Minerals of Britain and Ireland 2009-2024

3D images to complement those printed in 2D and originally photographed by John Chapman.

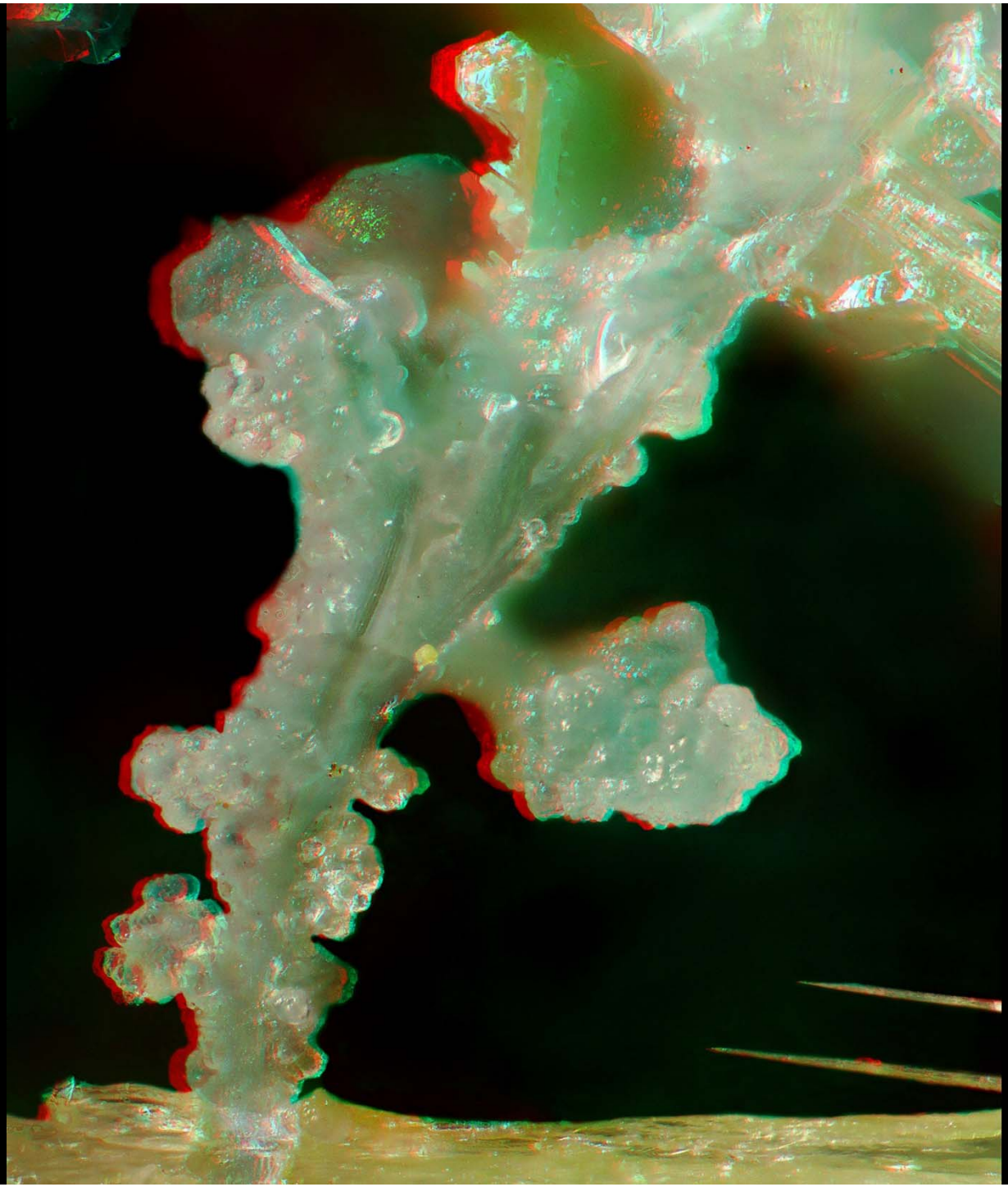
Images in three dimensions

These images have been produced at the same time as specimens were photographed for Minerals of Britain and Ireland 2009-2014 by photographing the specimen at three angles. Two of each of these three were used to make the images here. They are to be viewed with red-cyan spectacles, which allows for the images to be enlarged on screen and the contents explored.

Unfortunately, many minerals have colours that are opposite to those used in this method, which means that true colours are not always possible. Alternative rendering algorithms can compensate to a degree; also, black and white derivations can be helpful.

However, the other two angles can be used for projection (cinema-style) and in full, natural colour when so-called ‘shutter glasses’ are used. Such images are retained for any future public display.

Not all of the photographs taken were used in publication and so these have also been included, as well as some related images.



Allophane

'ideal' formula: $Al_2O_3(SiO_2)_{1.3\text{-}2.0}\cdot 2.5\text{-}3.0H_2O$.

Pale blue-green glassy ball-shaped amorphous formations, possibly around microbial filaments on yellow-brown cerussite needle groups.

Anglezarke area SD 630 164, near Chorley, Lancashire.

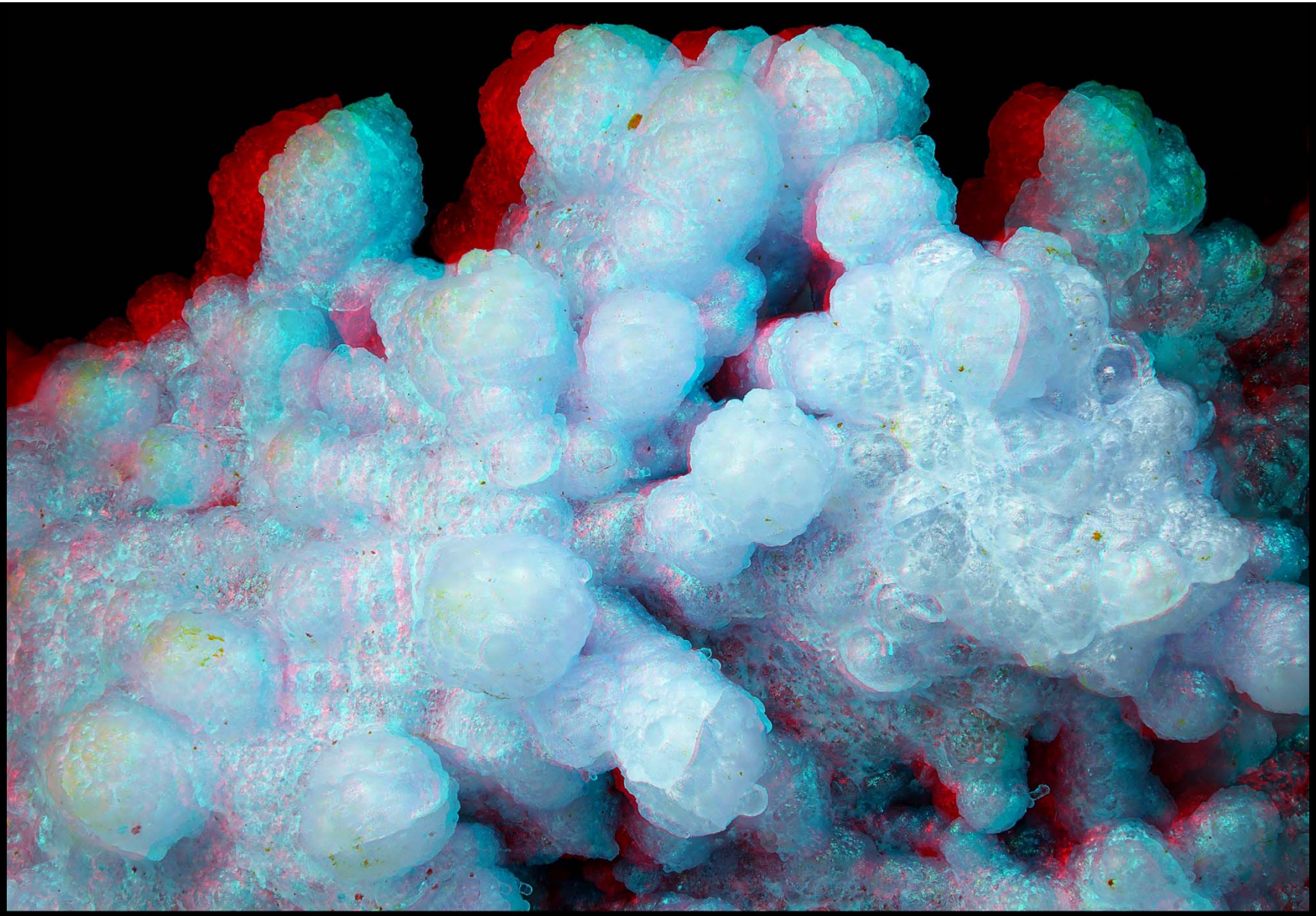
Specimen: Harry Critchley collection, No. AZ(HC)12.
Photography: John Chapman.

