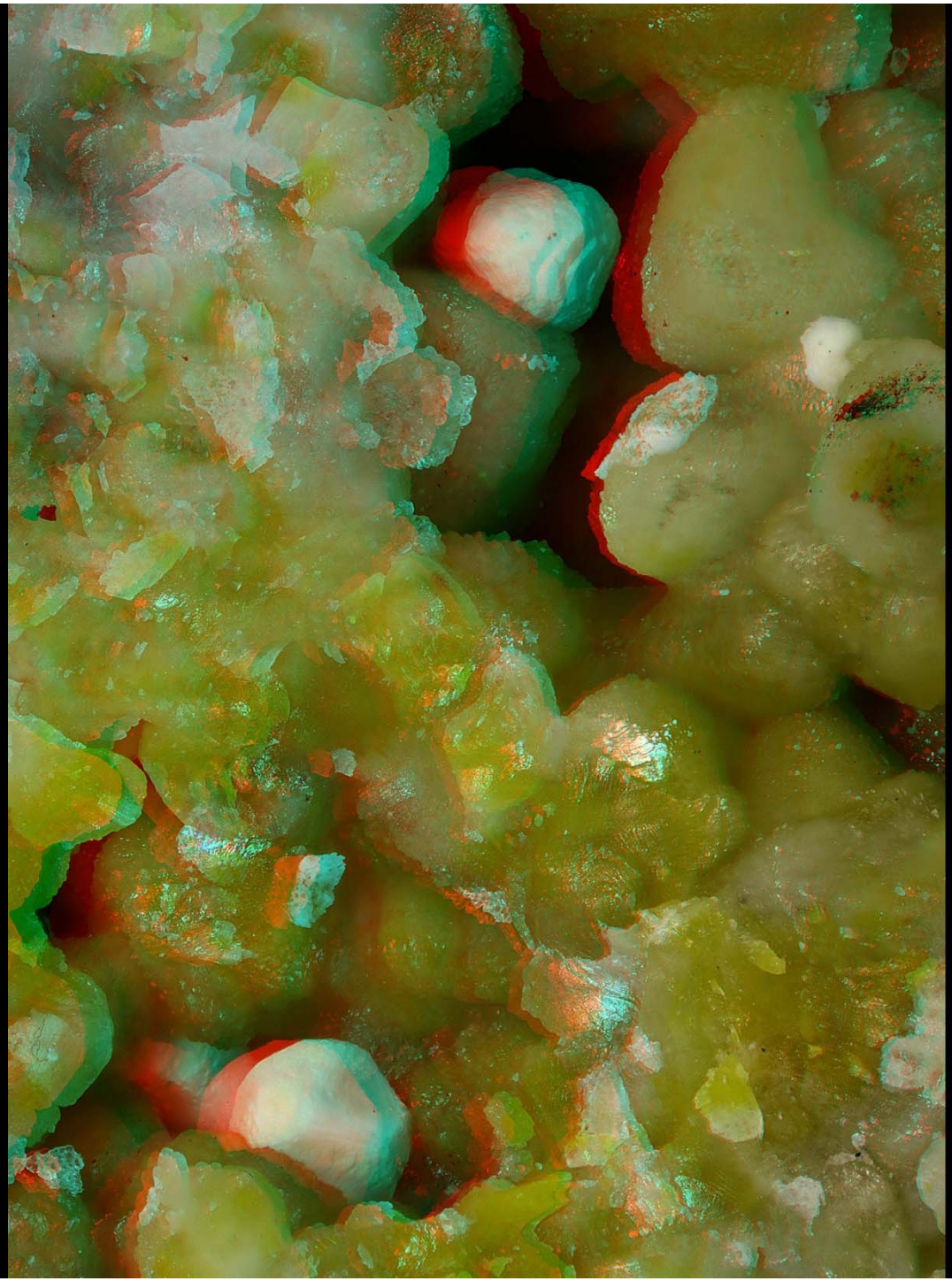
Dark pine-green sprays possibly with minor agardite on a rather hematite-coated quartz matrix.

Tincroft Mine, Illogan, Cornwall.

Specimen: David Green collection, ex-Don Alderson. Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 109 and 118 60-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



Otavite $Cd(CO_3)$

White rhombohedral crystals in cadmium sulphide-rich smithsonite.

Sheshodonnell East Mine R 268 968, Co. Clare.

Specimen: David Green collection.

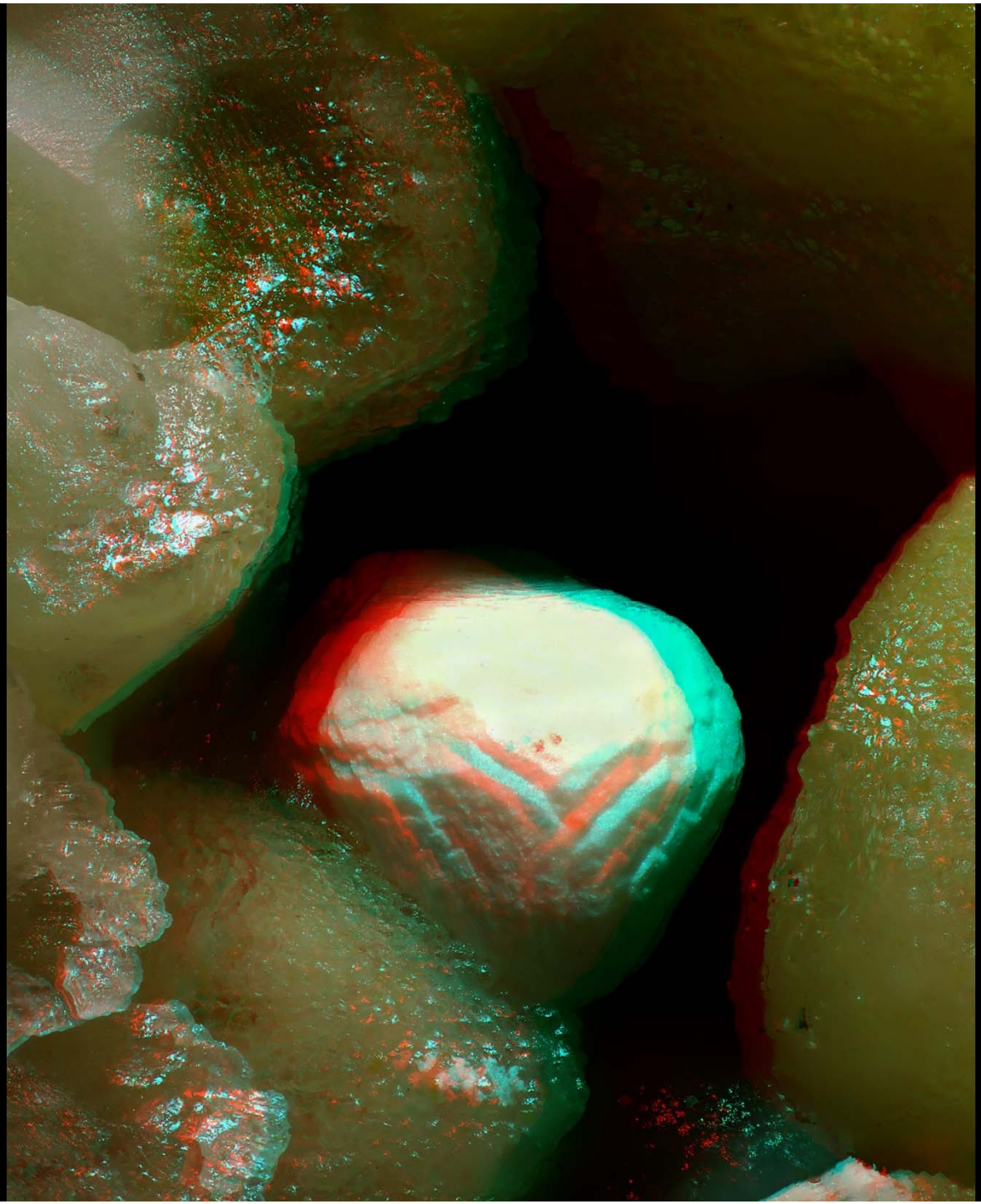
Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 73 and 72 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM and rendered in Stereophotomaker.

Field height 4.43 mm

1 mm



Otavite $Cd(CO_3)$

White rhombohedral crystals in cadmium sulphide-rich smithsonite.

Sheshodonnell East Mine R 268 968, Co. Clare.

Specimen: David Green collection.

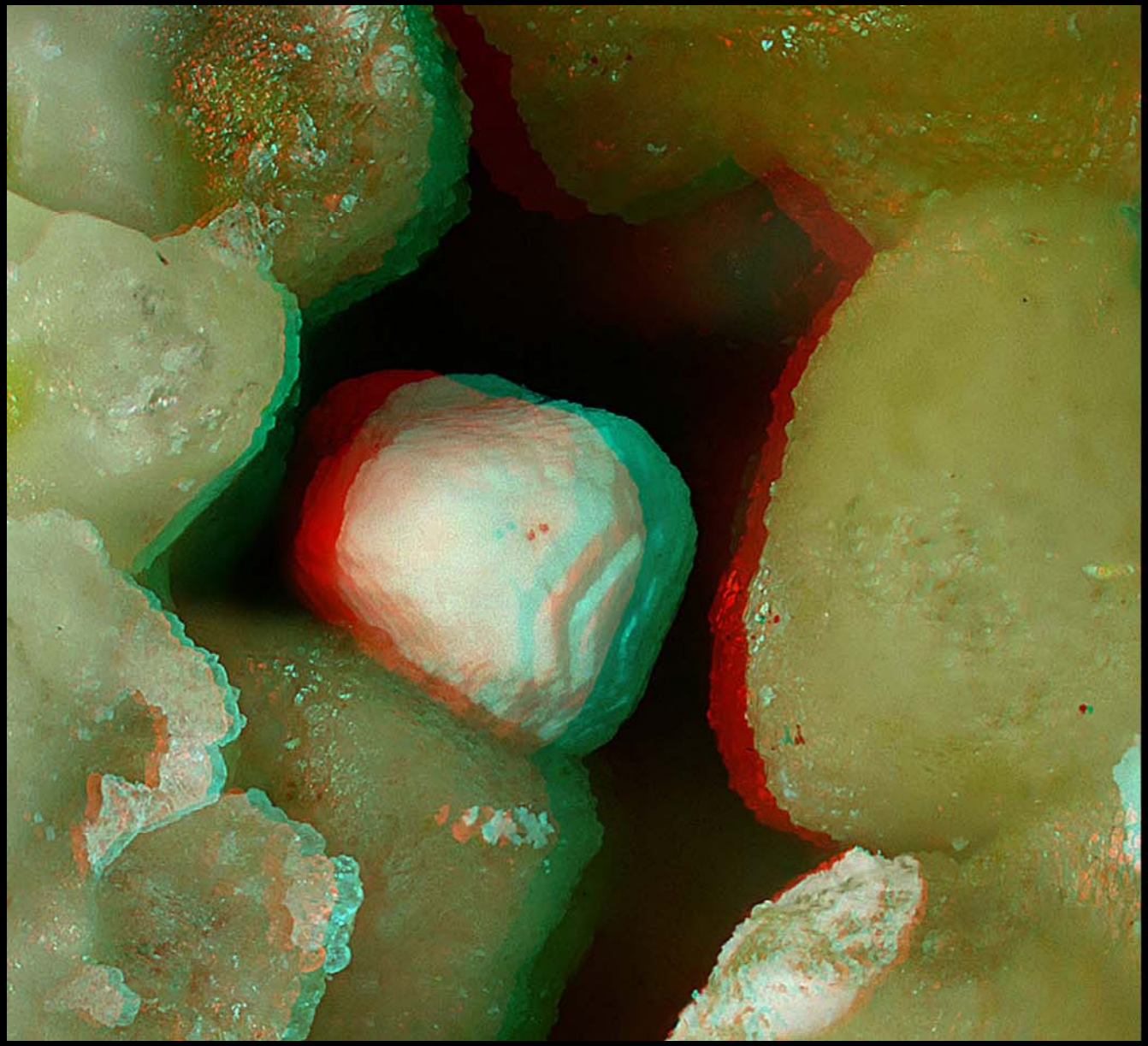
Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 16 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 107 and 111 10-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

Field height 1.57 mm.

0.1 mm



Otavite $Cd(CO_3)$

White rhombohedral crystals in cadmium sulphide-rich smithsonite.

Sheshodonnell East Mine R 268 968, Co. Clare.

Specimen: David Green collection.

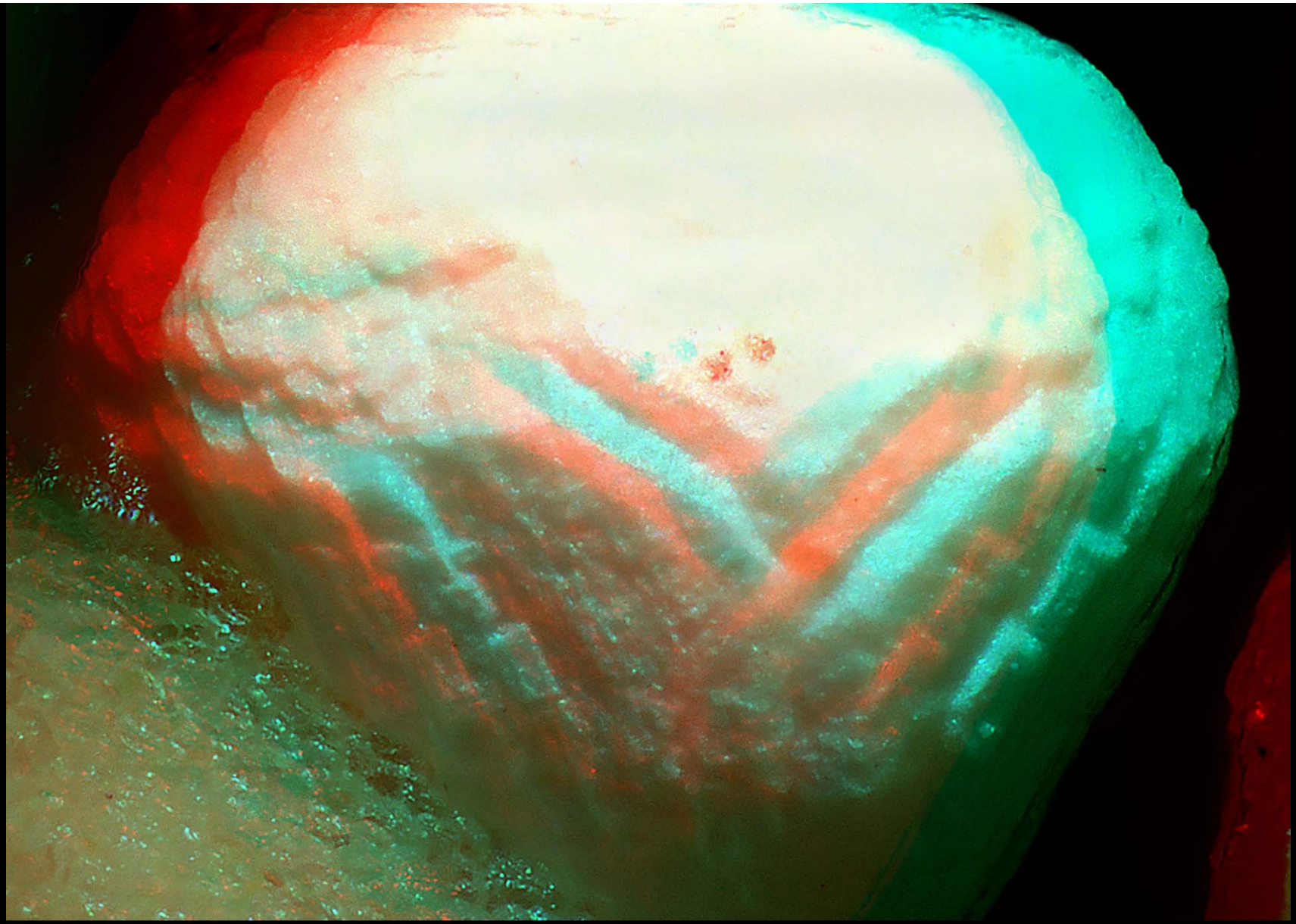
Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 73 and 72 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM and rendered in Stereophotomaker.

Field height 1.70 mm.

0.5 mm

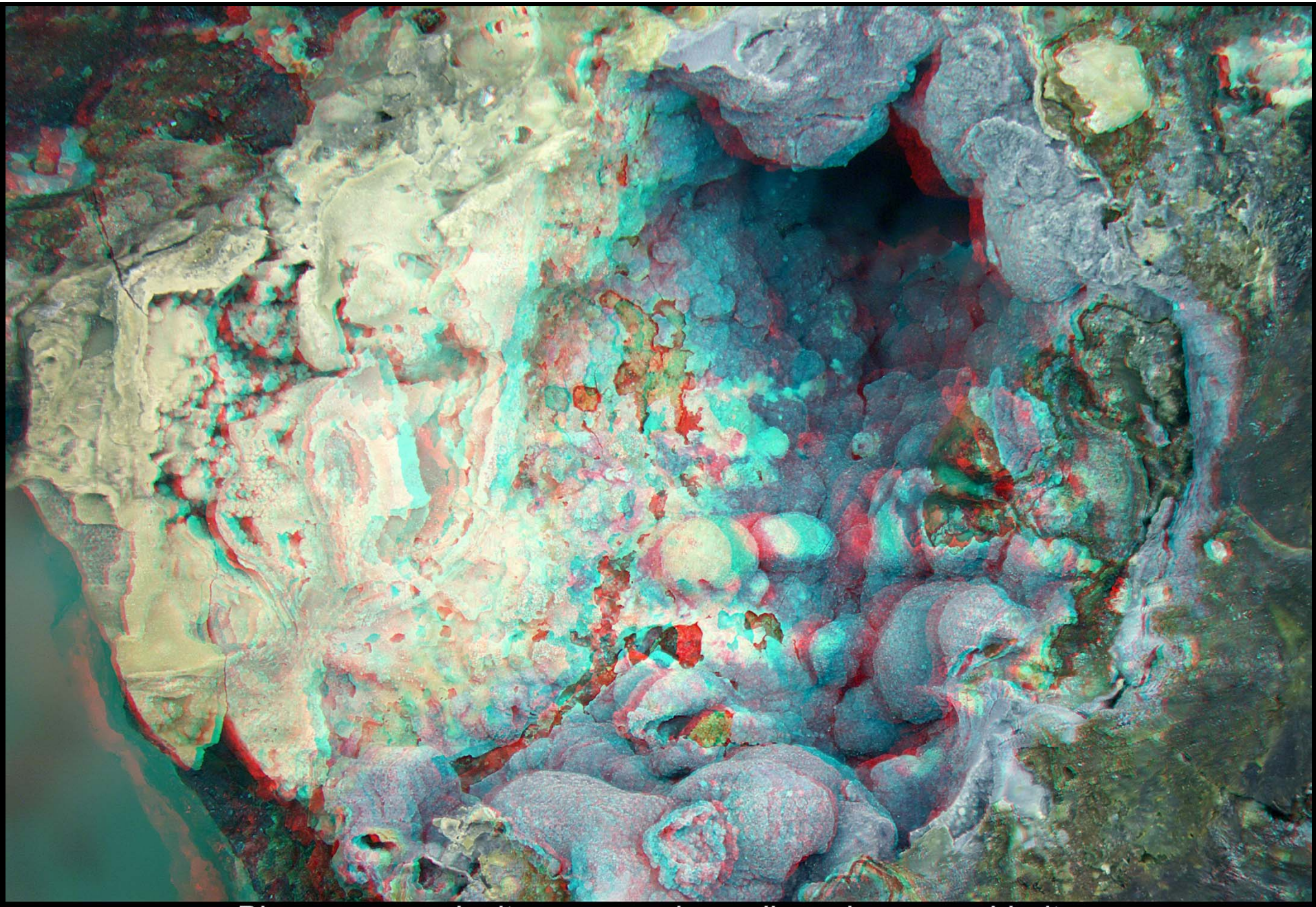


0.1 mm

Otavite $Cd(CO_3)$

Field height 0.665 mm.

White rhombohedral crystal on cadmium sulphide-rich smithsonite.
Sheshodonnell East Mine R 268 968, Co. Clare.
Specimen: David Green collection. Photography: John Chapman, January 2024.
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 107 and 111 10-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



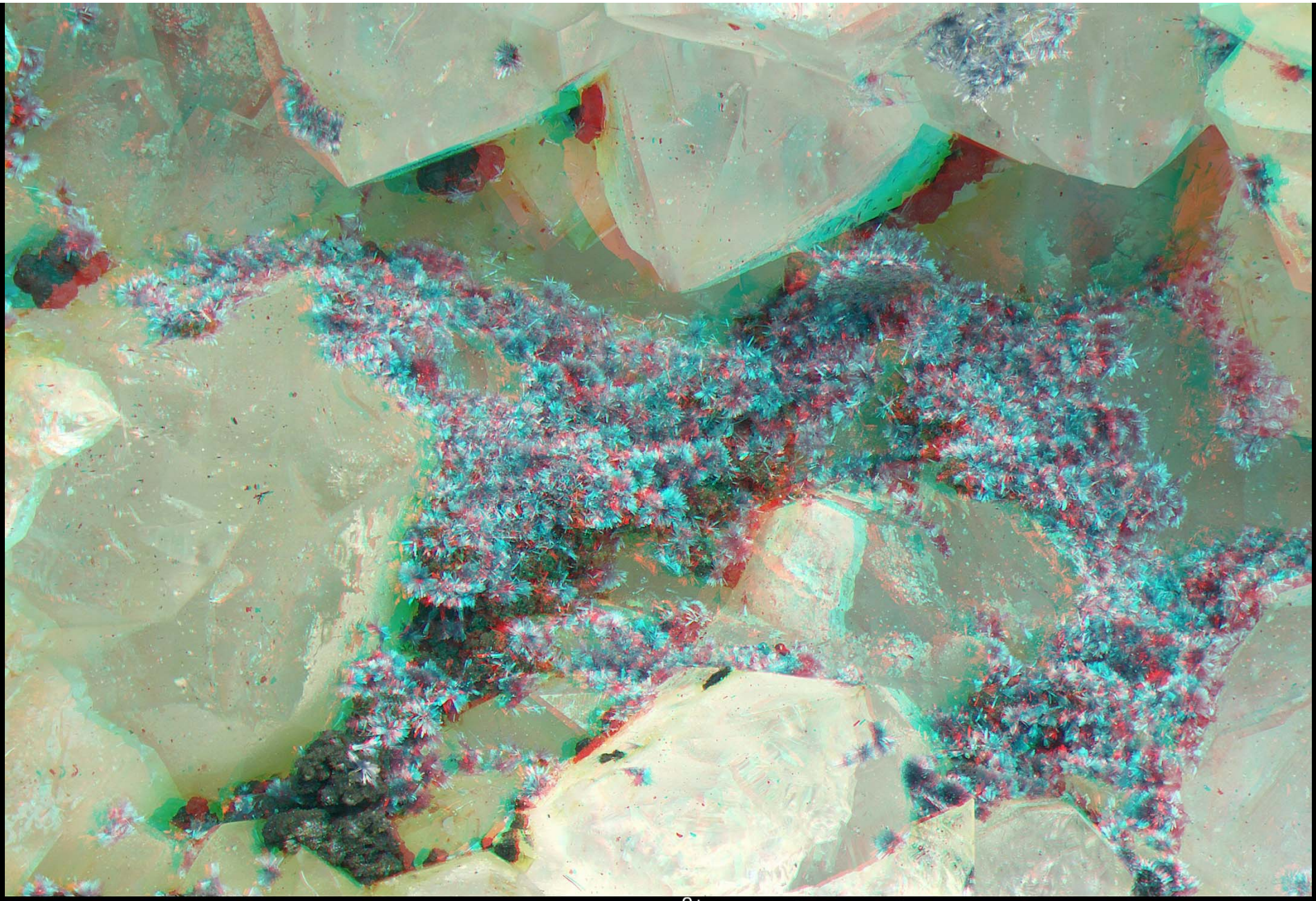
Blue parasymplesite overgrowing yellow pharmacosiderite.

1 mm

Hilton Mine, Scordale, near Appleby, Cumbria.

Field width = 22.2 mm

Charles Lamb collection. Photography: John Chapman.



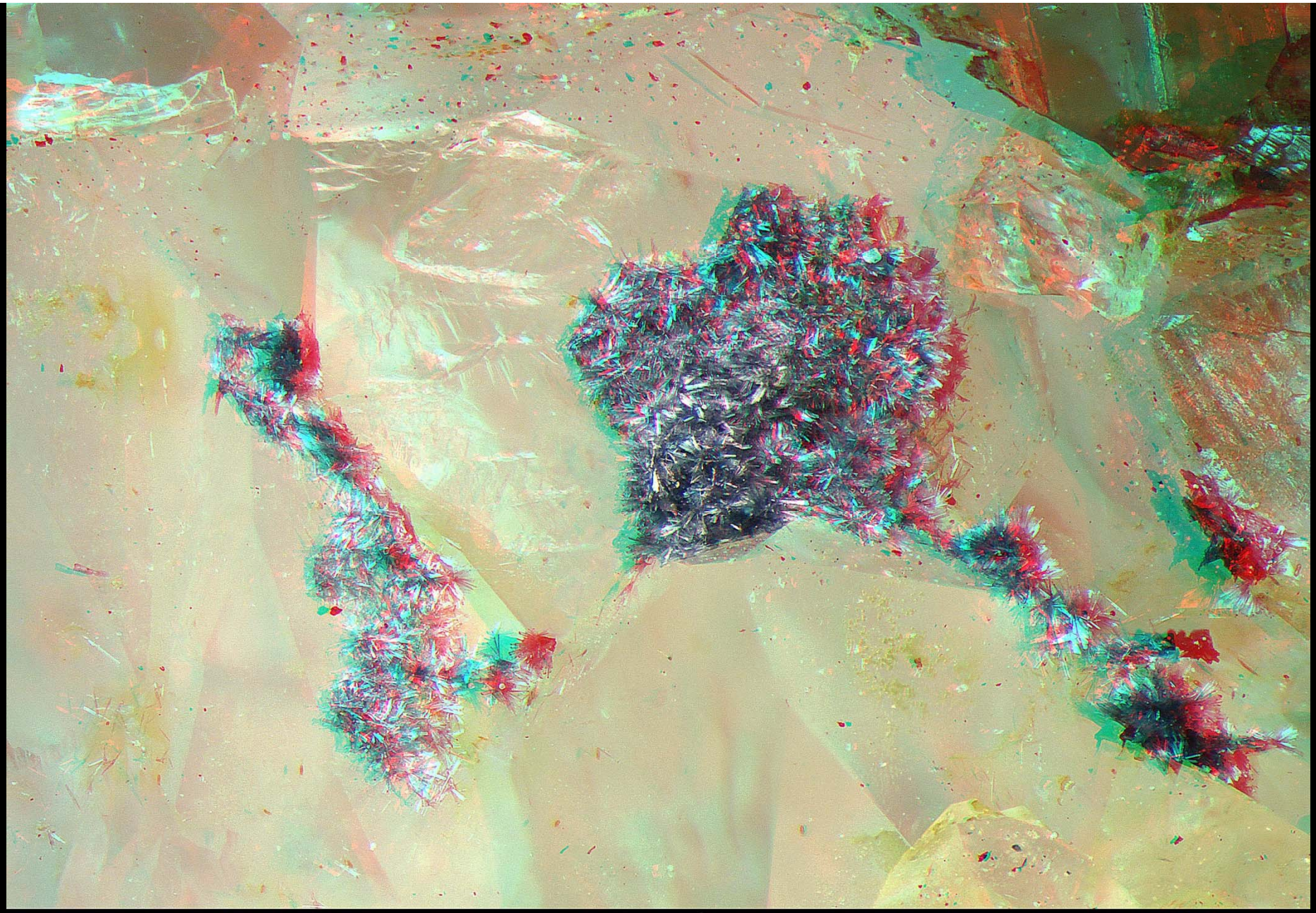
Parasymplesite $Fe^{2+}_3(AsO_4)_2.8H2O$

Hilton Mine, Scordale, nr. Appleby, Cumbria.

Charles Lamb collection. Photography: John Chapman.

1 mm

Field width = 10.8 mm



1 mm

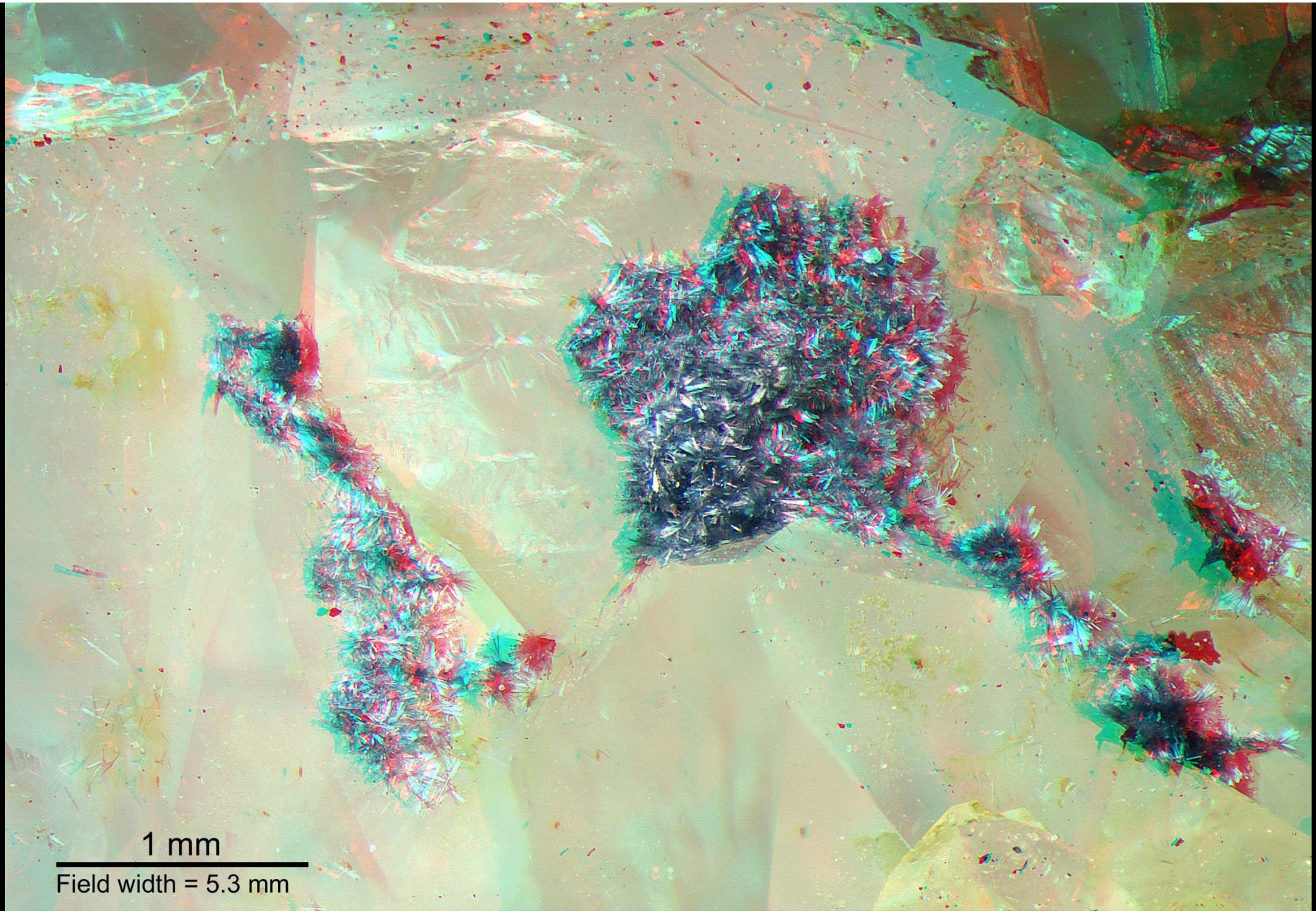
Parasymplesite $Fe^{2+}_3(AsO_4)_2.8H_2O$

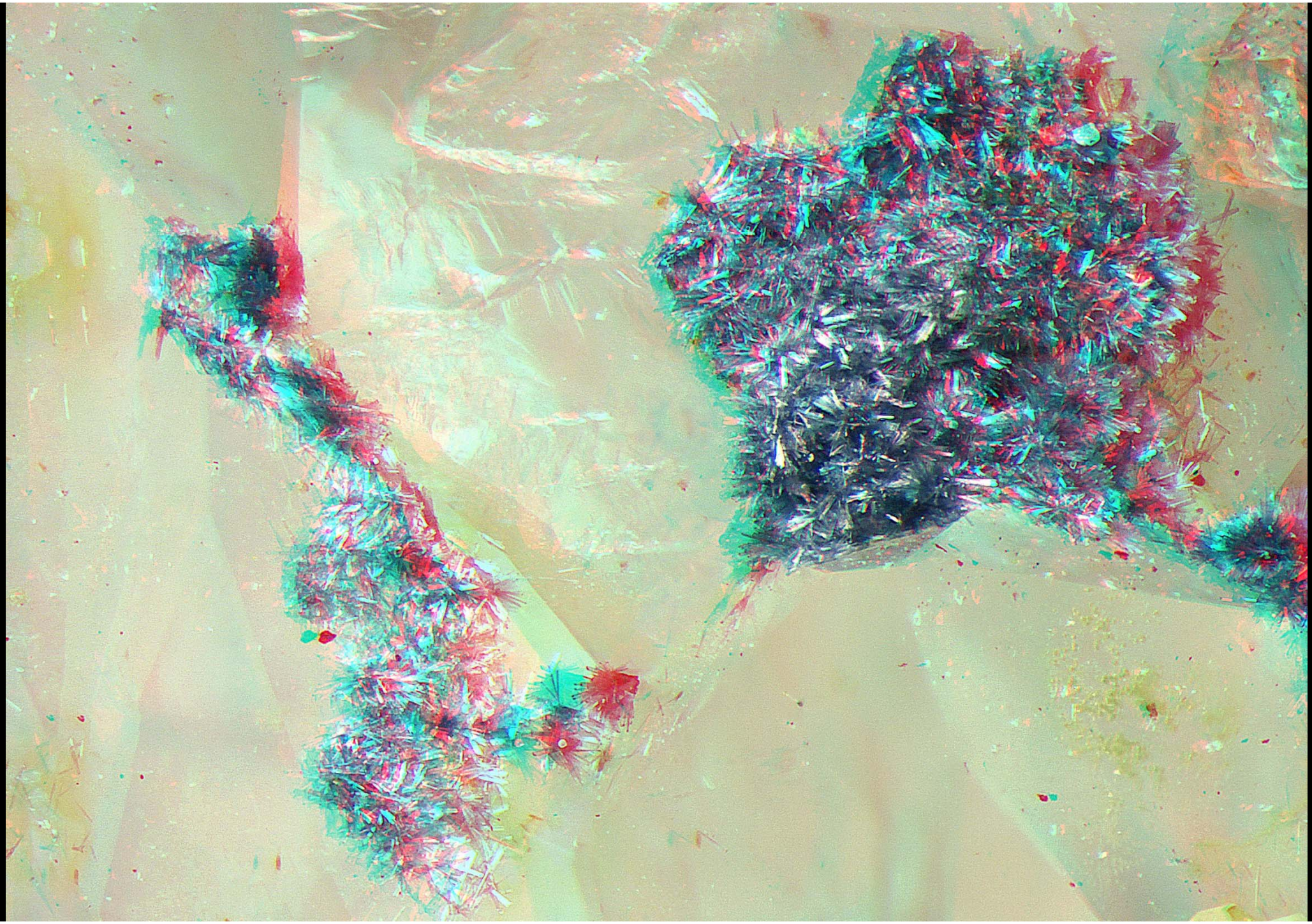
Hilton Mine, Scordale, near Appleby, Cumbria.

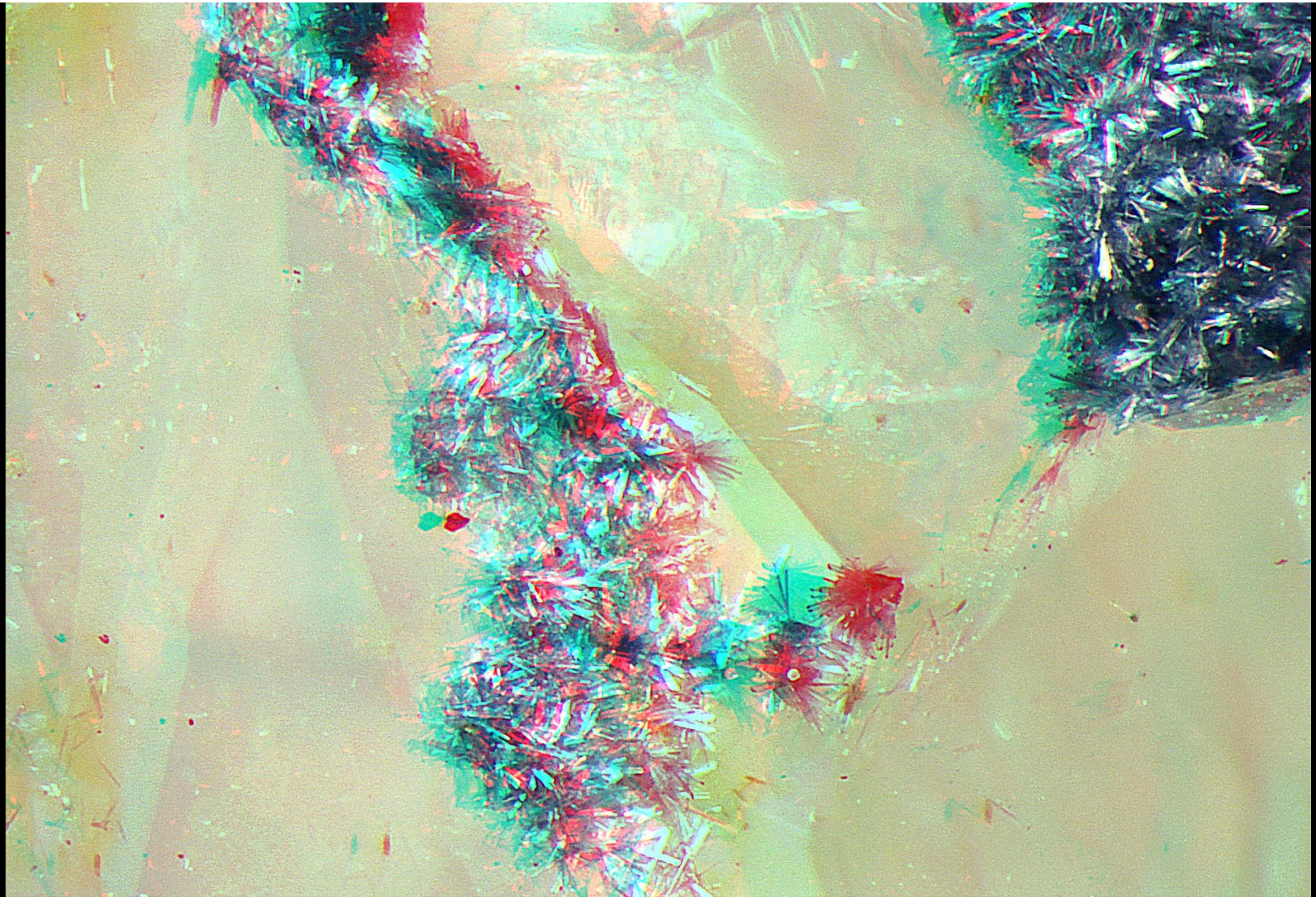
Field width 5.3 mm

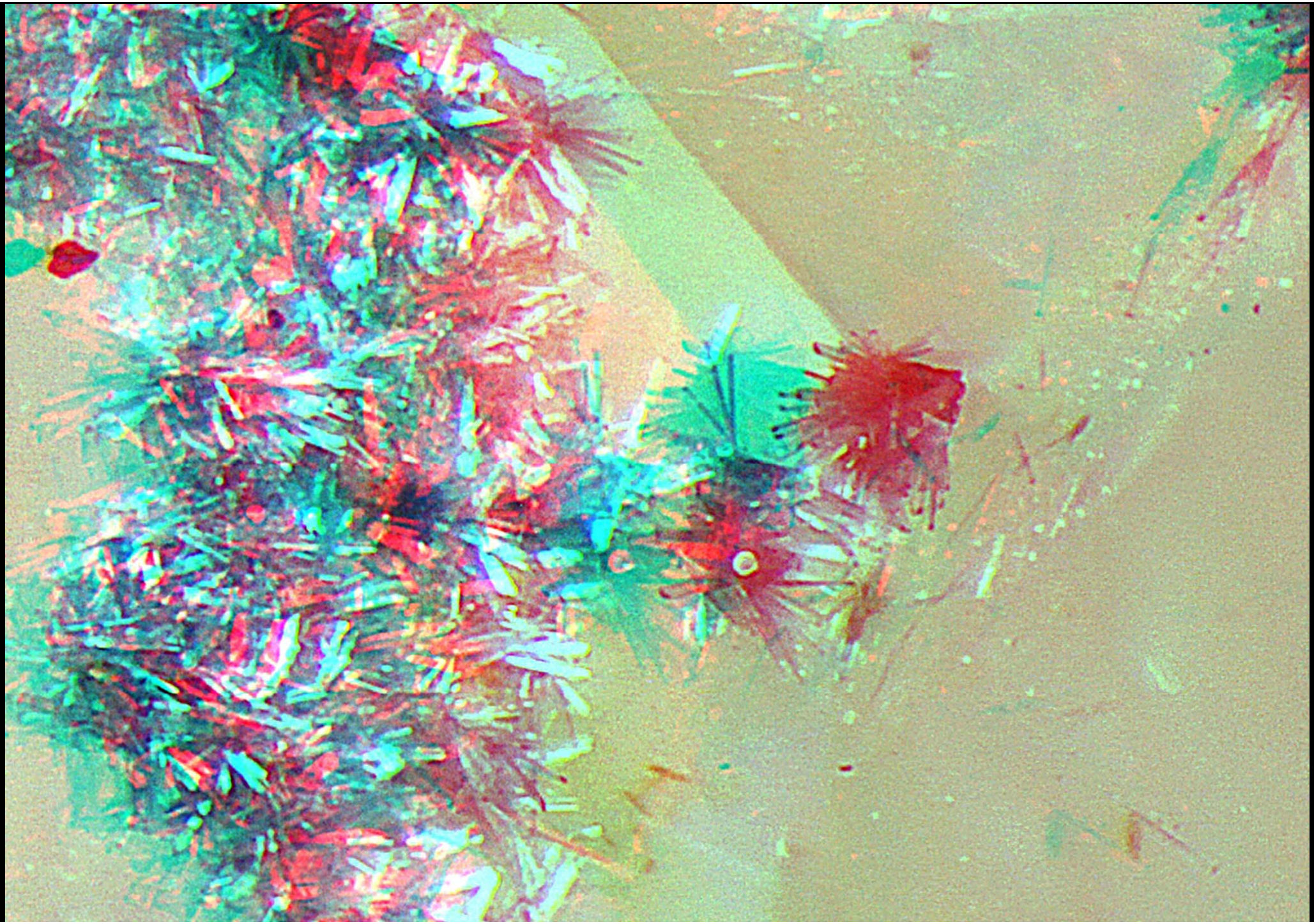
Specimen: Charles Lamb collection. Photography: John Chapman.