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 74 and 115 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 0.849 mm.



Allophane $Al_2O_3(SiO_2)_{1.3\text{-}2.0}\cdot 2.5\text{-}3.0H_2O$

Eggshell blue botryoidal flowstone crusts.

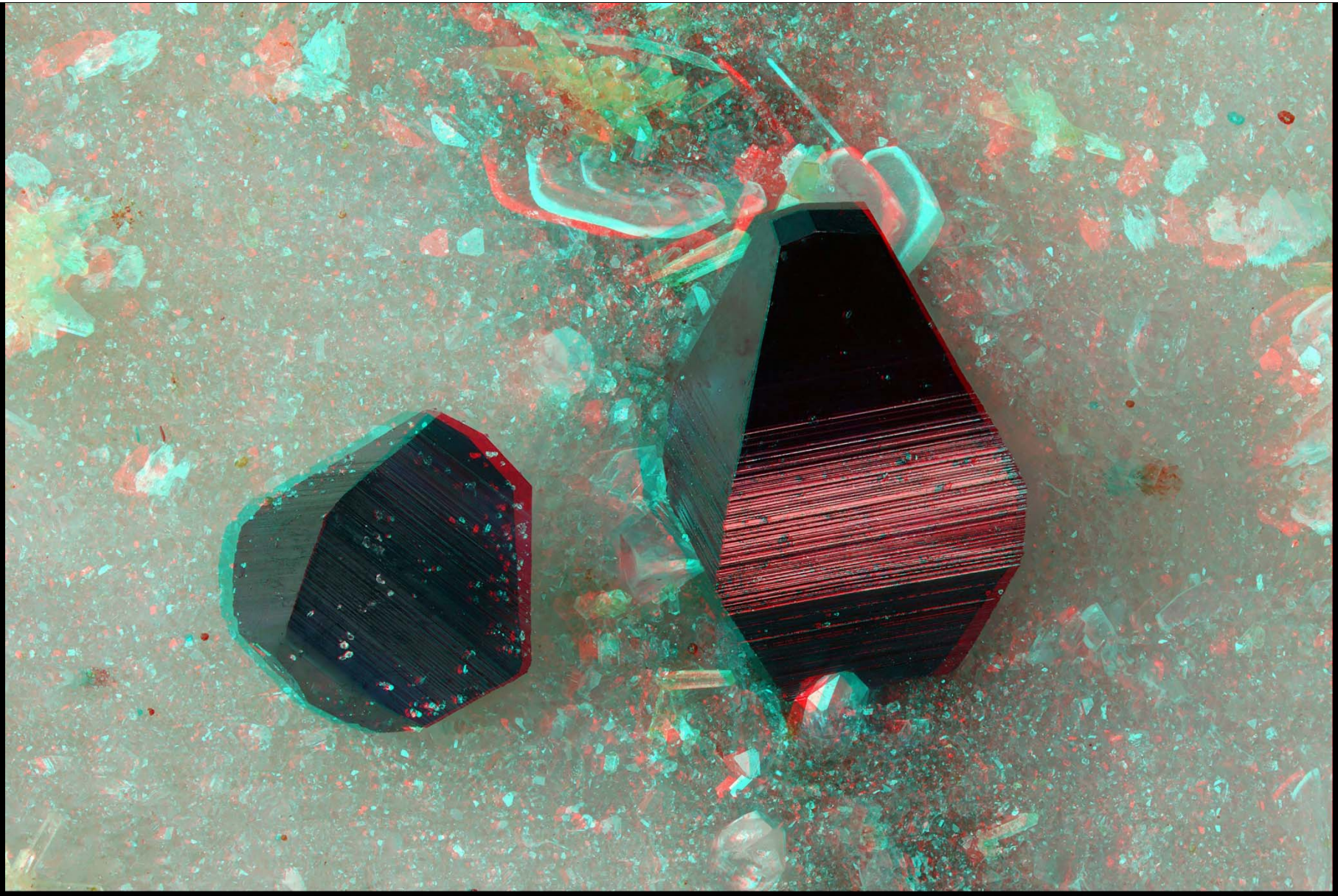
East Wheal Russell, Tavistock, Devon.

1 mm

Field width 17.35 mm.

Specimen: Formerly Nigel Hoppe 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 100 mm bellows extension, with Schott fibre optic illumination.
stacks of 111 and 122 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