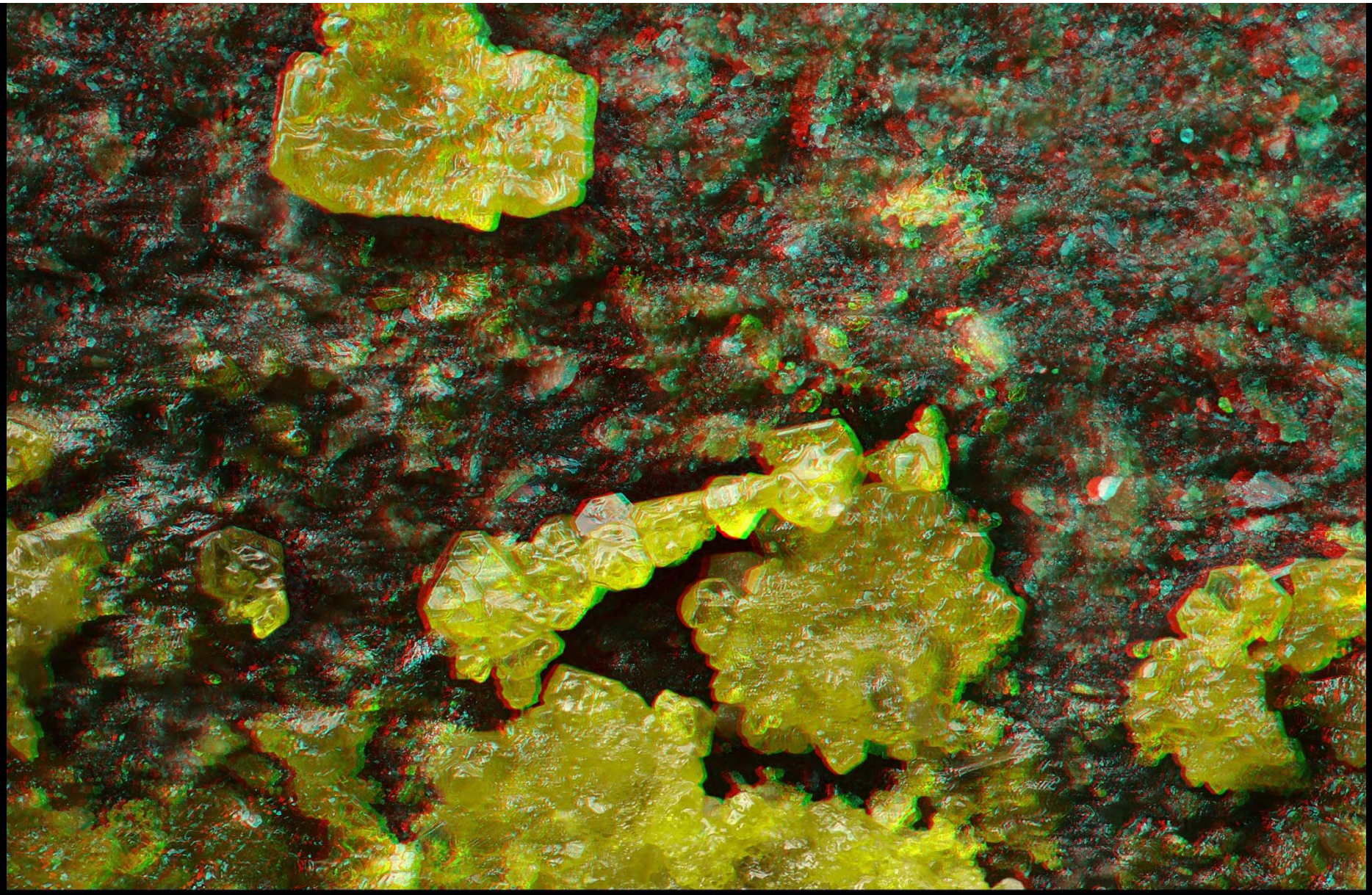
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 5x zoom, with Schott fibre optic lighting.


1 mm
Field width = 5.3 mm









0.1 mm

Pascoite $Ca_3V^{5+}_{10}O_{28}\cdot 17H_2O$

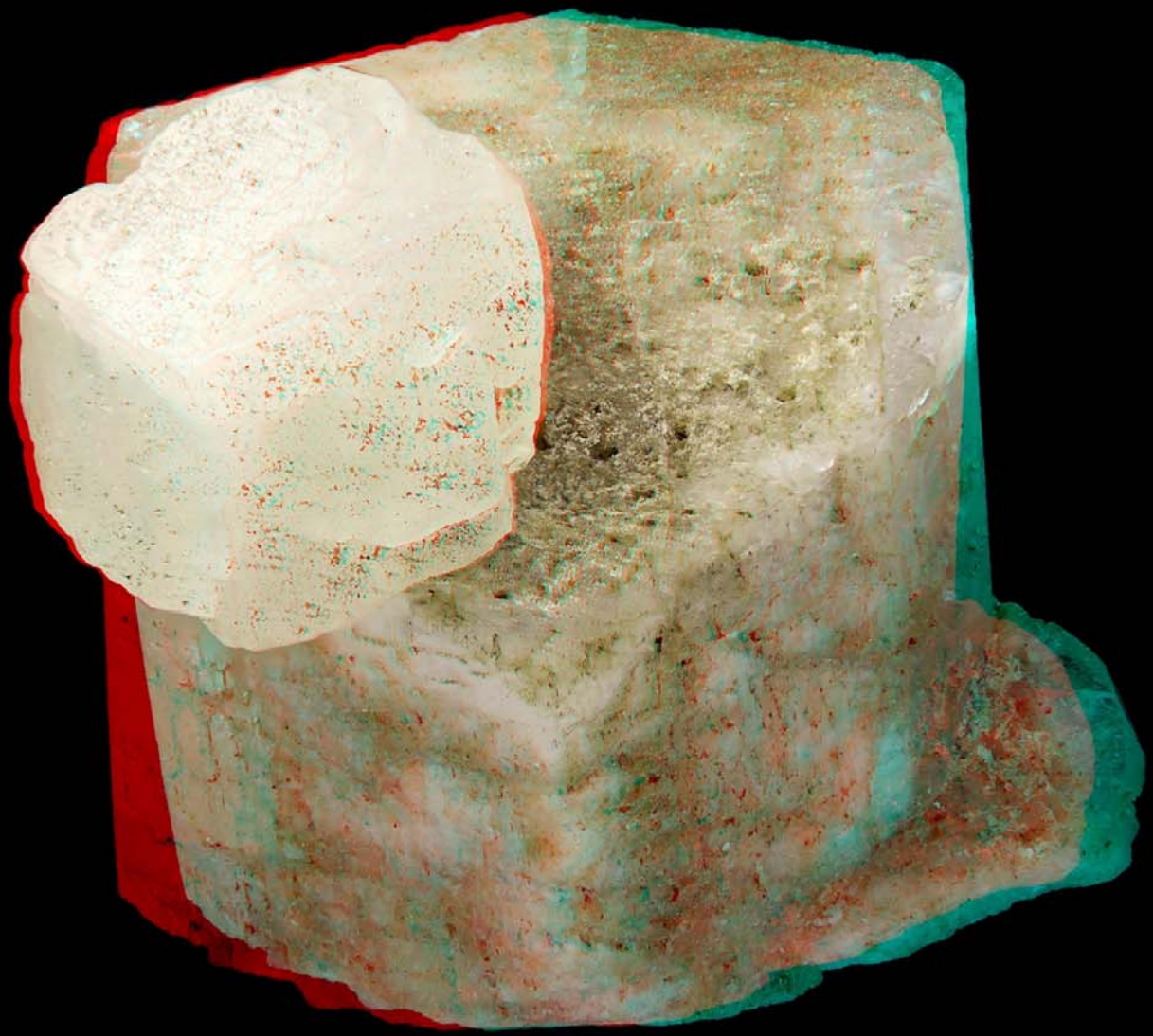
Field width 1.21 mm.

In centre of spherical nodule from Triassic tea green marls, Littleham Cove, Budleigh Salterton, Devon.

Specimen: David Green collection No. M713. Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 78 and 75 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Phenakite $Be_2(SiO_4)$

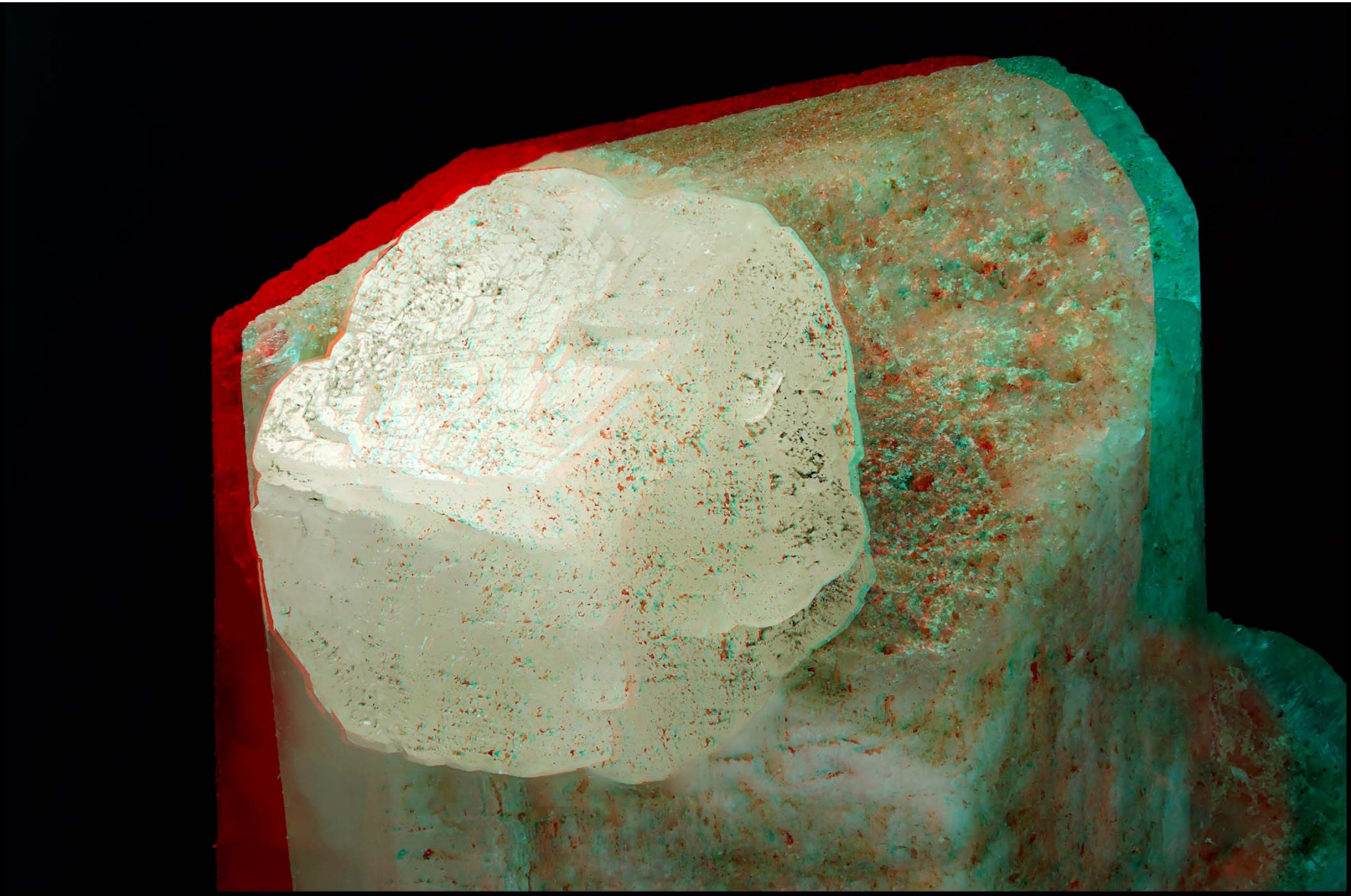
Translucent white tabular trigonal crystal
5.9 mm across on orthoclase feldspar crystal.

Beinn Macdui north east, Cairngorms,
Aberdeenshire.

Specimen: Calum Anton collection.
Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss Luminar 63 mm
objective lens on 80 mm bellows extension,
with Schott fibre optic illumination.

Left + right stacks of 113 and 111 100-micrometre steps at 6 degrees
via Stackshot rail, with Luminar at fully open aperture, combined in
CombineZM and rendered in Stereophotomaker.



1 mm

Phenakite $Be_2(SiO_4)$

Field width 15.3 mm

Translucent white tabular trigonal crystal 5.9 mm across on orthoclase feldspar crystal.
Ben Macdui north east, Cairngorms, Aberdeenshire.
Specimen: Calum Anton collection. Photography: John Chapman.
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 120 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 122 and 114 80-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

0.1 mm

Plumboagardite $(Pb,Ce,Nd,La,Ca)Cu_6(AsO_4)_3(OH)_6 \cdot 3H_2O$ Field width 0.887 mm.

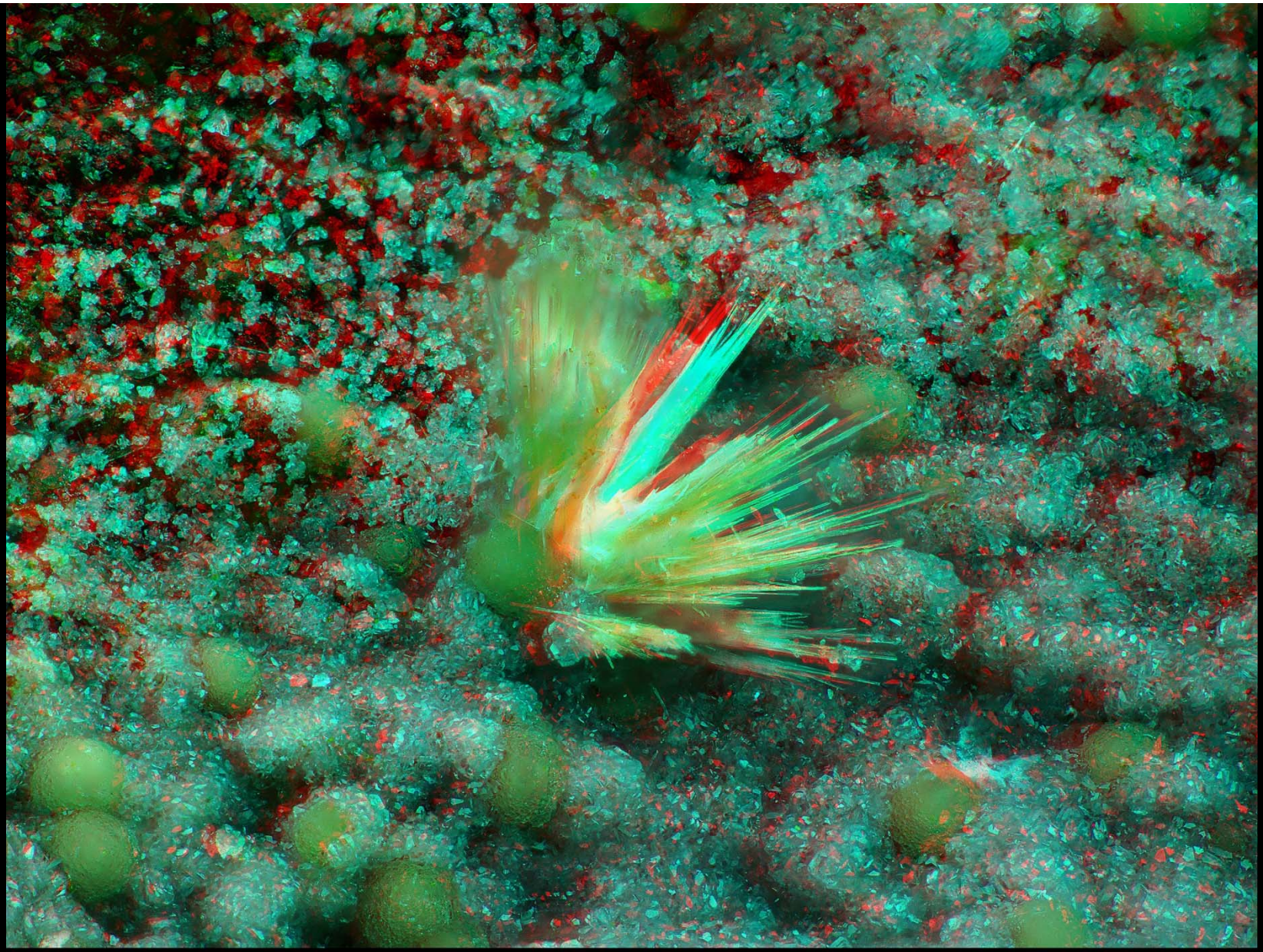
Acicular tufts (analysis confirmed) on green duftite balls overgrown by a sparkly crust of quartz.

Potts Gill Mine, Caldbeck Fells, Cumbria.

Specimen: Paul Nicholson collection. Photography: John Chapman, March 2024.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 84 and 92 5-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



0.1 mm

Plumboagardite $(Pb,Ce,Nd,La,Ca)Cu_6(AsO_4)_3(OH)_6 \cdot 3H_2O$ Field width 1.08 mm.

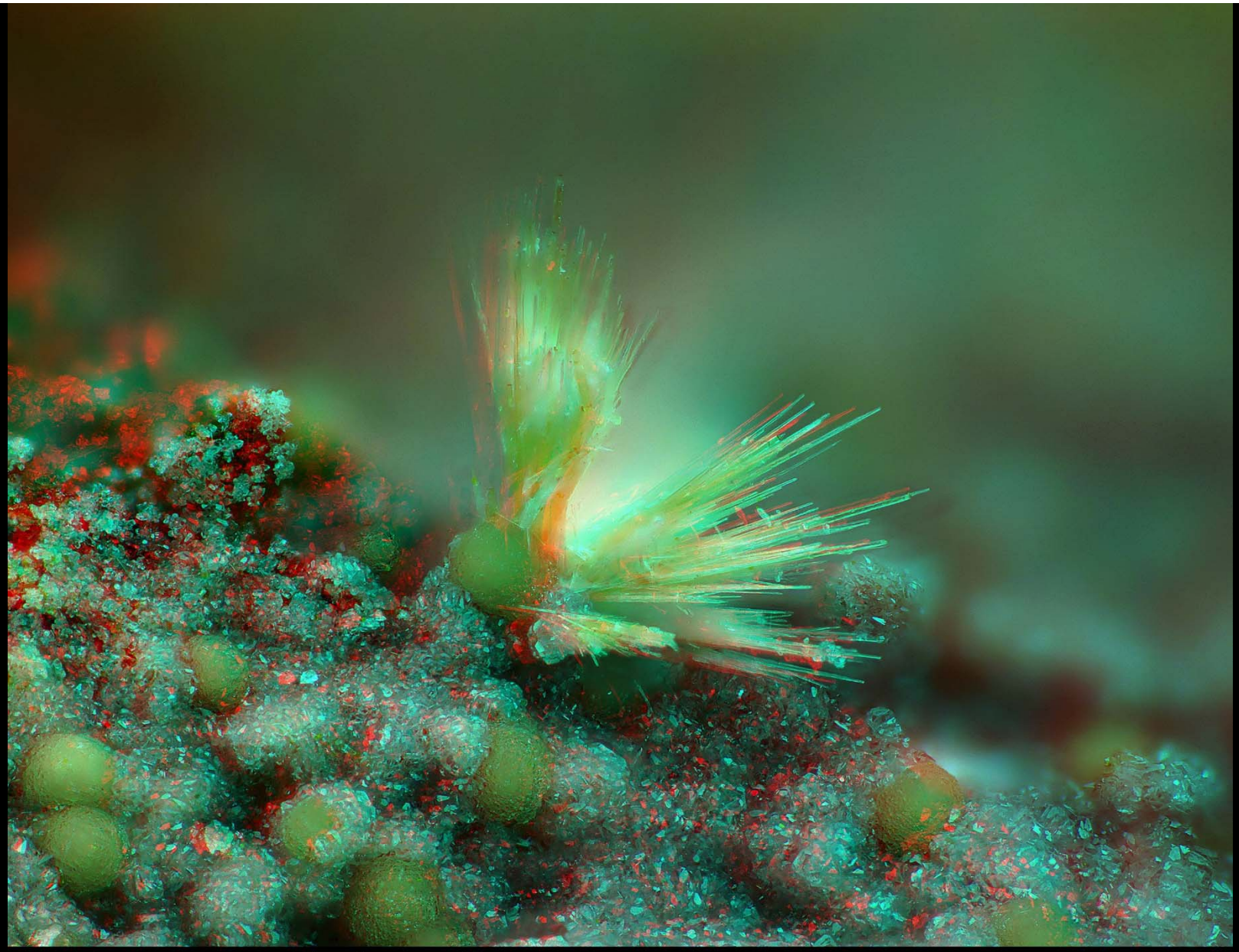
Acicular tufts (analysis confirmed) on green duftite balls overgrown by a sparkly crust of quartz.

Potts Gill Mine, Caldbeck Fells, Cumbria.

Specimen: Paul Nicholson collection. Photography: John Chapman, March 2024.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 123 and 117 4-micrometre steps at 6 degrees via Stackshot rail combined in CombineZM and rendered in Stereophotomaker.



0.1 mm

Plumboagardite $(Pb,Ce,Nd,La,Ca)Cu_6(AsO_4)_3(OH)_6 \cdot 3H_2O$ Field width 1.22 mm.

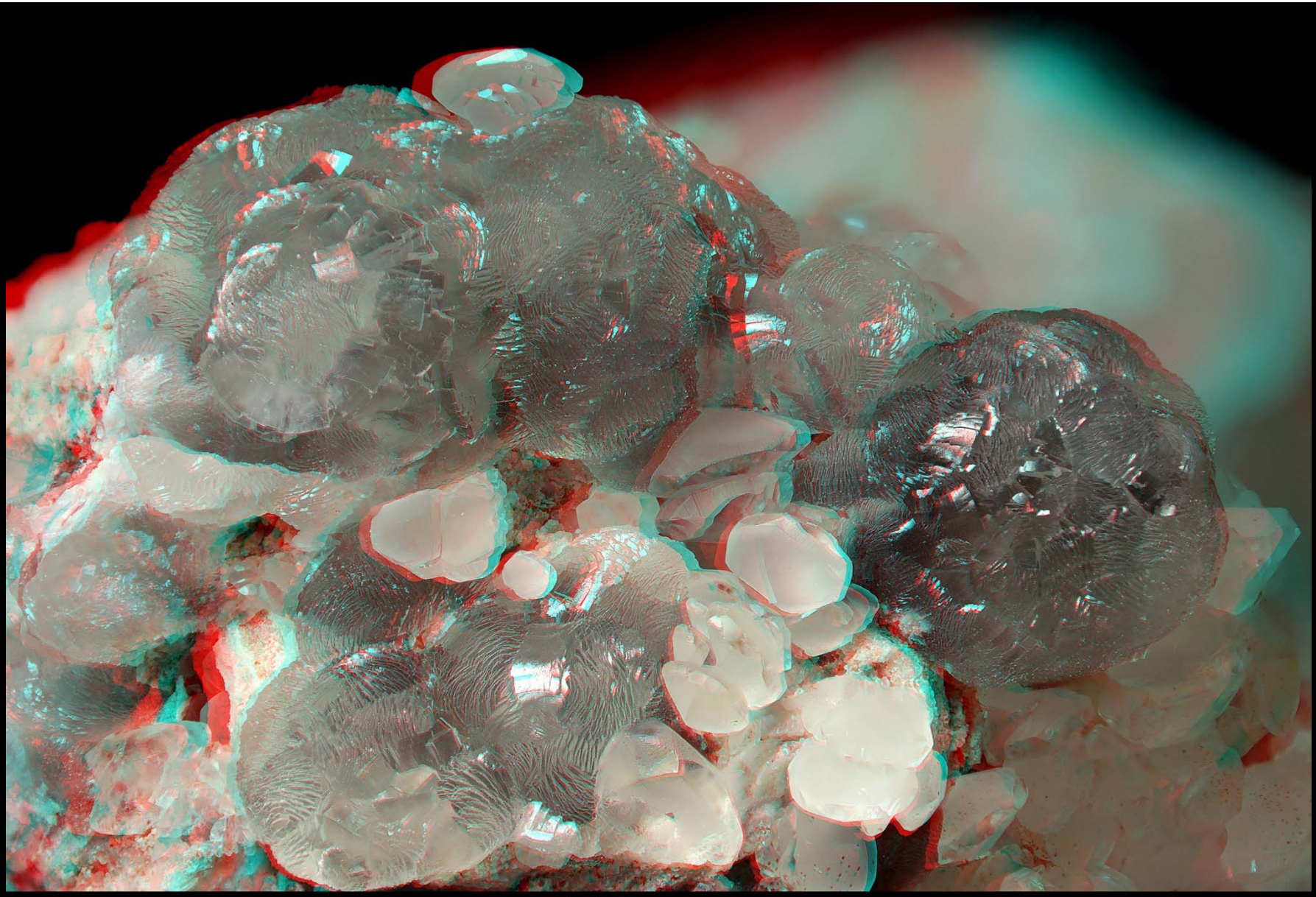
Acicular tufts (analysis confirmed) on green duftite balls overgrown by a sparkly crust of quartz.

Potts Gill Mine, Caldbeck Fells, Cumbria.

Specimen: Paul Nicholson collection. Photography: John Chapman, March 2024.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 123 and 117 4-micrometre steps at 6 degrees via Stackshot rail combined in CombineZM and rendered in Stereophotomaker.



1 mm

Calcite $Ca(CO_3)$

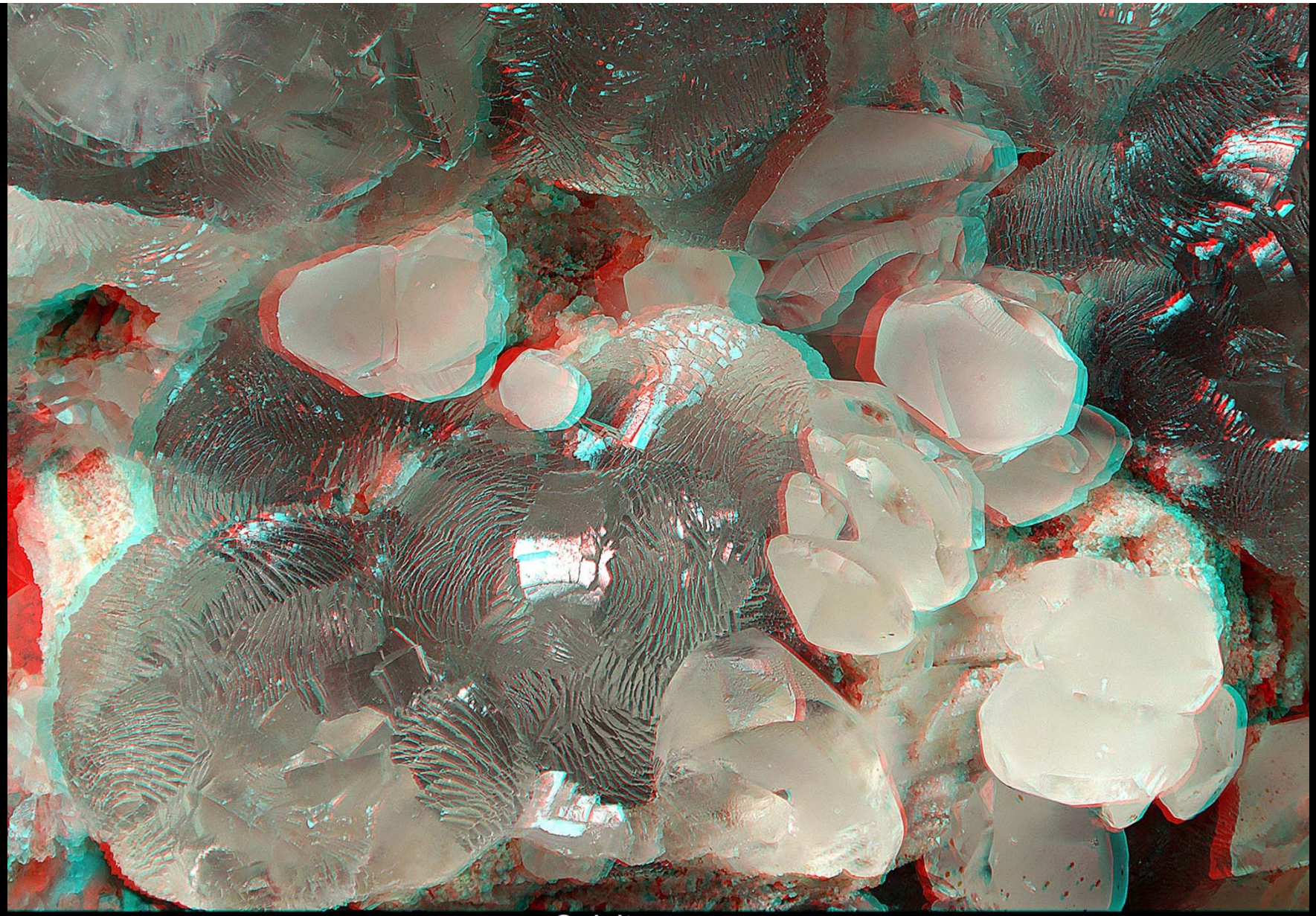
Field width 19.9 mm.

Flattened nail-head crystals stacked on their C-axis with finely frosted pyramids, with globular clusters of transparent prehnite $Ca_2Al(Si_3Al)O_{10}(OH)_2$. Loanhead Quarry, Beith, North Ayrshire.

Specimen: Susan Tyzack collection, No. 549. Photography: John Chapman, November 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 80 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 72 and 60 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



1 mm

Calcite $Ca(CO_3)$

Field width 9.23 mm.

Flattened nail-head crystals stacked on their C-axis with finely frosted pyramids, with globular clusters of transparent prehnite $Ca_2Al(Si_3Al)O_{10}(OH)_2$. Loanhead Quarry, Beith, North Ayrshire.

Specimen: Susan Tyzack collection, No. 549. Photography: John Chapman, November 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 80 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 72 and 60 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.

Pyromorphite $Pb_5(PO_4)_3Cl$

Radiating tapering prismatic crystals in a void left by a crinoid columnal in silicified Crow Limestone.

Hungry Hushes NY 98665 02889, Arkengarthdale, North Yorkshire.

Specimen: David McCallum collection.

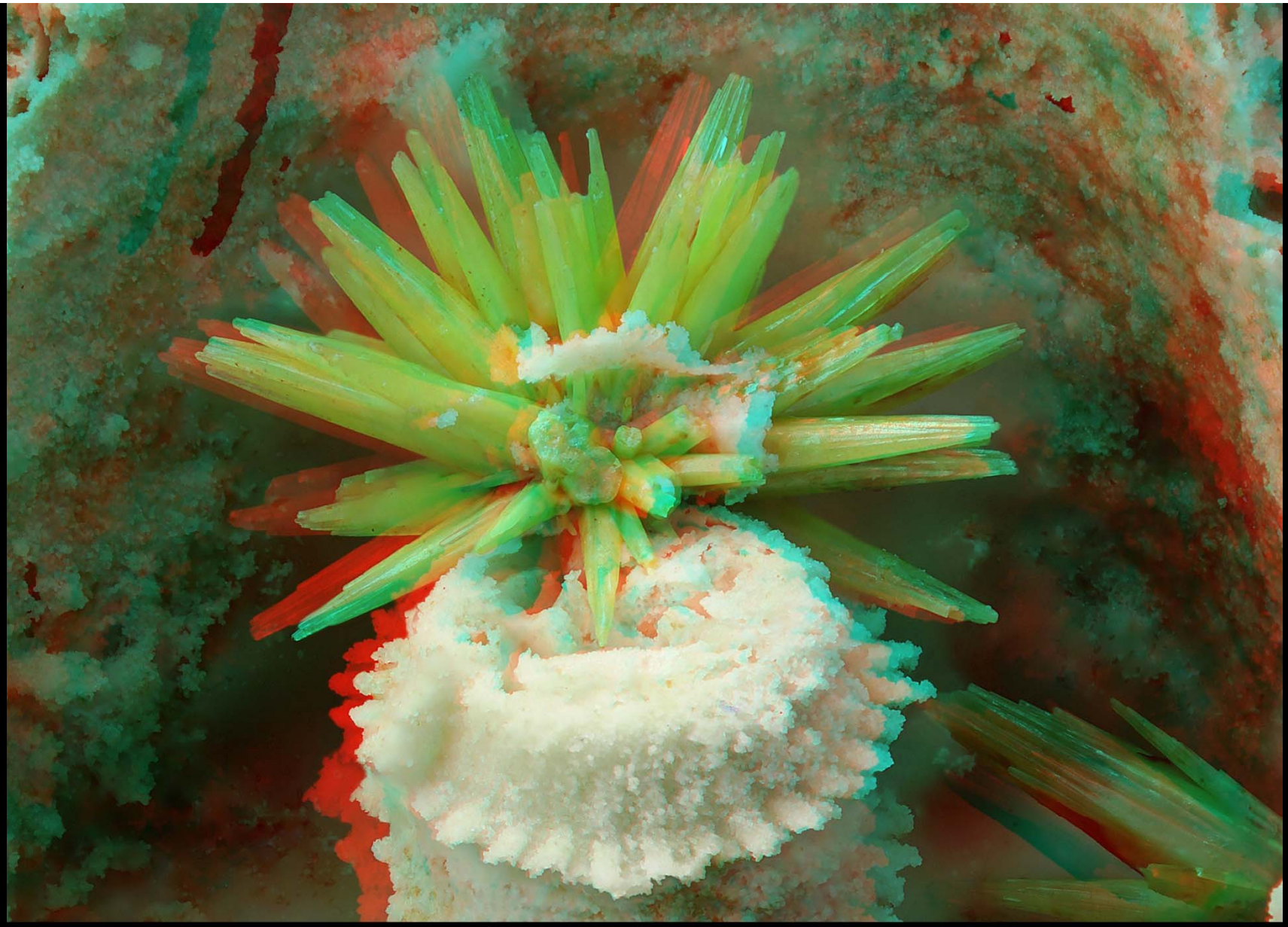
Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss Luminar 40 mm objective lens on 130 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 156 and 156 30-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 8.6 mm.



1 mm

Pyromorphite $Pb_5(PO_4)_3Cl$

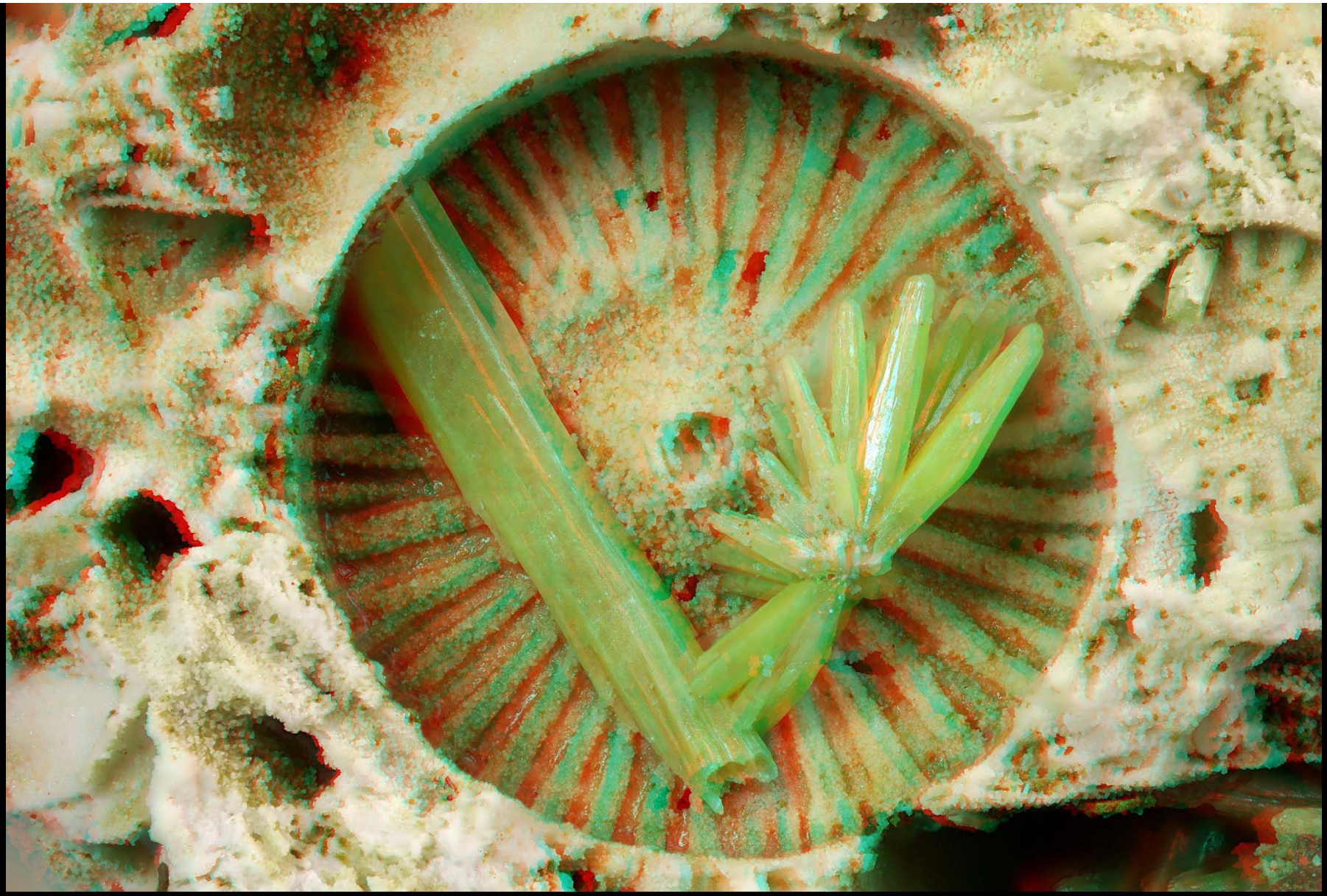
Field width 5.43 mm.

Radiating tapering prismatic crystals in a void left by a crinoid columnal in silicified Crow Limestone.

Hungry Hushes NY 98665 02889, Arkengarthdale, North Yorkshire.

Specimen: David McCallum collection. Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 130 mm bellows extension, with Schott fibre optic illumination.
stacks of 156 and 156 30-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

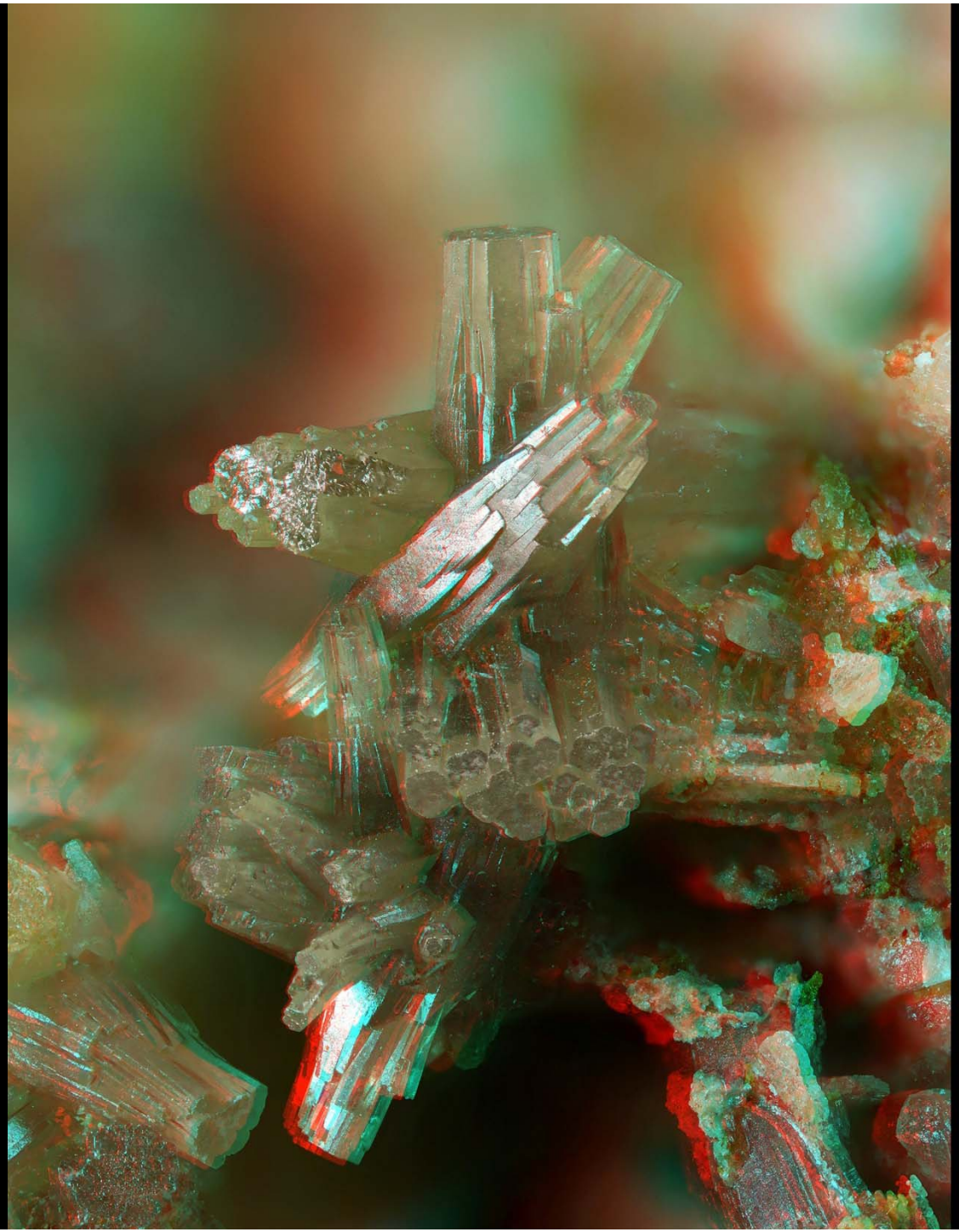
Pyromorphite $Pb_5(PO_4)_3Cl$

Field width 4.22 mm.

Tapering and radiating crystals on the base of a fossil crinoid columnal cast in silicified Crow Limestone.
Hungry Hushes NY 98665 02889, Arkengarthdale, North Yorkshire.

Specimen: found by David McCallum and now in John Chapman collection, No. HH147. Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 140 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 93 and 98 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Pyromorphite $Pb_5(PO_4)_3Cl$

Pale tawny brown subparallel groups with fluorite and baryte.

Northside Mines, northern flank of Stoddart Hush NY 8965 0287, Whaw, Arkengarthdale, North Yorkshire. From a vein in clastic rocks below the massive Richmond Chert.

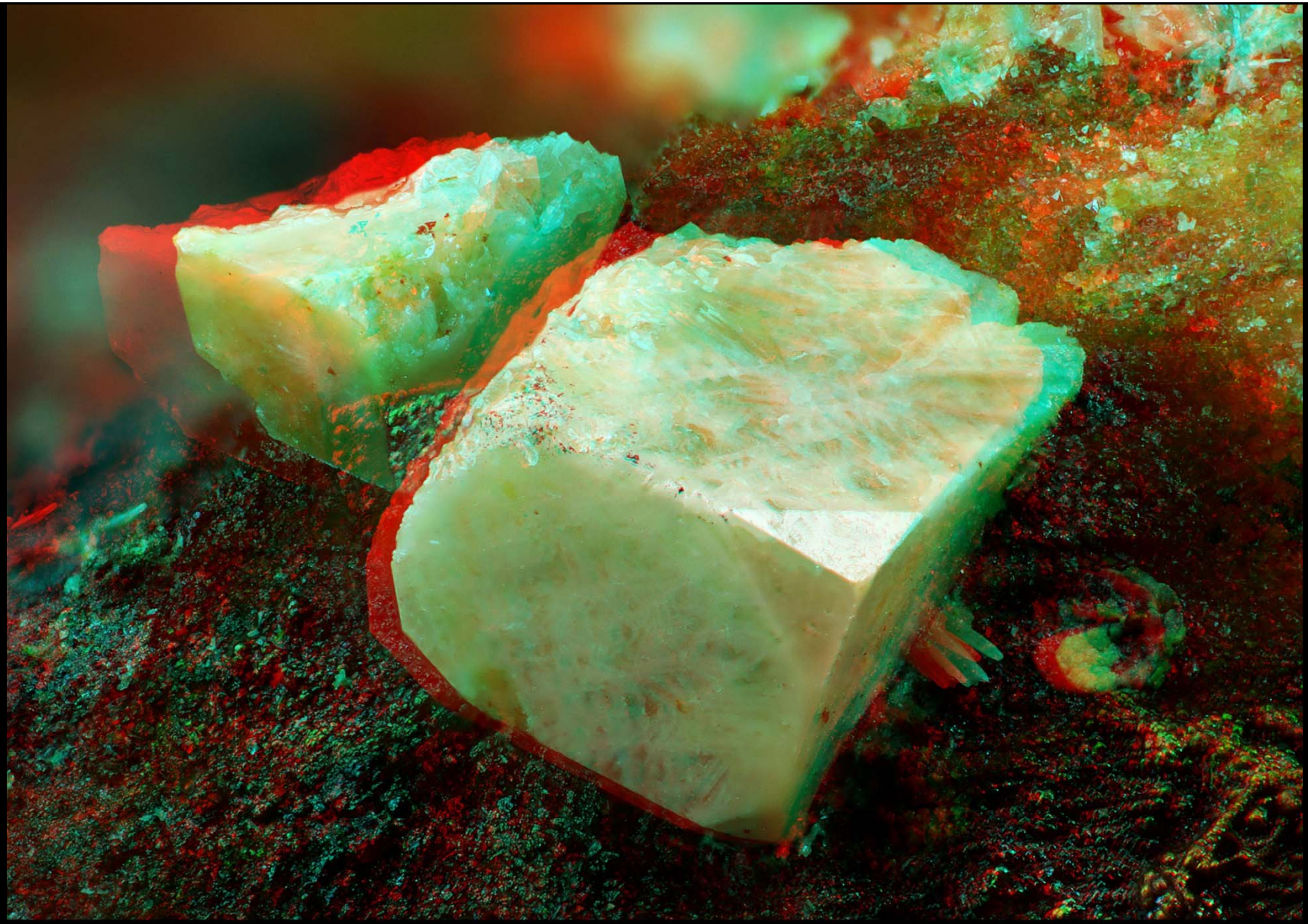
Specimen: found by David Green and in John Chapman collection.
Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss Luminar 25 mm lens on 175 mm bellows extension.
Left + right stacks of 51 and 48 20-micrometre steps at 6 degrees via Stackshot rail,
with Luminar at fully open aperture, combined in CombineZM.

3D image for viewing on computer screens.

1 mm

Field height 3.65 mm



0.1 mm

Pyromorphite $Pb_5(PO_4)_3Cl$

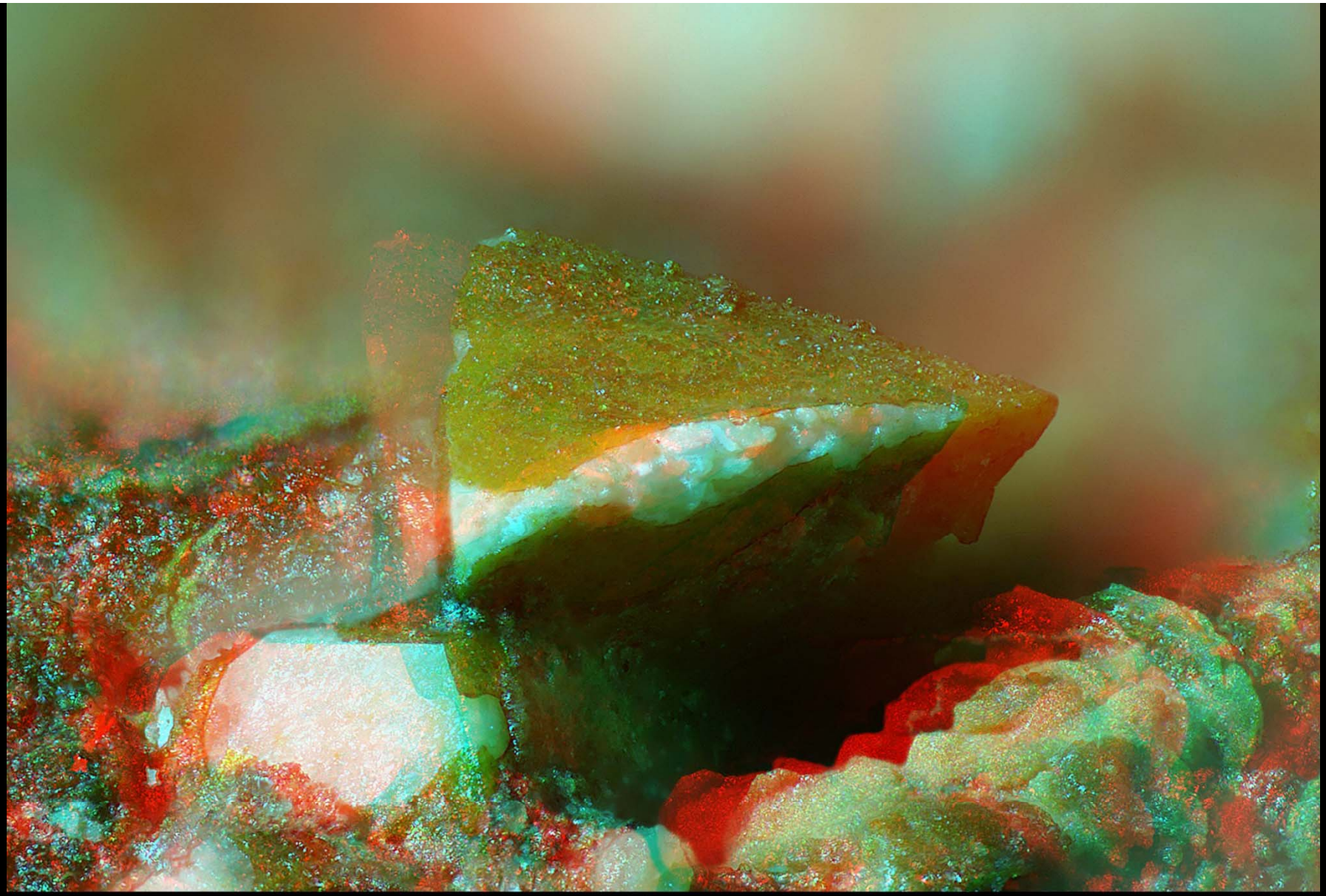
Field width 1.61 mm.

Rare pseudomorphs after fluorite, complete with corner modifications. From a landslipped faulted block of Crow Chert at NY 98667 02888, Hungry Hushes, Arkengarthdale, North Yorkshire.

Specimen: found by David McCallum and now in David Green collection. Photography: John Chapman, August 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 16 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 109 and 115 10-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

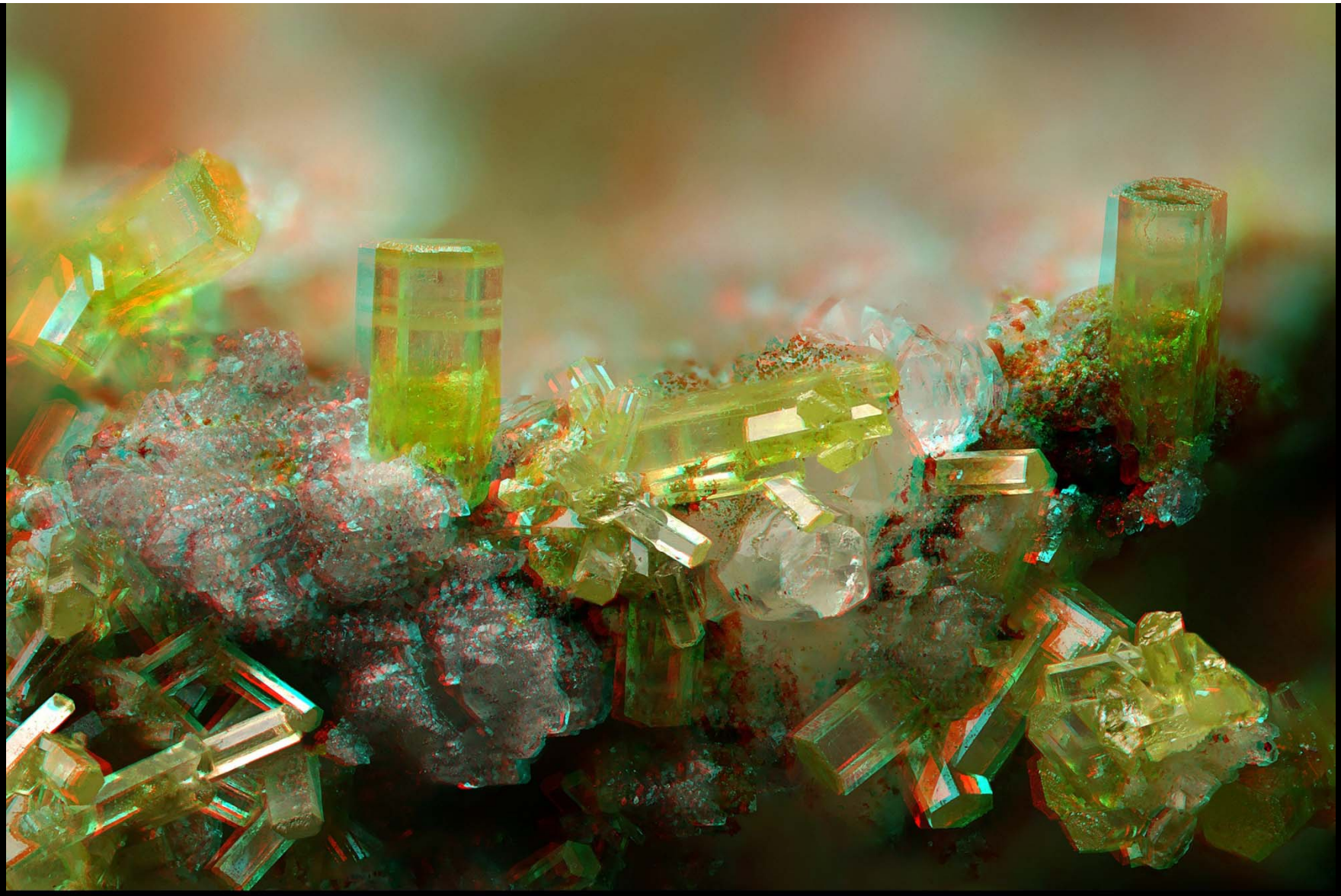
Pyromorphite $Pb_5(PO_4)_3Cl$

Field width 0.784 mm.

An unusual tetrahedral pseudomorph of unkown origin with thin coating of limonitic goethite. From a landslipped faulted block of Crow Chert at NY 98667 02888, Hungry Hushes, Arkengarthdale, North Yorkshire.

Specimen: found by David McCallum and now in David Green collection. Photography: JohnChapman, August 2023.

Canon EOS 5DSr camera with 2x tele-extender with Mitutoyo M Plan Apo 10x/0.28 objective lens on Thorlabs apochromatic tube lens and tubes, with Schott fibre optic illumination. Left + right stacks of 135 and 142 5-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM.



1 mm

Pyromorphite $Pb_5(PO_4)_3Cl$

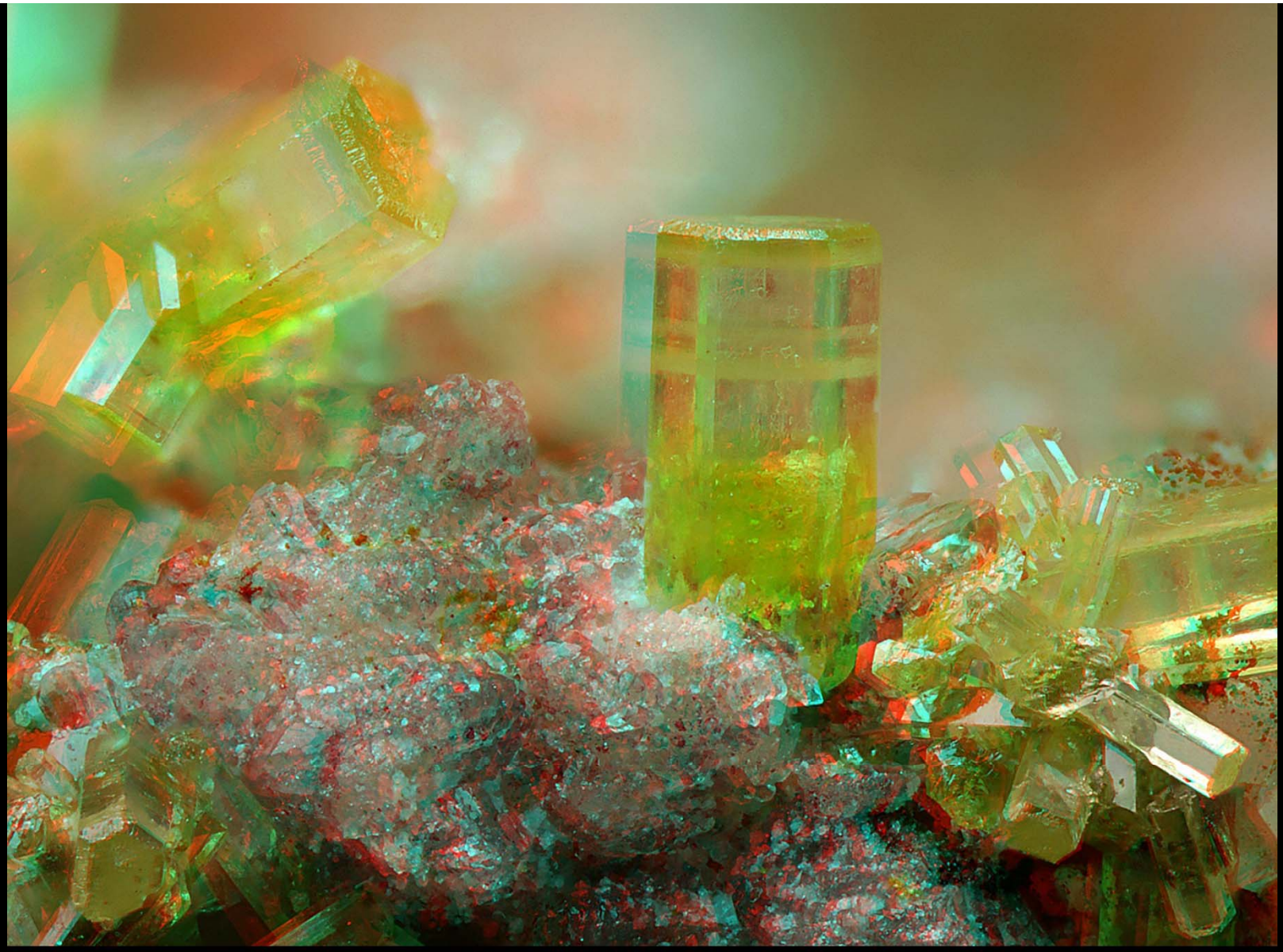
Field width 2.40 mm.

Prismatic crystals with translucent zones and terminated by very short etched hexagonal pyramids (Miller indices 011, 111, 101, $0\bar{1}1$, $1\bar{1}1$, $\bar{1}01$) and broad pinacoidal faces [001].

New Glencrieff Mine, Wanlockhead, Dumfries and Galloway.

Specimen: Susan Tyzack collection (1977-82). Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 95 and 77 15-micrometre steps at degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Field width 1.33 mm.

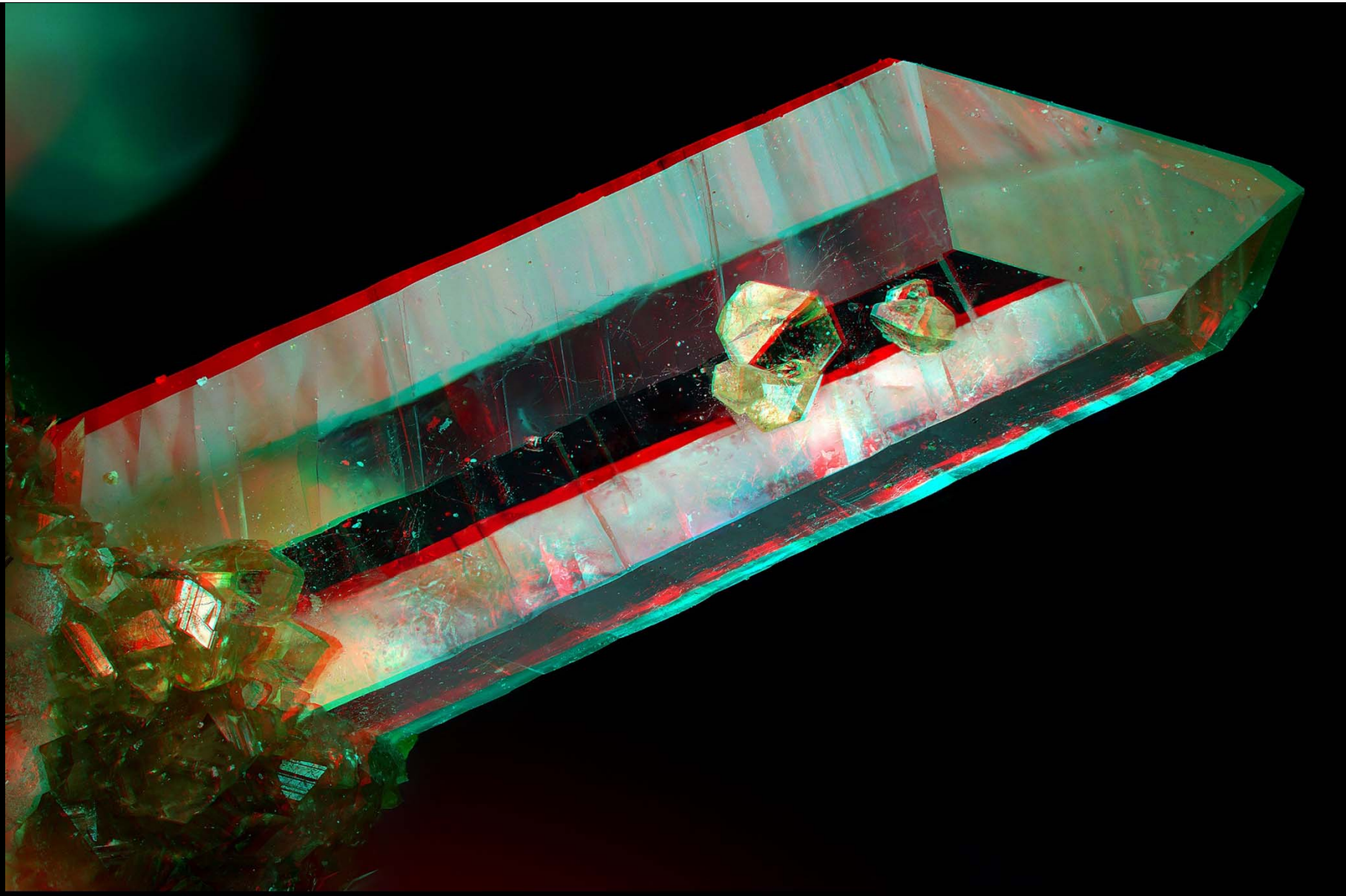
Pyromorphite $Pb_5(PO_4)_3Cl$

Prismatic crystals with translucent zones and terminated by very short etched hexagonal pyramids (Miller indices 011, 111, 101, $0\bar{1}1$, $1\bar{1}1$, $\bar{1}01$) and broad pinacoidal faces [001].

New Glencrieff Mine, Wanlockhead, Dumfries and Galloway.

Specimen: Susan Tyzack collection (1977-82). Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 95 and 77 15-micrometre steps at degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Childrenite $Fe^{2+}Al(PO_4)(OH)_2 \cdot H_2O$

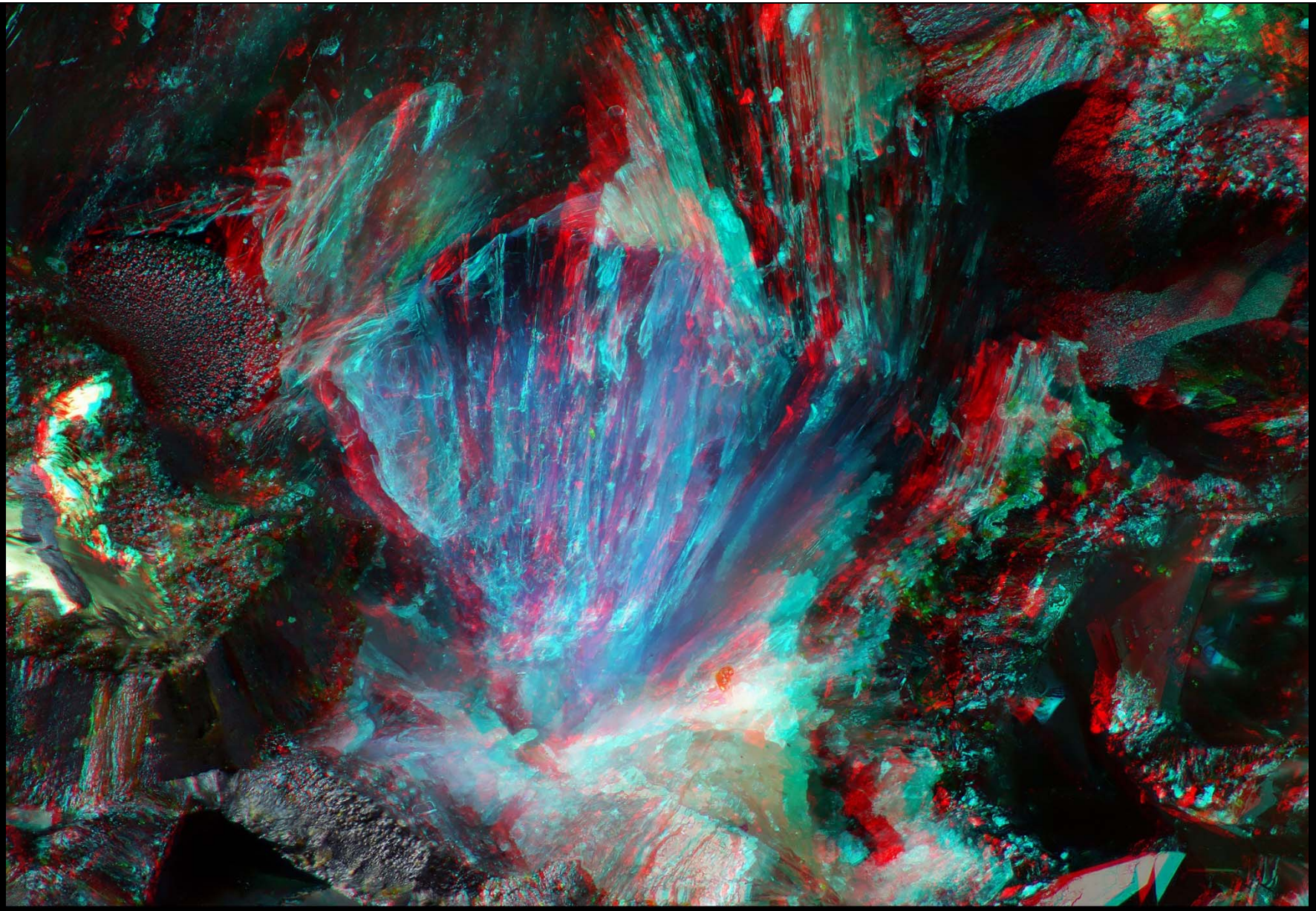
Field width 5.02 mm.

Transparent pale brown pyramidal orthorhombic system crystals on transparent high temperature quartz crystals.
Crinnis Cliff SX 0538 5199, Carlyon, Cornwall.

Specimen: David and Julie Green collection. Photography: John Chapman, February 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 100 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 117 and 109 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

Amethyst variety of quartz SiO_2 with drawing pin/mushroom-shaped inclusion of goethite FeO(OH).
Borrow pit 300m west of High Alderstocks in Whitelee Forest (now windfarm), Strathaven, South Lanarkshire.
Specimen: found by John Faithfull and now in Susan Tyzack collection, No. 605. Photography: John Chapman, January 2024.
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 160 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 188 and 163 15-micrometre steps at degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.
1 mm
Field width 3.84 mm.



0.1 mm

Richelsdorfite $Ca_2Cu_5Sb^{5+}(AsO_4)_4(OH)_6Cl.6H_2O$

Field width 1.19 mm.

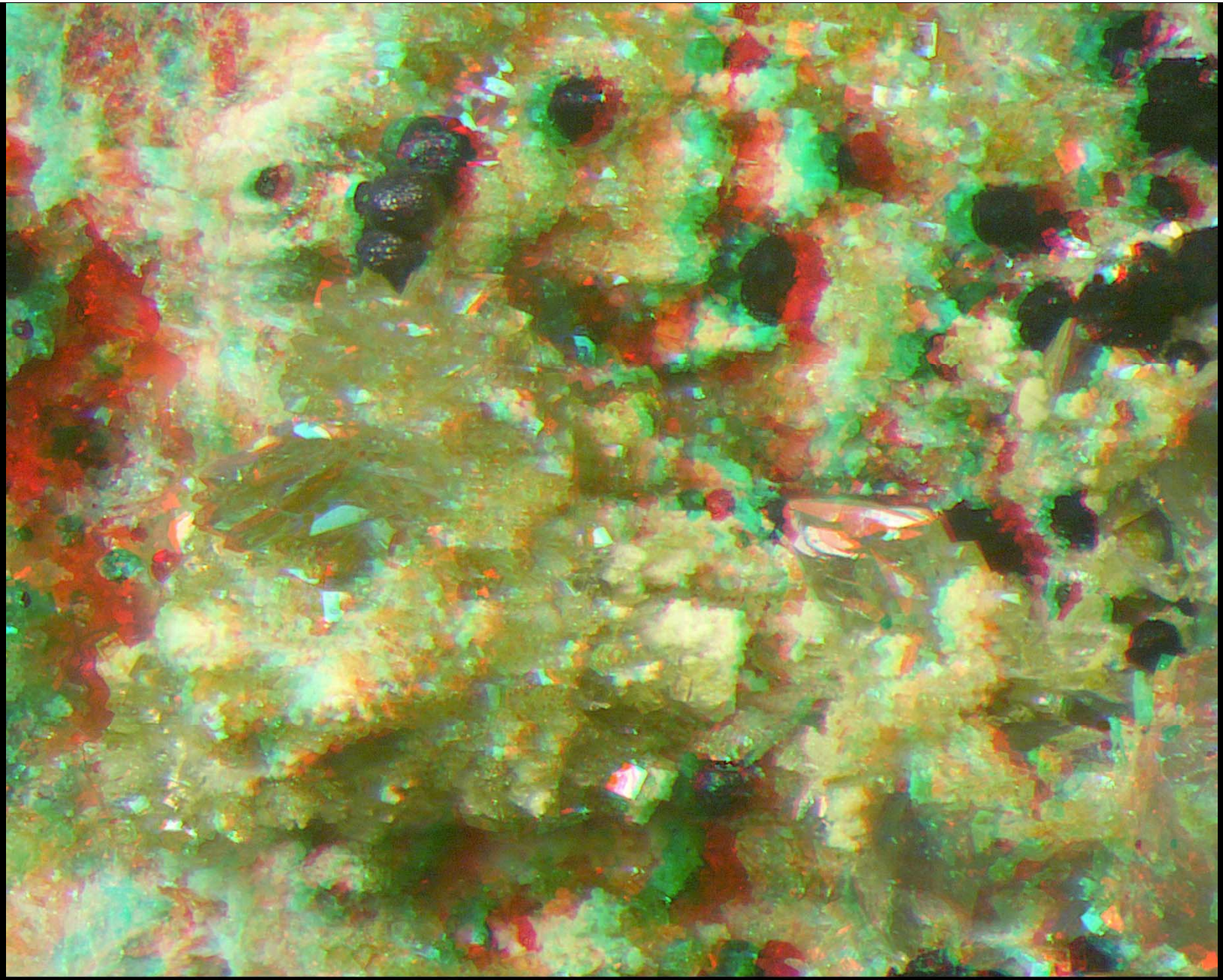
Blue lath-like crystals within quartz, chalcopyrite and goethite.

Murton Mine, small area in entrance flats to E of Hardshins Level crosscut, NY 7595 2252, Scordale, near Appleby, Cumbria.

Specimen: David Green specimen, No. MT251. Photography: John Chapman, May 2023.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension with Schott fibre optic illumination.

Left + right stacks of 133 and 111 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Scorodite $Fe^{3+}AsO_4.2H_2O$ with bariopharmacosiderite $Ba_{0.5}Fe^{3+}_4(AsO_4)_3(OH)_4.5H_2O$

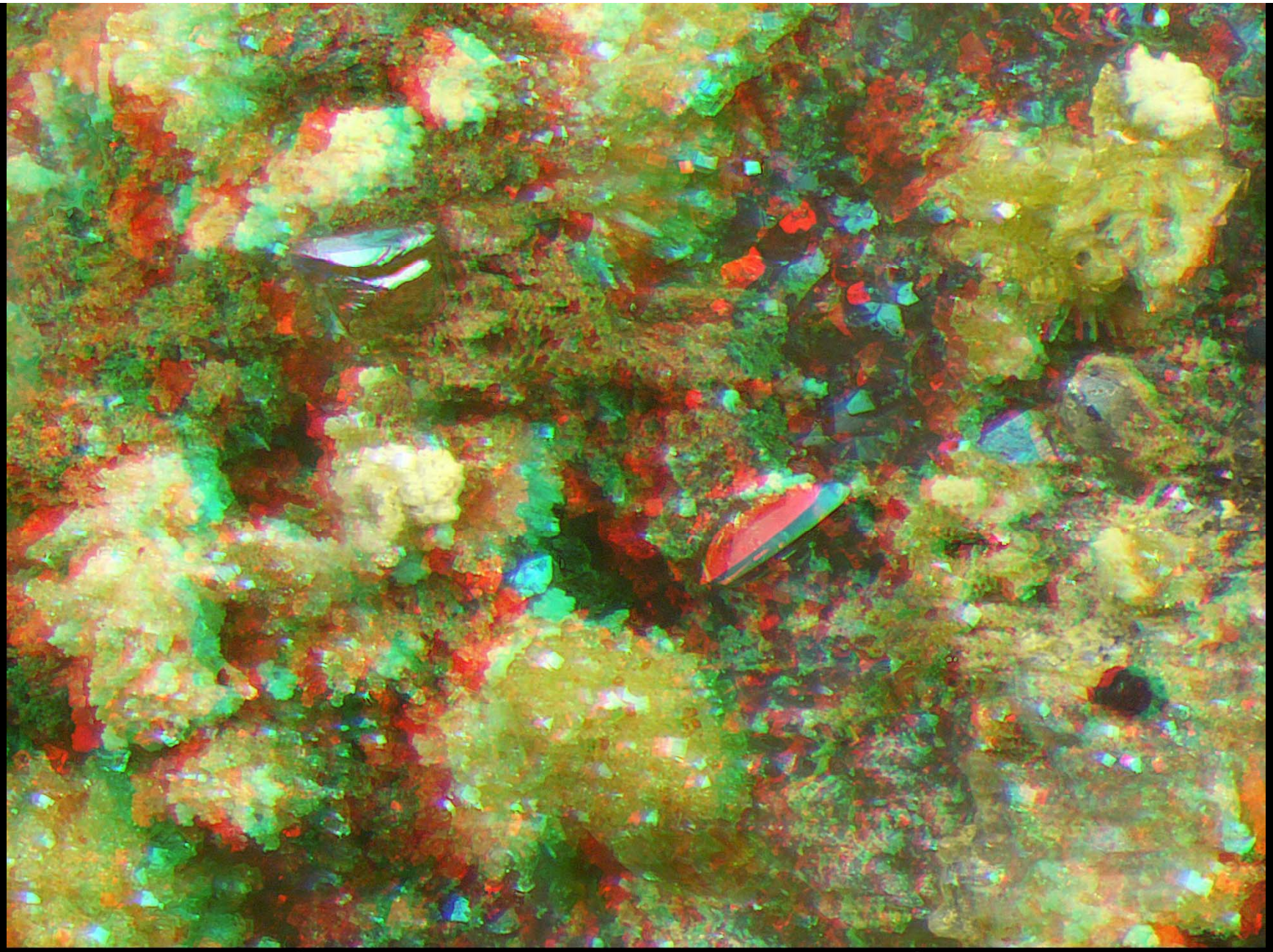
0.5 mm

Murton Mine, Scordale, near Appleby, Cumbria.

Field width 2.35 mm

Specimen: found underground and now in Charles Lamb collection. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 6.4x zoom, with LED lamp illumination.



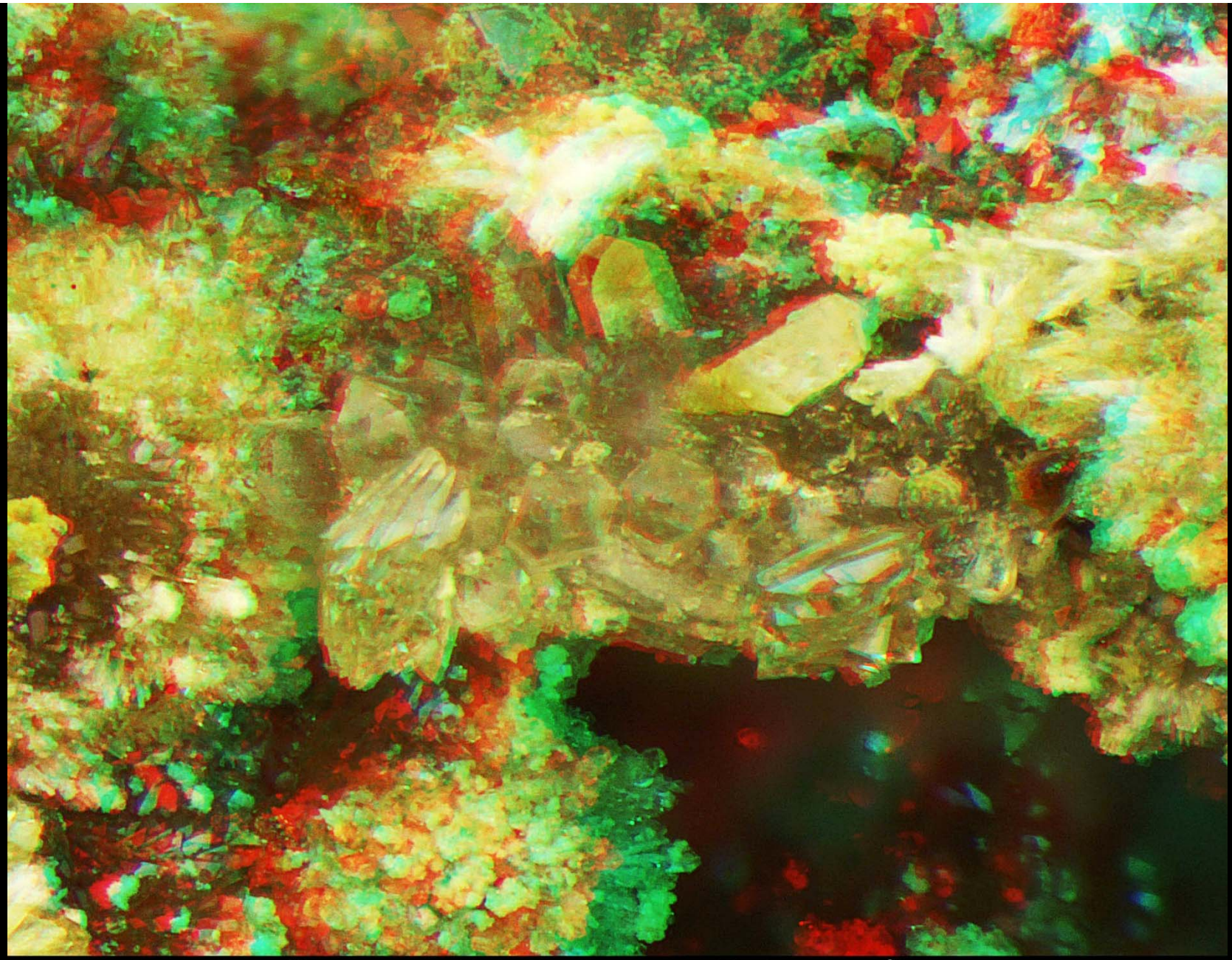
Scorodite $Fe^{3+}AsO_4.2H_2O$ with bariopharmacosiderite $Ba_{0.5}Fe^{3+}_4(AsO_4)_3(OH)_4.5H_2O$

0.5 mm

Murton Mine, Scordale, near Appleby, Cumbria. Field width 2.49 mm

Specimen: found underground and now in Charles Lamb collection. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 6.4x zoom, with LED lamp illumination.



Scorodite $Fe^{3+}AsO_4.2H_2O$ with bariopharmacosiderite $Ba_{0.5}Fe^{3+}_4(AsO_4)_3(OH)_4.5H_2O$

0.5 mm

Murton Mine, Scordale, near Appleby, Cumbria. Field width 2.27mm

Specimen: found underground and now in Charles Lamb collection. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 6.4x zoom, with LED lamp illumination.

No 3D available

Scorodite $Fe^{3+}AsO_4.2H_2O$ with bariopharmacosiderite $Ba_{0.5}Fe^{3+}_4(AsO_4)_3(OH)_4.5H_2O$

0.1 mm

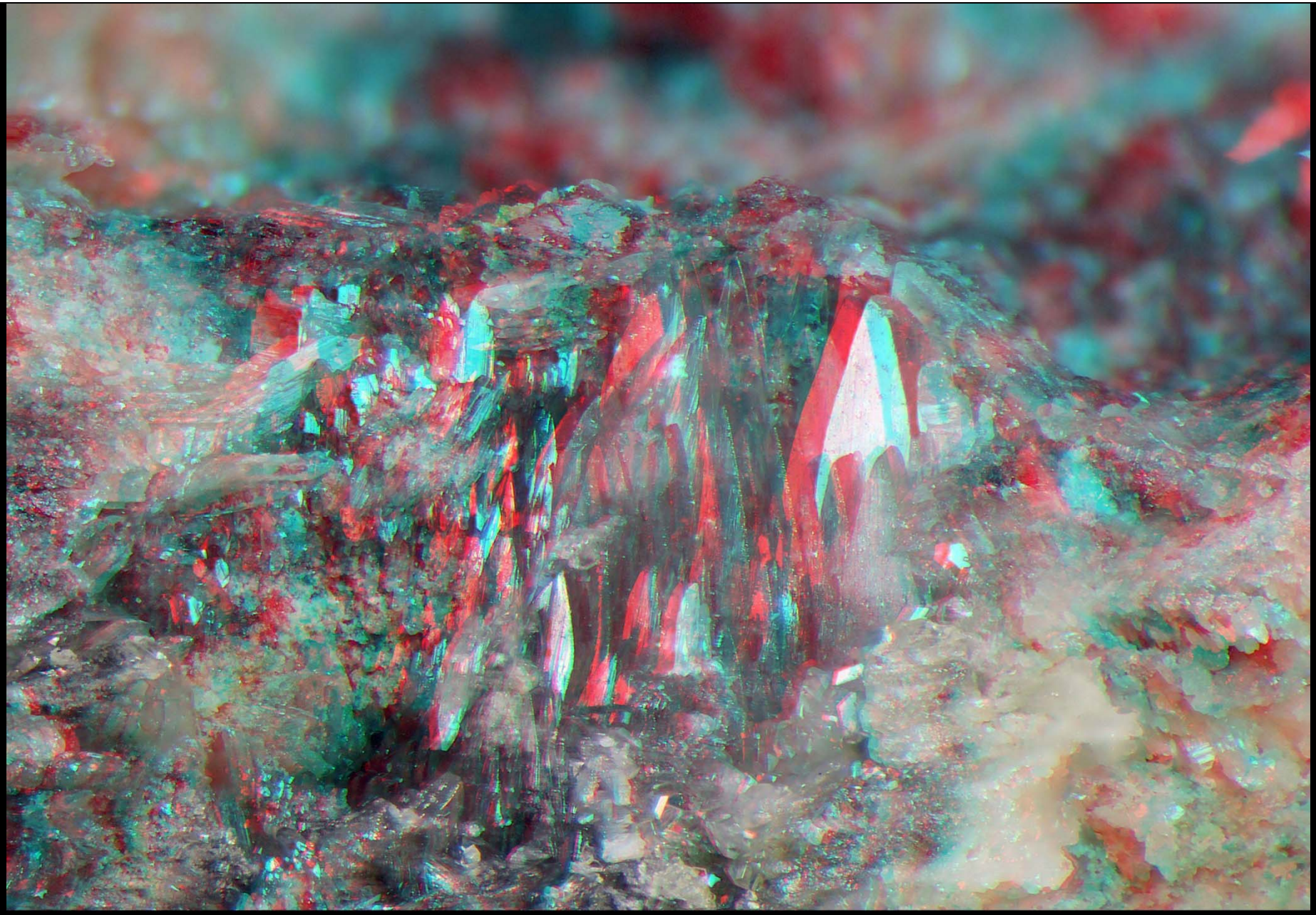
Murton Mine, Scordale, near Appleby, Cumbria.