1 mm

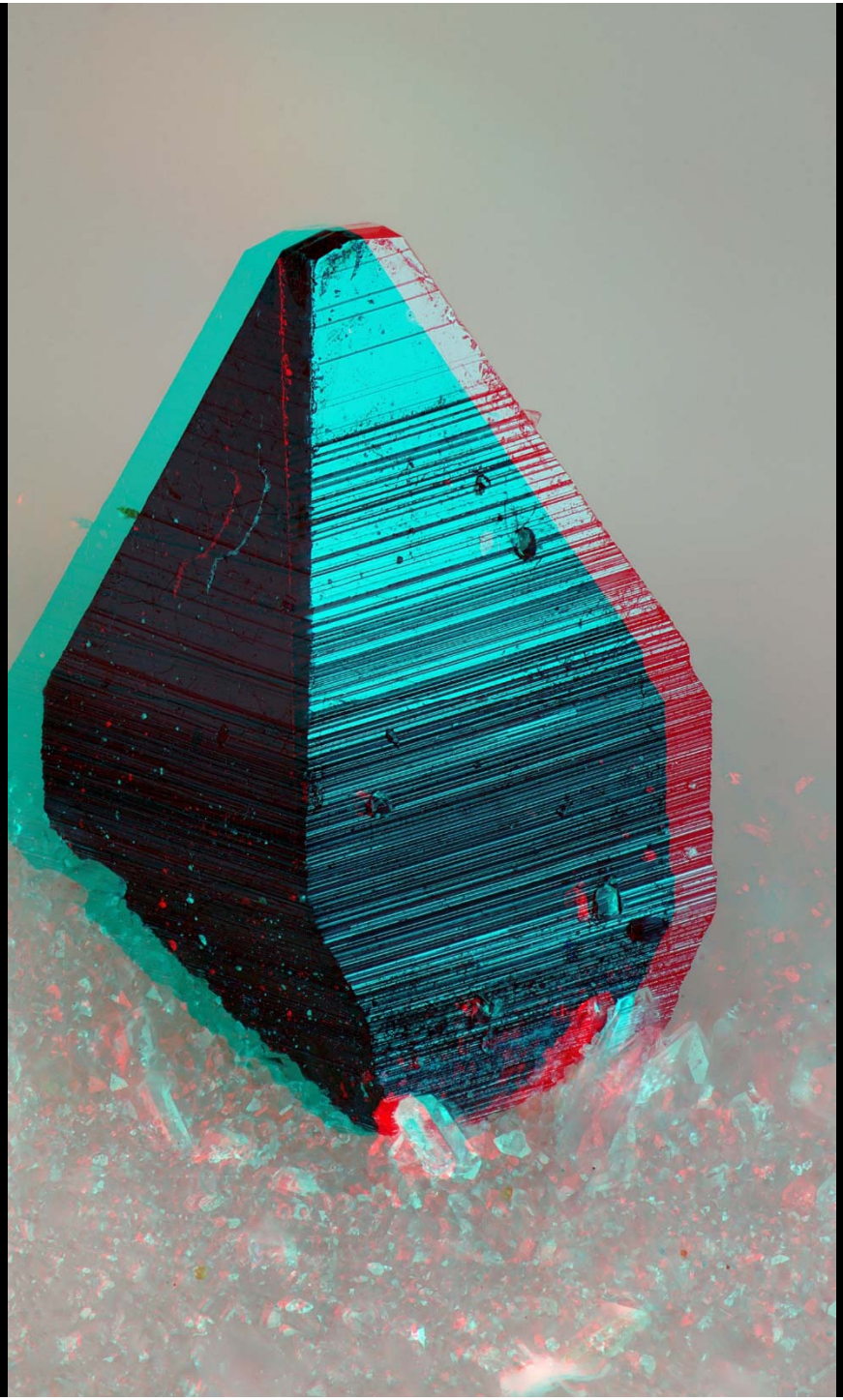
Anatase TiO_2

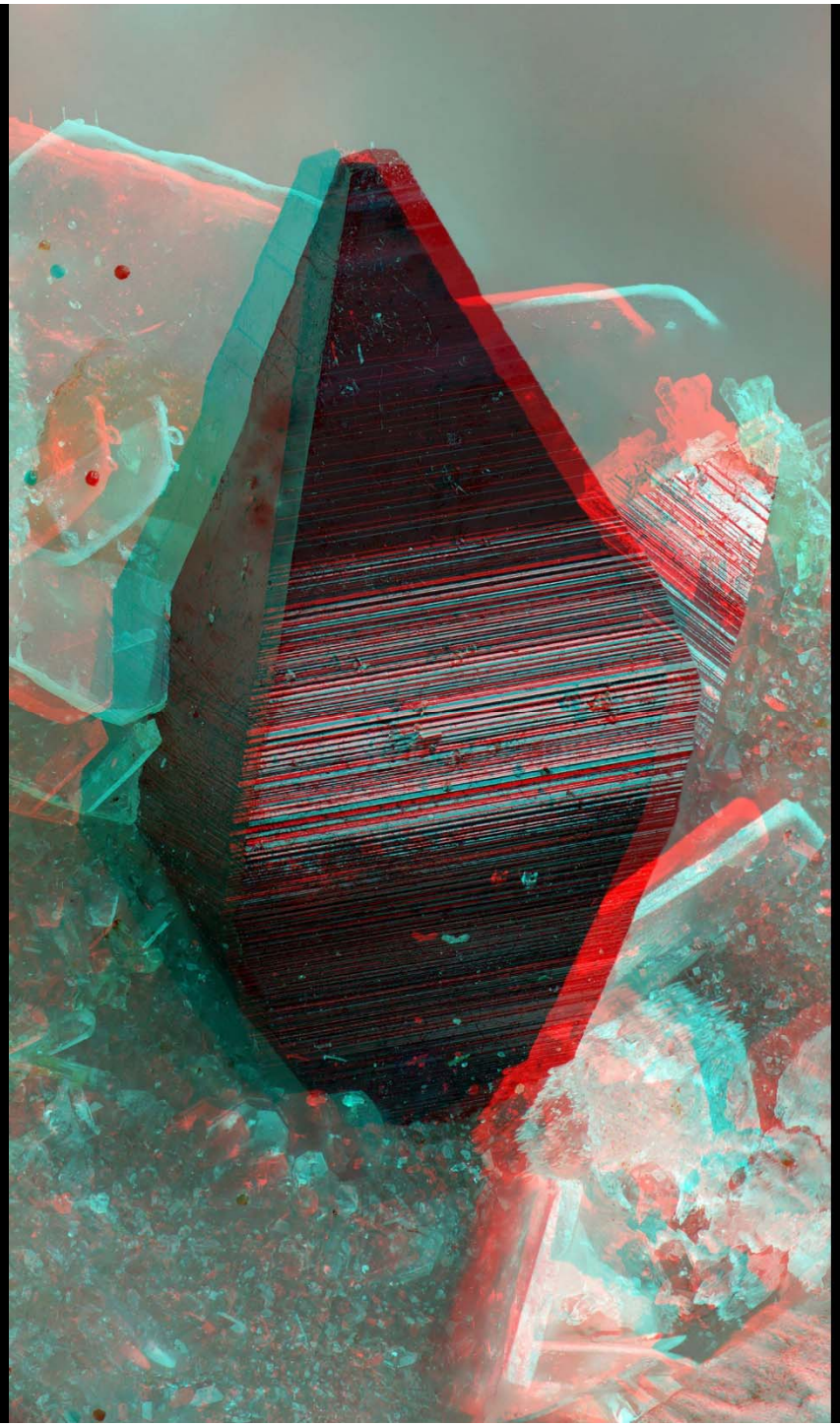
Field width 3.70 mm.

Acute bipyramidal crystals with xenotime-(Y), synchysite-(Ce) and quartz 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 Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 127 and 103 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.





Anatase TiO_2

Acute bipyramidal crystal on quartz, with tiny brookite crystals set into it, in crack in silicified rhyolitic tuff turbidite.

Cwmorthin Quarry, Blaenau Ffestiniog, Gwynedd.

Specimen: David Green collection.

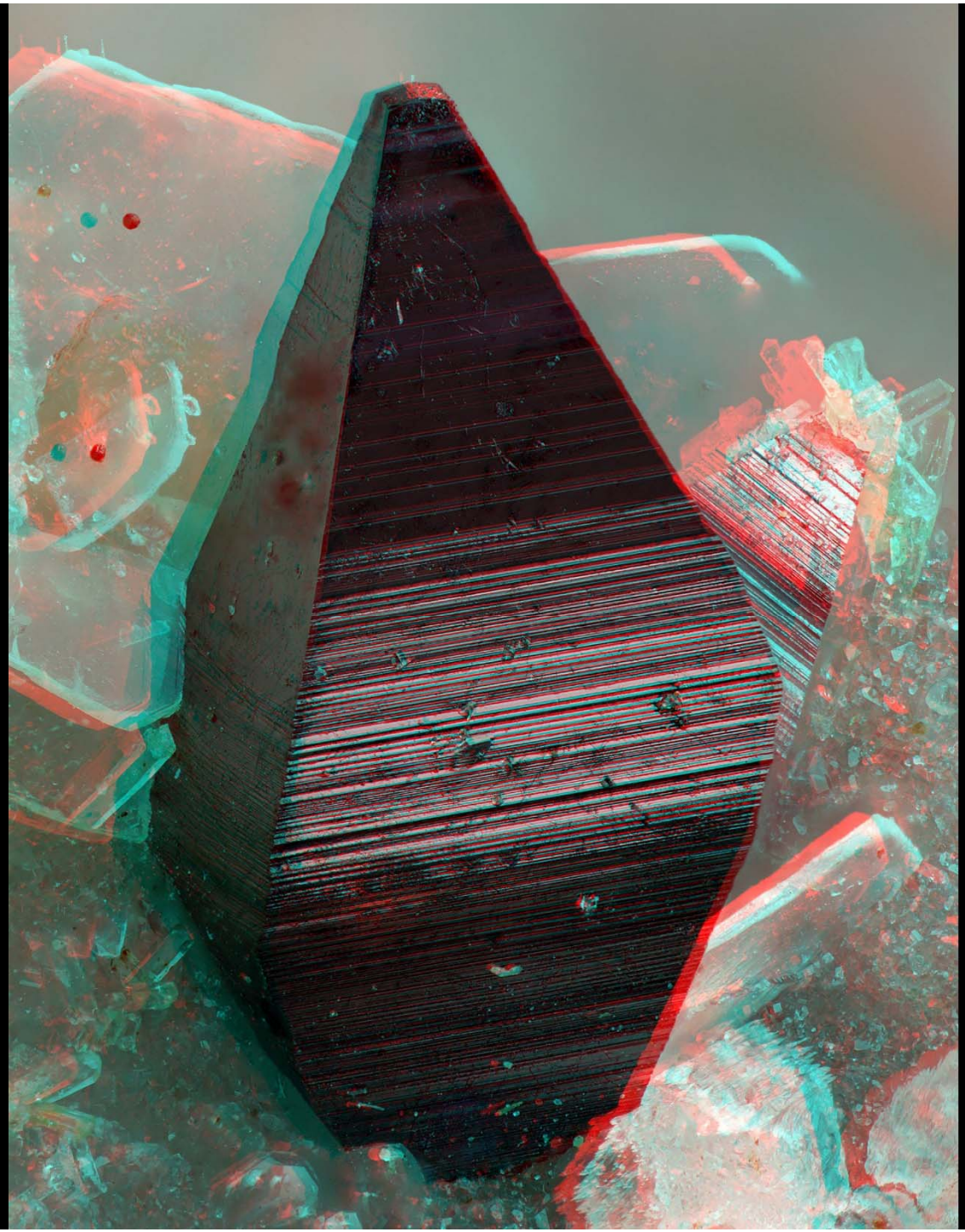
Photography: John Chapman, September 2024.