Field width 0.84 mm

Specimen: found by Charles Lamb and in Charles Lamb collection. Photography: John Chapman.

Canon EOS 5D Mk II camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Stack of 125 4-micrometre steps via Stackshot rail, combined in CombineZM and processed in PhotoShop CS5.



1 mm

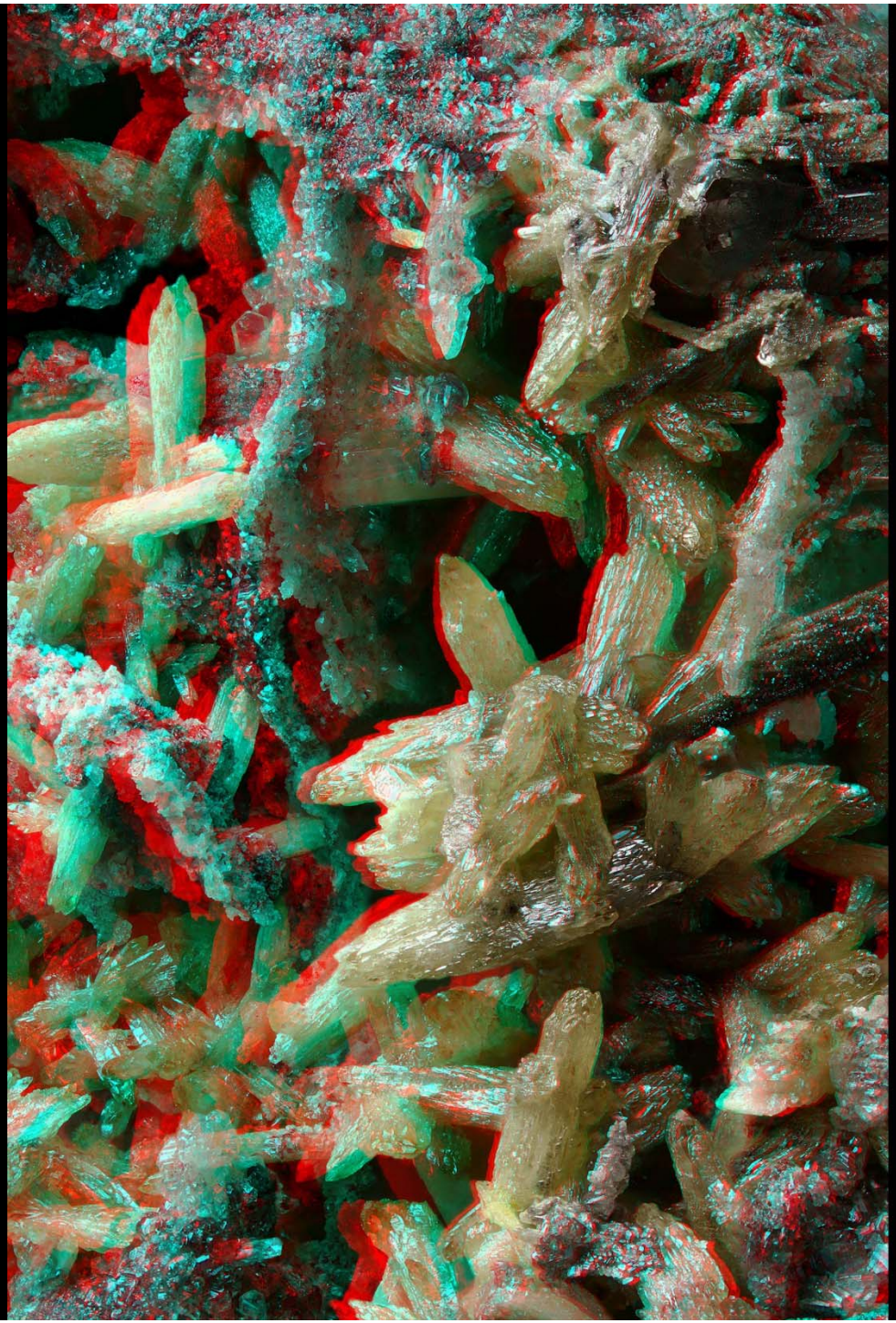
Scotlandite $PbSO_3$

Field width 4.3 mm

Classic chisel blade crystals with lanarkite and anglesite. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: found by David McCallum, No. E123, and now in David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 6.4x zoom, with LED lamp illumination.



Scotlandite $Pb(S^{4+}O_3)$

Intergrown pale brown Type 1 crystals distinguished by their complex pointed terminations, together with as yet uncharacterised phases.

Park Hall Fault, Whitwell Quarry SK 5350 7489,
Whitwell, Derbyshire.

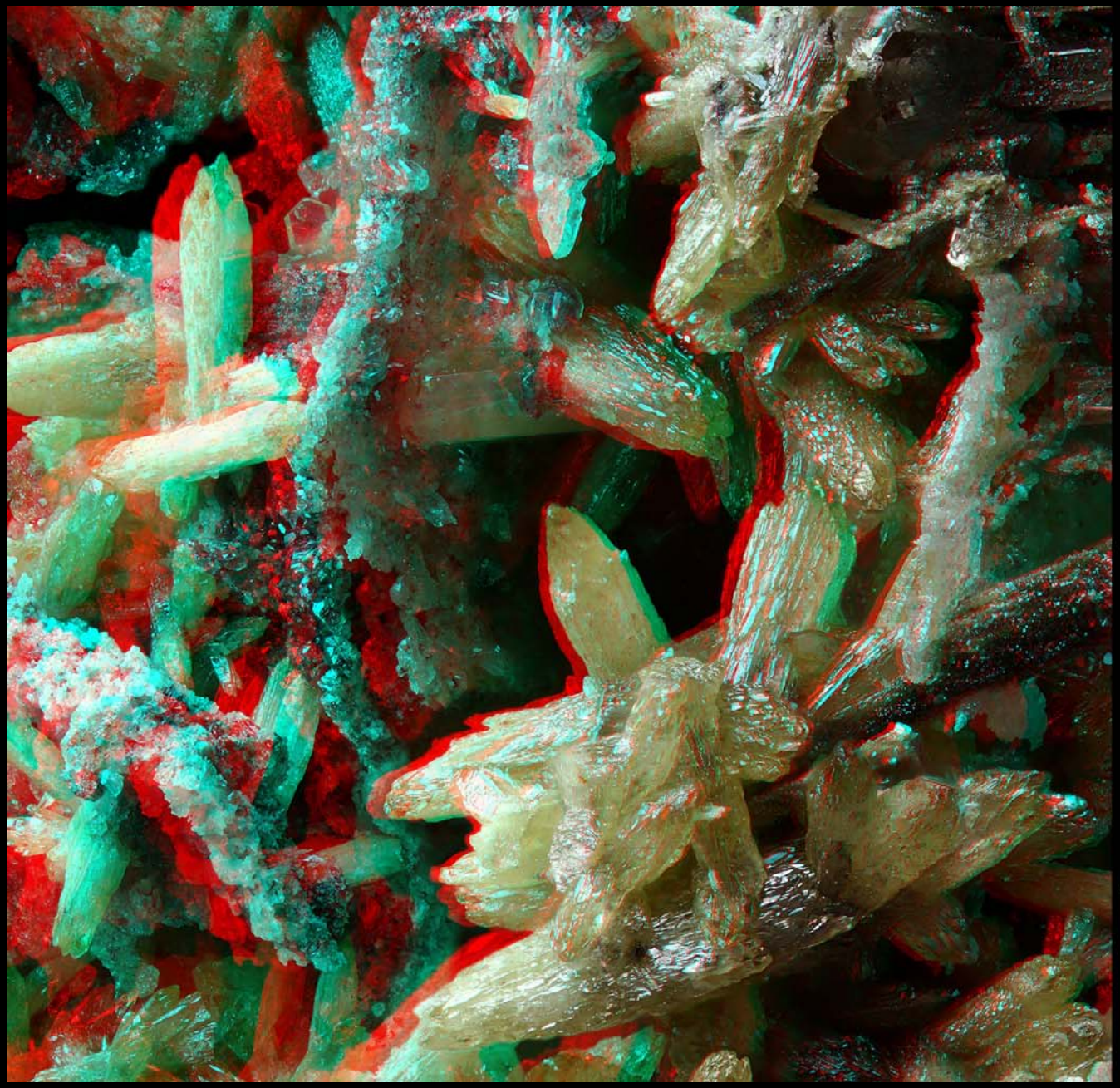
Specimen: Peter Briscoe collection, No. GC4 - 1987.
Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic lighting.

Left + right stacks of 120 and 133 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 3.65 mm



Scotlandite $Pb(S^{4+}O_3)$

Intergrown pale brown Type 1 crystals distinguished by their complex pointed terminations, together with as yet uncharacterised phases.

Park Hall Fault, Whitwell Quarry SK 5350 7489, Whitwell, Derbyshire.

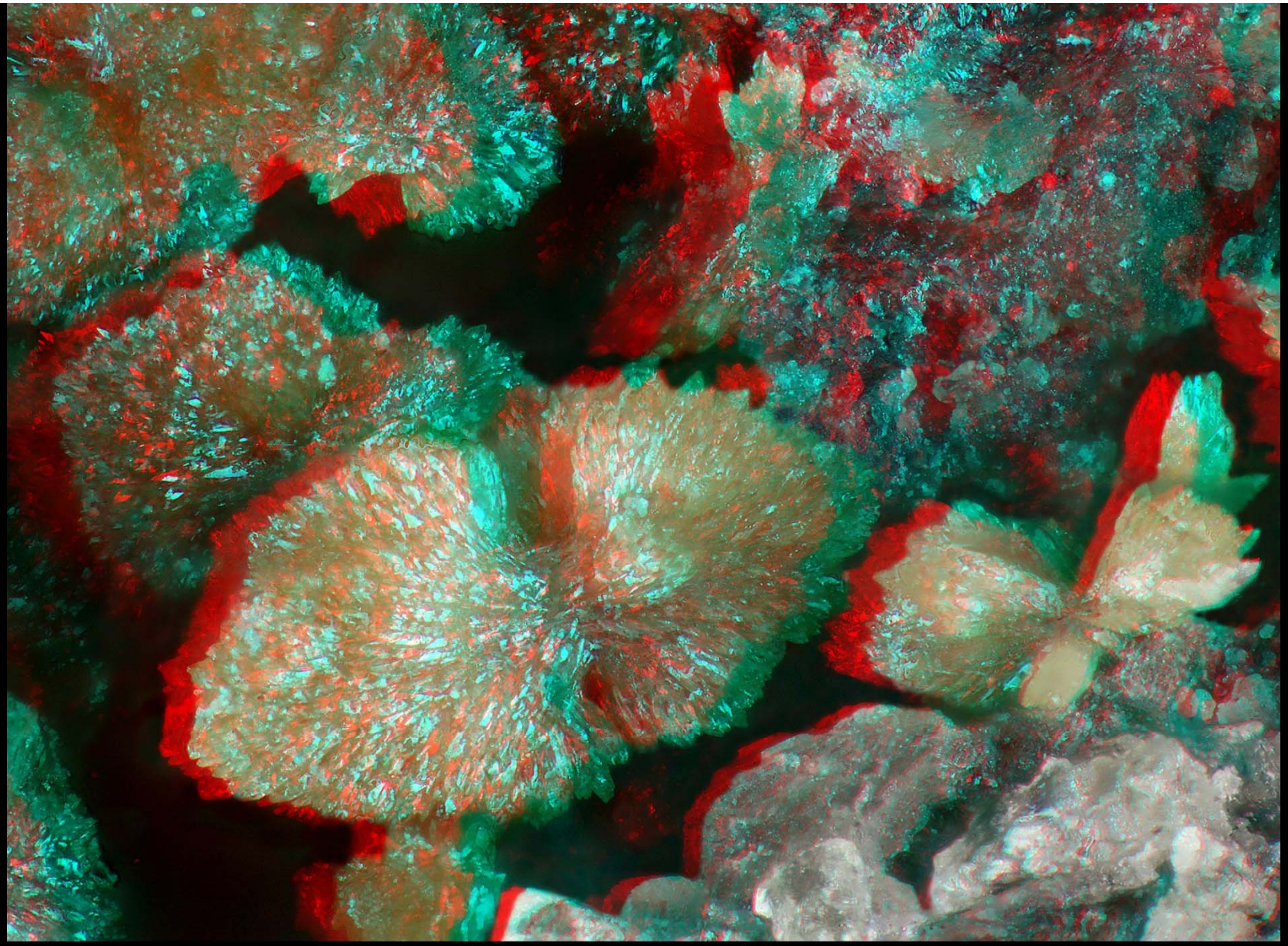
Specimen: Peter Briscoe collection, No. GC4 - 1987.
Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic lighting.

Left + right stacks of 120 and 133 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field width 2.43 mm



0.1 mm

Uncharacterised phase, possibly scotlandite. Field width 0.77 mm

Unidentified brown bow-tie aggregates with a visual similarity to the rare lead thiosulphate carbonate fassinaite.

Whitwell Quarry SK 530 753, Whitwell, Derbyshire. [$Pb_2(CO_3)(S_2O_3)$].

Specimen: Peter Briscoe collection, No. GC4 - 1987. Photography: John Chapman.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 111 and 105 5-micrometre steps at 6 degrees via Stackshot rail combined in CombineZM and rendered in Stereophotomaker.

No 3D available

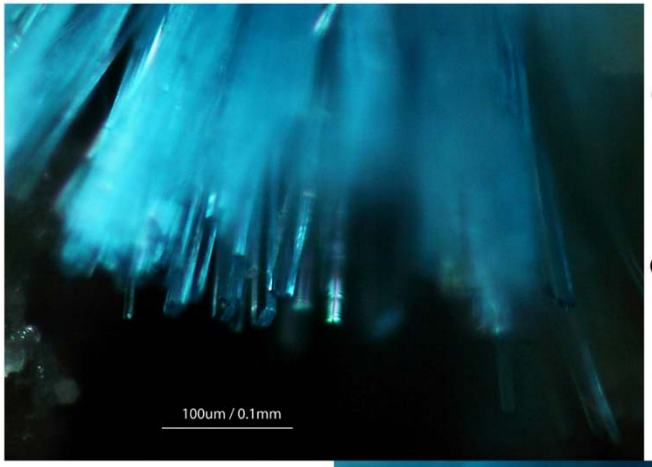
0.1 mm 1 mm **Serpierite** $Ca(Cu,Zn)_4(SO_4)_2(OH)_6.3H_2O$ Field width 2.1 mm

Wet Grooves Lead Mine, Carperby, Wensleydale, North Yorkshire, found underground by JDC 25th March 2015.

Specimen: John Chapman collection, identity confirmed by SEM-EDS by Christian Rewitzer. Also present: namuwite, also confirmed as $(Zn,Cu)_4(SO_4)(OH)_6.4H_2O$, smithsonite and calcite. Neither serpierite nor namuwite have been previously recorded from Yorkshire and are both considered rare. Specimen no. Zn12/WG1. Photography: John Chapman.

94 steps with Canon EOS 5D Mk II camera with Carl Zeiss Luminar 16 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

No 3D available



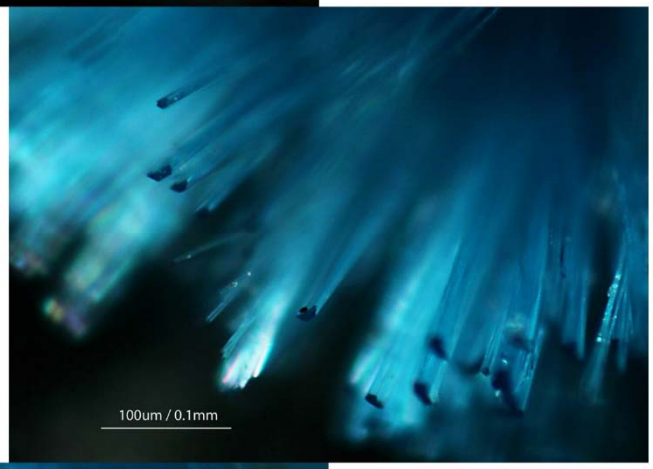
Serpierite

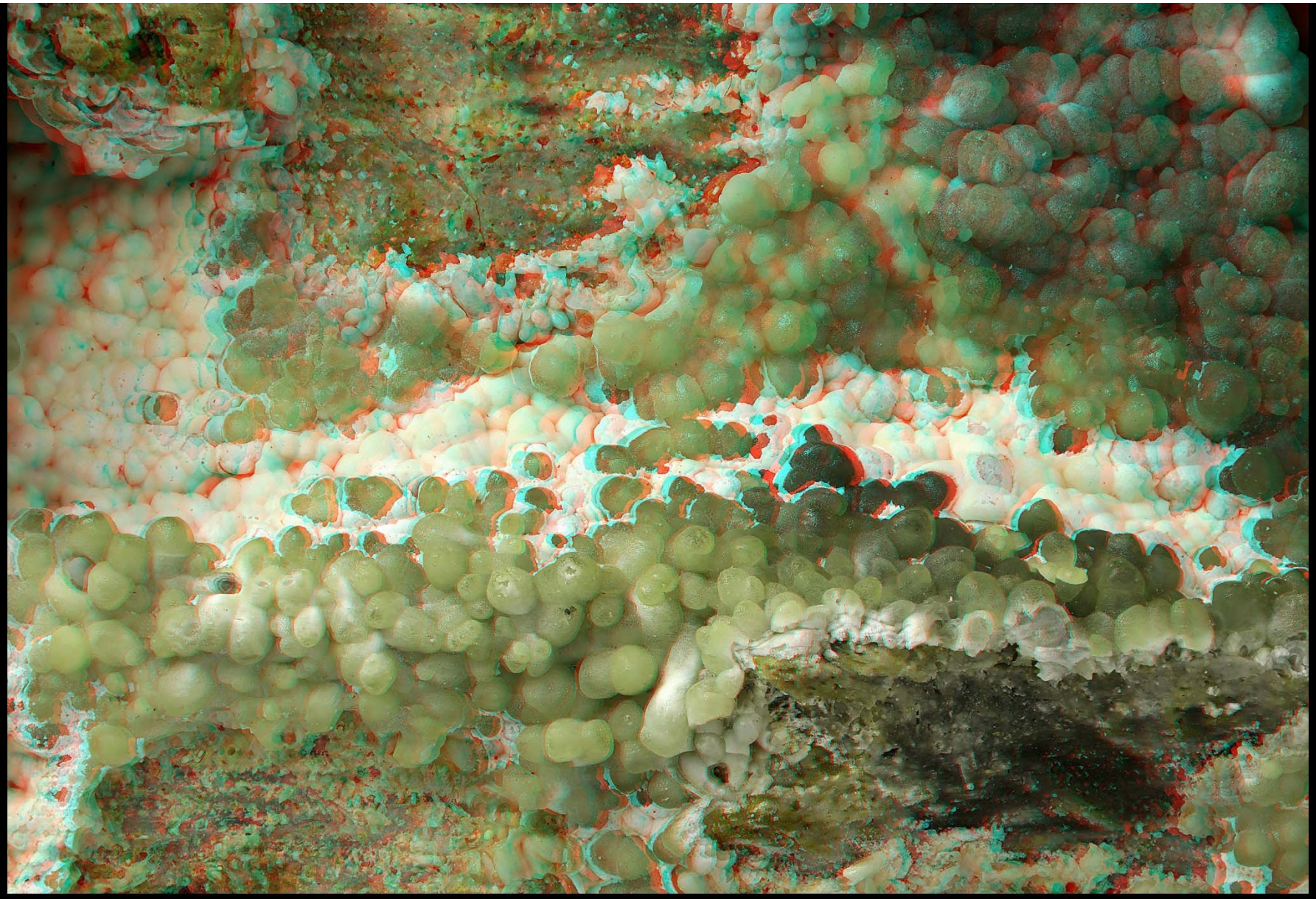
$Ca(Cu,Zn)_4(SO_4)_2(OH)_6.3H_2O$

Wet Grooves lead mine, Wensleydale (underground). Closeups from single levels from image stack.

This is the first recorded occurrence in Yorkshire.

Found by John Chapman.
Specimen No. Zn12/WG1





1 mm

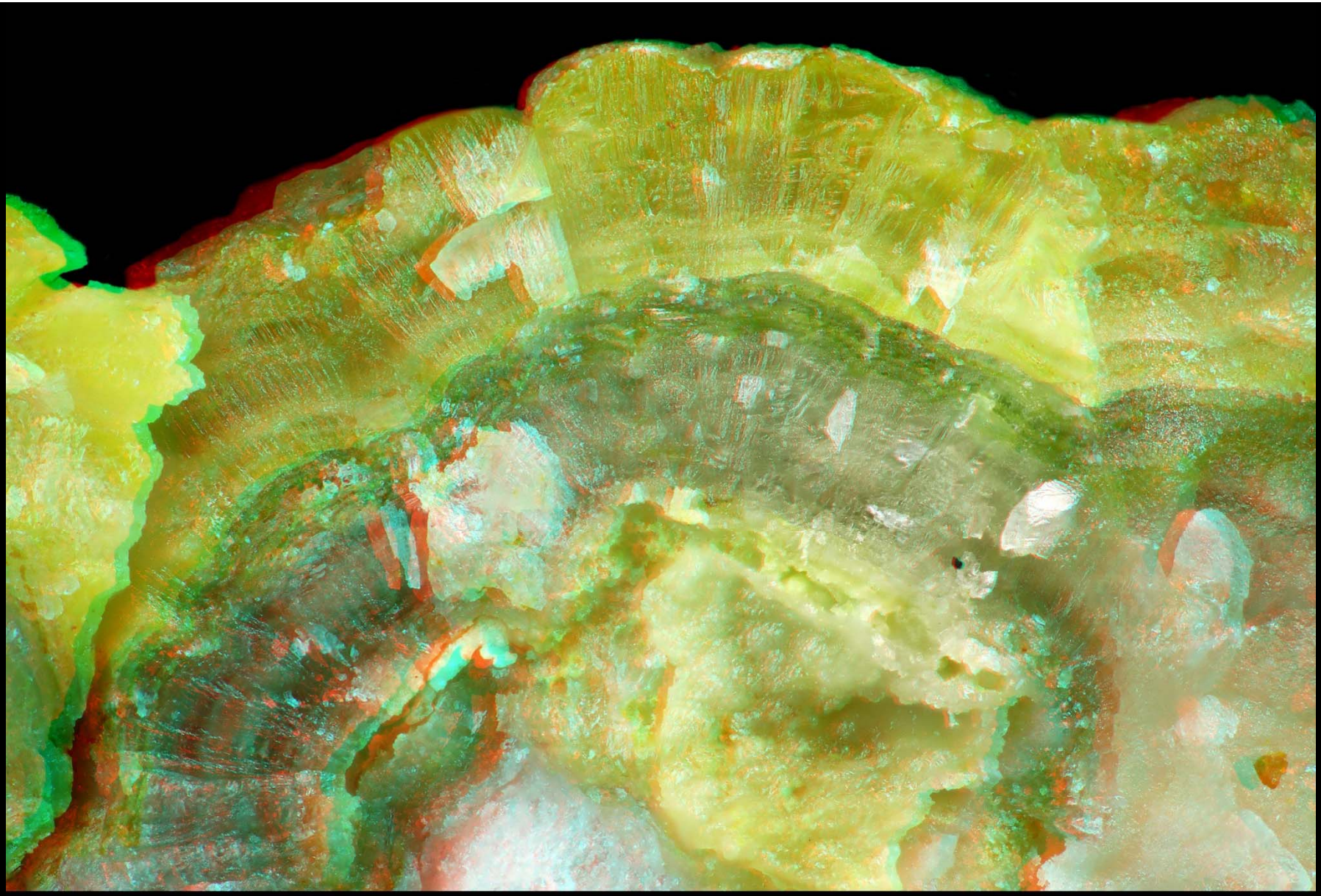
Smithsonite $Zn(CO_3)$

Field width 13.9 mm.

Botryoidal crystals showing interesting colour variation, particularly the rather unusual dark grey-green colour, as well as the onion ring structure. Grinton How Mine SE 0356 9609, Grinton, Swaledale, North Yorkshire.

Specimen: found by Charles Lamb and in Charles Lamb collection. Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 130 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 88 and 86 50-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



1 mm

Smithsonite $Zn(CO_3)$

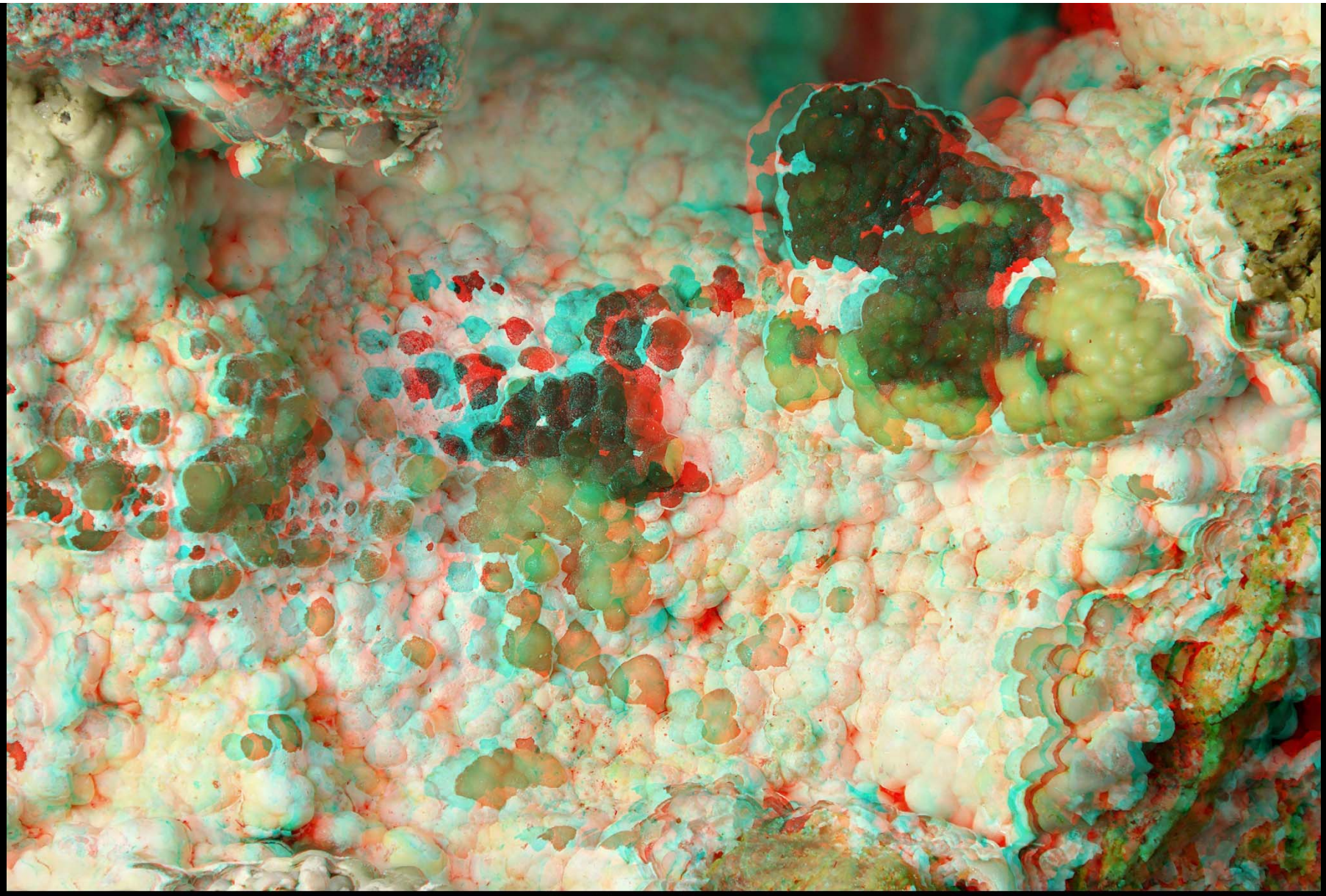
Field width 1.215 mm.

Fracture surface of botryoidal yellow cadmium sulphide enriched smithsonite in the presence of malachite, some possibly included with the smithsonite. Grinton How Mine SE 0356 9609, Swaledale, North Yorkshire.

Specimen: found by Charles Lamb and now in John Chapman collection via David Green. Photography: John Chapman.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 118 and 107 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

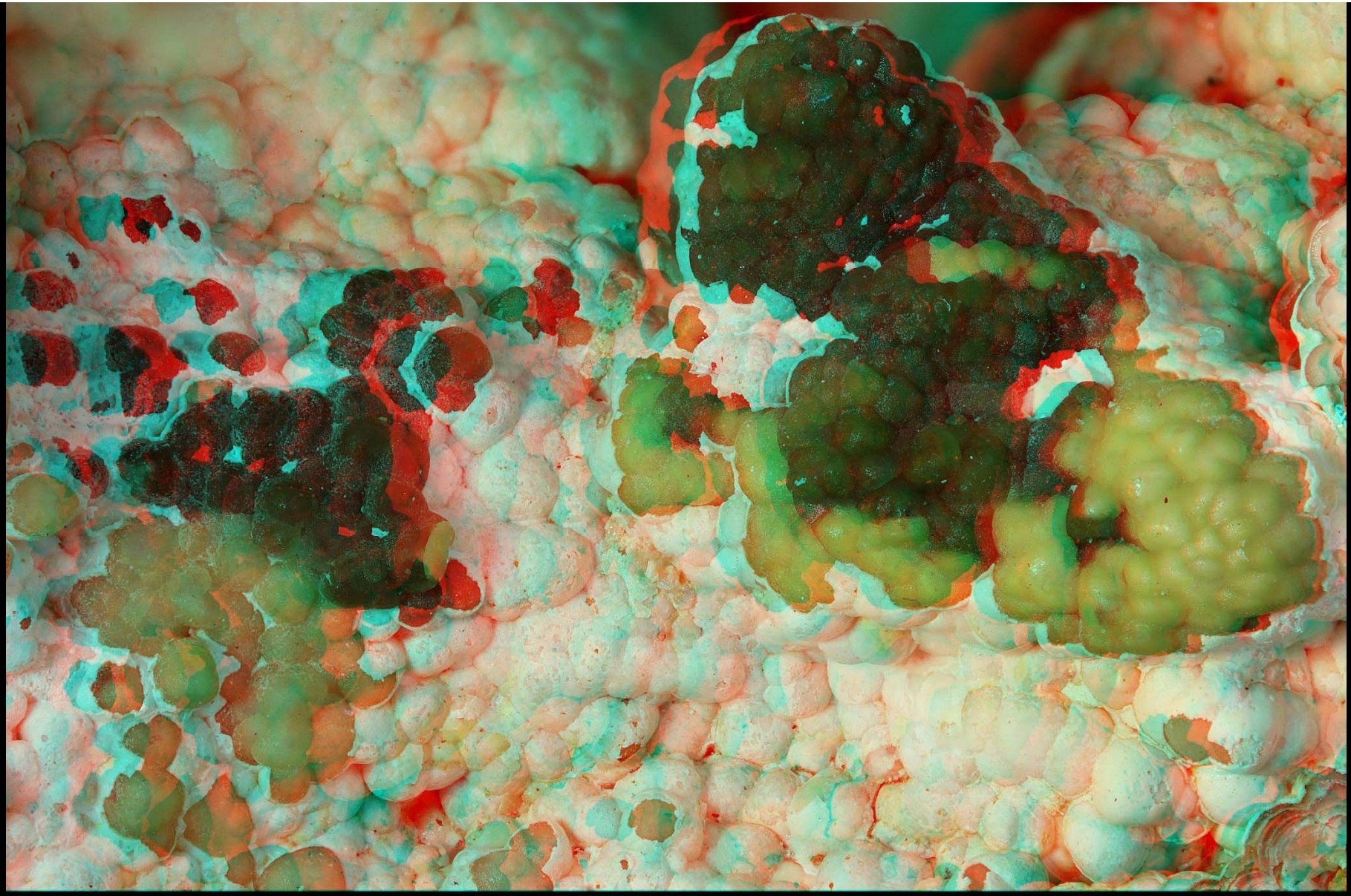


1 mm

Smithsonite $ZnCO_3$

Field width 17.5 mm

Botryoidal coatings in green, grey and off-white colours over brecciated limestone with remnant galena crystals.
Grinton How Mine SE 0356 9609, Grinton, Swaledale, North Yorkshire.
Specimen: found by Charles Lamb and in Charles Lamb collection. Photography: John Chapman.
Canon EOS 5DSR camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 100 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 149 and 135 75-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

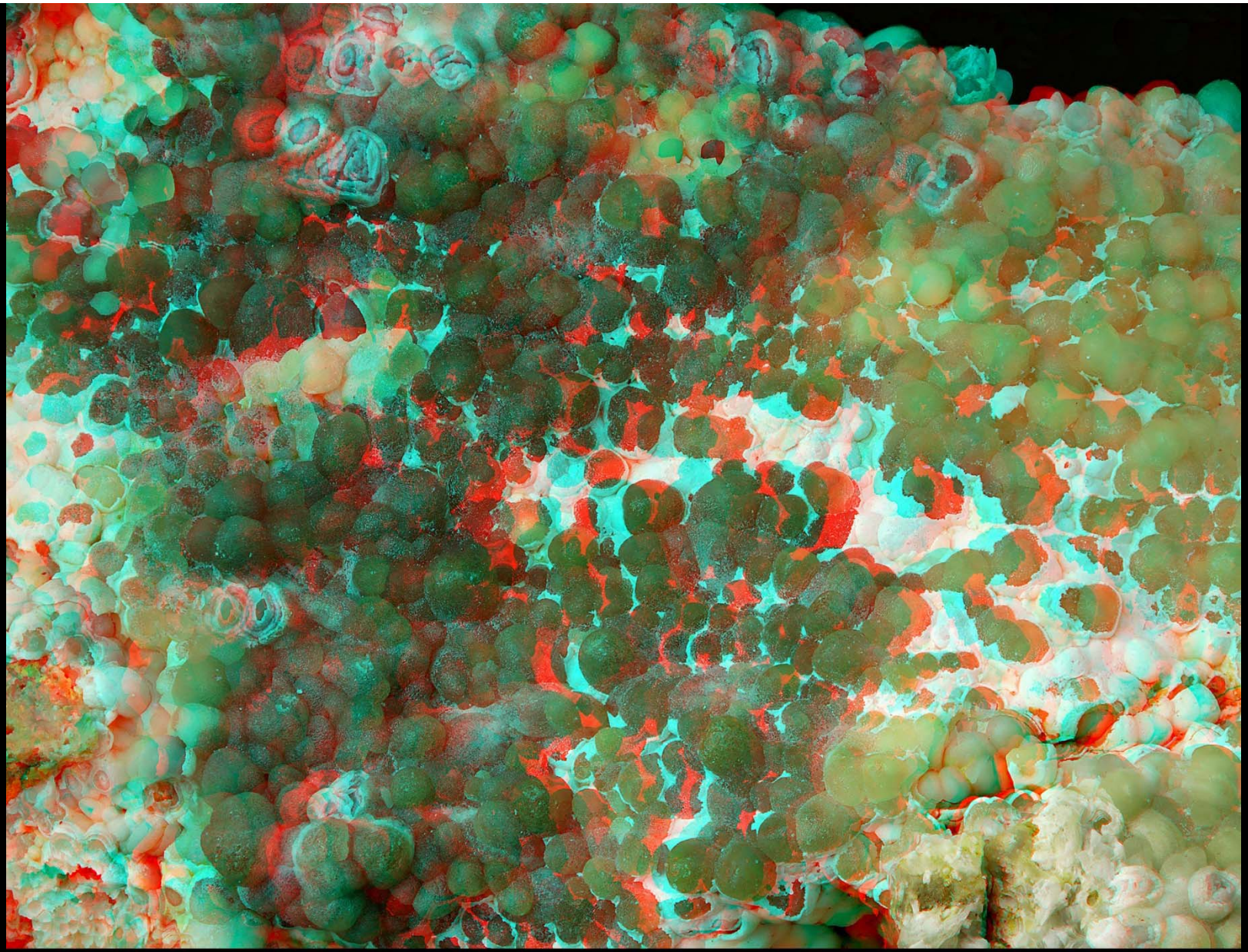


1 mm

Smithsonite $ZnCO_3$

Field width 12.0 mm

Botryoidal coatings in green, grey and off-white colours over brecciated limestone with remnant galena crystals.
Grinton How Mine SE 0356 9609, Grinton, Swaledale, North Yorkshire.
Specimen: found by Charles Lamb and in Charles Lamb collection. Photography: John Chapman.
Canon EOS 5DSR camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 79 and 76 60-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

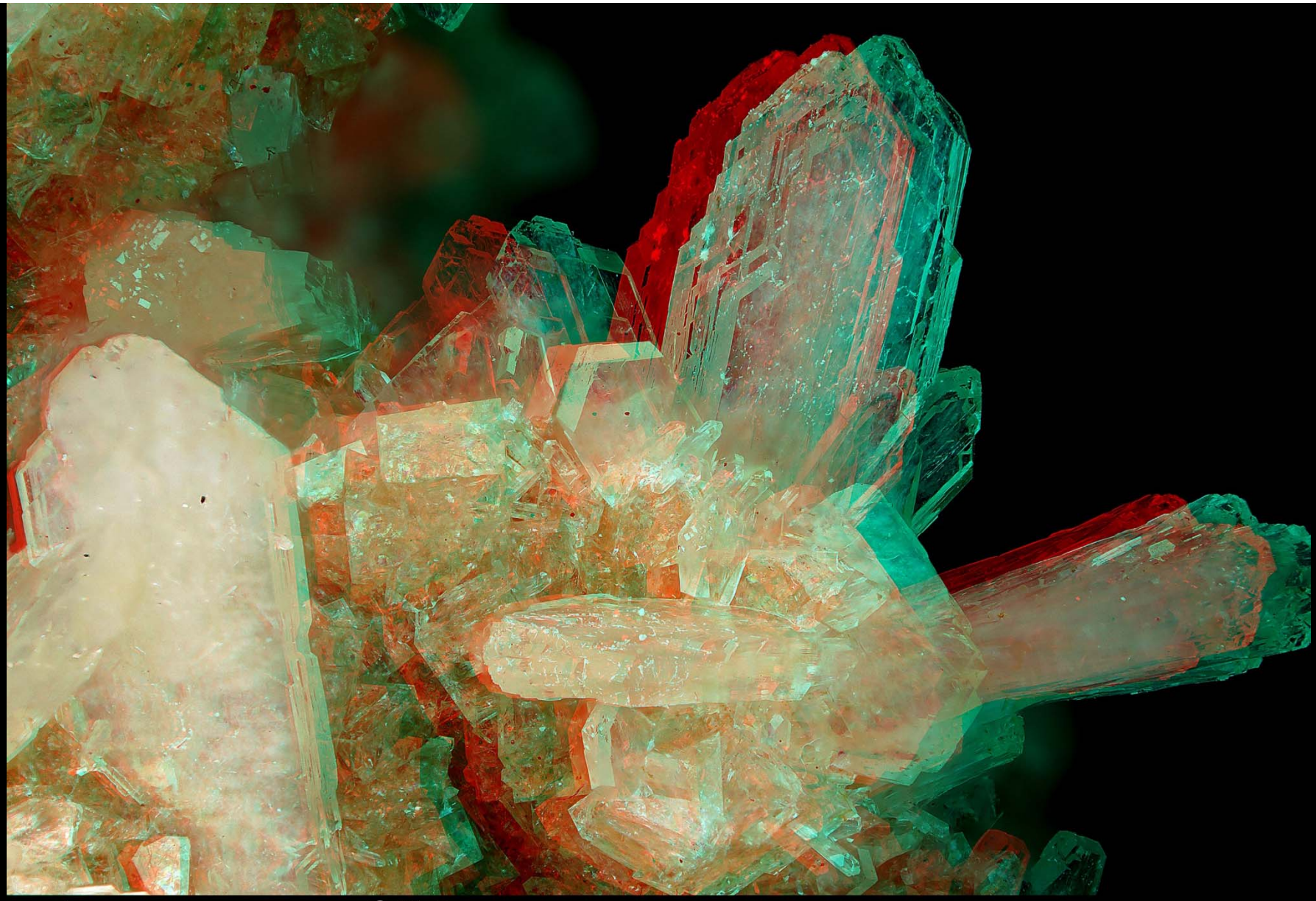
Smithsonite $Zn(CO_3)$

Field width 8.67 mm.

Botryoidal crystals showing interesting colour variation, particularly the rather unusual dark grey-green colour, as well as the onion ring structure. Grinton How Mine SE 0356 9609, Grinton, Swaledale, North Yorkshire.

Specimen: found by Charles Lamb and in Charles Lamb collection. Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 140 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 115 and 126 50-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



1 mm

Stilbite, probably -Ca [$NaCa_4(Si_{27}Al_9)O_{72}\cdot 28H_2O$]

Field width 20.4 mm.

Platy and partly sheaf-like colourless crystals on cinnamon pink chabazite, probably Ca- ($Ca_2[Al_4Si_8O_{24}]\cdot 13H_2O$).