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 121 and 111 12-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

1 mm

Field height 2.60 mm.



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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 121 and 111 12-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

1 mm Field height 2.00 mm.

0.1 mm

Ancylite-(Ce) $CeSr(CO_3)_2(OH)\cdot H_2O$ Field width mm.

Distorted orthorhombic crystal perched on single cockscomb baryte leaf.

Strontian Mine, Strontian, Highland.

Specimen: David McCallum collection. Photography: John Chapman, November 2023.

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 120 and 117 6-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

1 mm

Ancylite-(Ce) $CeSr(CO_3)_2(OH)\cdot H_2O$

Field width 3.71 mm.

Distorted orthorhombic crystal surrounded by pyrite crystals on top of cockscomb baryte.
Strontian Mine, Strontian, Highland.

Specimen: David McCallum collection. Photography: John Chapman, November 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 173 and 162 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in Combine ZM.

0.1 mm

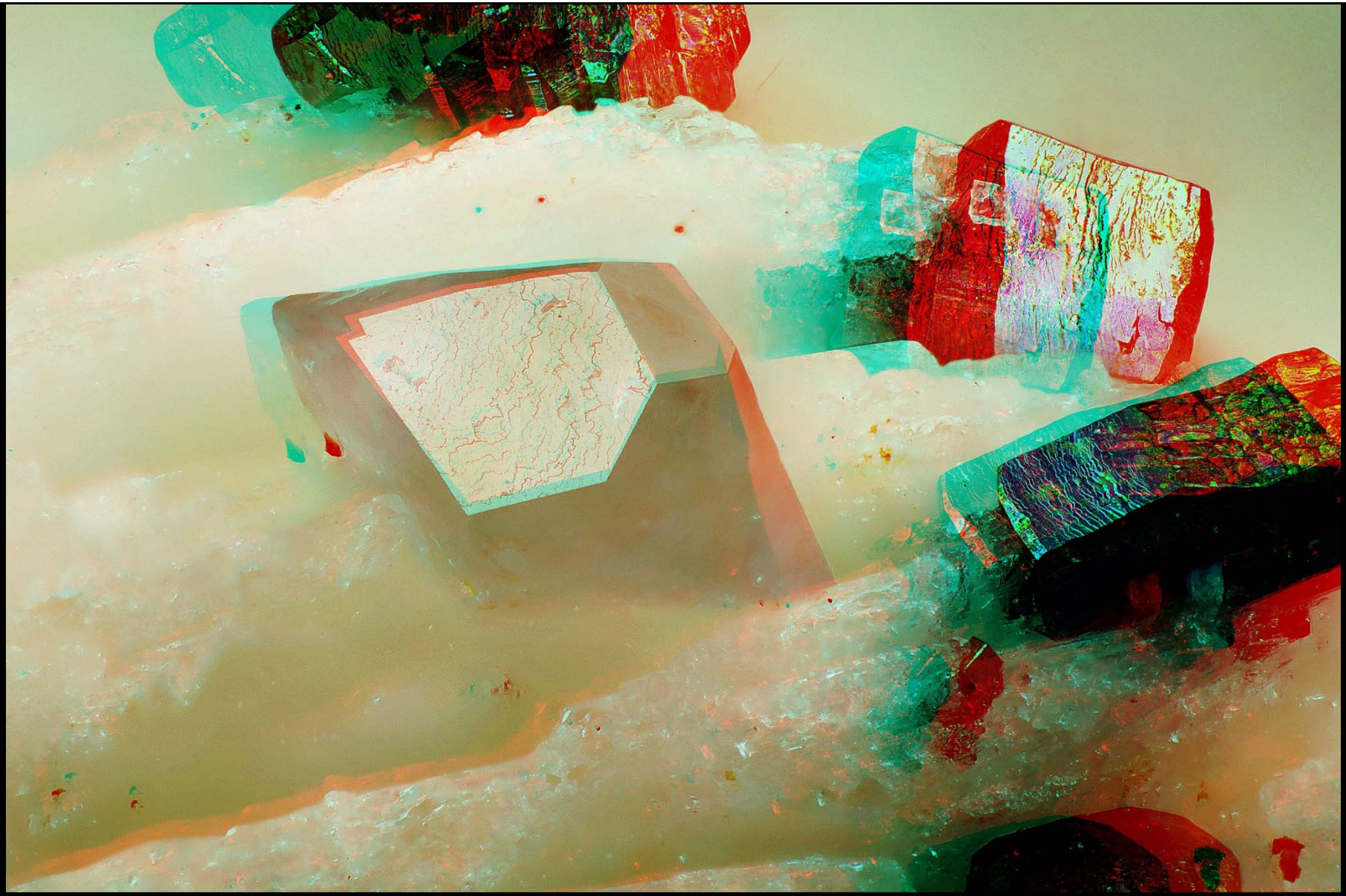
Ancylite-(Ce) $CeSr(CO_3)_2(OH)\cdot H_2O$

Field width 2.12 mm.

Distorted orthorhombic crystal surrounded by pyrite crystals on top of cockscomb baryte.
Strontian Mine, Strontian, Highland.

Specimen: David McCallum collection. Photography: John Chapman, November 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 173 and 162 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in Combine ZM.