Moonen Bay NG 1527 4639, Duirinish, Isle of Skye.

Specimen: formerly Mike Wood collection, now in David Green collection. Photography: John Chapman, March 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 80 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 111 and 104 120-micrometre steps at 6 degrees, with Luminar at aperture 1.5, combined in CombineZM.

Stilbite, probably -Ca

$NaCa_4(Si_{27}Al_9)O_{72}\cdot 28H_2O$

Platy and partly sheaf-likecolourless crystals on cinnamon pink chabazite, probably -Ca $Ca_2[Al_4Si_8O_{24}]\cdot 13H_2O$.

Moonen Bay NG 1527 4639, Duirinish, Isle of Skye.

Specimen: formerly Mike Wood collection, now in David Green collection.

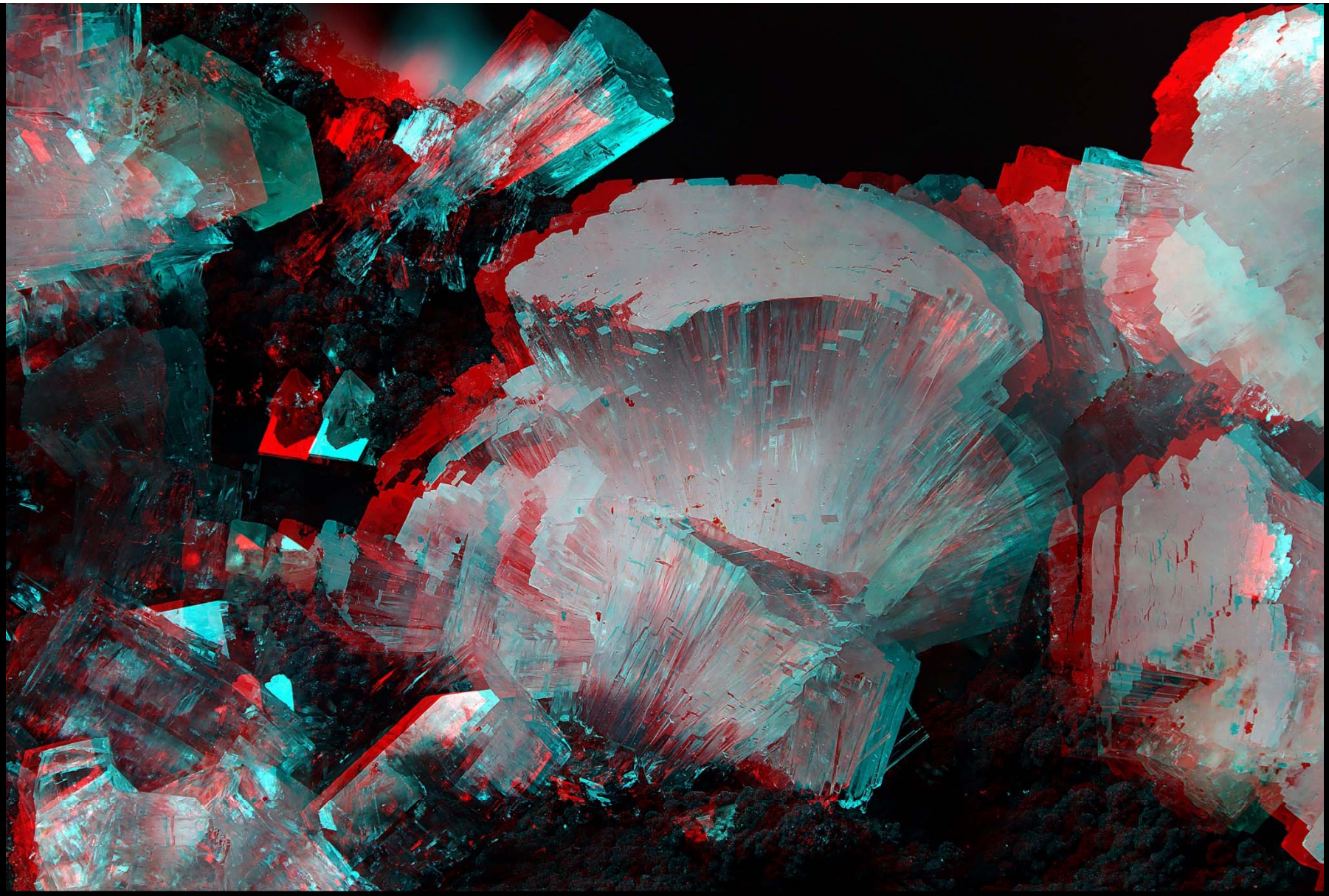
Photography: John Chapman, March 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 80 mm bellows extension with Schott fibre optic illumination.

Left + right stacks of 111 and 104 120-micrometre steps at 6 degrees, with Luminar at aperture 1.5, combined in CombineZM and rendered in Stereophotomaker.

1 mm

Field height 14.0 mm.



5 mm

Stilbite-Ca $NaCa_4(Si_{27}Al_9)O_{72}\cdot 28H_2O$

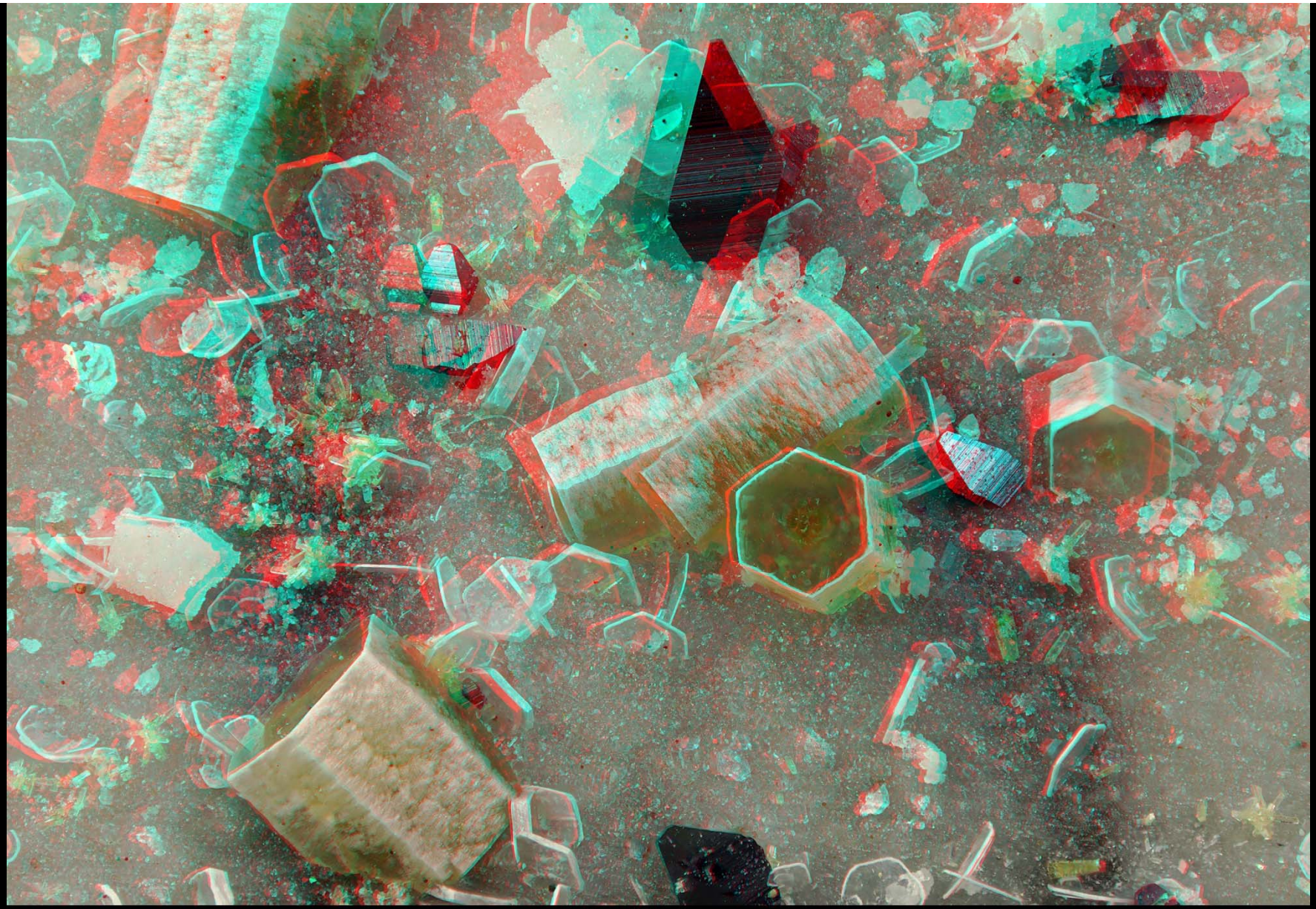
Field width 19.1 mm.

Flat topped crystal sprays with blocky heulandite (bottom left) and rhombohedral calcite.

Oisgill Bay NG 134 500, Isle of Skye.

Specimen: David Green collection. Photography: John Chapman, February 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 100 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 119 and 111 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



1 mm

Synchysite-(Ce) $CaCe(CO_3)_2F$

Field width 10.01 mm.

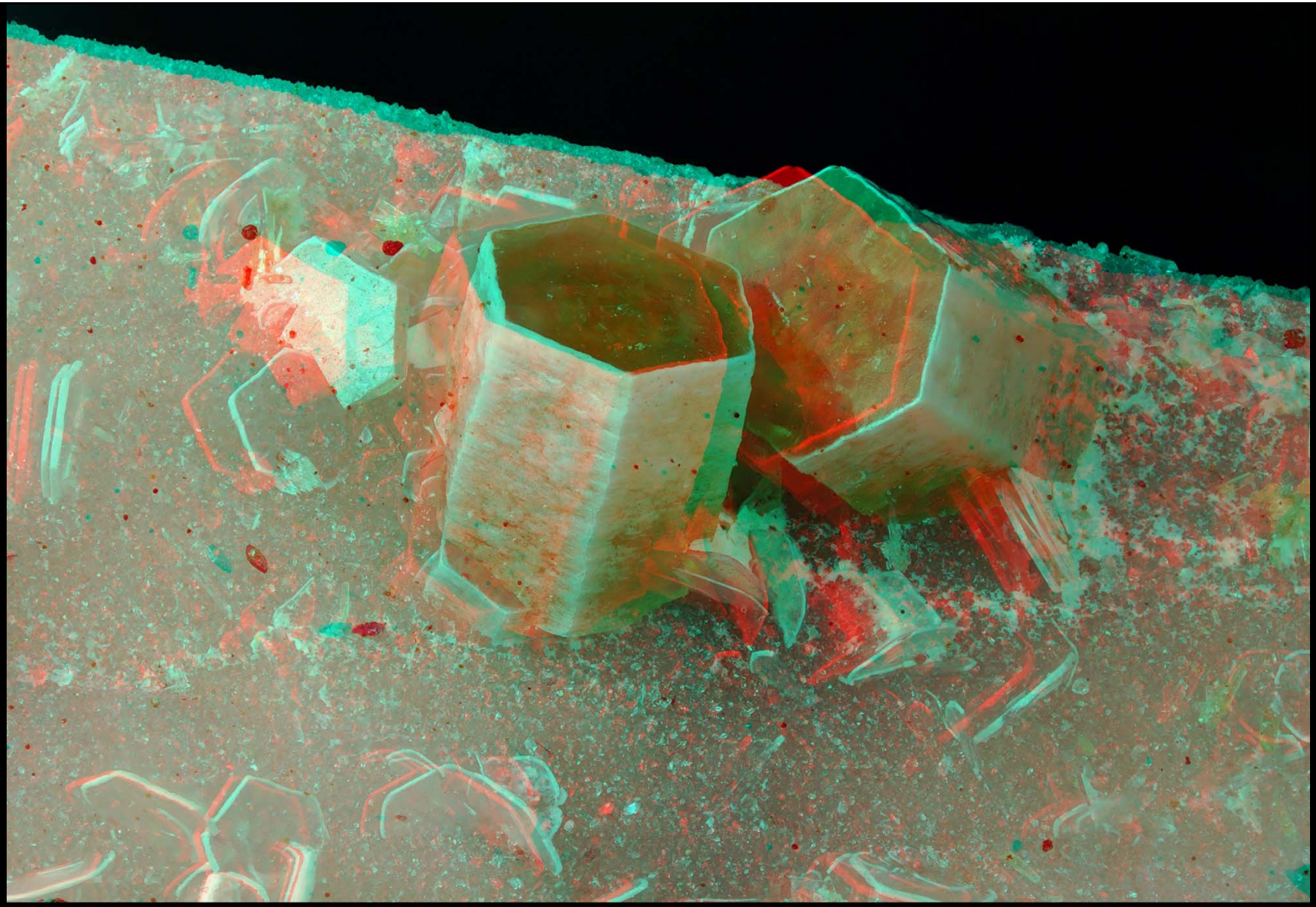
Hexagonal prisms, coated, and thin plates with xenotime-(Y) and anatase in crack in silicified rhyolitic tuff turbidite.

Cwmorthin Quarry, Blaenau Ffestiniog, Gwyneth.

Specimen: David Green collection. Photography: John Chapman, September 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 100 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 123 and 143 40-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

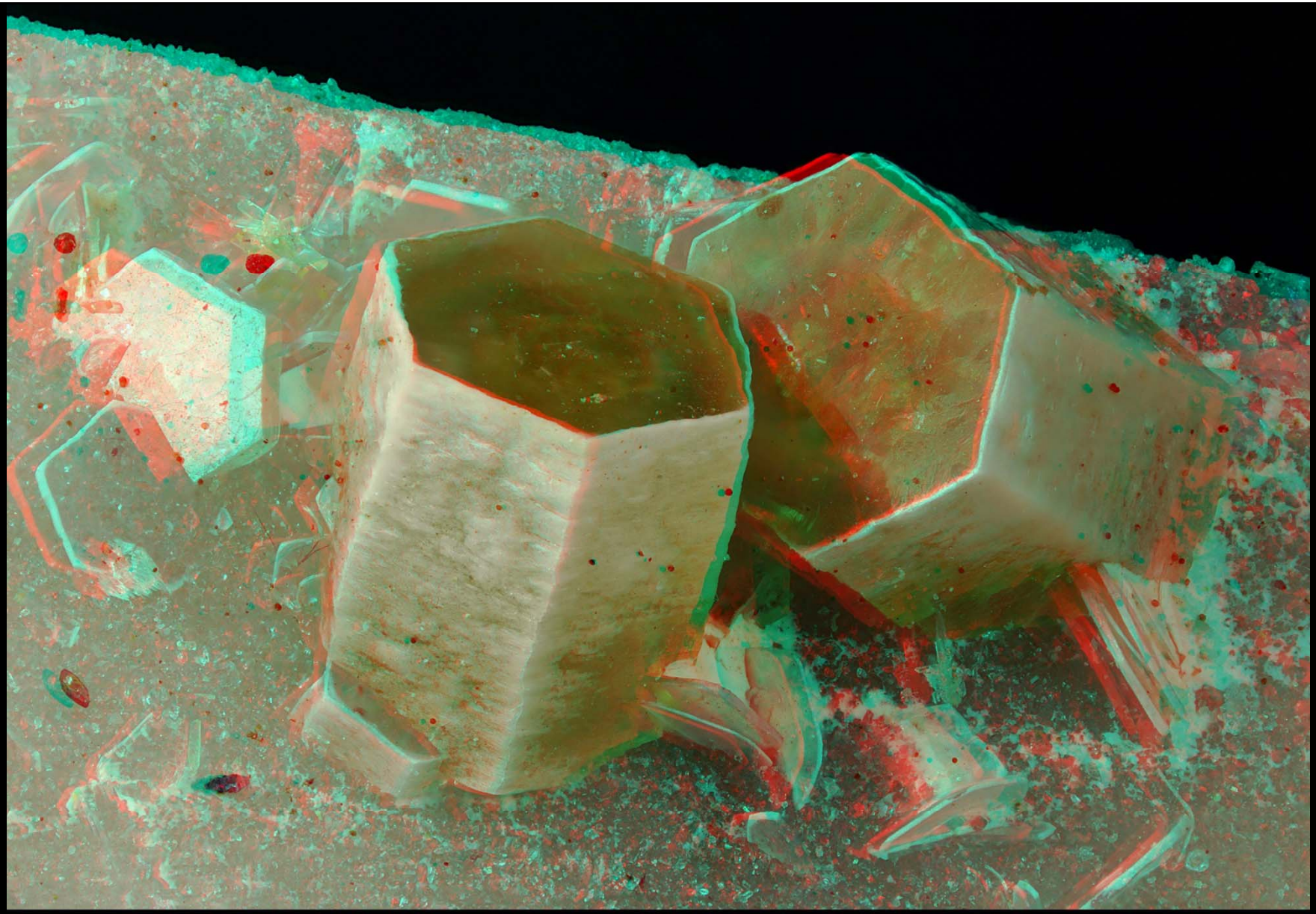
Synchysite-(Ce) $CaCe(CO_3)_2F$

Field width 6.52 mm.

Hexagonal prisms, coated, and thin plates with xenotime-(Y), anatase and rutile in crack in silicified rhyolitic tuff turbidite.
Cwmorthin Quarry, Blaenau Ffestiniog, Gwyneth.

Specimen: David Green collection. Photography: John Chapman, September 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 112 and 105 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Synchysite-(Ce) $CaCe(CO_3)_2F$

Field width 4.79 mm.

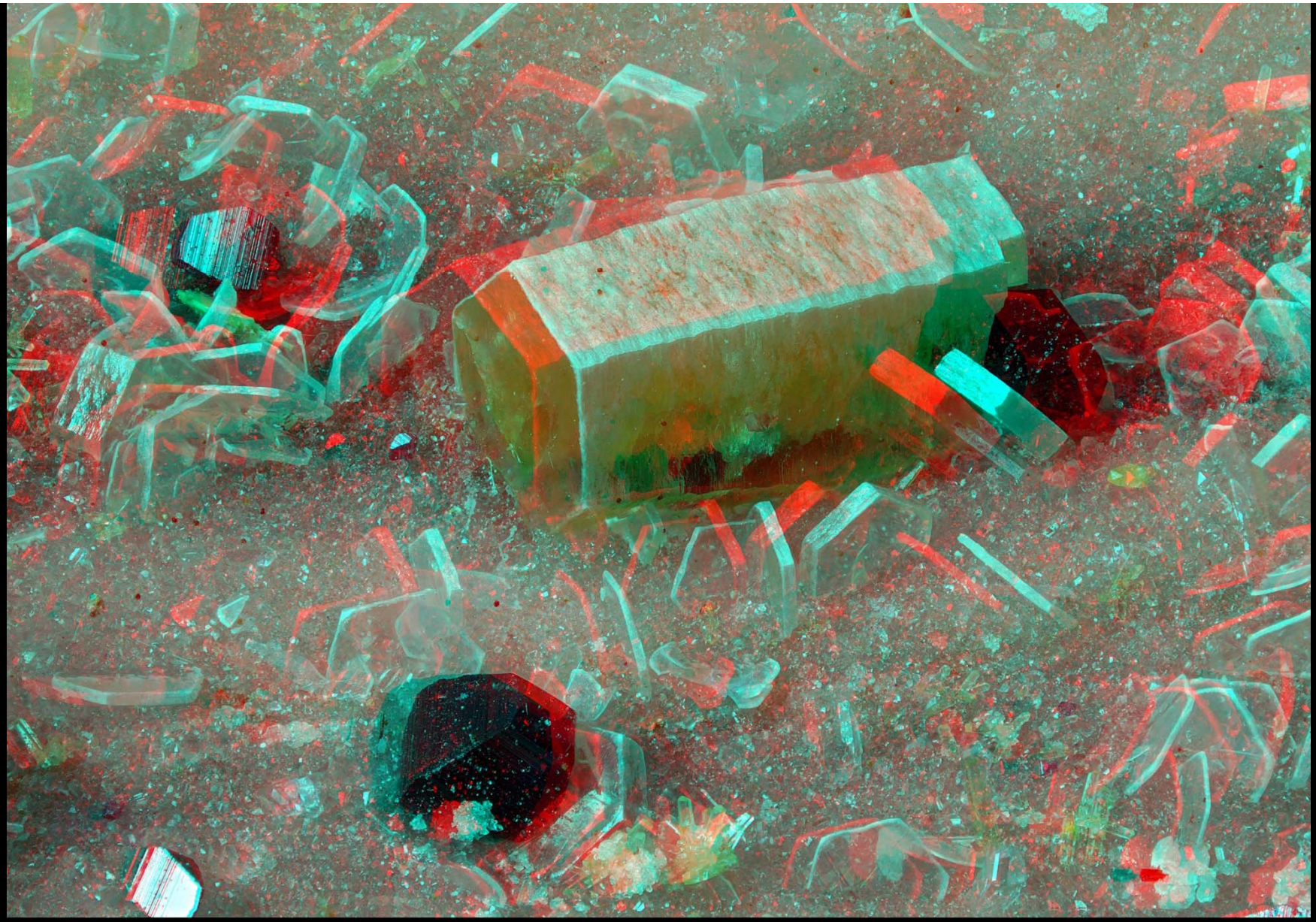
Hexagonal prisms, coated, and thin plates with xenotime-(Y), anatase and rutile in crack in silicified rhyolitic tuff turbidite.

Cwmorthin Quarry, Blaenau Ffestiniog, Gwyneth.

Specimen: David Green collection. Photography: John Chapman, September 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 112 and 105 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Synchysite-(Ce) $CaCe(CO_3)_2F$

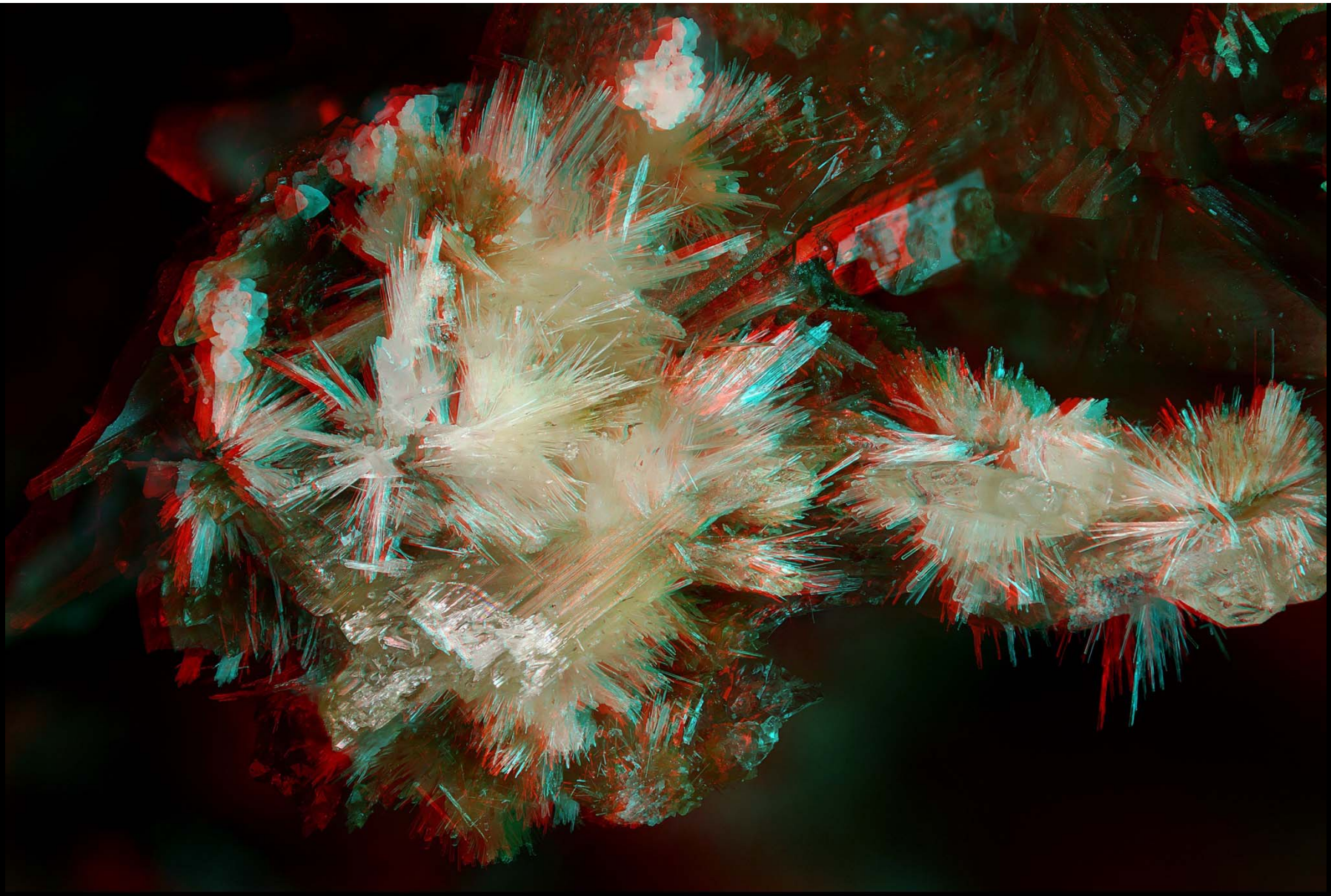
Field width 6.34 mm.

Hexagonal prisms, coated, and thin plates with xenotime-(Y) and anatase in crack in silicified rhyolitic tuff turbidite.

Cwmorthin Quarry, Blaenau Ffestiniog, Gwyneth.

Specimen: David Green collection. Photography: John Chapman, September 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 201 and 164 35-micrometre steps at 6 degees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

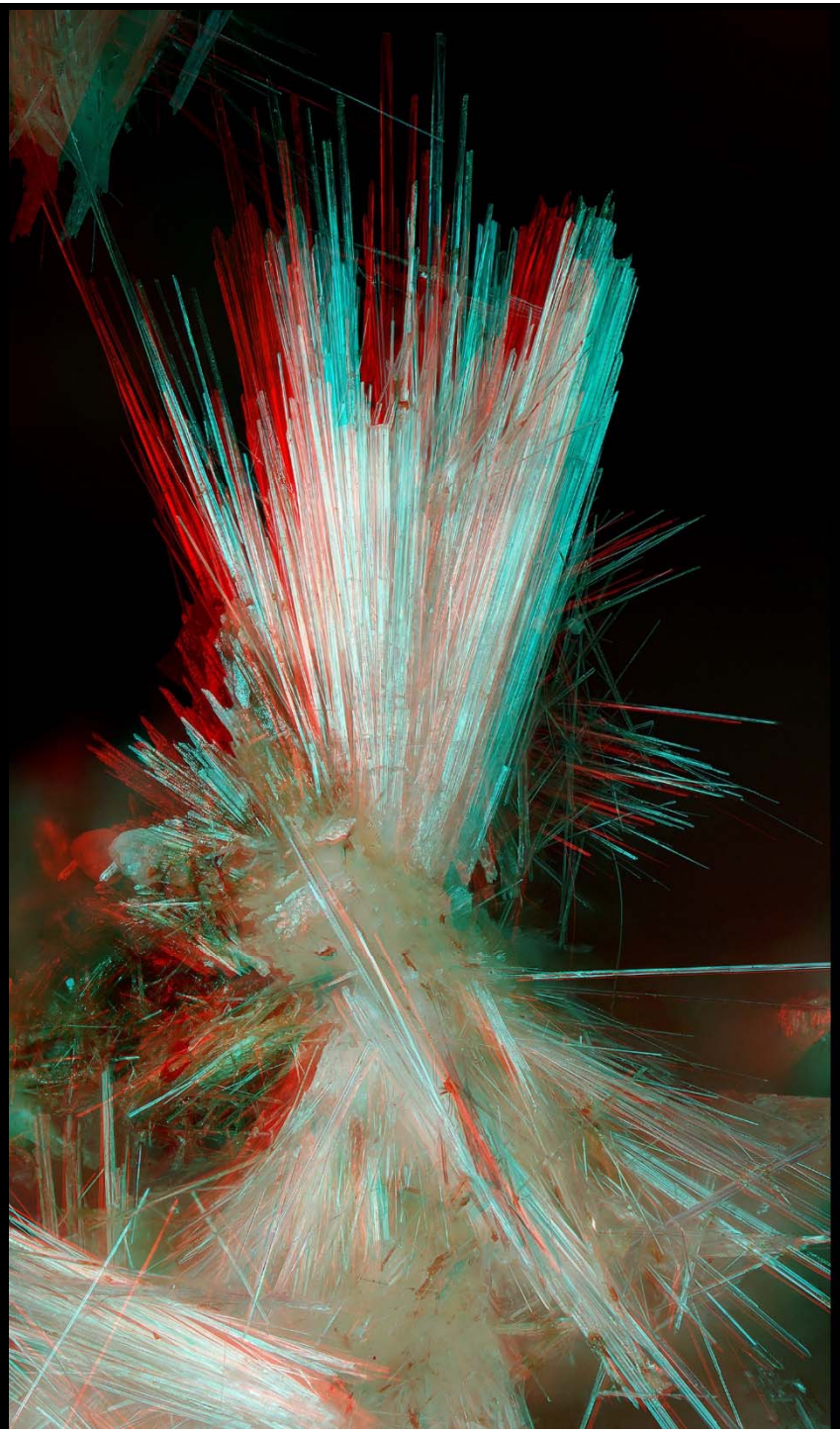
Szaibelyite $MgBO_2(OH)$

Field width 7.16 mm.

Rich white (colourless) tufts on well crystallised hilgardite with minor striated hydroboracite all overgrowing a large fragment of platy volkovskite. Panel 848 Boulby Mine, Loftus, Cleveland.

Specimen: found by David Green in 2013 and in David Green collection. Photography: John Chapman, August 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 130 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 108 and 94 25-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Szaibelyite $MgBO_2(OH)$

Rich white (colourless) tufts on well crystallised hilgardite with minor striated hydroboracite all overgrowing a large fragment of platy volkovskite.

Panel 848 Boulby Mine, Loftus, Cleveland.

Specimen: found by David Green in 2013 and in David Green collection.

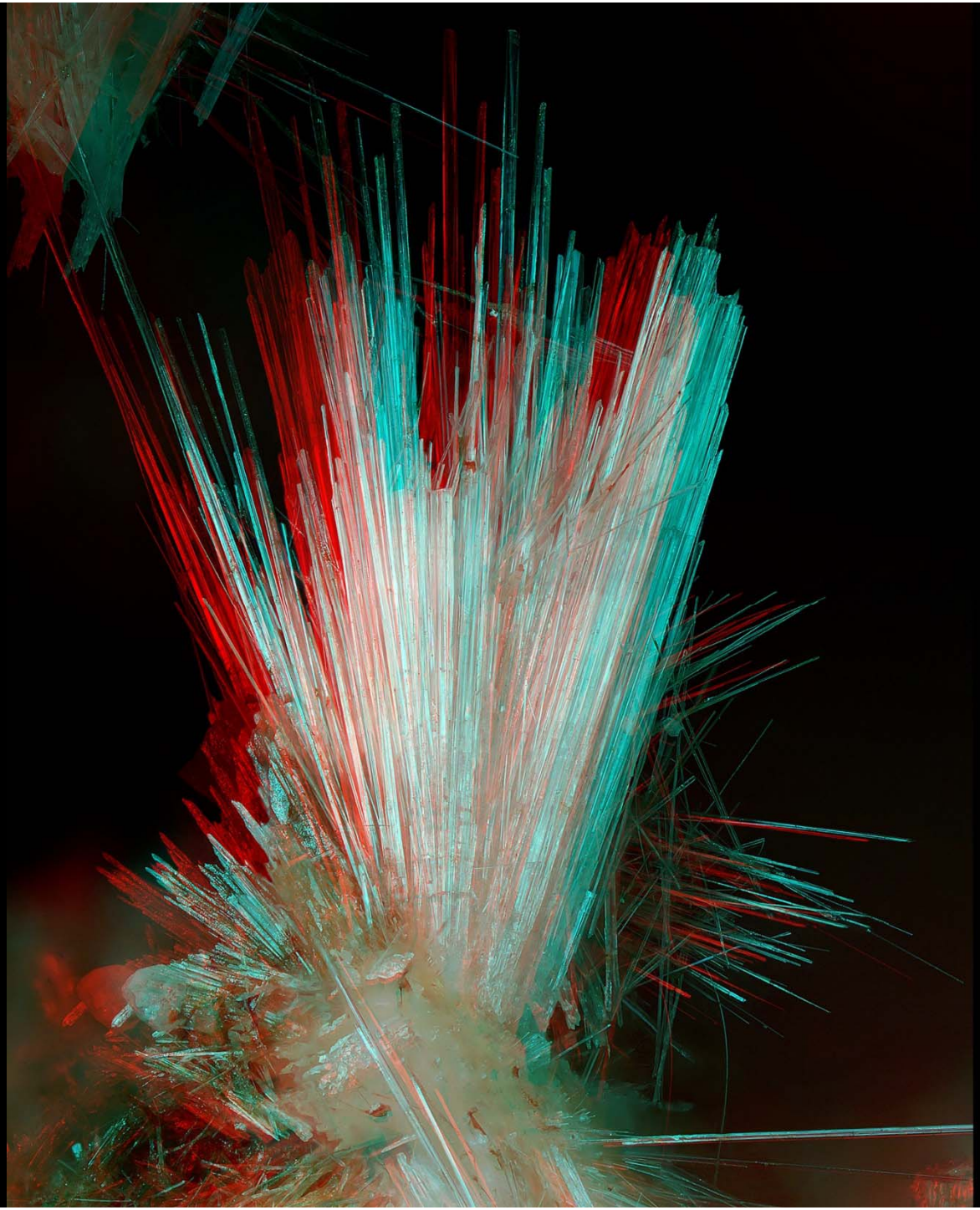
Photography: John Chapman, August 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 110 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 220 and 206 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 4.96 mm.



Szaibelyite $MgBO_2(OH)$

Rich white (colourless) tufts on well crystallised hilgardite with minor striated hydroboracite all overgrowing a large fragment of platy volkovskite.

Panel 848 Boulby Mine, Loftus, Cleveland.

Specimen: found by David Green in 2013 and in David Green collection.

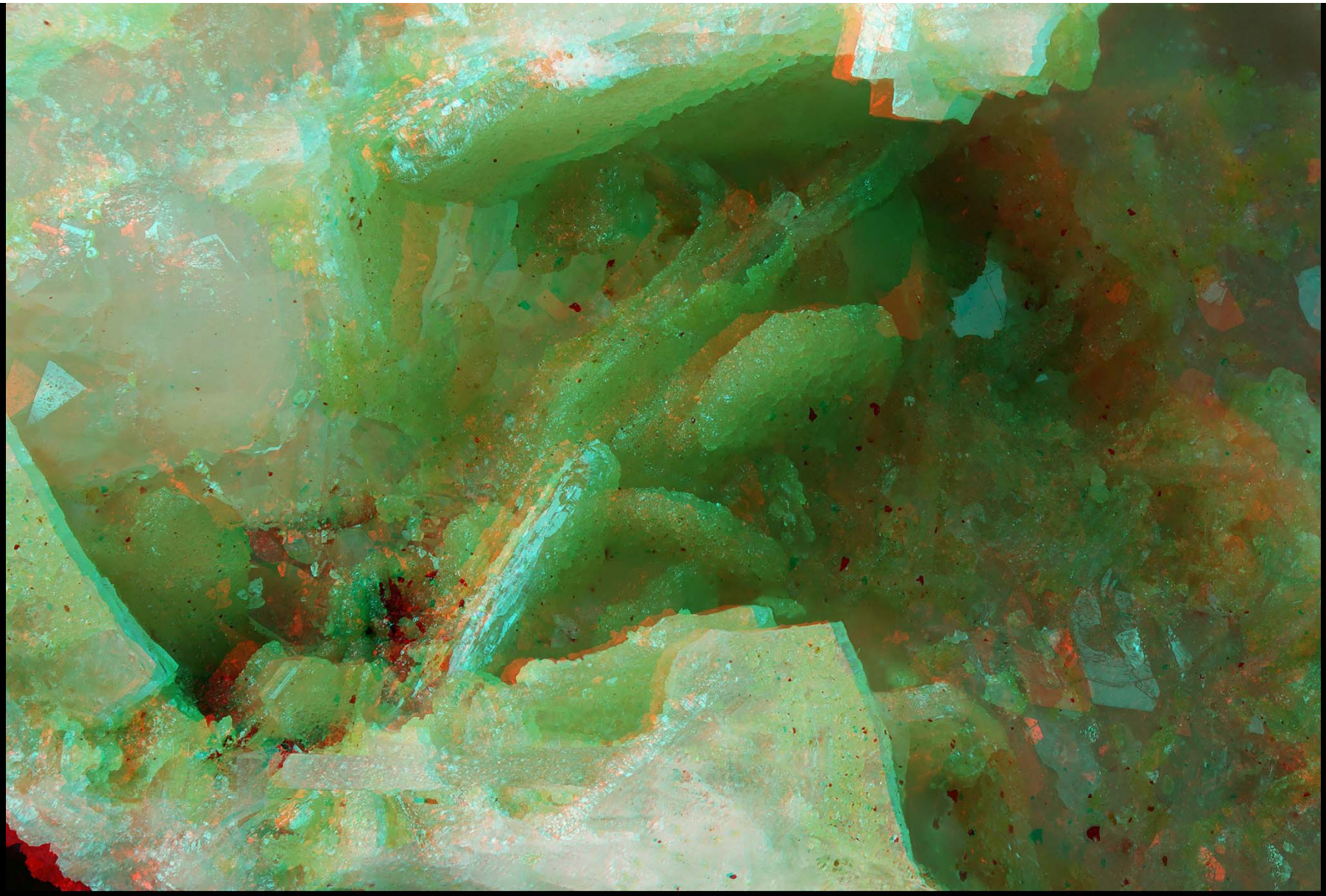
Photography: John Chapman, August 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 110 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 220 and 206 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 3.58 mm.

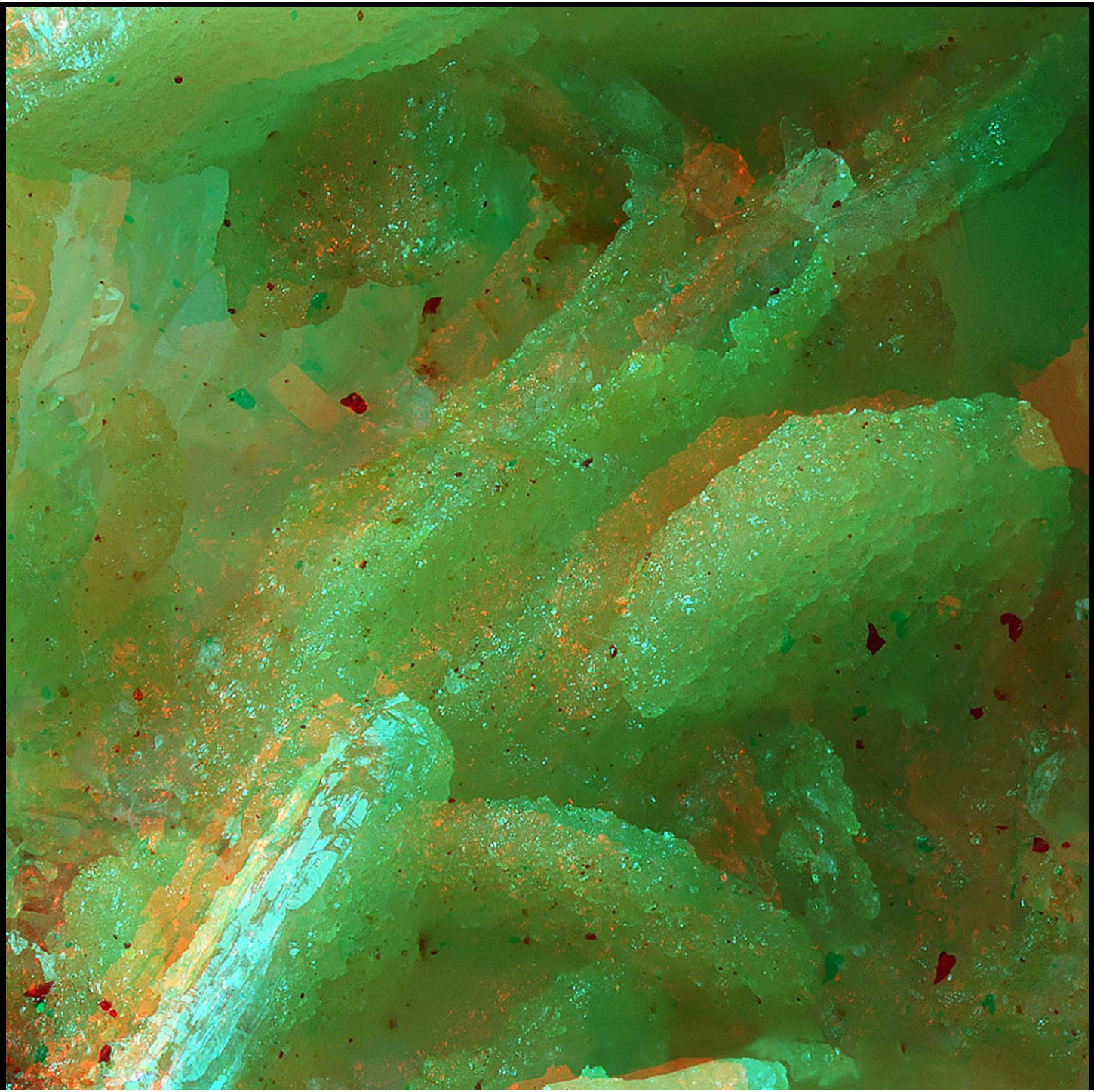


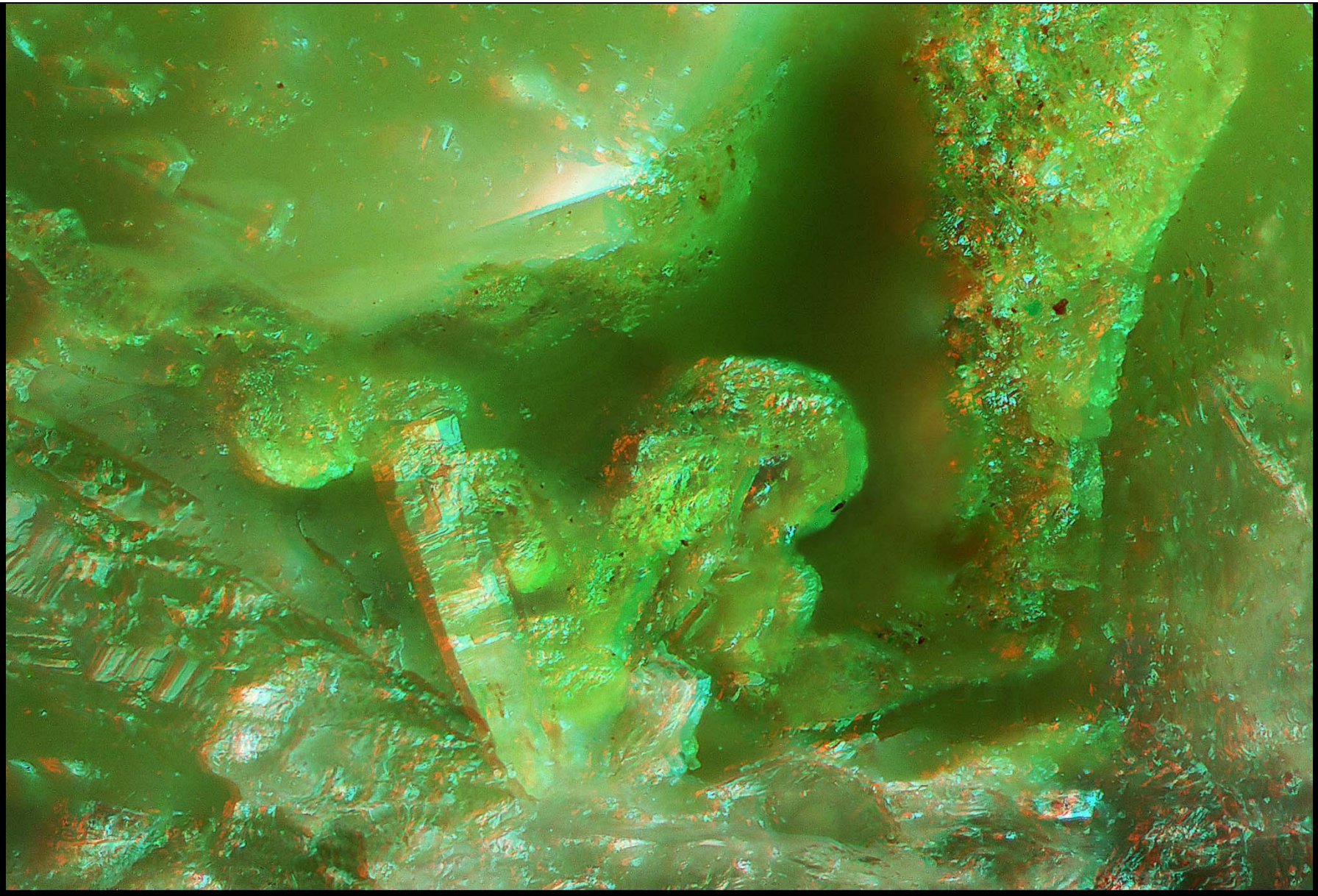
1 mm

Thometzekite $PbCu^{2+}_2(AsO_4)_2 \cdot 2H_2O$

Field width 3.67 mm.