0.1 mm

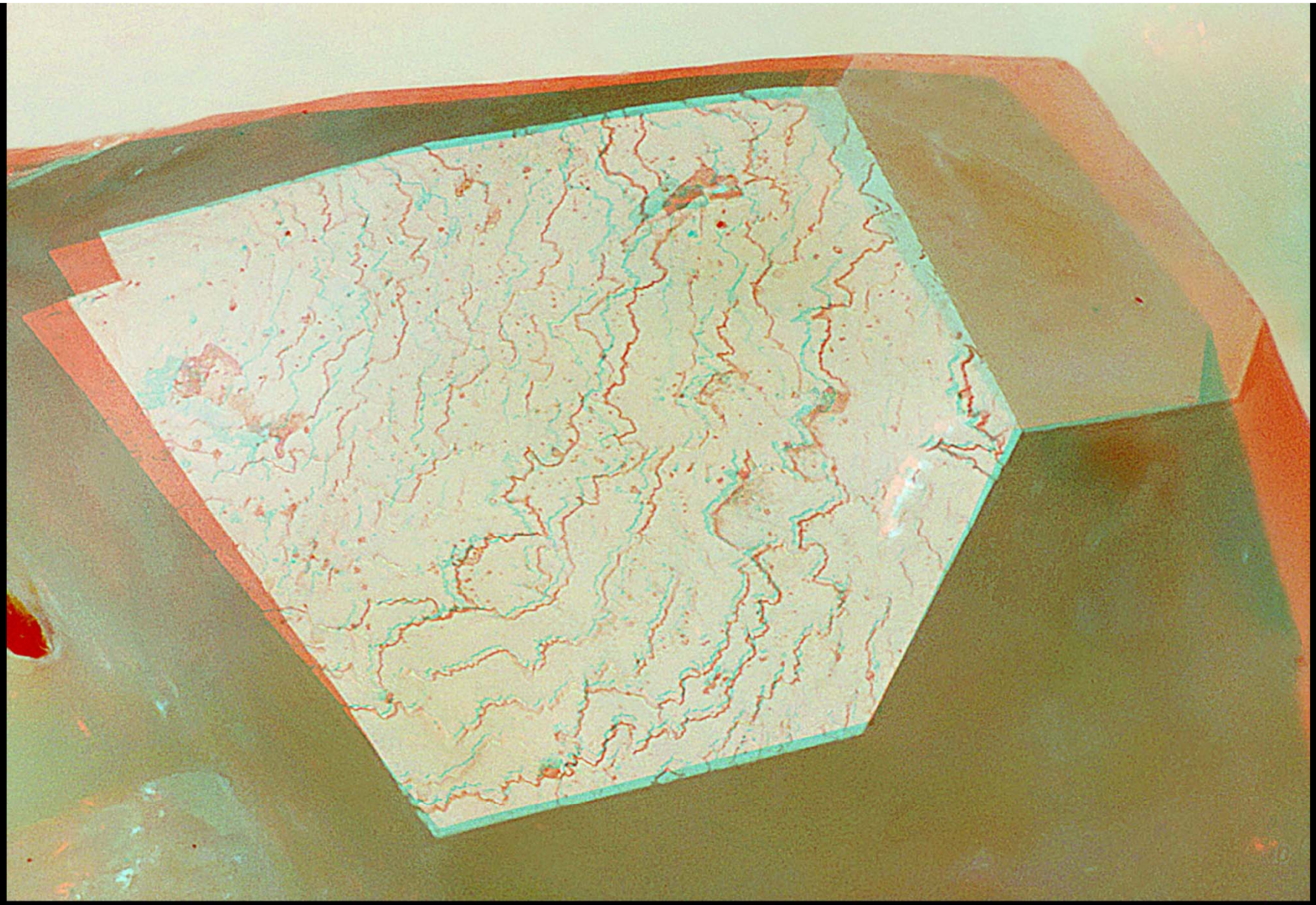
Ancylite-(Ce) $CeSr(CO_3)_2(OH)\cdot H_2O$

Field width 1.74 mm.

Distorted orthorhombic crystal surrounded by pyrite crystals on top of cockscomb baryte.
Strontian Mine, Strontian, Highland.

Specimen: David McCallum collection. Photography: John Chapman, November 2023.

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 178 and 167 6-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



0.1 mm

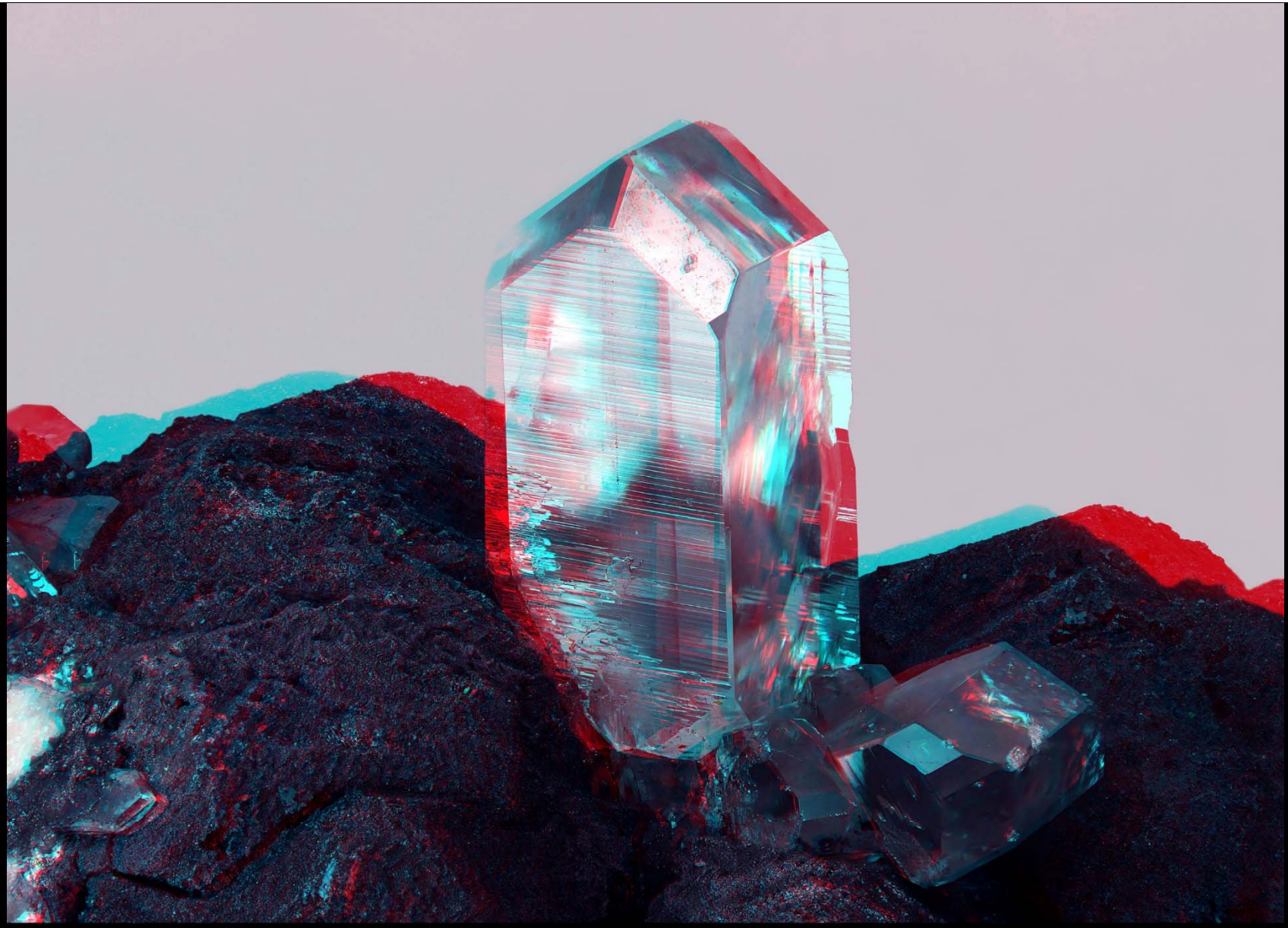
Ancylite-(Ce) $CeSr(CO_3)_2(OH)\cdot H_2O$

Field width 0.550 mm.

Distorted orthorhombic crystal surrounded by pyrite crystals on top of cockscomb baryte.
Strontian Mine, Strontian, Highland.

Specimen: David McCallum collection. Photography: John Chapman, November 2023.

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 178 and 167 6-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Anglesite $PbSO_4$

Blocky prismatic crystal with complex pyramidal terminations and with striations across the prism.

1 mm

Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Field width 9.5 mm

Specimen: found by Max Freier and in Max Freier collection. Photography: John Chapman.

Canon EOS 5DSR camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 110 mm bellows extension, with Schott fibre optic illumination.

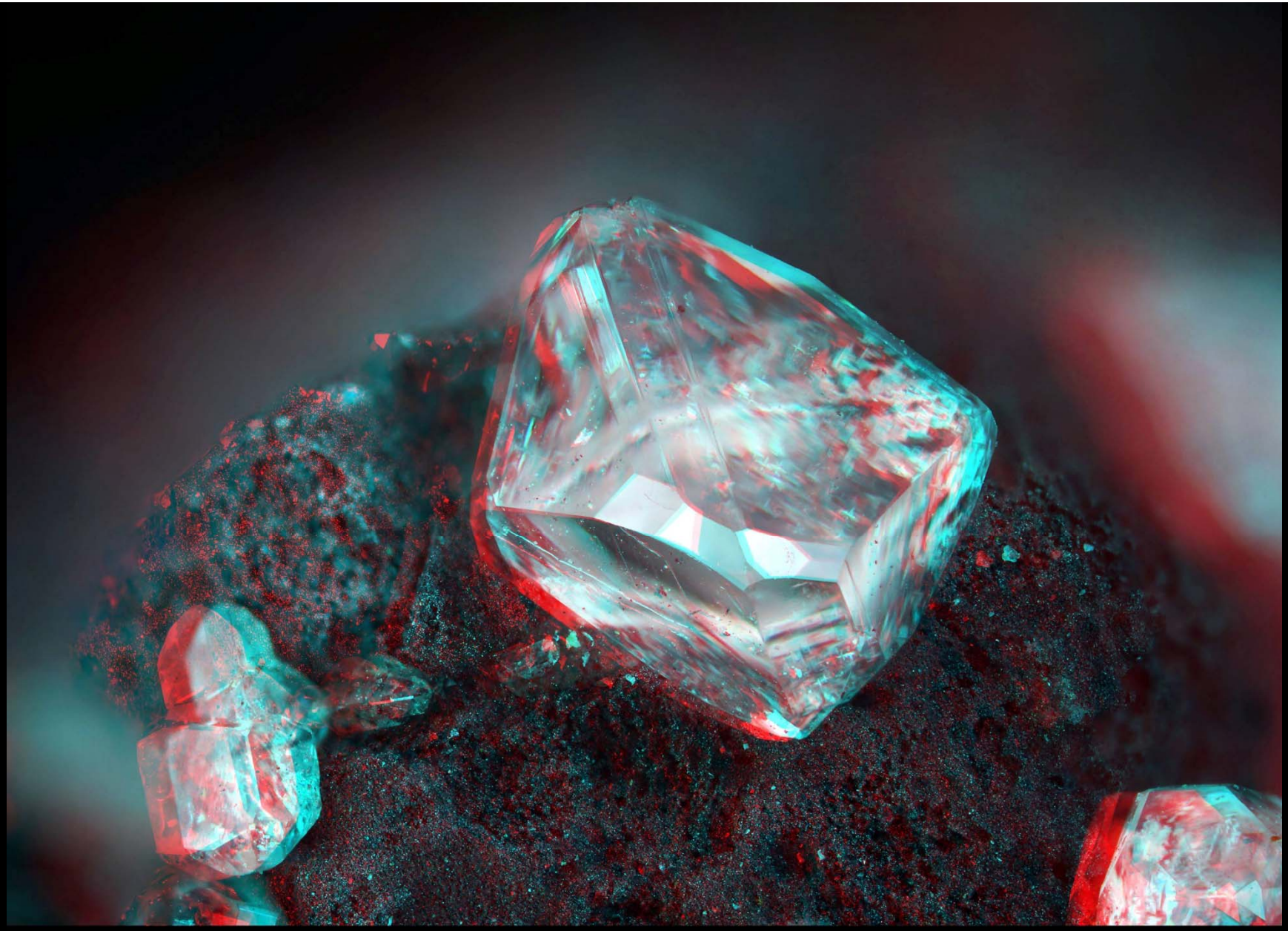
Left + right stacks of 144 and141 40-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM

Anglesite $PbSO_4$

Blocky prismatic crystal with complex pyramidal terminations and with striations across the prism. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.
Specimen: Max Freier collection.
Photography: John Chapman.

1 mm Field height 6.3 mm

Canon EOS 5DSR camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension. Left and right stacks of 144 and 138 25-micrometre steps via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM and Stereophotomaker.



1 mm

Anglesite $PbSO_4$

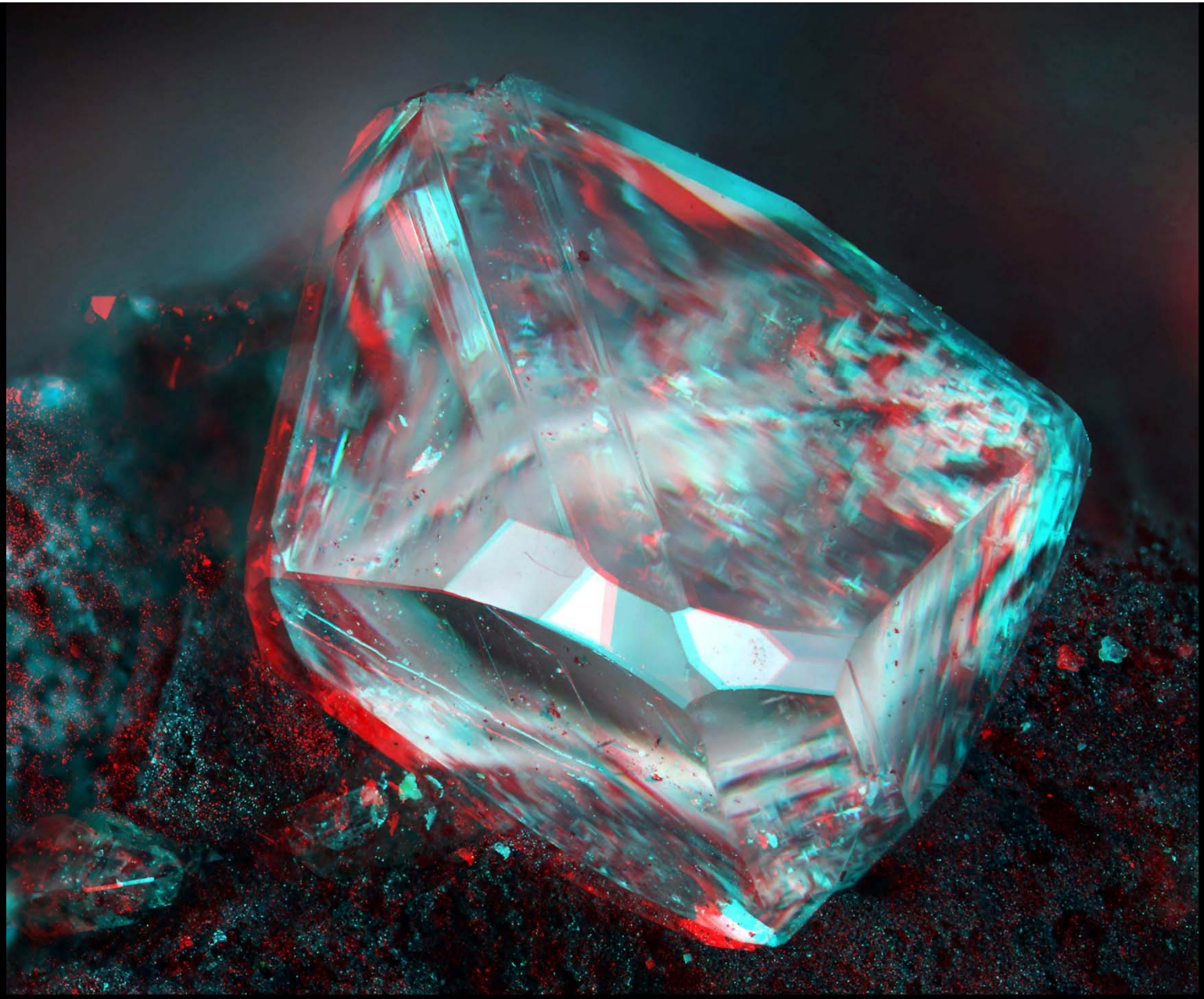
Field width 3.65 mm

Remarkable transparent blocky crystals on galena. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: David Green collection, No. MM1955. 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 illumination.