Minutely botryoidal coating on baryte crystals.
Potts Gill Mine, Caldbeck Fells, Cumbria.
Specimen: Paul Nicholson collection. Photography: John Chapman, March 2024.
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 166 and 146 15-25-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.





0.1 mm

Thometzekite $PbCu^{2+}_2(AsO_4)_2 \cdot 2H_2O$

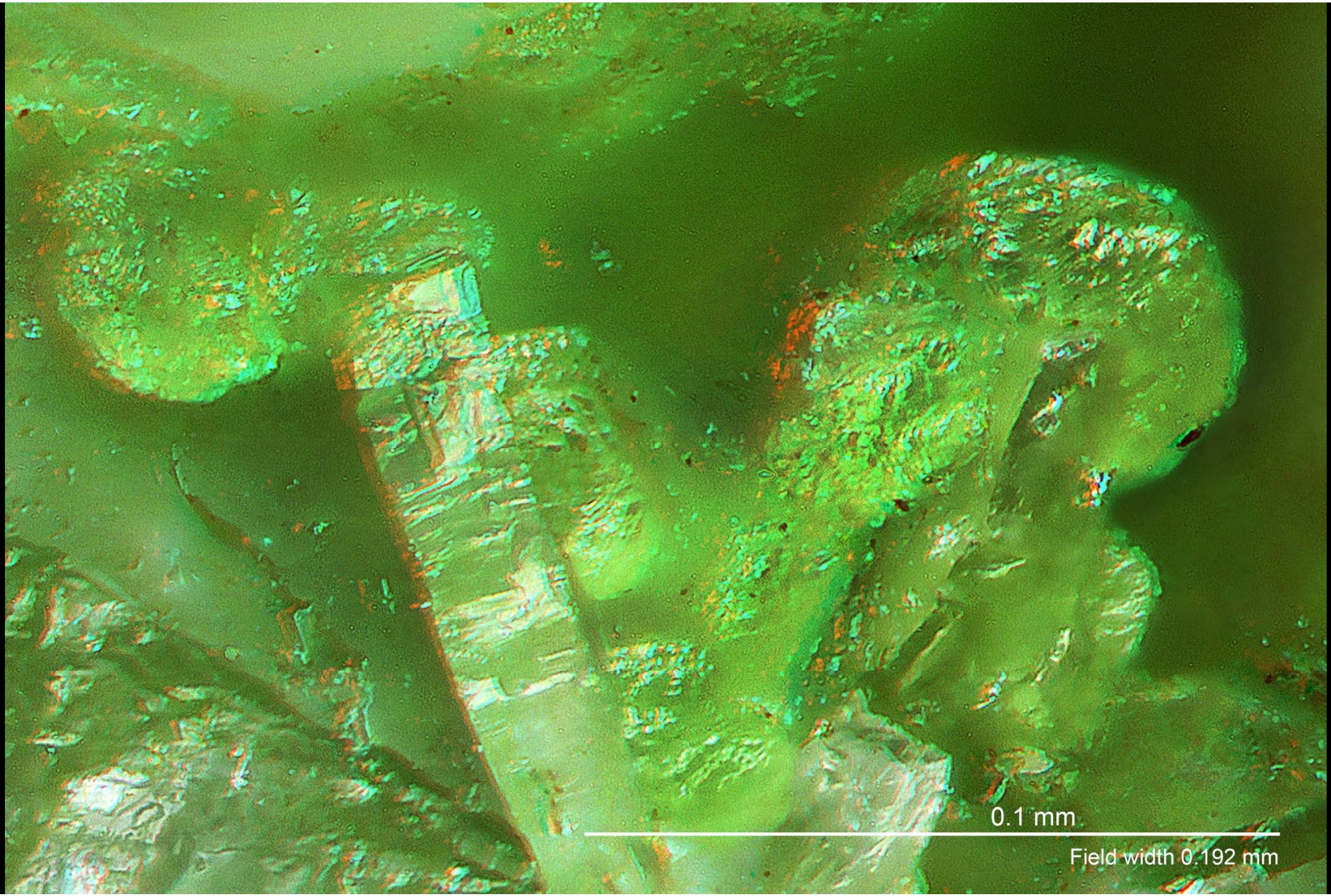
Field width 0.489 mm.

Possible minutely foliaceous coating on baryte crystals.

Potts Gill Mine, Caldbeck Fells, Cumbria.

Specimen: Paul Nicholson collection. Photography: John Chapman, March 2024.

Canon EOS 5DSr camera with Leica 350x/0.50 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 47 and 77 2-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotmaker.


0.1 mm
Field width 0.192 mm

1 mm

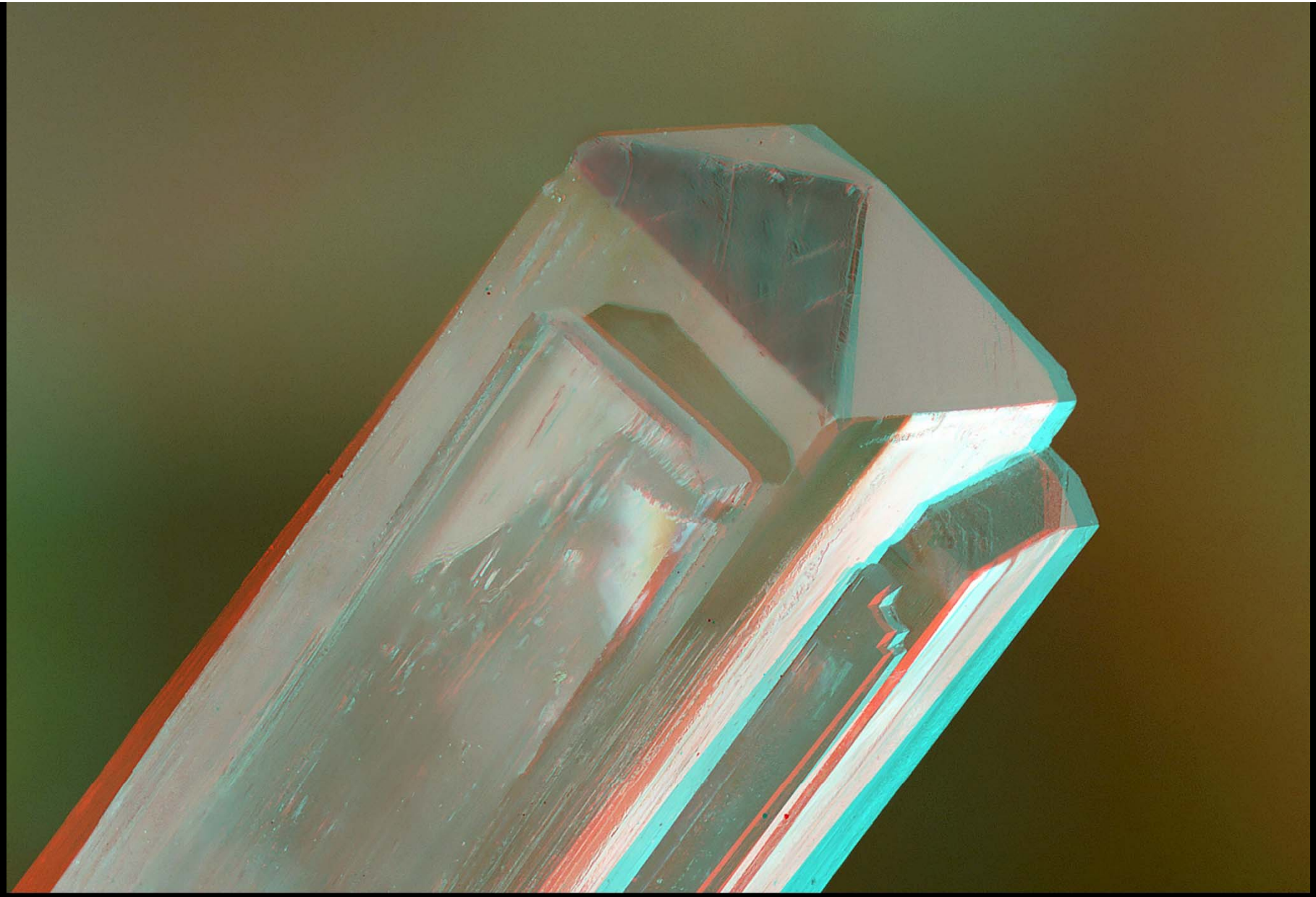
Thomsonite-Ca $NaCa_2(Al_5Si_5)O_{20}\cdot 6H_2O$

Field width 3.71 mm.

Isolated prismatic crystal having pyramidal termination, with calcite. Loanhead Quarry, Beith, North Ayrshire.

Specimen: Susan Tyzack collection, No. 544. Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 88 and 89 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

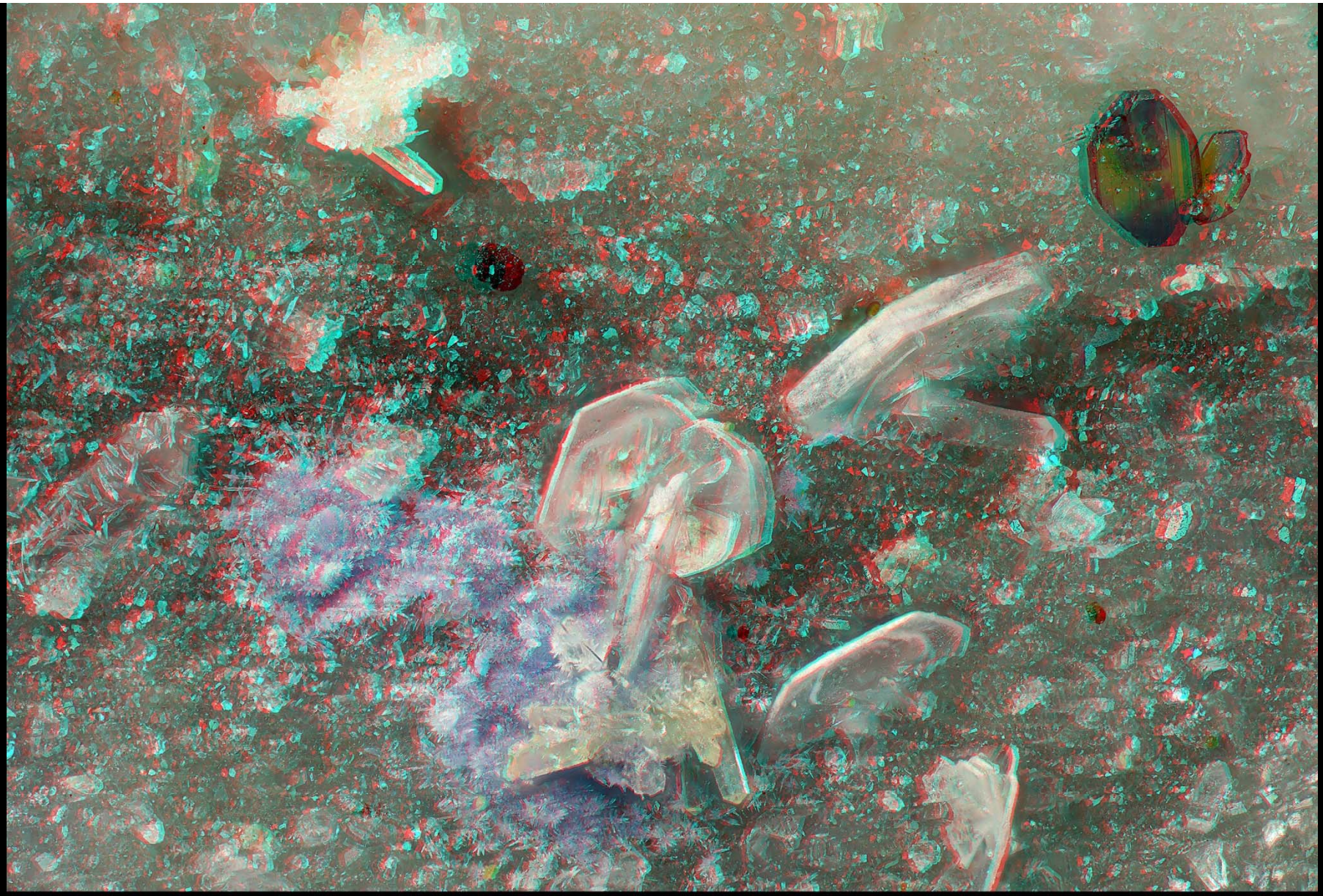
Thomsonite-Ca $NaCa_2(Al_5Si_5)O_{20}\cdot 6H_2O$

Field width 1.89 mm.

Isolated prismatic crystal having pyramidal termination, with calcite. Loanhead Quarry, Beith, North Ayrshire.

Specimen: Susan Tyzack collection, No. 544. Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 88 and 89 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

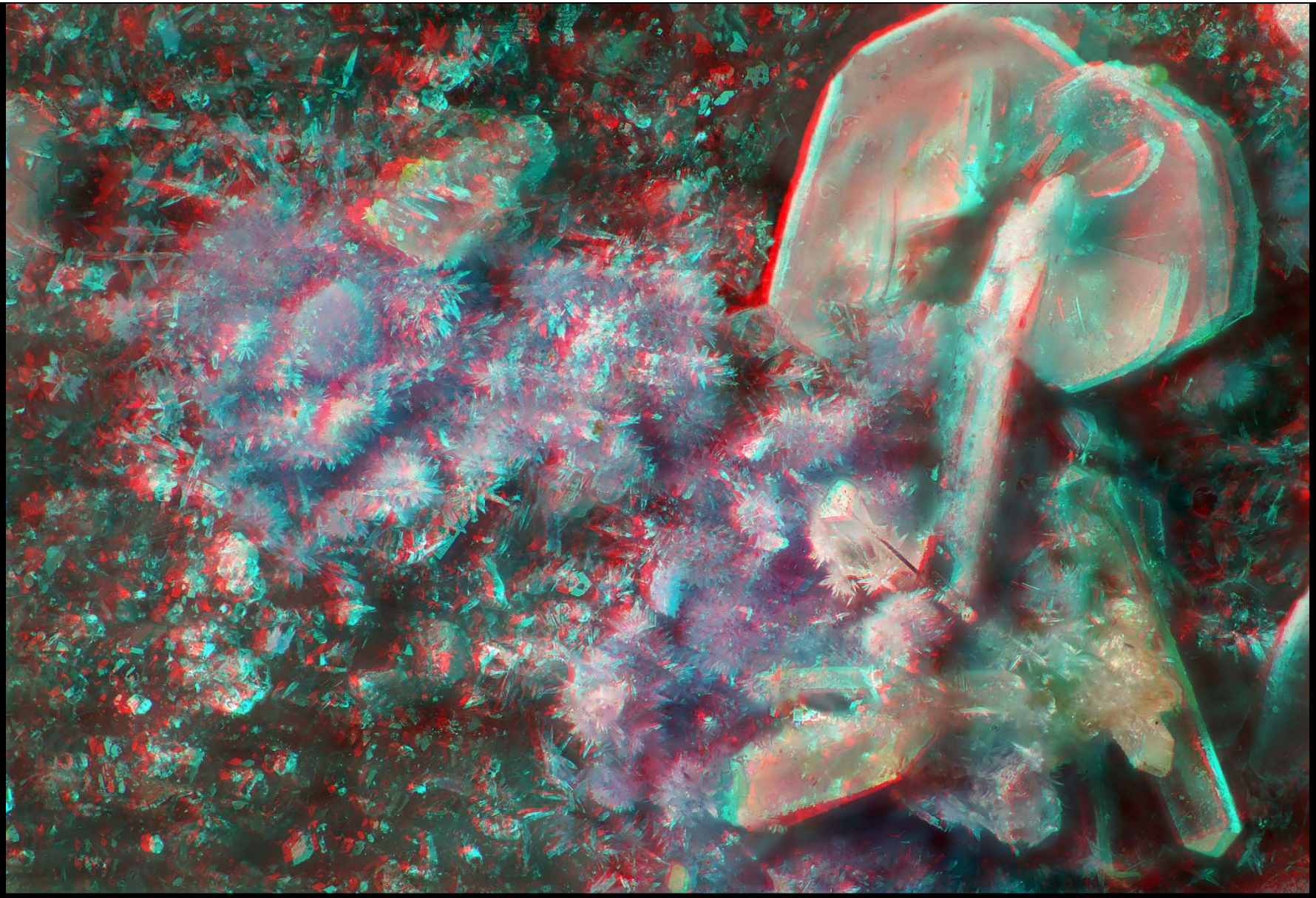


0.1 mm 1 mm

Thortveitite $Sc_2Si_2O_7$

Field width 2.44 mm.

Pale blue acicular crystals in crack in silicified rhyolitic tuff turbidite.
Cwmorthin Quarry, Blaenau Ffestiniog, Gwynedd.
Specimen: David Green collection. Photography: John Chapman, September 2024.
Canon EOS 5DSr camera with Mitutoyo M Plan Apo 10x/0.28 objective lens on Thorlabs tubes and apochromatic tube lens, with Schott fibre optic illumination.
Left + right stacks of 108 and 124 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

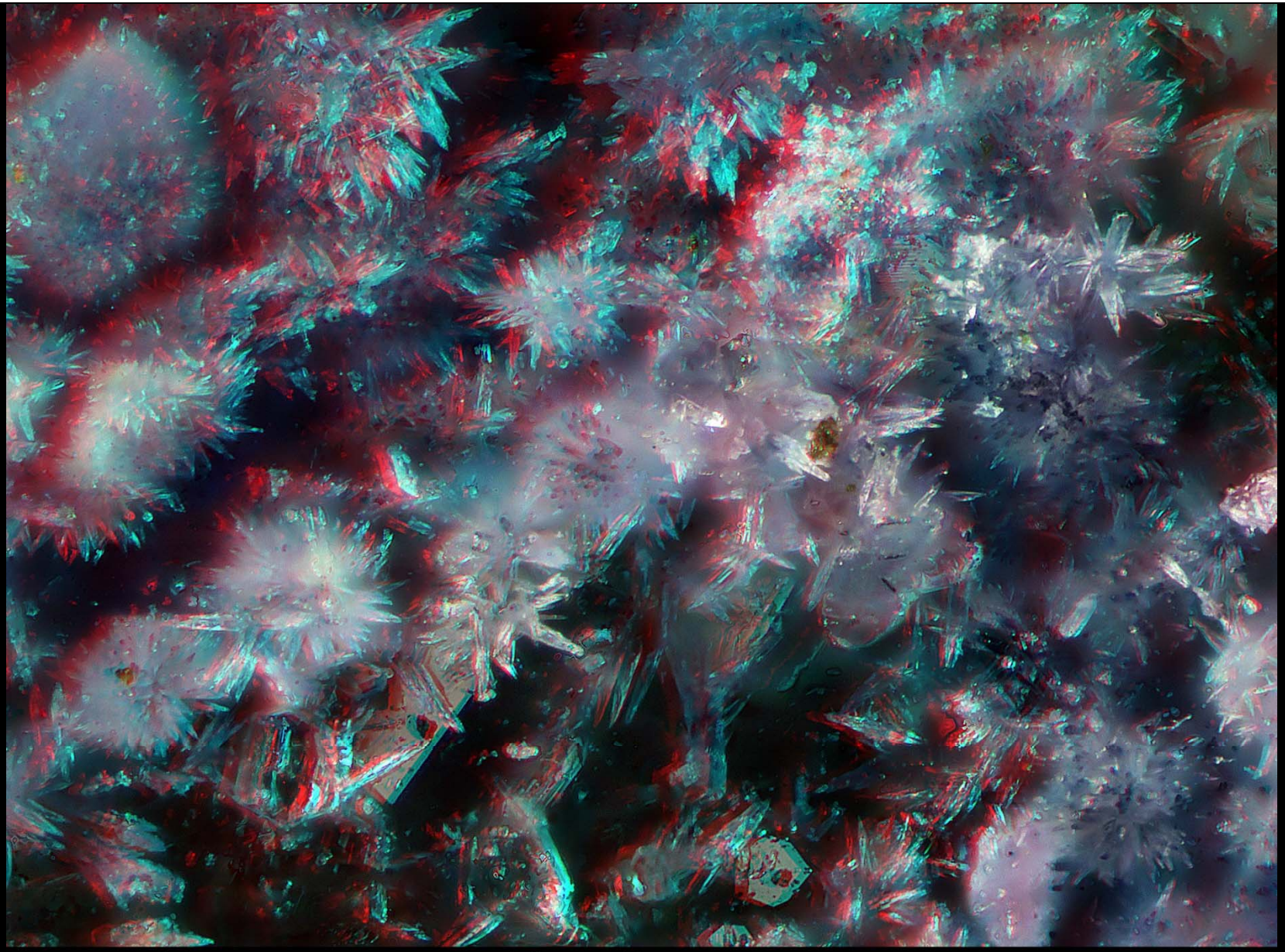


0.1 mm

Thortveitite $Sc_2Si_2O_7$

Field width 1.17 mm.

Pale blue acicular crystals in crack in silicified rhyolitic tuff turbidite.
Cwmorthin Quarry, Blaenau Ffestiniog, Gwynedd.
Specimen: David Green collection. Photography: John Chapman, September 2024.
Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 135 and 140 3-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

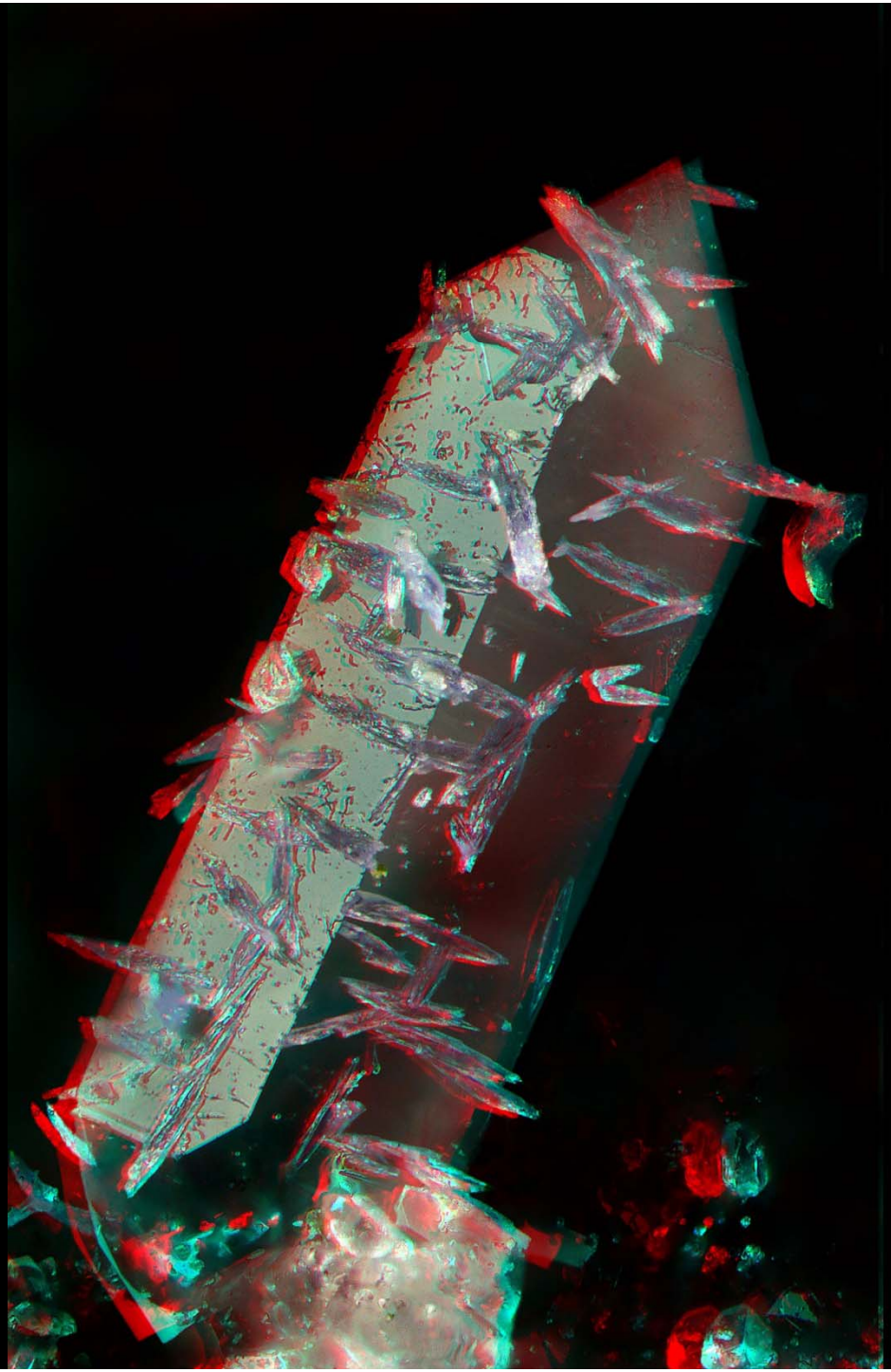


0.1 mm

Thortveitite $Sc_2Si_2O_7$

Field width 0.420 mm.

Pale blue acicular crystals in crack in silicified rhyolitic tuff turbidite.
Cwmorthin Quarry, Blaenau Ffestiniog, Gwynedd.
Specimen: David Green collection. Photography: John Chapman, September 2024.
Canon EOS 5DSr camera with Leica 350x/0.50 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + rights stacks of 92 and 122 2-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Thortveitite $Sc_2Si_2O_7$

Pale blue transparent double terminated pointed prismatic crystals on a double terminated quartz crystal. The thortveitite crystals average 10 micrometres wide. In comparison, red blood cells average 8.1 micrometres in diameter.
The substrate is quartz coating a crack in silicified rhyolitic tuff turbidite.

Cwmorthin Quarry, Blaenau Ffestiniog, Gwynedd.

Specimen: David Green collection.

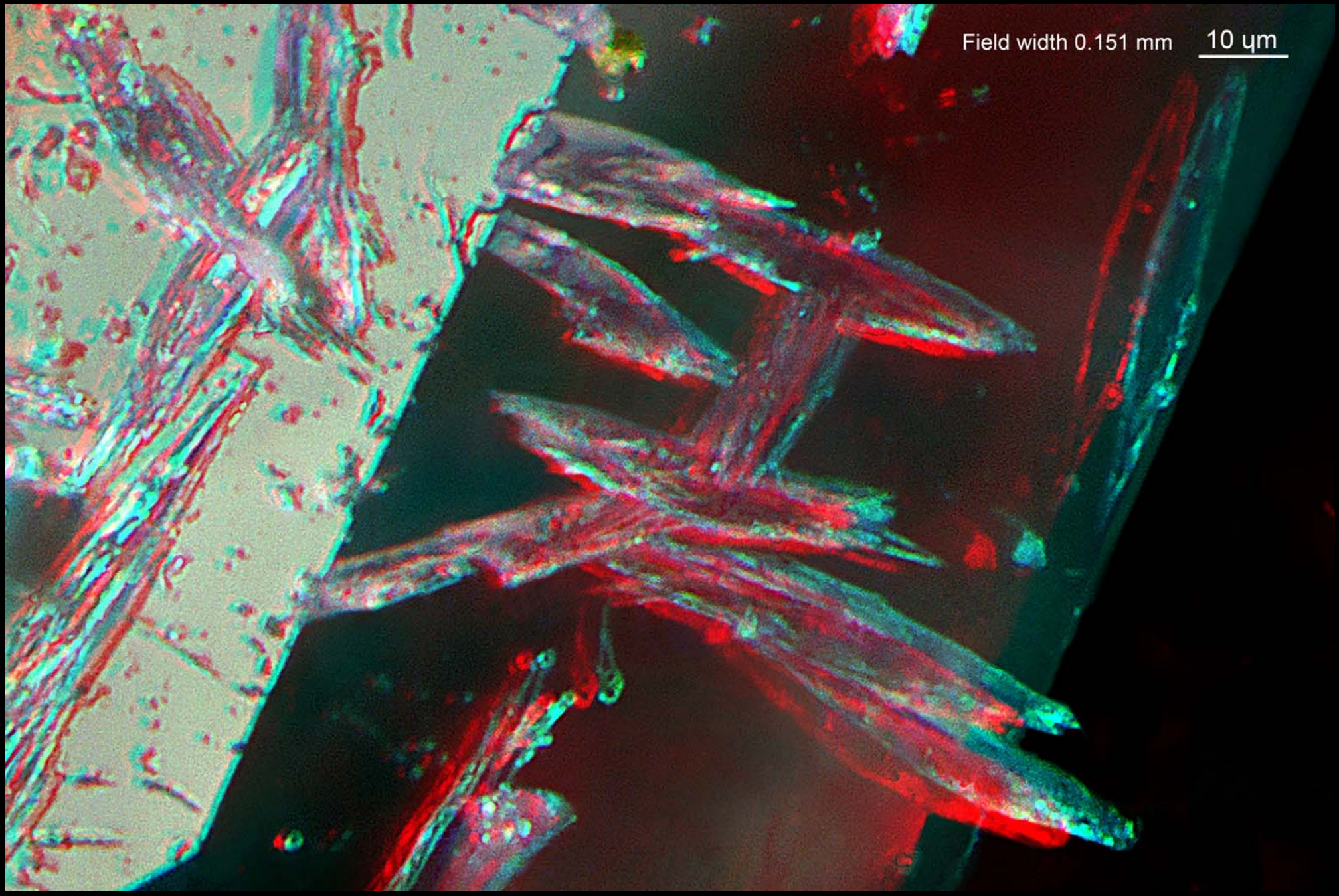
Photography: John Chapman, September 2024.

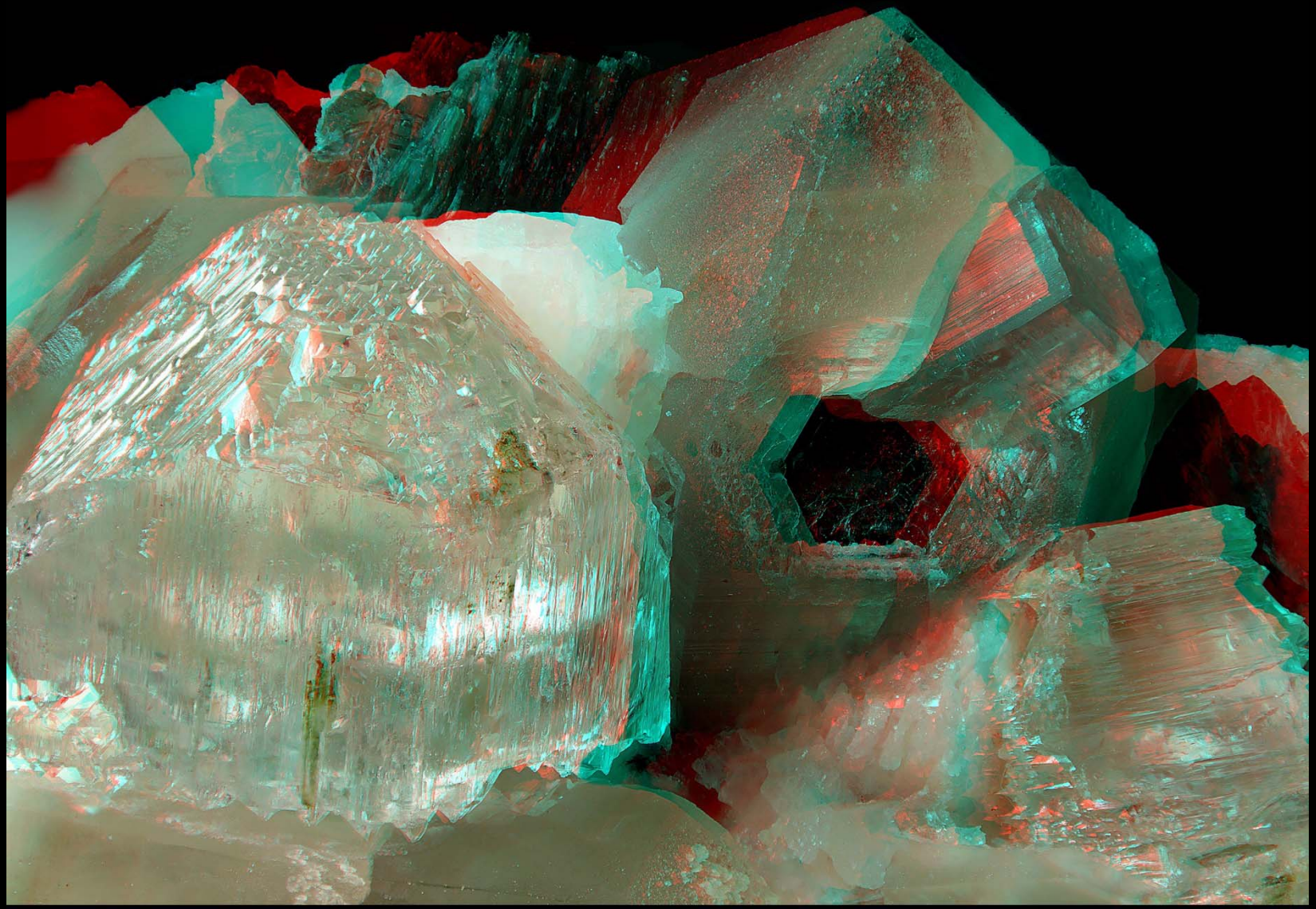
Canon EOS 5DSr camera with Leica 350x/0.50 objective lens on 175mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 134 and 104 1-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 0.501 mm.


Field width 0.151 mm
10 µm



Topaz $Al_2SiO_4F_2$ and beryl $Be_3Al_2Si_6O_{18}$ with pale smoky quartz, biotite mica and feldspar.

The two topaz crystals are partially dissolved and regrown, whilst the blue-green hexagonal beryl and hexagonal black biotite are overgrown by a hexagonal smoky quartz crystal, with off-white feldspar around, plus a dark green mica above. Field width 23.0 mm.

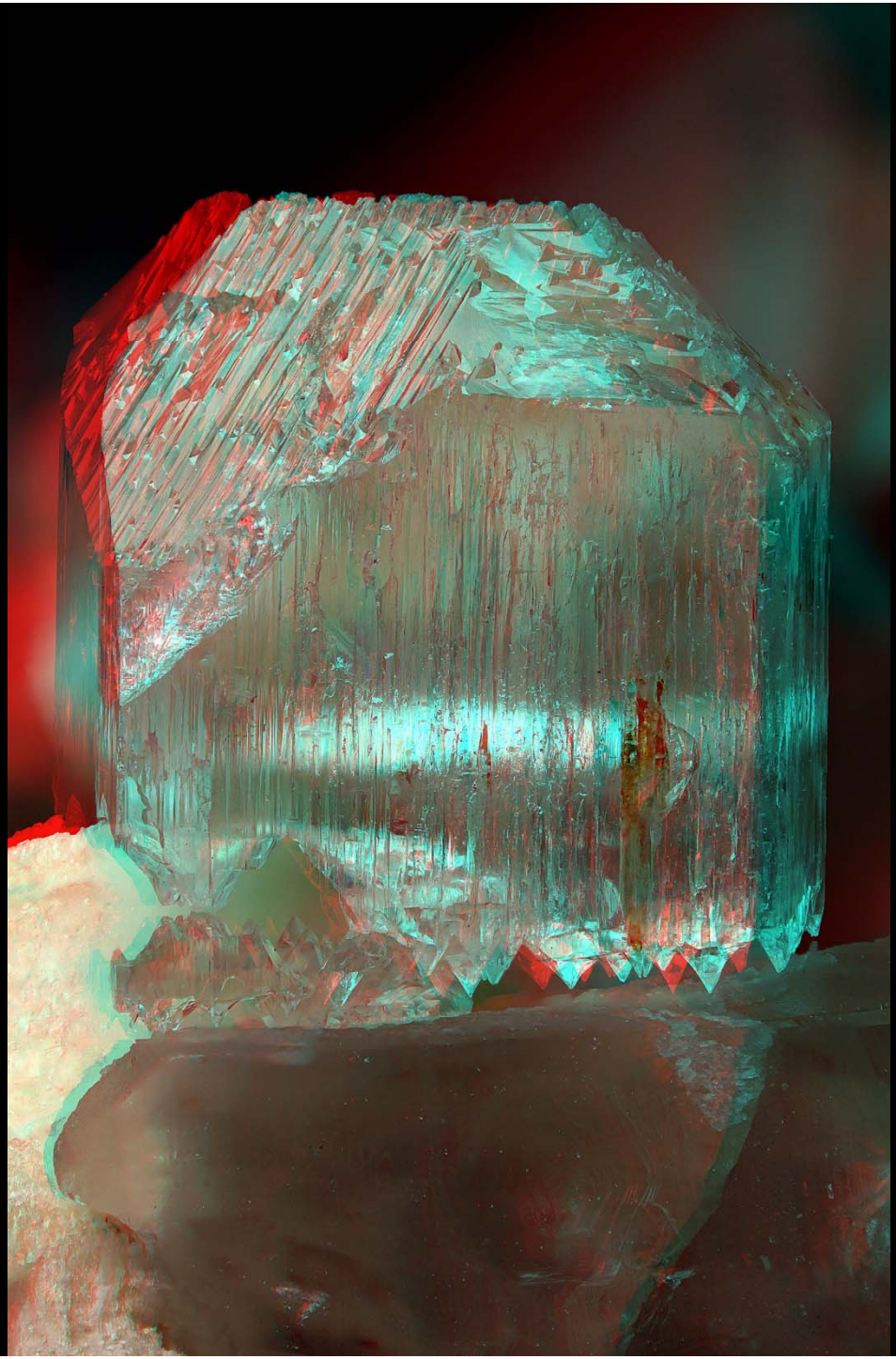
1 mm

From granite boulders near the bottom of a gulley south of Battery Point SS 128 448, Lundy, Devon.

Specimen: formerly in Mike Wood collection and now in David Green collection. Photography: John Chapman, February 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 120 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 154 and 150 150-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



Topaz $Al_2SiO_4F_2$

Dissolved and partially regrown crystal with quartz and feldspar.

From granite boulders near the bottom of a gulley south of Battery Point SS 128 448, Lundy, Devon.

Specimen: formerly in Mike Wood collection, now in David Green collection.