Left + right stacks of 76 and 77 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm 0.5 mm

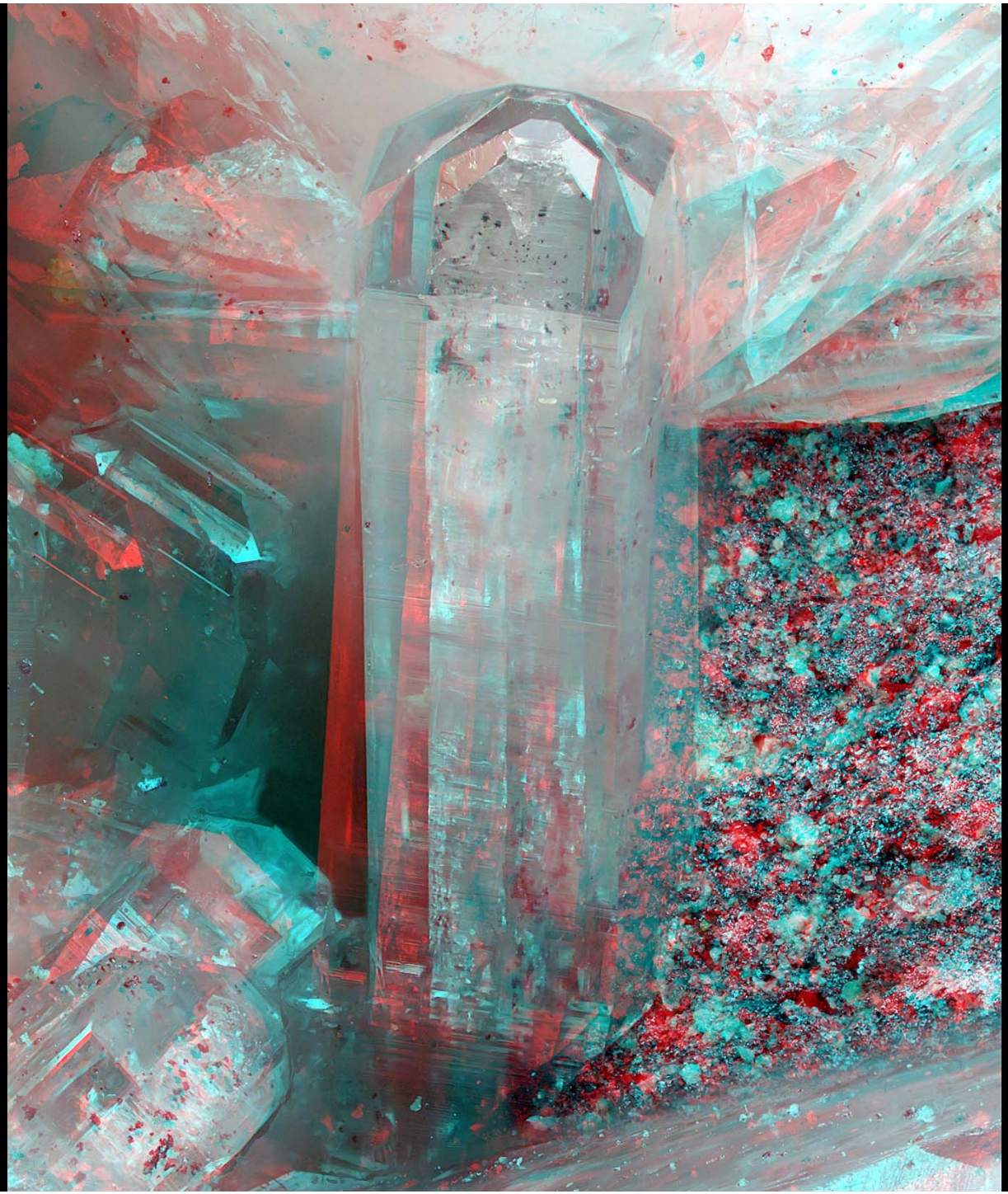
Anglesite $PbSO_4$ Field width 2.126 mm

Remarkable transparent blocky crystals on galena. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: David Green collection, No. MM1955. 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 illumination.

Left + right stacks of 76 and 77 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Anglesite $PbSO_4$

A truly remarkable crystal containing a ghost void in perfect crystallographic register with the surrounding crystal, which has fine striations across the prism faces.

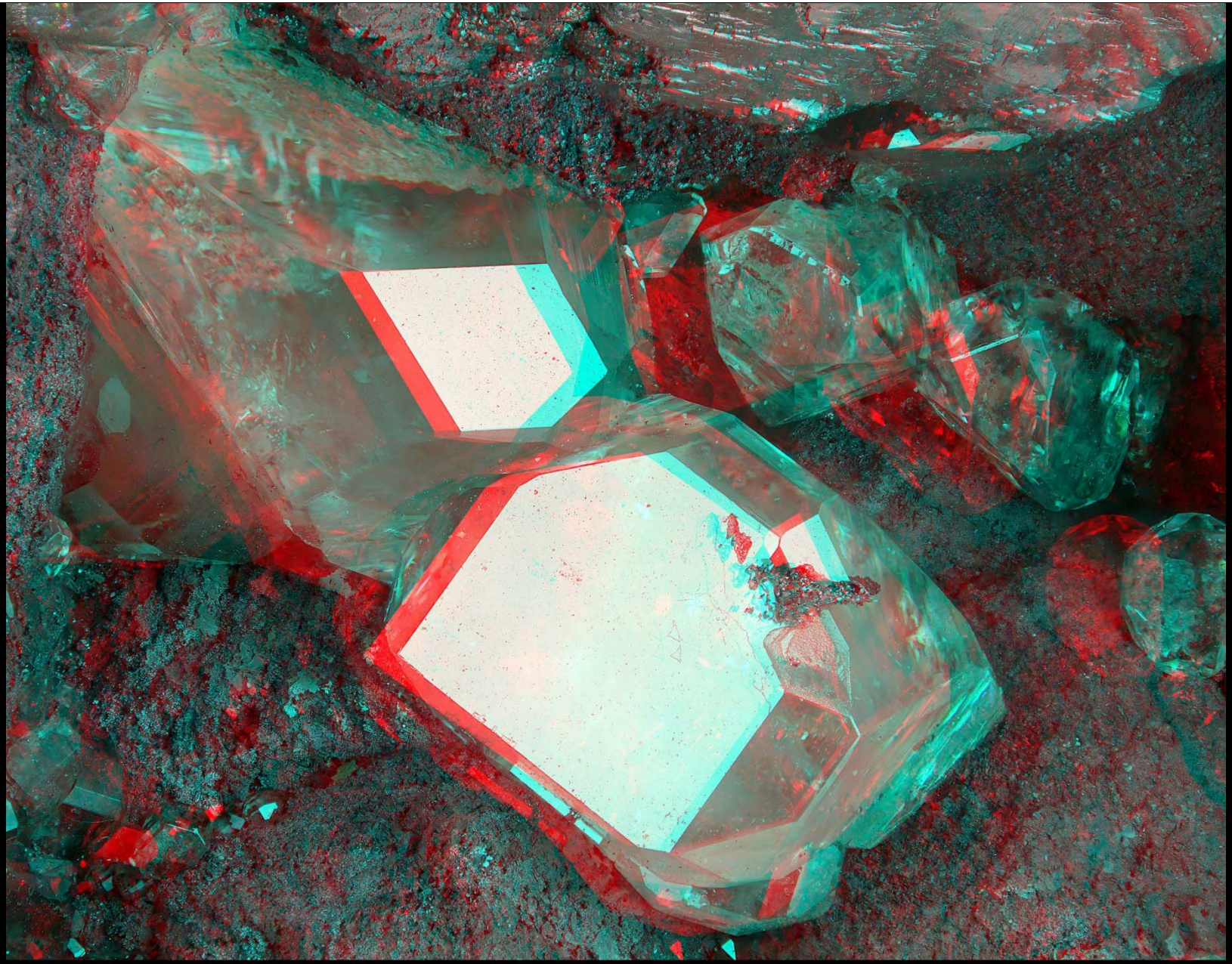
Whitwell Quarry SK 530 753,
Whitwell, Derbyshire.

Specimen: David Green collection.
Photography: John Chapman.

Canon EOS 5DSR camera with Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 154 and 163 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture combined in CombineZM and rendered in Stereophotomaker.