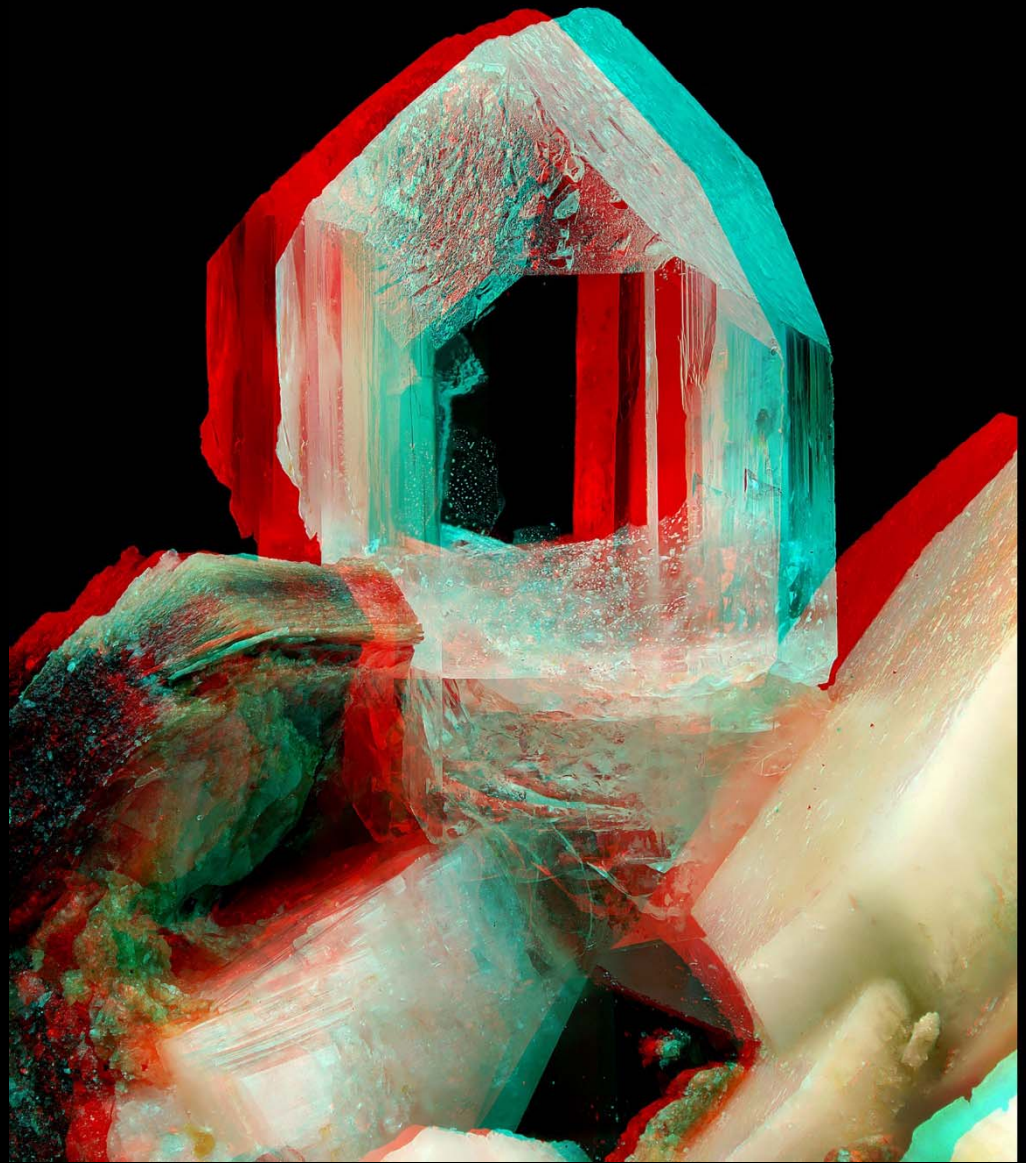
Photography: John Chapman, February 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 110 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 104 and 102 80-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM and rendered in Stereophotomaker.

1 mm

Field height 16.5 mm.



Topaz $Al_2SiO_4F_2$

Colourless transparent prismatic crystal with glass clear prism faces and etched pyramid faces. In miarolitic cavity in granite together with cinnamon-pink orthoclase feldspar, white albite feldspar, muscovite mica and smoky quartz crystal.

Diamond Rocks, Mourne Mountains, Co. Down, Northern Ireland.

Specimen: the late Julie Green collection.

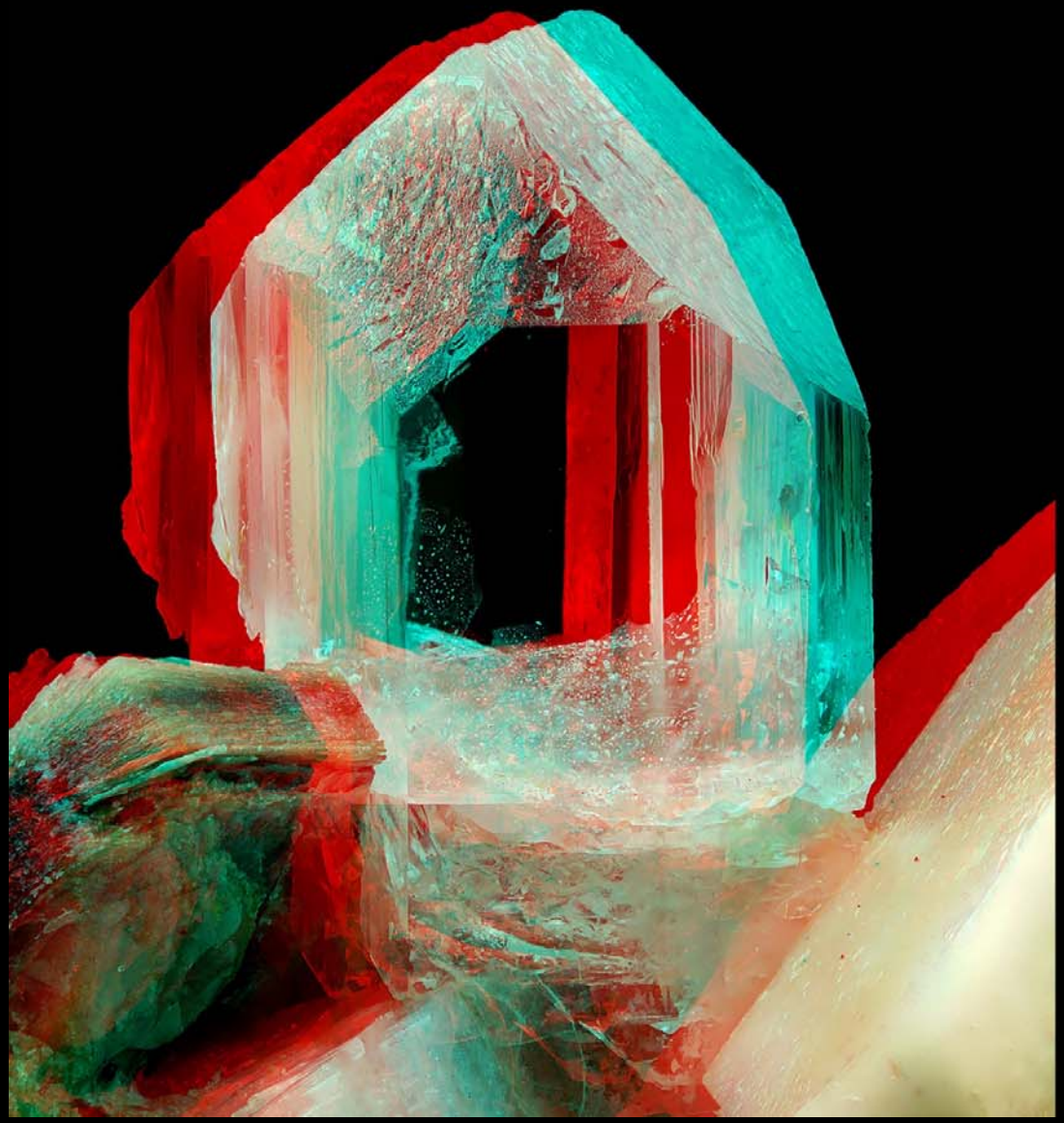
Photography: John Chapman, September 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 120 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 174 and 186 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 7.92 mm.



Topaz $Al_2SiO_4F_2$

Colourless transparent prismatic crystal with glass clear prism faces and etched pyramid faces. In miarolitic cavity in granite together with cinnamon-pink orthoclase feldspar, white albite feldspar, muscovite mica and smoky quartz crystal.

Diamond Rocks, Mourne Mountains, Co. Down, Northern Ireland.

Specimen: the late Julie Green collection.

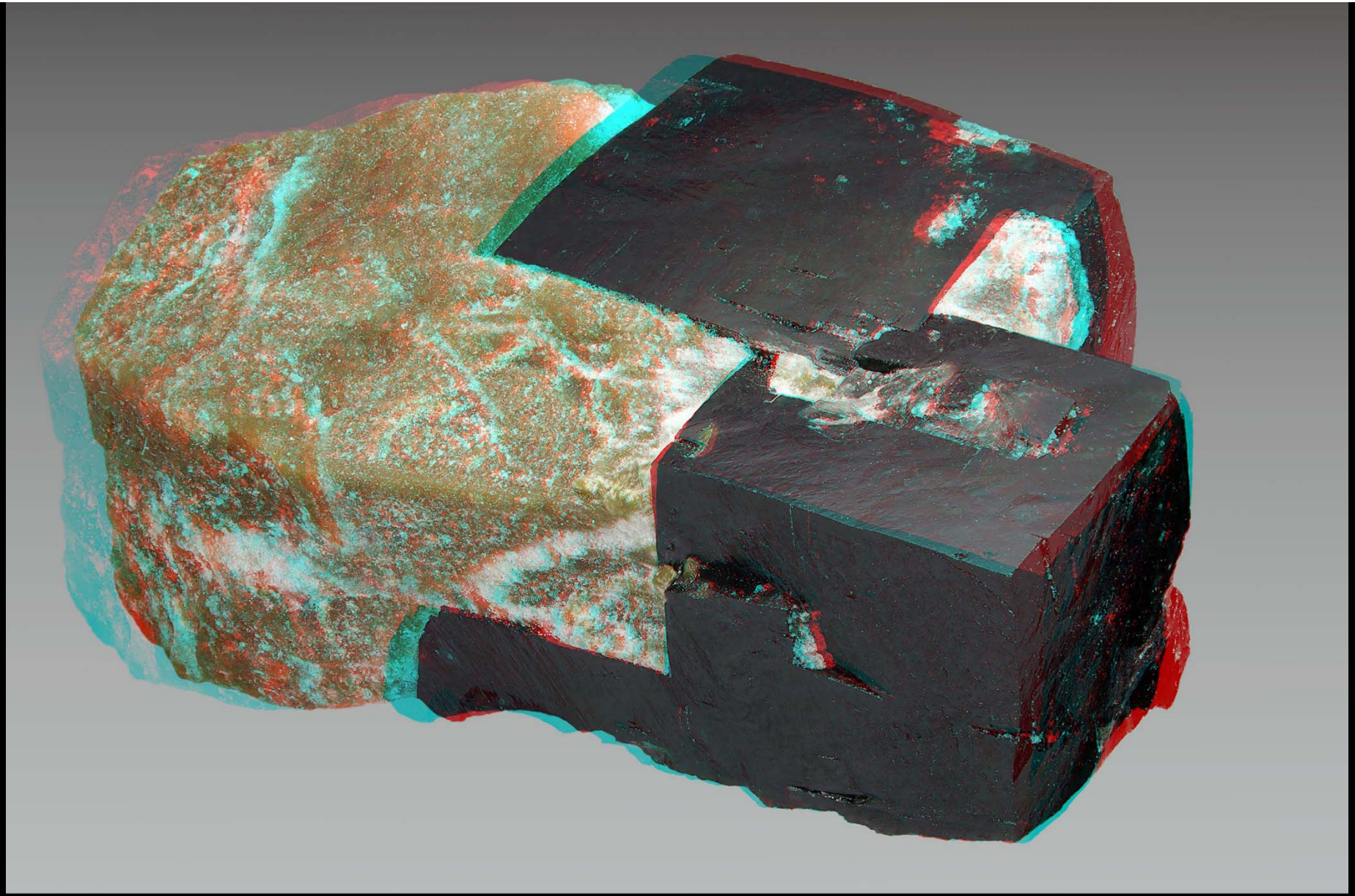
Photography: John Chapman, September 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 120 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 174 and 186 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 6.01 mm.



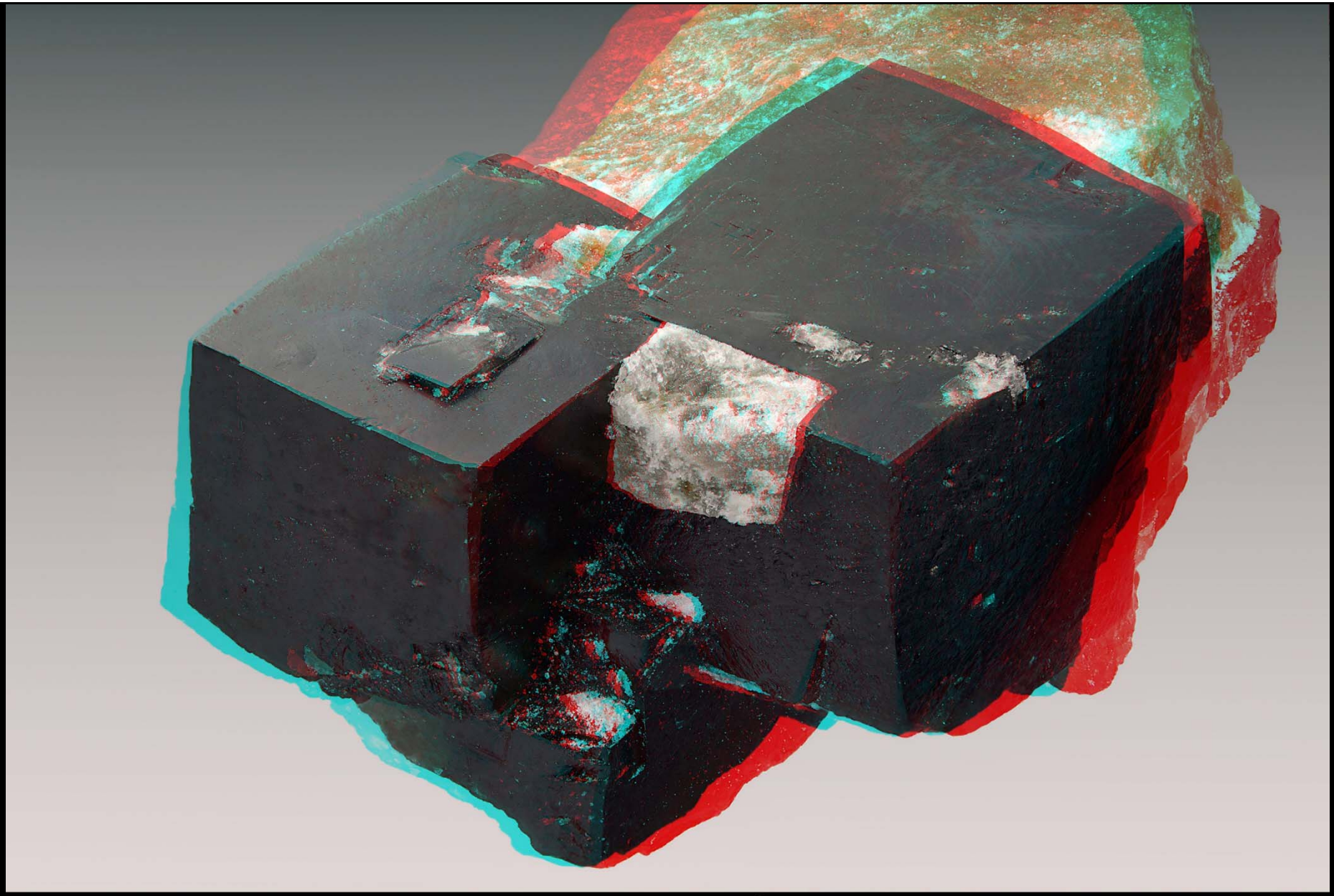
10 mm **Congolite-trembathite** $(Fe^{2+}_3\text{-}Mg_3)B_7O_{13}Cl$ Field width 27.1 mm.

Very dark brown pseudocubic crystals in sylinite ore. Panel 14 area, Boulby Mine, Loftus, Cleveland.

Specimen: collected by Peter Edey and now in David Green collection. Photography: John Chapman August 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 50 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 134 and 117 120-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 2, combined in CombineZM



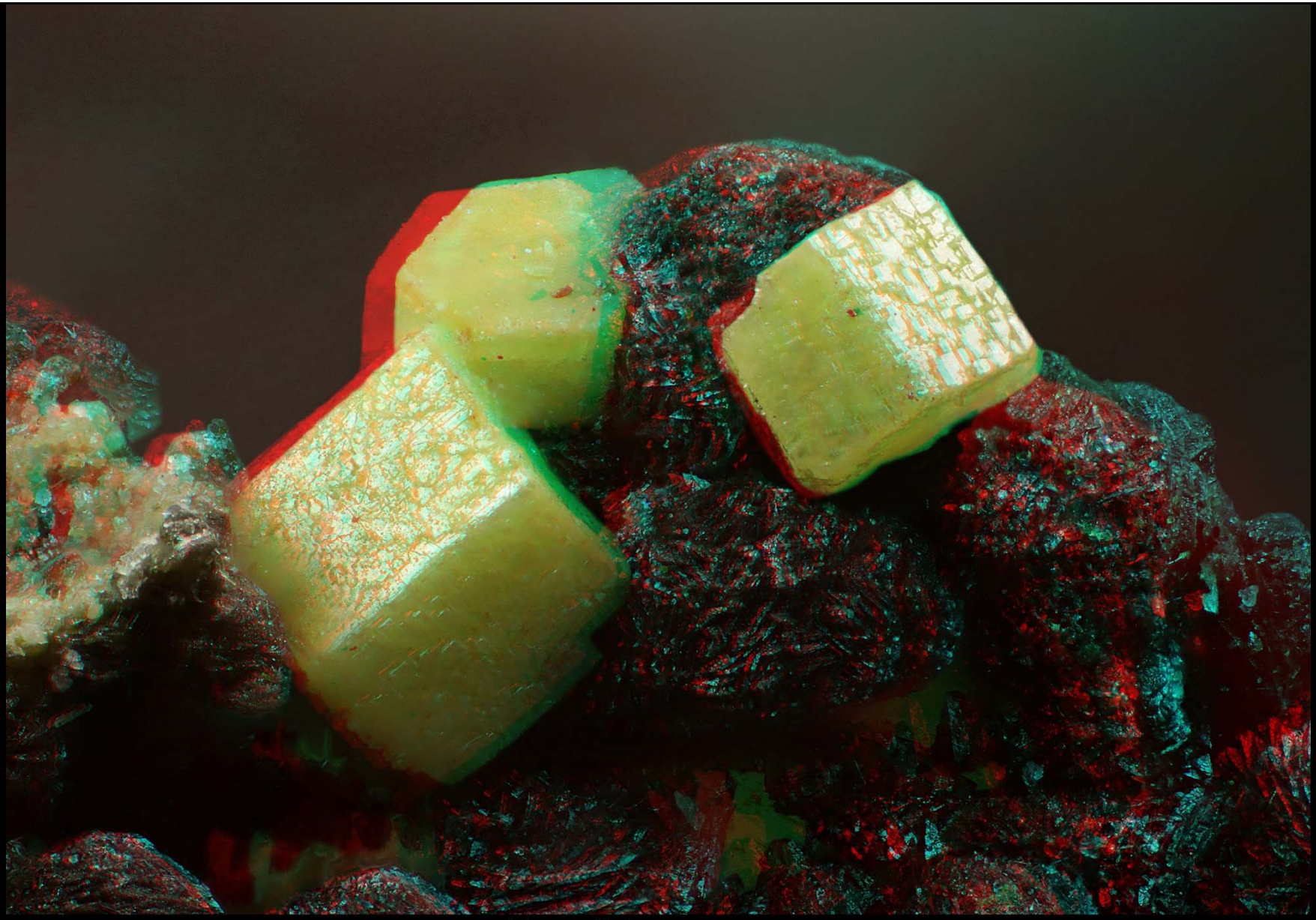
10 mm **Congolite-trembathite** $(Fe^{2+}_3\text{-}Mg_3)B_7O_{13}Cl$ Field width 26.5 mm.

Very dark brown pseudocubic crystals in sylinite ore. Panel 14 area, Boulby Mine, Loftus, Cleveland.

Specimen: collected by Peter Edey and now in David Green collection. Photography: John Chapman August 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 60 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 125 and 112 150-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 2, combined in CombineZM.



0.1 mm

Vanadinite $Pb_5(VO_4)_3Cl$

Field width 0.941 mm.

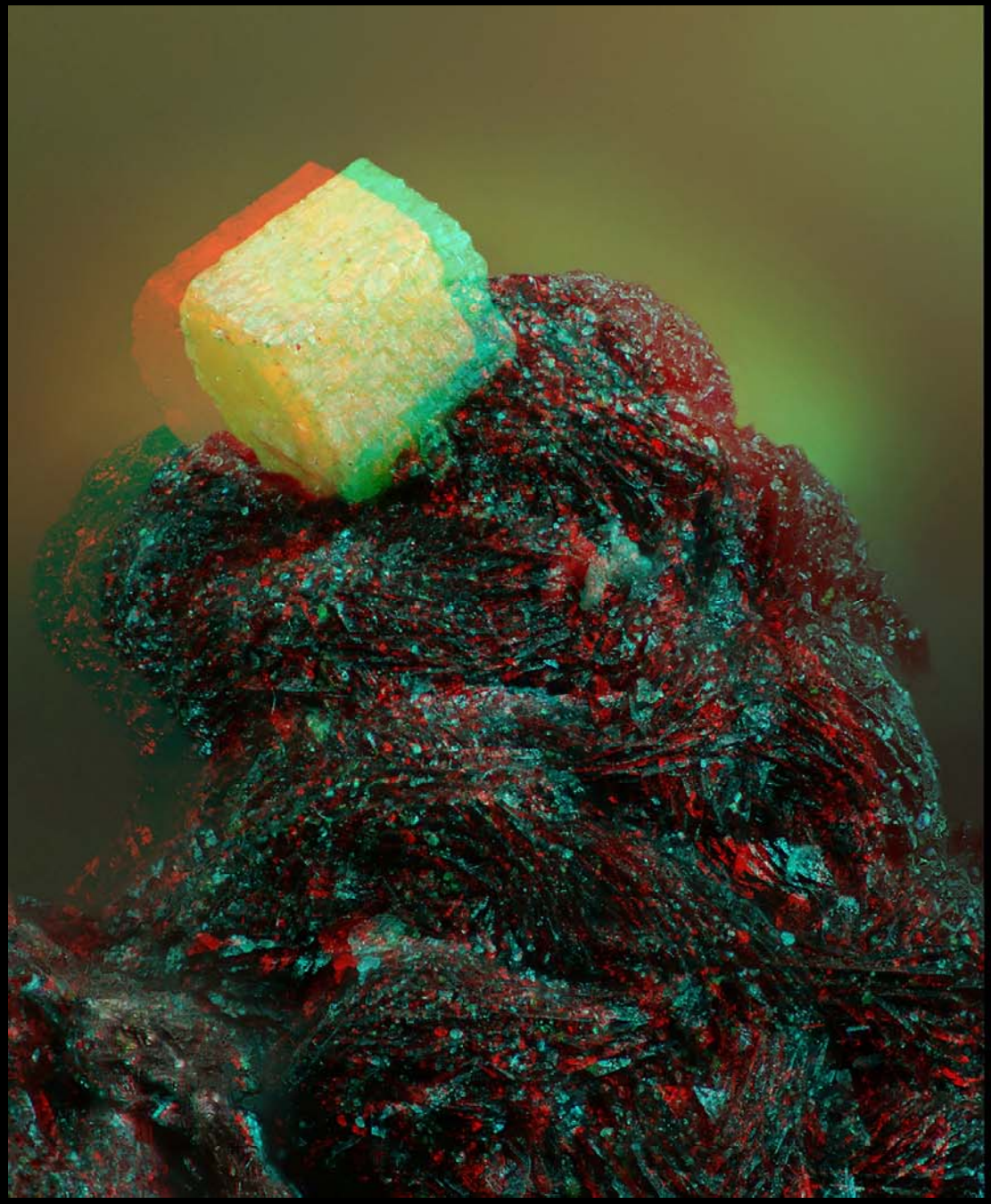
Pale yellow textured prismatic crystals on mottramite [$PbCu(VO_4)(OH)$].

Miller Moss Vein, higher Roughton Gill, Caldbeck Fells, Cumbria.

Specimen: David Green collection. Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 102 and 114 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Vanadinite $Pb_5(VO_4)_3Cl$

Pale yellow textured prismatic crystal
on mottramite [PbCu(VO4)(OH)].

Miller Moss Vein, Higher Roughton Gill,
Caldbeck Fells, Cumbria.

Specimen: David Green collection.

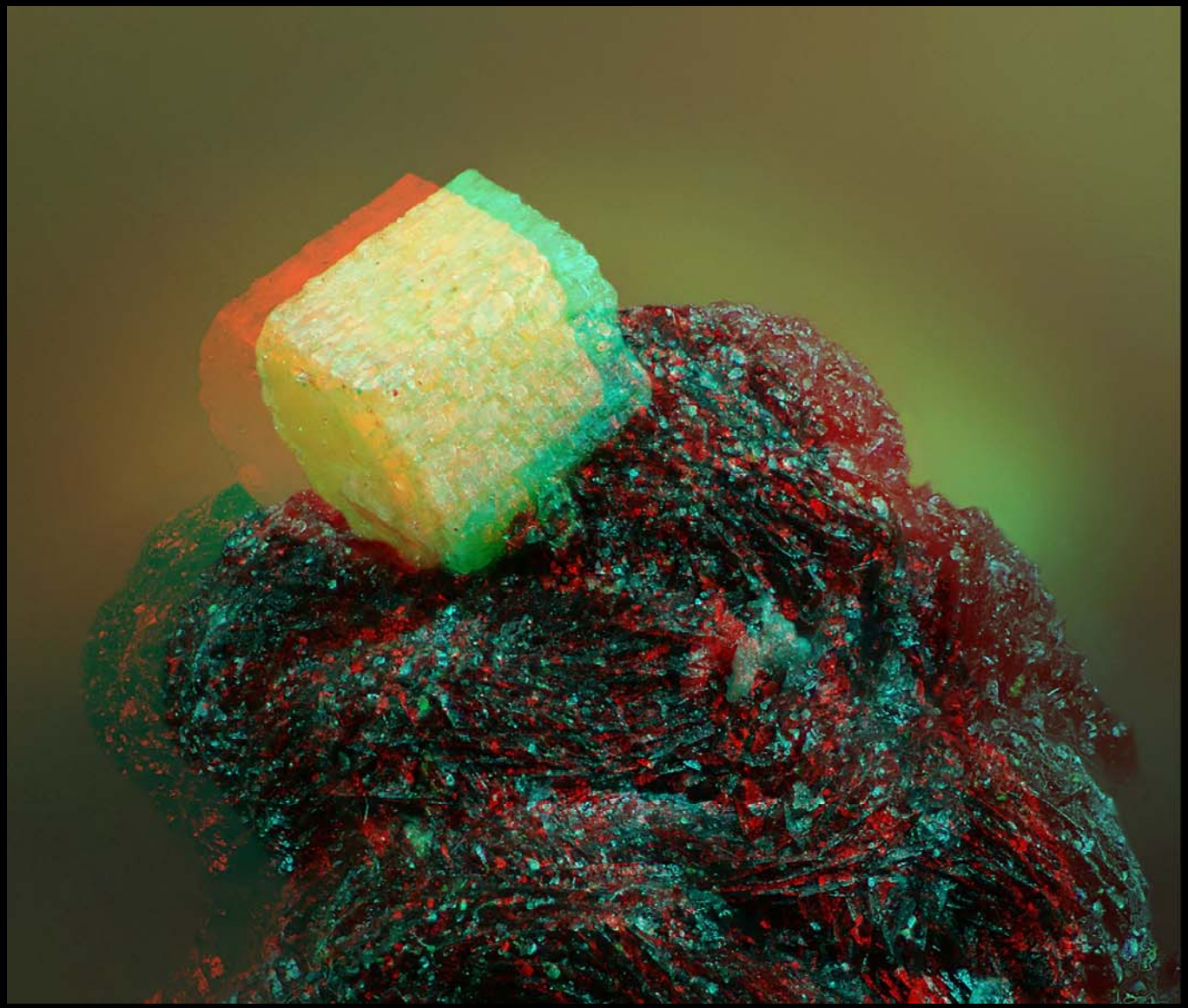
Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Leica 140x/0.40 objectove lens
on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 150 and 150 4-micrometre steps at 6 degrees via Stackshot rail,
combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 0.724 mm.



Vanadinite $Pb_5(VO_4)_3Cl$

Pale yellow textured prismatic crystal
on mottramite [PbCu(VO4)(OH)].

Miller Moss Vein, Higher Roughton Gill,
Caldbeck Fells, Cumbria.

Specimen: David Green collection.

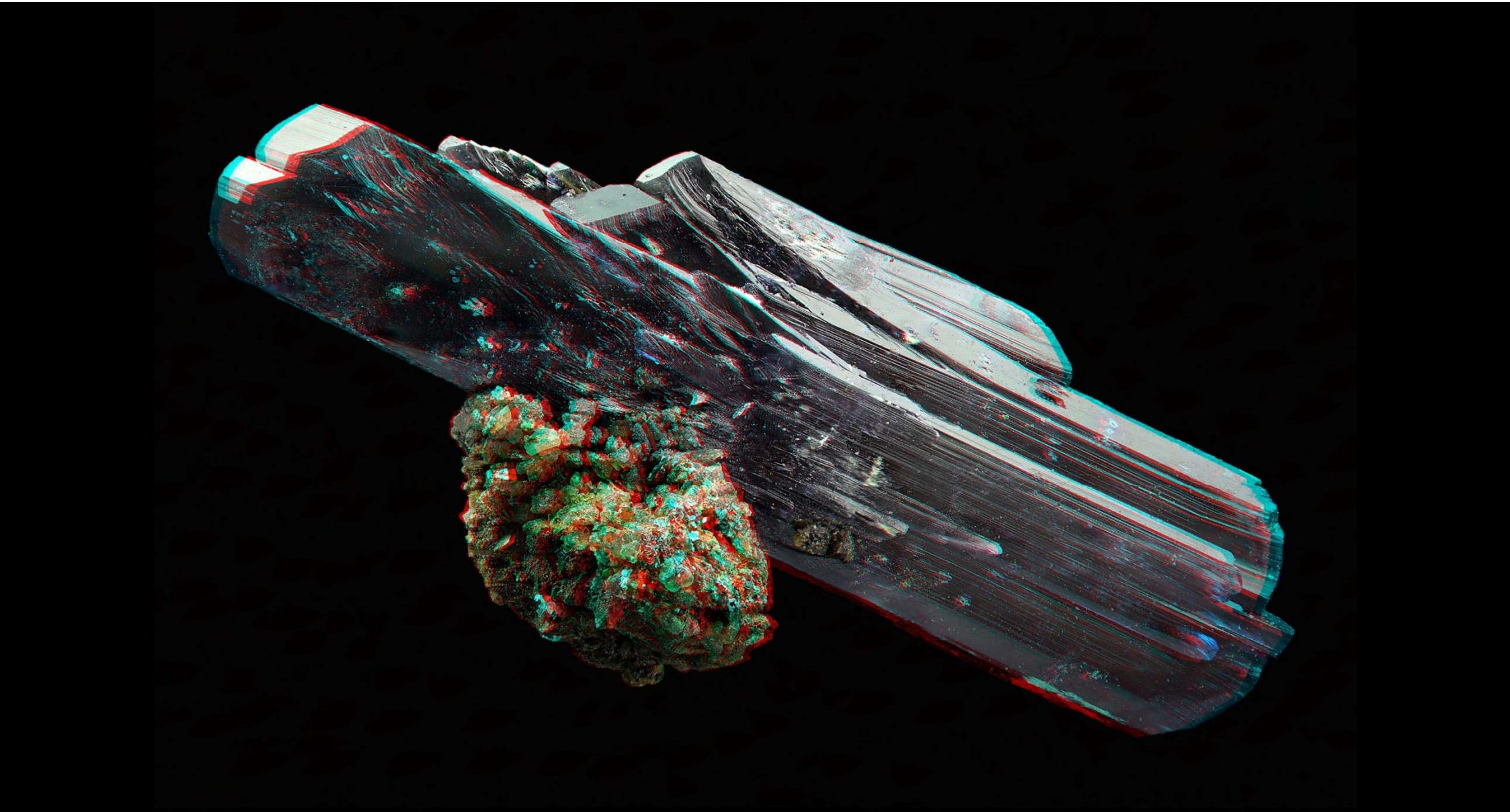
Photography: John Chapman, December 2023.

Canon EOS 5DSr camera with Leica 140x/0.40 objectove lens
on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 150 and 150 4-micrometre steps at 6 degrees via Stackshot rail,
combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 0.606 mm.



1 mm

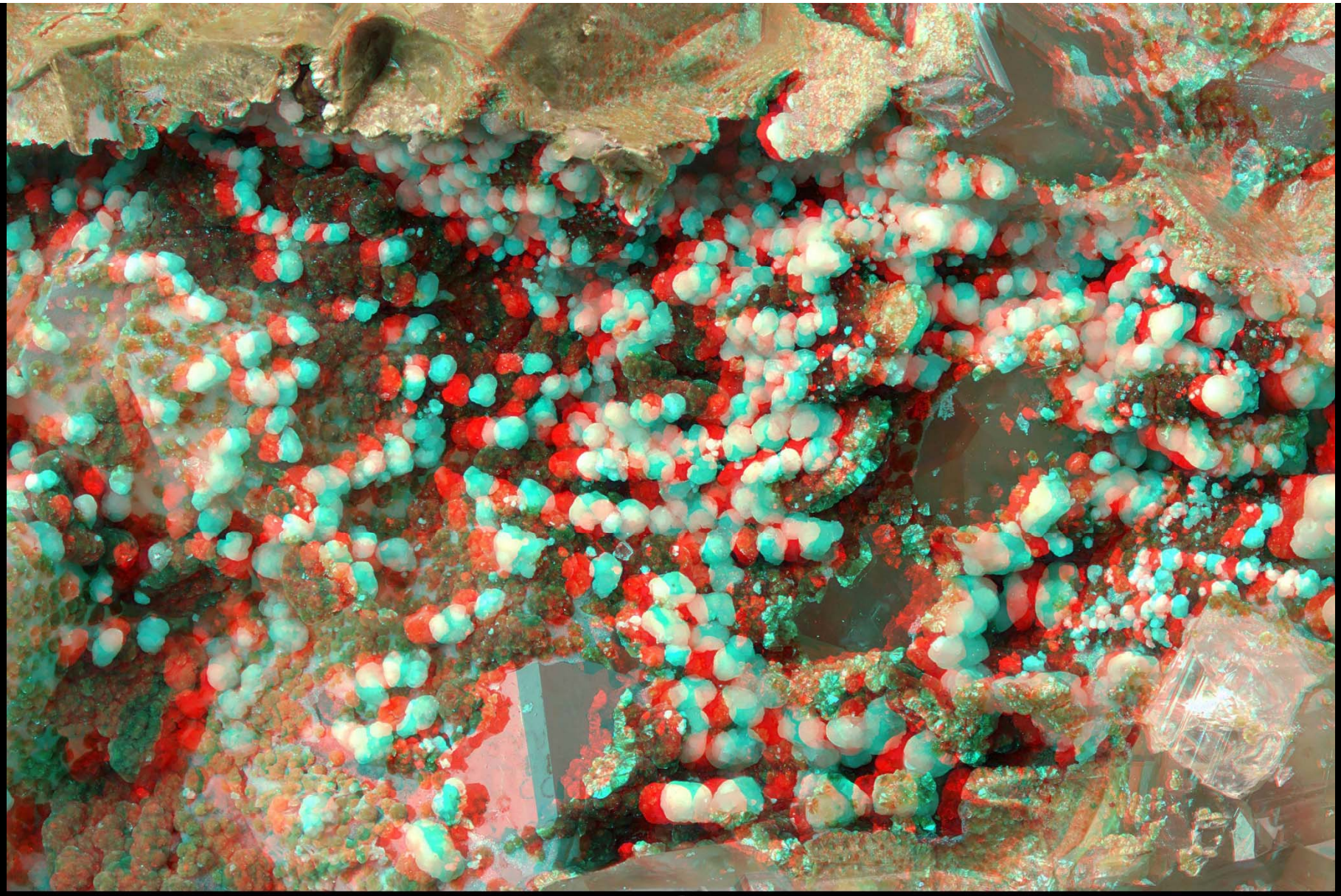
Vivianite $Fe^{2+}_3(PO_4)_2 \cdot 8H_2O$

Field width 9.42 mm.

Prismatic crystal from cavity in phosphatic nodule weathered out of Cretaceous sediments.
Whale Chine, Atherfield Bay, Shorwell, Isle of Wight.

Specimen: David Green collection. Photography: John Chapman, March 2024.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 110 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 109 and 101 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm Wallkilldellite-Fe $(Ca,Cu)_4Fe^{2+}_6(AsO_4,SiO_4)_4(OH,O)_8.18H_2O$ Field width 3.65 mm

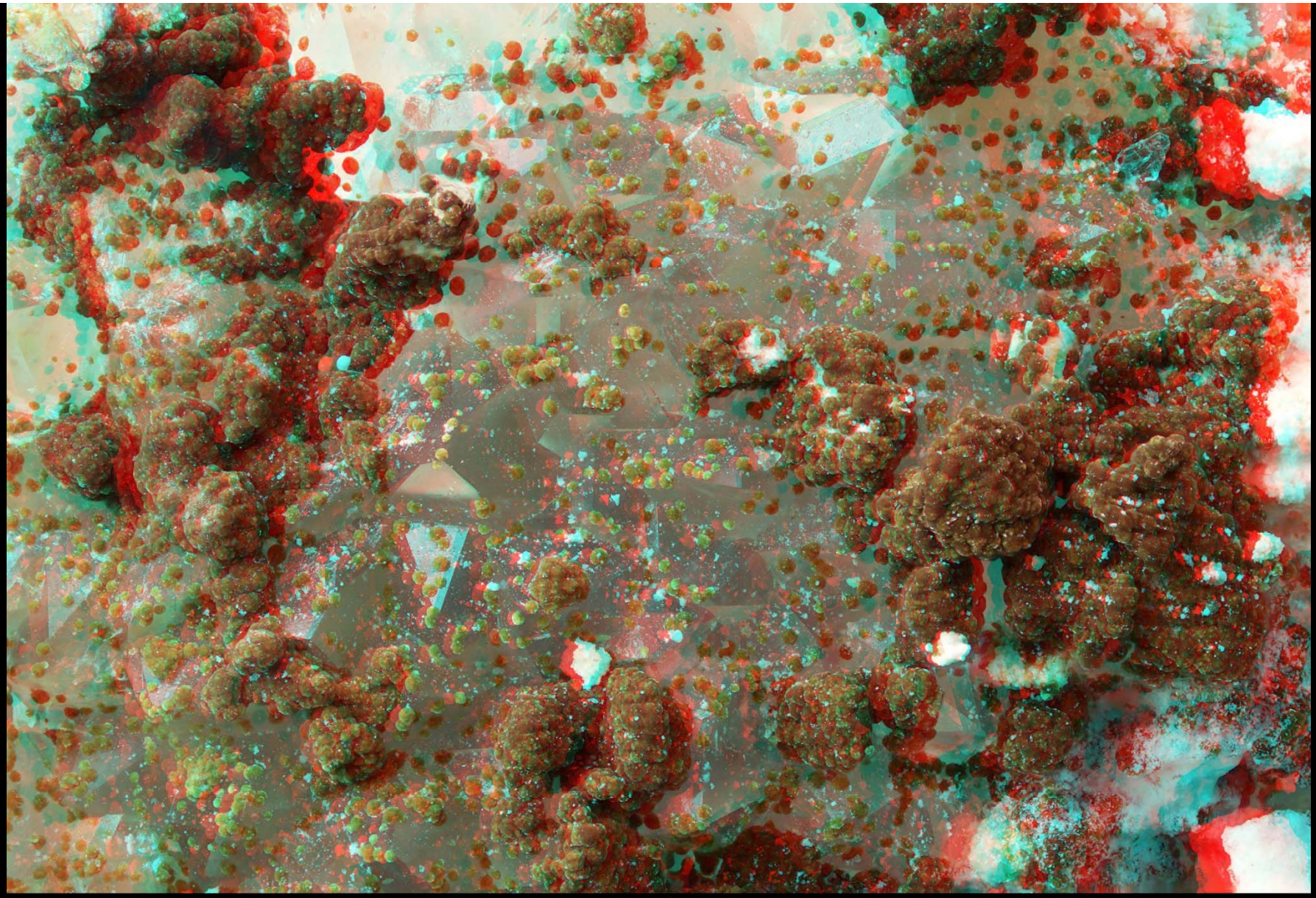
Reddish-brown spheroidal intergrown masses overgrown by very pale pink tinted annabergite.

Hardshins Level, Murton Mine NY 7595 2252, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Carl Zeiss (West Germany) 25 mm Luminar objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 69 and 75 20-micrometre steps at 8 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm **Wallkilldellite-Fe** $(Ca,Cu)_4Fe^{2+}_6(AsO_4,SiO_4)_4(OH,O)_8.18H_2O$ Field width 4.2 mm

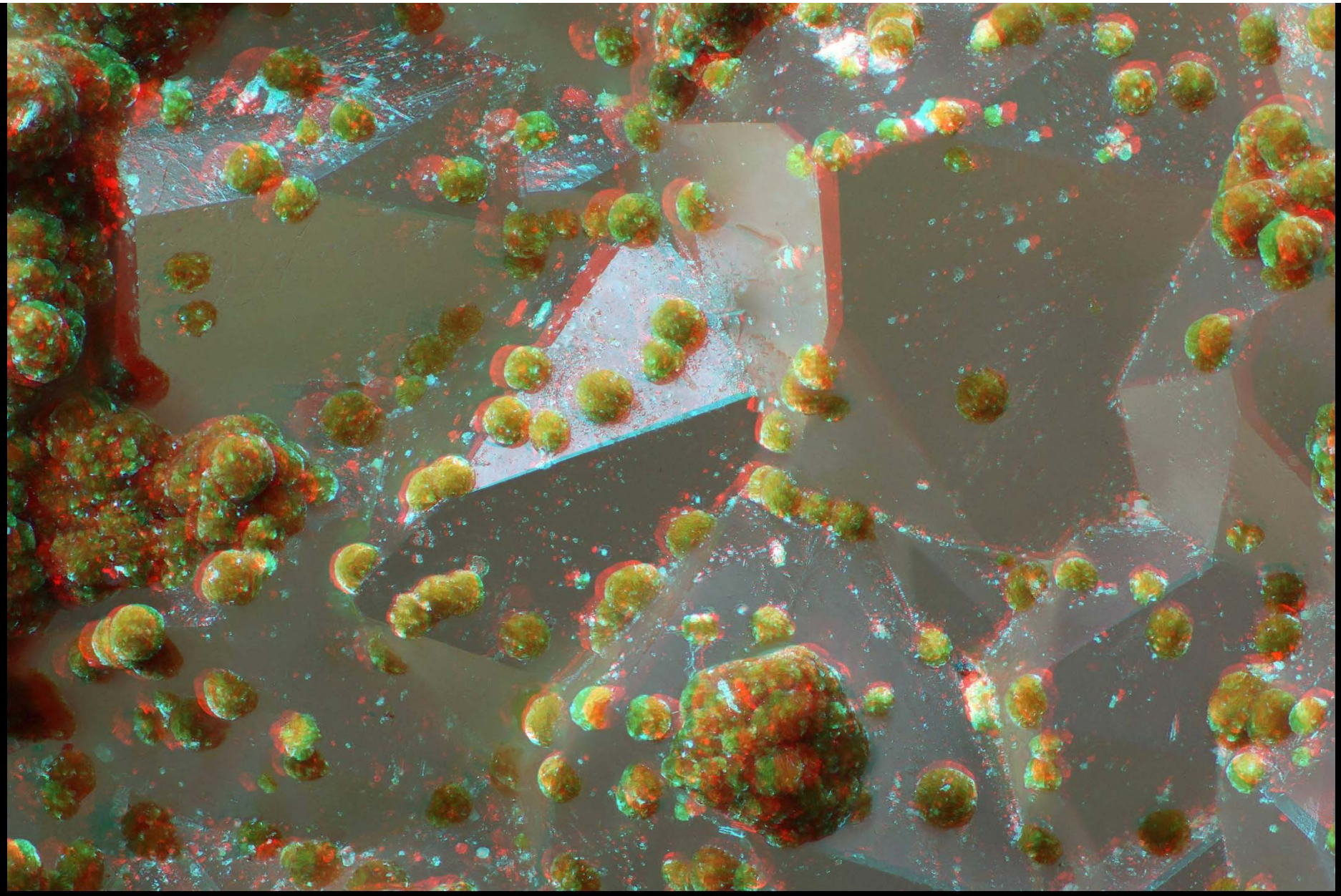
Reddish-brown spheroidal intergrown masses overgrown by very pale pink tinted annabergite.

Hardshins Level, Murton Mine NY 7595 2252, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Carl Zeiss (West Germany) 25 mm Luminar objective lens on 140 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 99 and 98 steps at 8 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

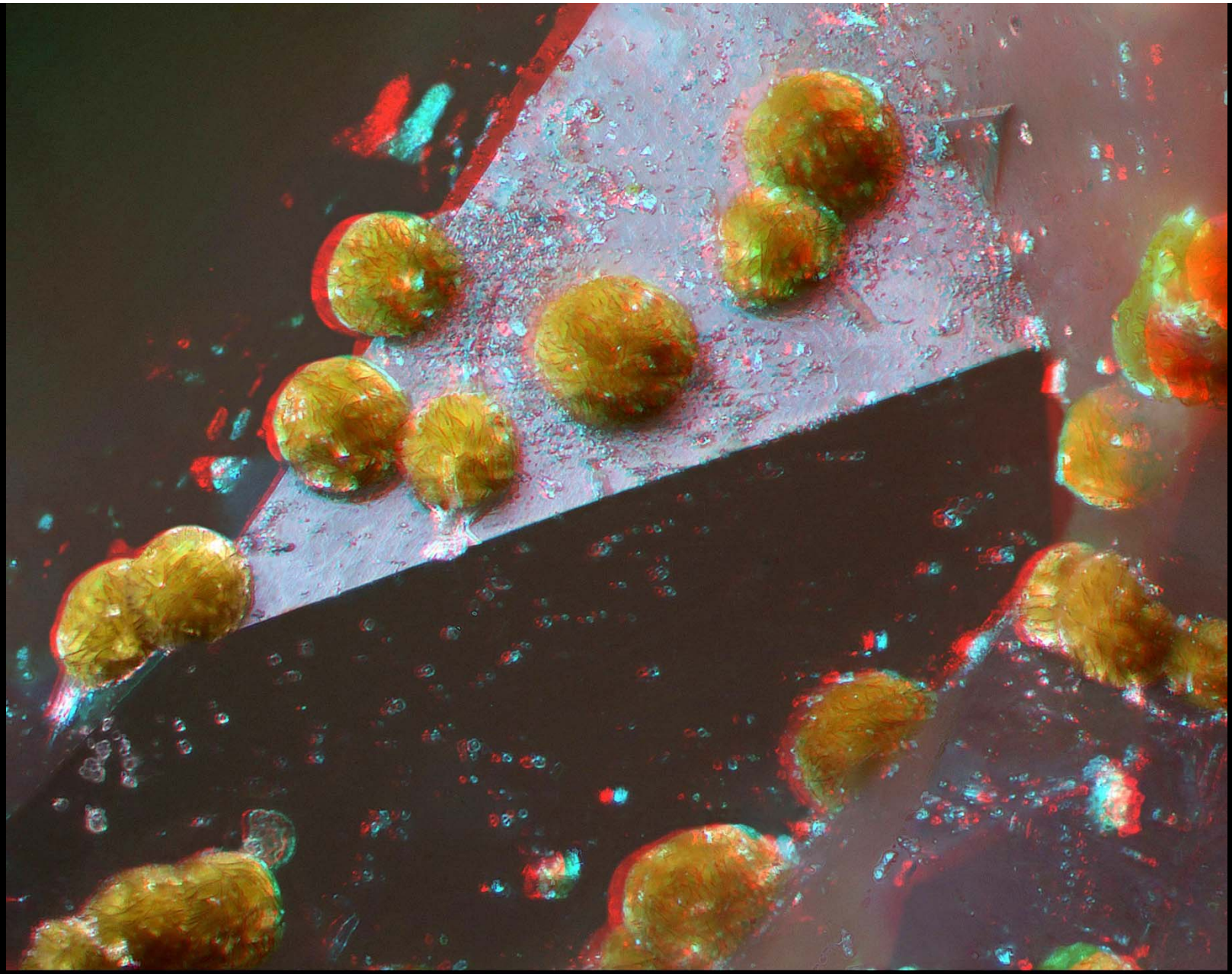
Wallkilldellite-Fe $Ca_2Fe^{2+}_3(AsO_4)_2(OH)_4.9H_2O$ Field width 1.25 mm

Minutely spherulitic on quartz crystals. Murton Mine, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + middle stacks of 119 and 127 5-micrometre steps at 4 degrees via Stackshot rail, combined in CombineZM and processed in Stereophotomaker.



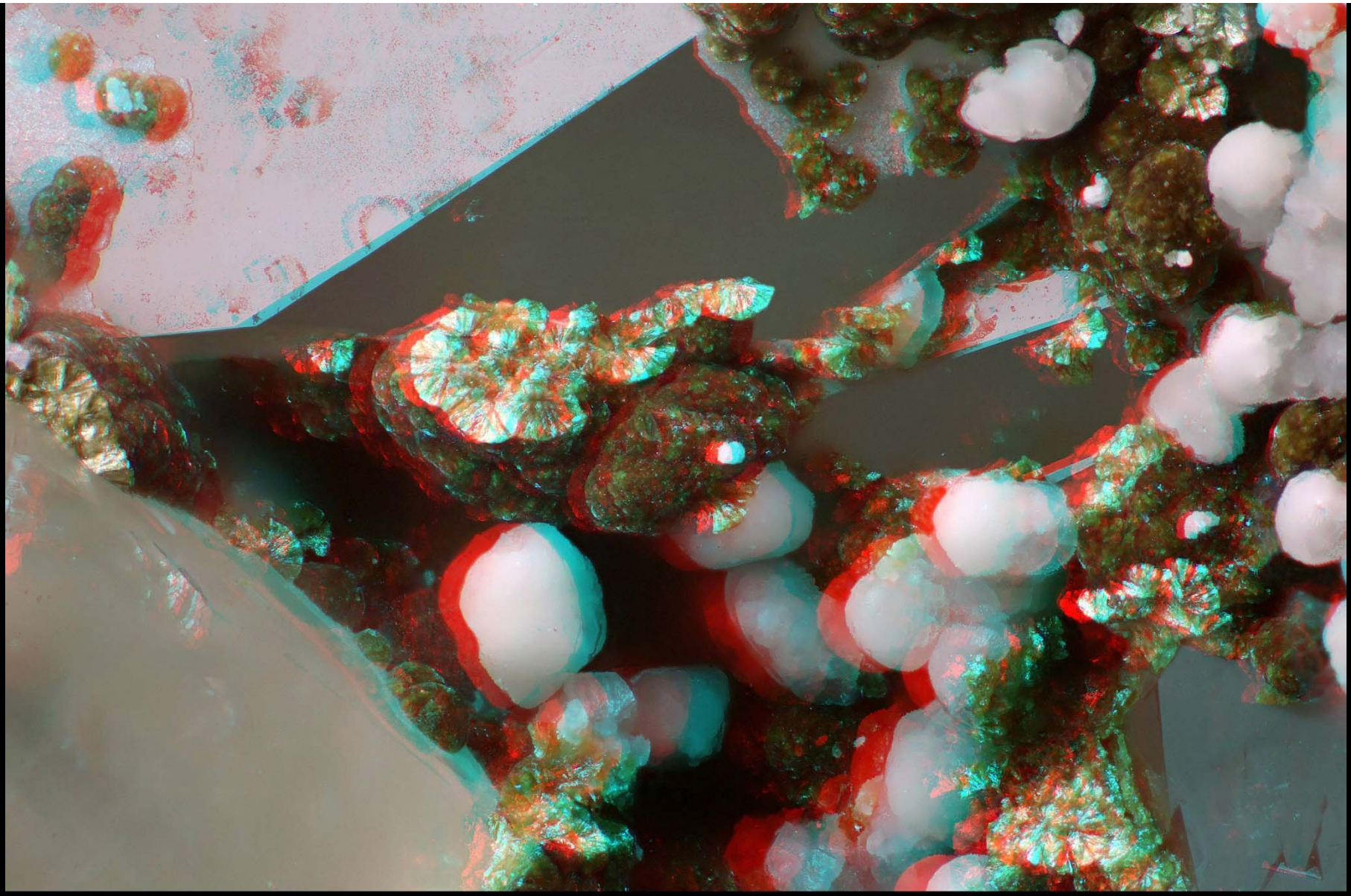
0.1 mm

Wallkilldellite-Fe $Ca_2Fe^{2+}_3(AsO_4)_2(OH)_4.9H_2O$ Field width 0.50 mm

Minutely spherulitic on quartz crystals. Murton Mine, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Leica 350x/0.50 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 90 and 91 3-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and processed in Stereophotomaker.



0.1 mm

Wallkilldellite-Fe $(Ca,Cu)_4Fe^{2+}_6(AsO_4,SiO_4)_4(OH,O)_8.18H_2O$ Field width 1.15 mm

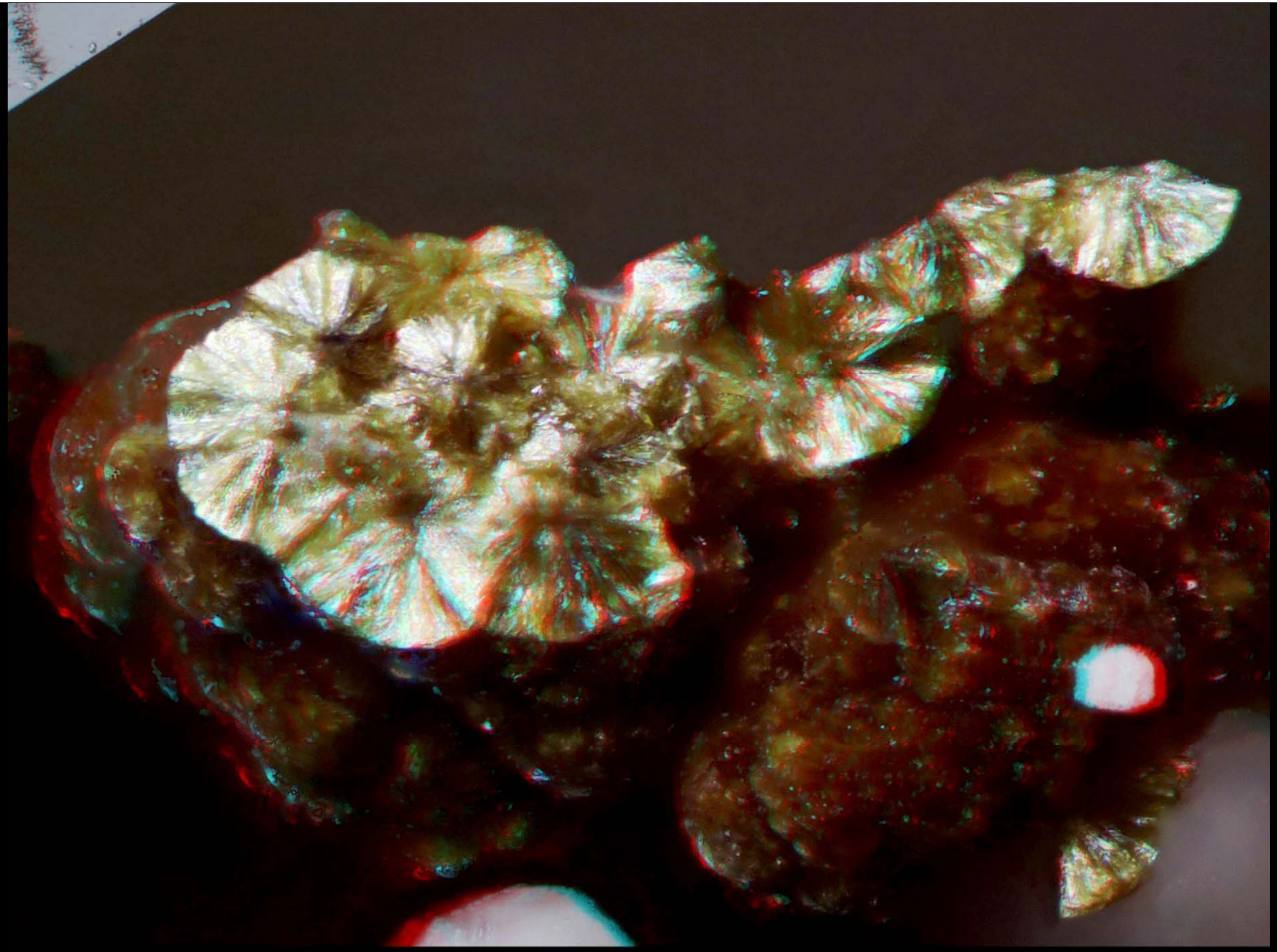
Reddish-brown coated spherulitic with broken surfaces revealing highly lustrous radiating crystals, with pale pink annabergite overgrowing.

Hardshins Level, Murton Mine NY 7595 2252, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 118 and 121 5-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and processed in Stereophotomaker.



0.1 mm **Wallkilldellite-Fe** $(Ca,Cu)_4Fe^{2+}_6(AsO_4,SiO_4)_4(OH,O)_8.18H_2O$ Field width 0.412 mm

Reddish-brown coated spherulitic with broken surfaces revealing highly lustrous radiating crystals, with pale pink annabergite overgrowing.

Hardshins Level, Murton Mine NY 7595 2252, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Leica 350x/0.5 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 68 and 73 2-micrometre steps at 6 degrees via Stackshot rail, processed in CombineZM and Stereophotomaker.

Wroewolfeite $Cu_4(SO_4)(OH)_6 \cdot 2H_2O$

Radiating monoclinic system blades and prisms with minor bridgesite-(Ce), surrounded by dark green drusy brochanitite (outside field), on siliceous Tynebottom Limestone with gypsum and aragonite.

Tynebottom Mine, Garrigill, Cumbria.

Specimen: Charles Lamb collection.

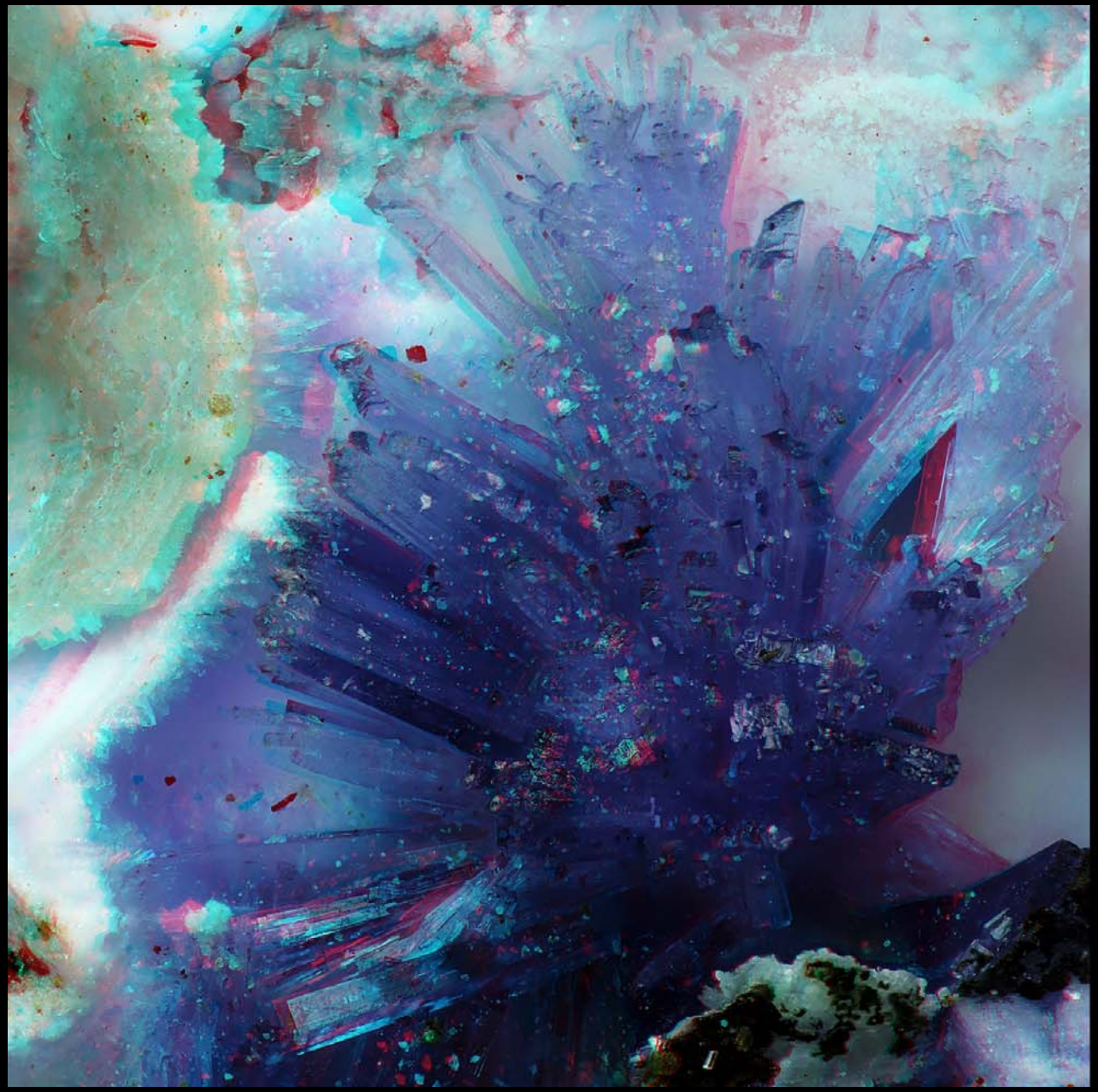
Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Mitutoyo 10x/0.28 objective lens on Thorlabs tubes and apochromatic tube lens, with Schott fibre optic illumination.

Left + right stacks of 65 and 71 8-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 1.68 mm.



Wroewolfeite $Cu_4(SO_4)(OH)_6 \cdot 2H_2O$

Radiating monoclinic system blades and prisms with minor bridgesite-(Ce), surrounded by dark green drusy brochanitite (outside field), on siliceous Tynebottom Limestone with gypsum and aragonite.

Tynebottom Mine, Garrigill, Cumbria.

Specimen: Charles Lamb collection.

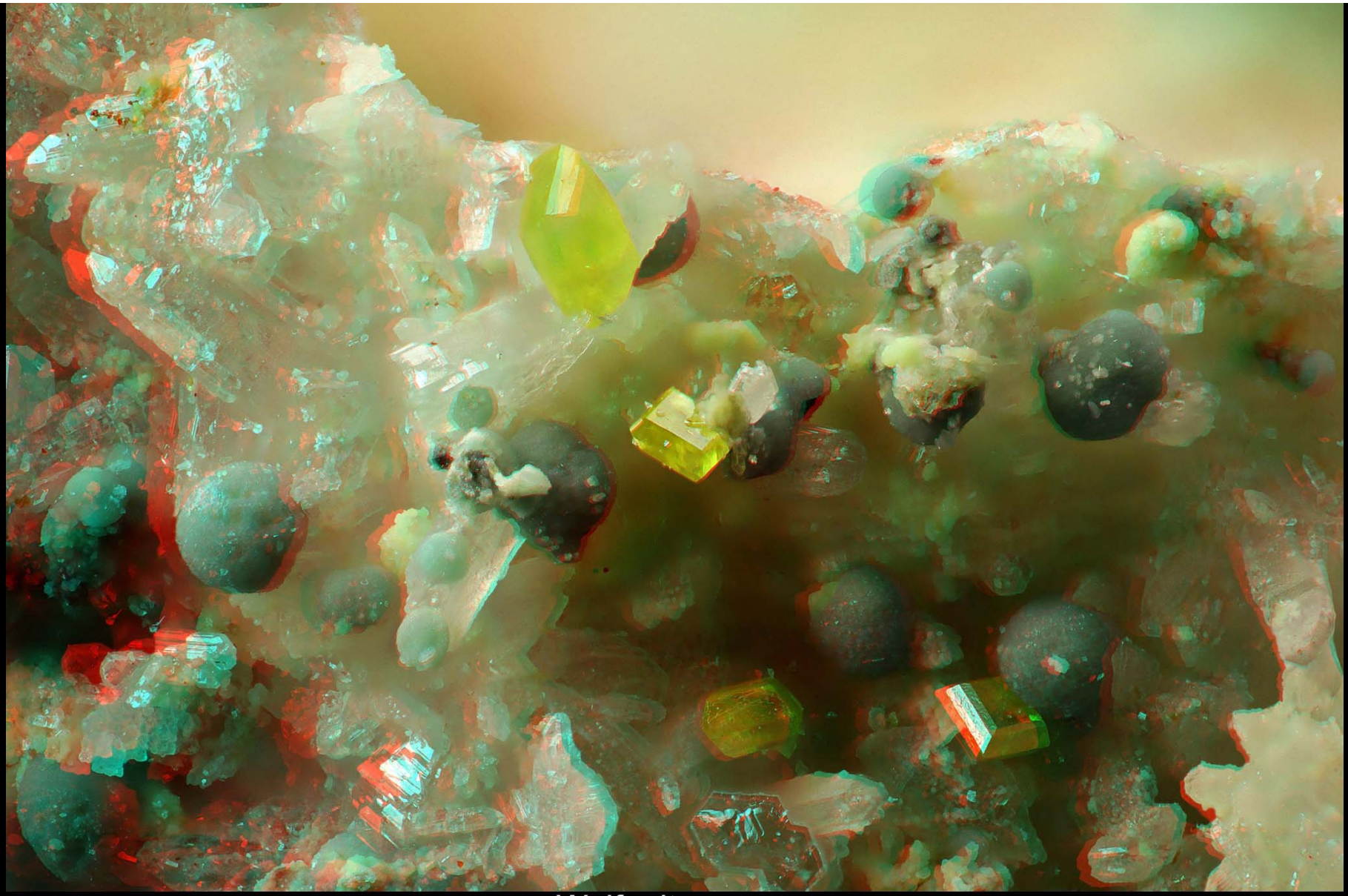
Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Mitutoyo 10x/0.28 objective lens on Thorlabs tubes and apochromatic tube lens, with Schott fibre optic illumination.

Left + right stacks of 65 and 71 8-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field width and height 1.10 mm.



0.1 mm 1 mm

Wulfenite $PbMoO_4$

Tabular crystals with cerussite and malachite.

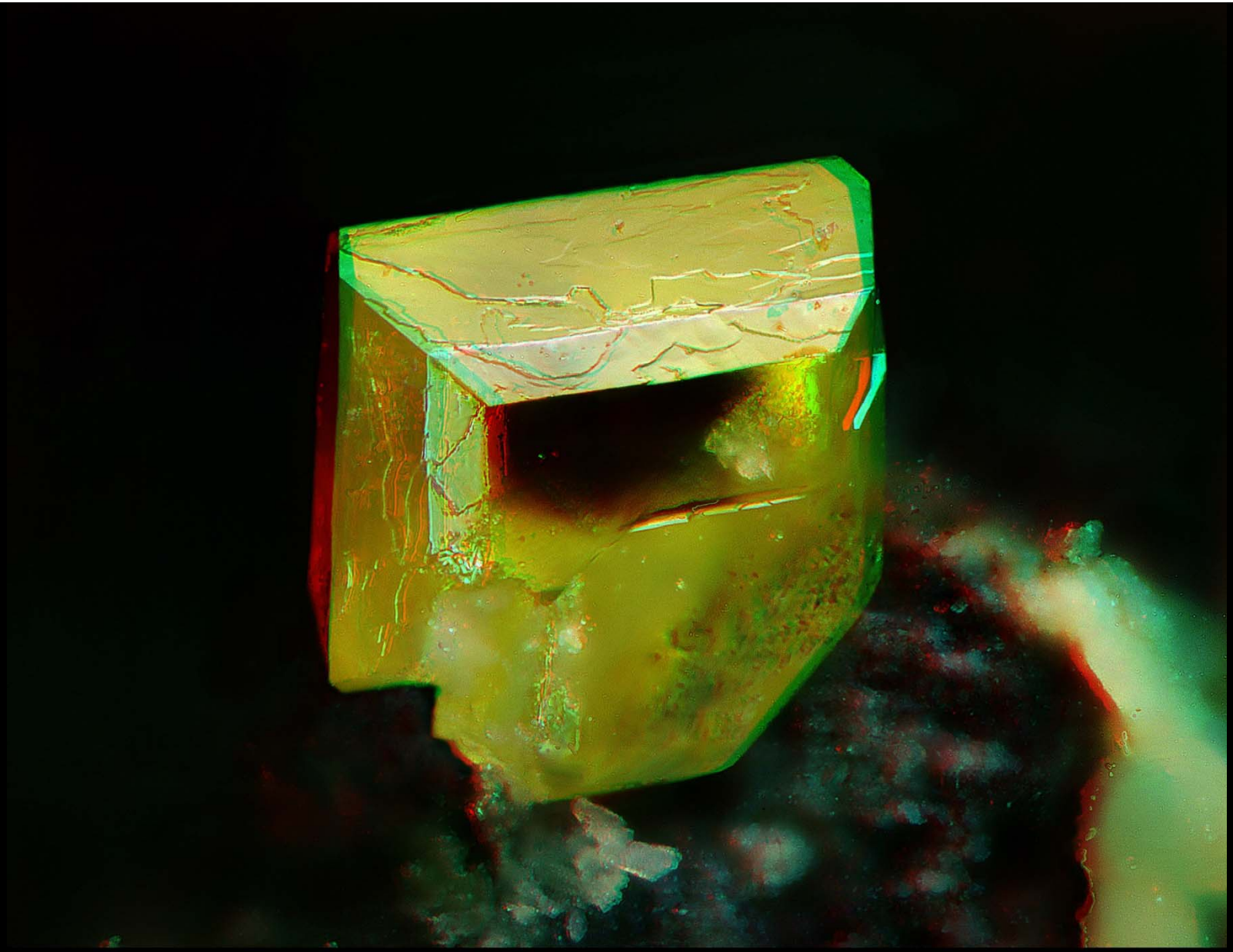
Field width 2.17 mm.

No.2 Level dumps, Wythburn Mines (western slopes of Helvellyn), Allerdale, Cumbria.

Specimen: found by Paul Nicholson in 2016 and in Paul Nicholson collection. Photography: John Chapman, October 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 16 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 98 and 103 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Crystal width 0.145 mm

Wulfenite $PbMoO_4$

Tabular crystals with cerussite and malachite.

Field width 0.353 mm.

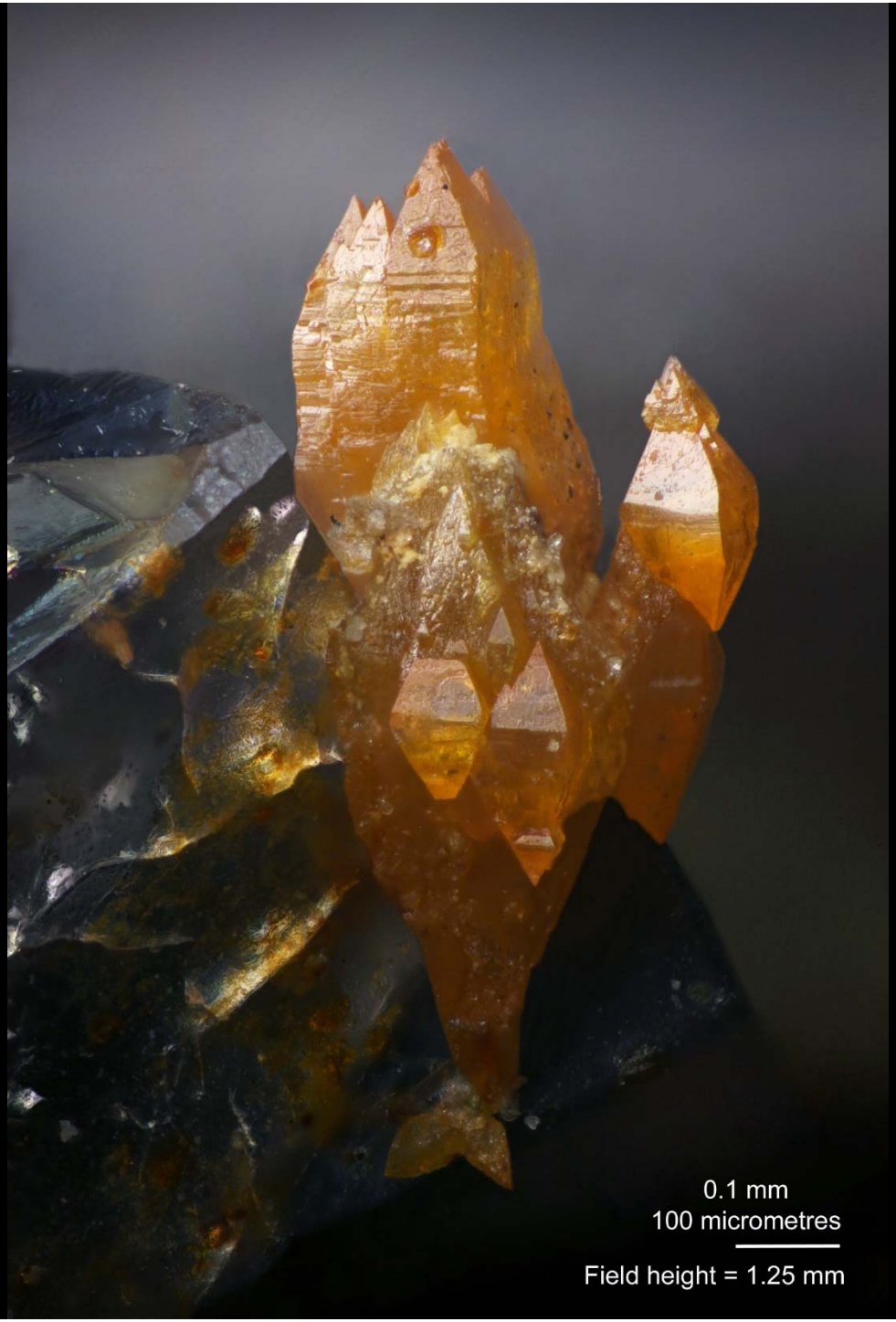
No.2 Level dumps, Wythburn Mines (western slopes of Helvellyn), Allerdale, Cumbria.

Specimen: found by Paul Nicholson in 2016 and in Paul Nicholson collection. Photography: John Chapman, October 2023.

Canon EOS 5DSr camera with Leica 350x/0.50 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 70 and 76 2-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

No 3D available

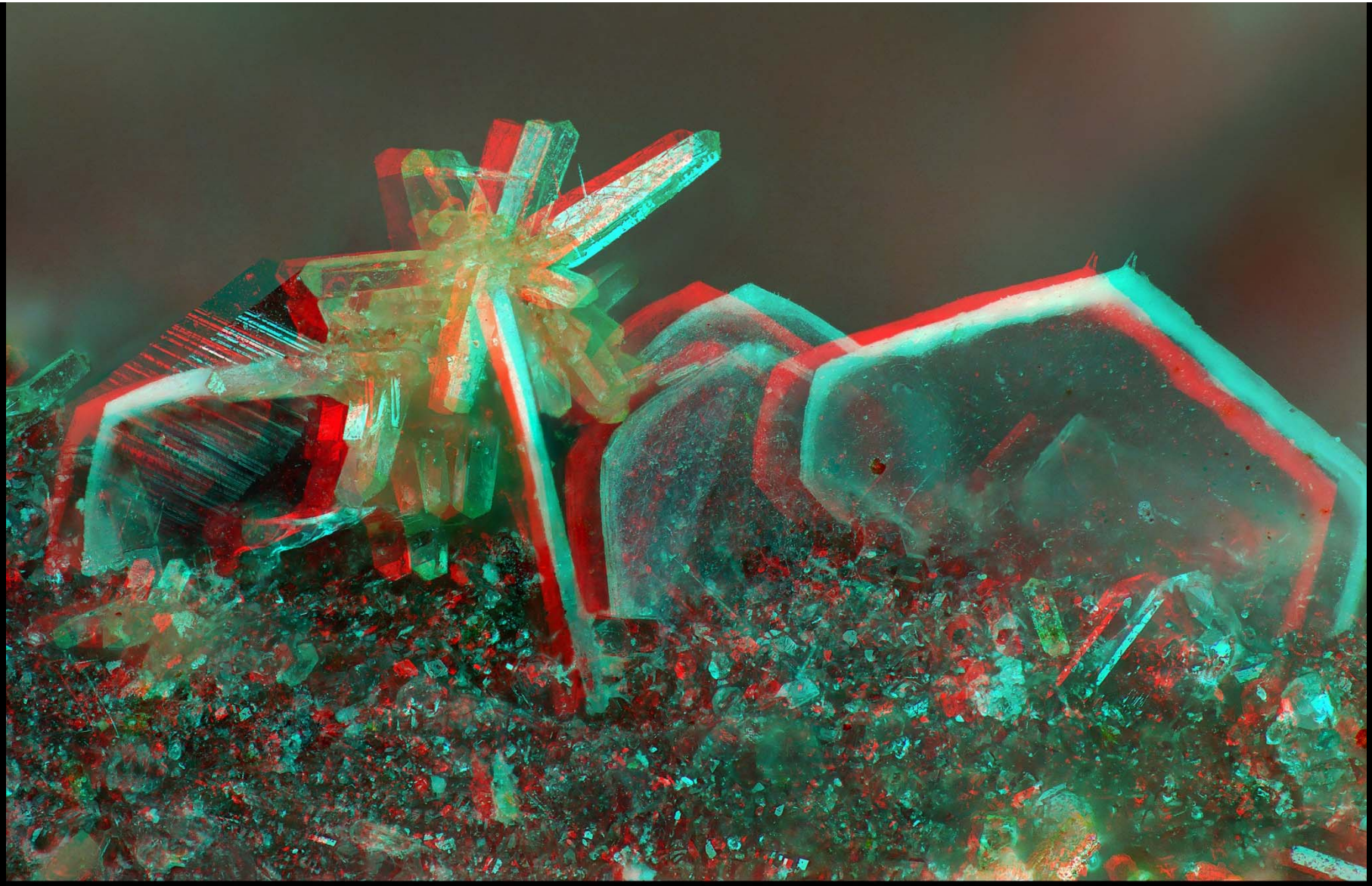


No 3D available

0.1 mm

Wulfenite (lead and molybdenum oxide - $PbMoO_4$),
in cavity with calcite and purple fluorite.
Cavendish Mill processing plant for Milldam Mine, Stoney Middleton, Derbyshire.
Specimen and photography: John Chapman.

Field width = 0.85 mm
Crystal width = 0.27 mm



0.1 mm

Xenotime-(Y) $Y(PO_4)$

Field width 1.73 mm.

Transparent pale brown tetragonal system crystals having steeply pyramidal prisms and shallow four-sided pyramidal terminations, with pseudo-hexagonal plates of synchysite-(Ce) [$CaCe(CO_3)_2F$], anatase [TiO_2] and fragments of blue thortvietite (only known British), in tectonic fracture in rhyolitic silicified tuff.

Cwmorthin Quarry, Blaenau Ffestiniog, Gwynedd. Specimen: David Green collection. Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Mitutoyo M Plan Apo 10x/0.28 objective lens on Thorlabs tubes and apochromatic tube lens, with Schott fibre optic illumination.
Left + right stacks of 88 and 106 8-micrometre steps at 4 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Xenotime-(Y) $Y(PO_4)$

Field width 1.66 mm.

Obelisk-shaped crystal with rutile fibres emerging, with hexagonal plates of synchysite-(Ce) [$CaCe(CO_3)_2F$] in crack in silicified rhyolitic tuff turbdite. Cwmorthin Quarry, Blaenau Ffestiniog, Gwynnedd.

Specimen: David Green collection. Photography: John Chapman, September 2024.

Canon EOS 5DSr camera with Mitutoyo M Plan Apo 10x/0.28 objective lens on Thorlabs tubes and apochromatic tube lens, with Schott fibre optic illumination.
Left + right stacks of 147 and 135 8-micrometre steps at 6 degrees via Stackshot rail, combine in CombineZM and rendered in Stereophotomaker.

0.1 mm

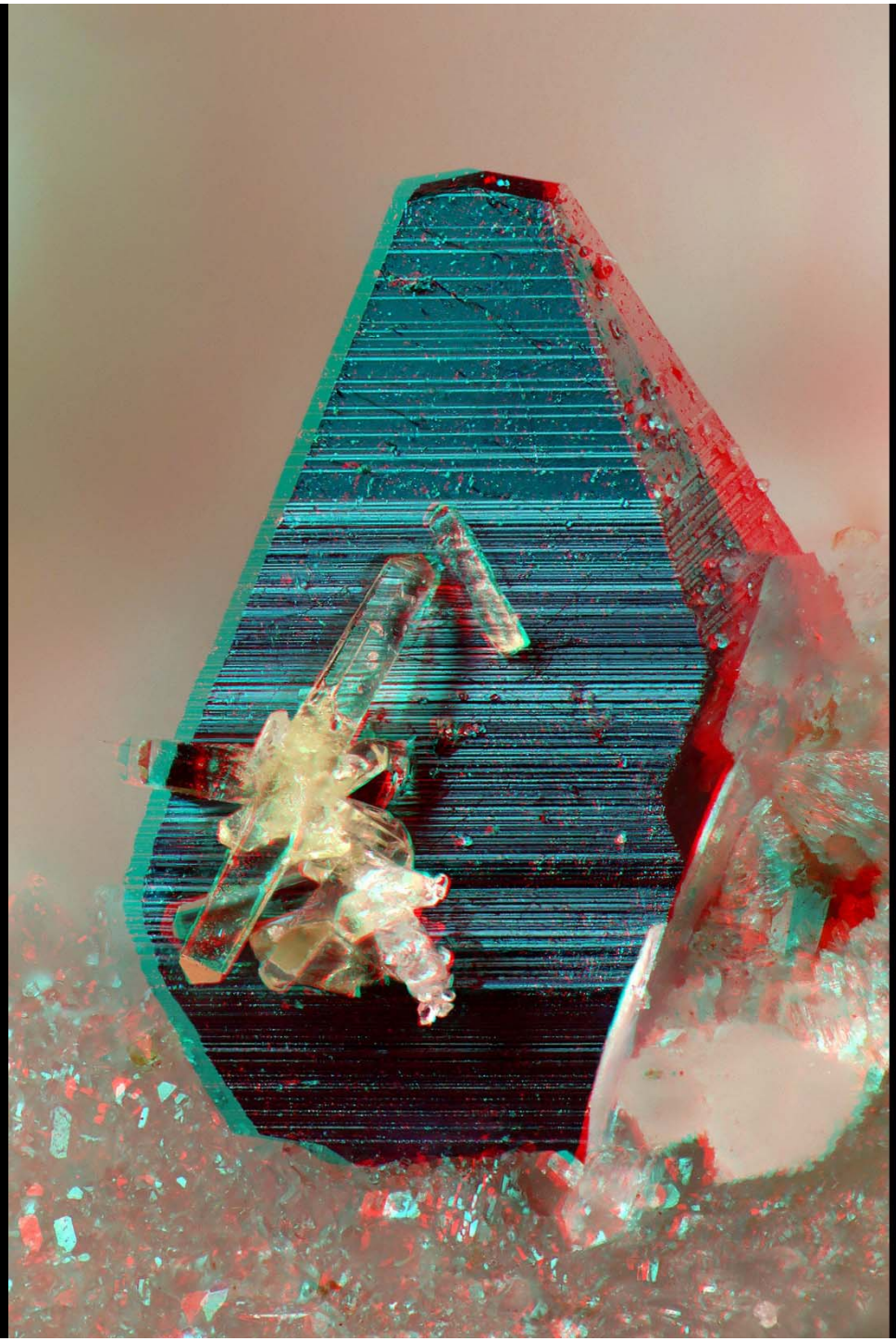
Xenotime-(Y) $Y(PO_4)$

Field width 1.20 mm.

Obelisk-shaped crystal with rutile fibres emerging, with hexagonal plates of synchysite-(Ce) [$CaCe(CO_3)_2F$] in crack in silicified rhyolitic tuff turbdite. Cwmorthin Quarry, Blaenau Ffestiniog, Gwynnedd.

Specimen: David Green collection. Photography: John Chapman, September 2024.

Canon EOS 5DSr camera with Mitutoyo M Plan Apo 10x/0.28 objective lens on Thorlabs tubes and apochromatic tube lens, with Schott fibre optic illumination.
Left + right stacks of 147 and 135 8-micrometre steps at 6 degrees via Stackshot rail, combine in CombineZM and rendered in Stereophotomaker.



Xenotime-(Y) $Y(PO_4)$

Transparent pale brown tetragonal system crystals having steeply pyramidal terminations and shallow four-sided pyramidal terminations on an anatase crystal [TiO_2] in tectonic fracture in silicified rhyolitic tuff turbidite.

Cwmorthin Quarry, Blaenau Ffestiniog, Gwynedd.

Specimen: David Green collection.

Photography: John Chapman, January 2024.

Canon EOS 5DSr camera with Mitutoyo M Plan Apo 10x/0.28 objective lens on Thorlabs tubes and apochromatic tube lens, with Schott fibre optic illumination.

Left + right stacks of 57 and 57 10-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 1.35 mm.