0.1 mm 0.5 mm

Field height 1.94 mm



1 mm

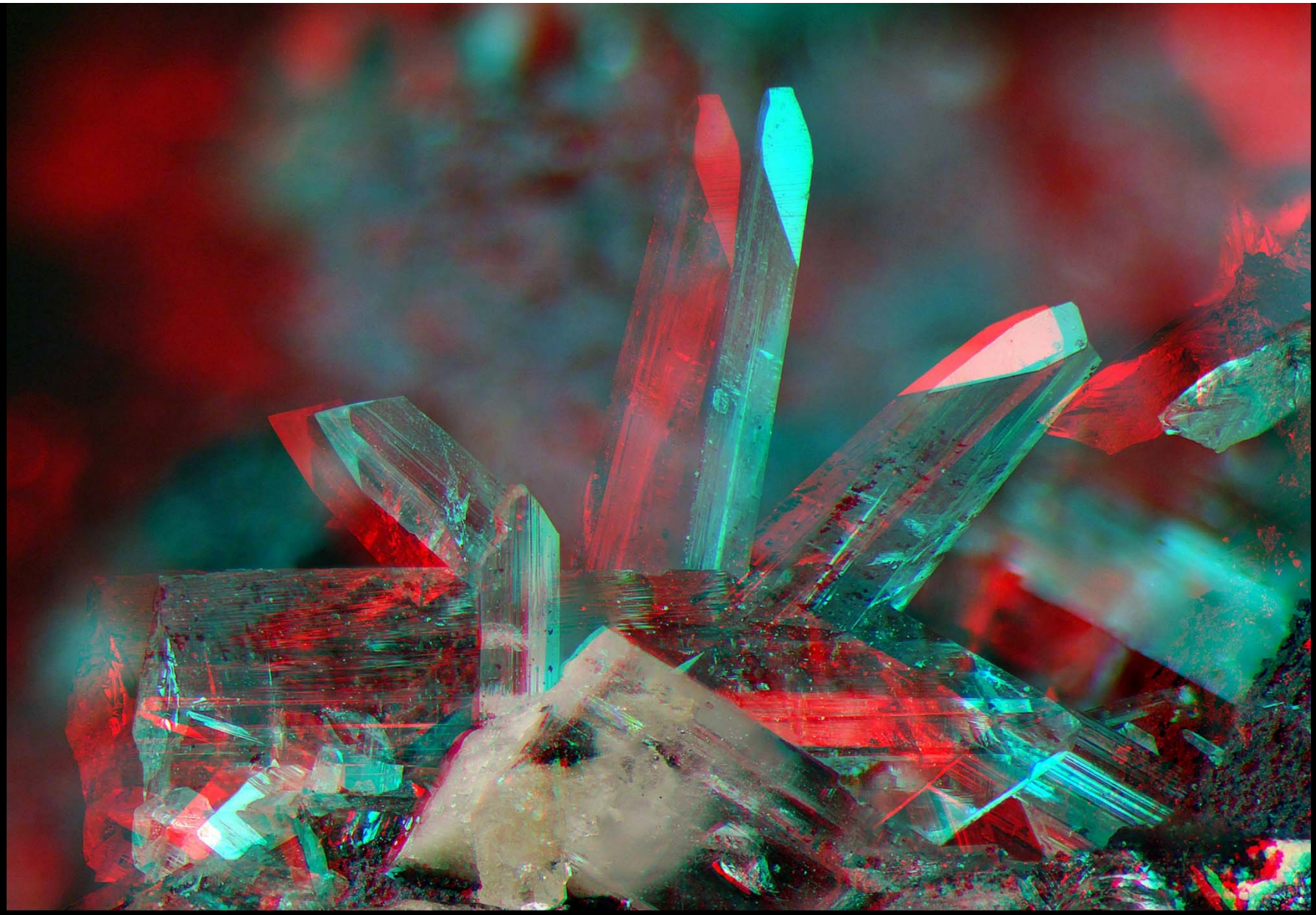
Anglesite $PbSO_4$

Field width 8.8 mm

Blocky very pale yellow transparent crystals on degenerate galena. Whitwell Quarry SK 530 753, Derbyshire.

Specimen: found by David McCallum, No. E099, and now in David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 100 mm bellows extension, with Schott fibre optic illumination.
L and R stacks of 140 and 127 50-micrometre steps via Stackshot rail at 10 degrees angle combined in CombineZM, with Luminar at fully open aperture.

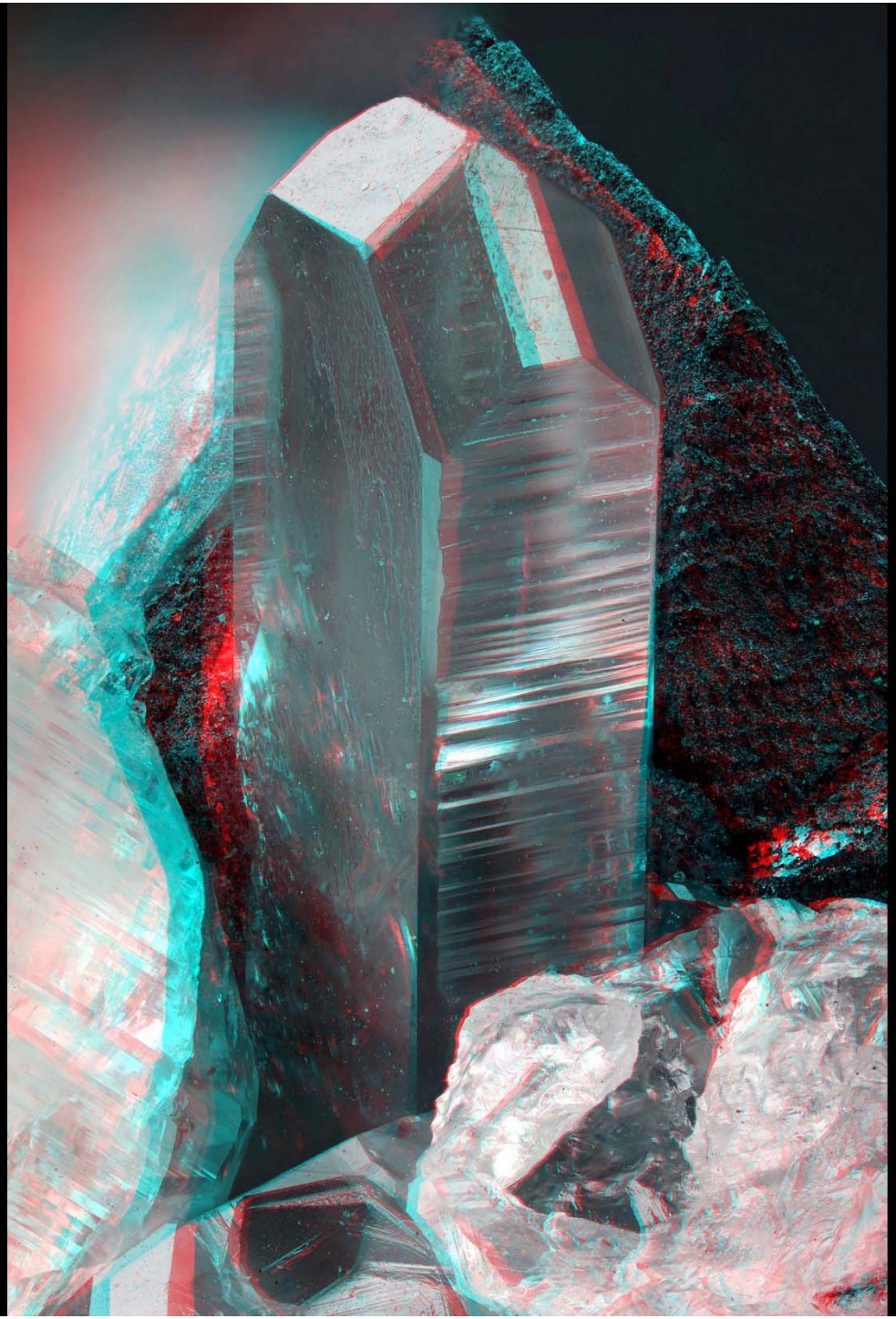


1 mm

Anglesite $PbSO_4$

Field width 6.7 mm

A group of bladed-prismatic crystals on galena. The crystals have off-centre terminal pyramids.
Whitwell Quarry SK 530 753, Whitwell, Derbyshire.
Specimen: found by David McCallum, No. E102, and now in David Green collection. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 4.0x zoom, with LED lamp illumination.



Anglesite $PbSO_4$

Remarkable crystal on galena with
interesting surface ornamentation
and striations.

Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: David Green collection, No. WQ039.

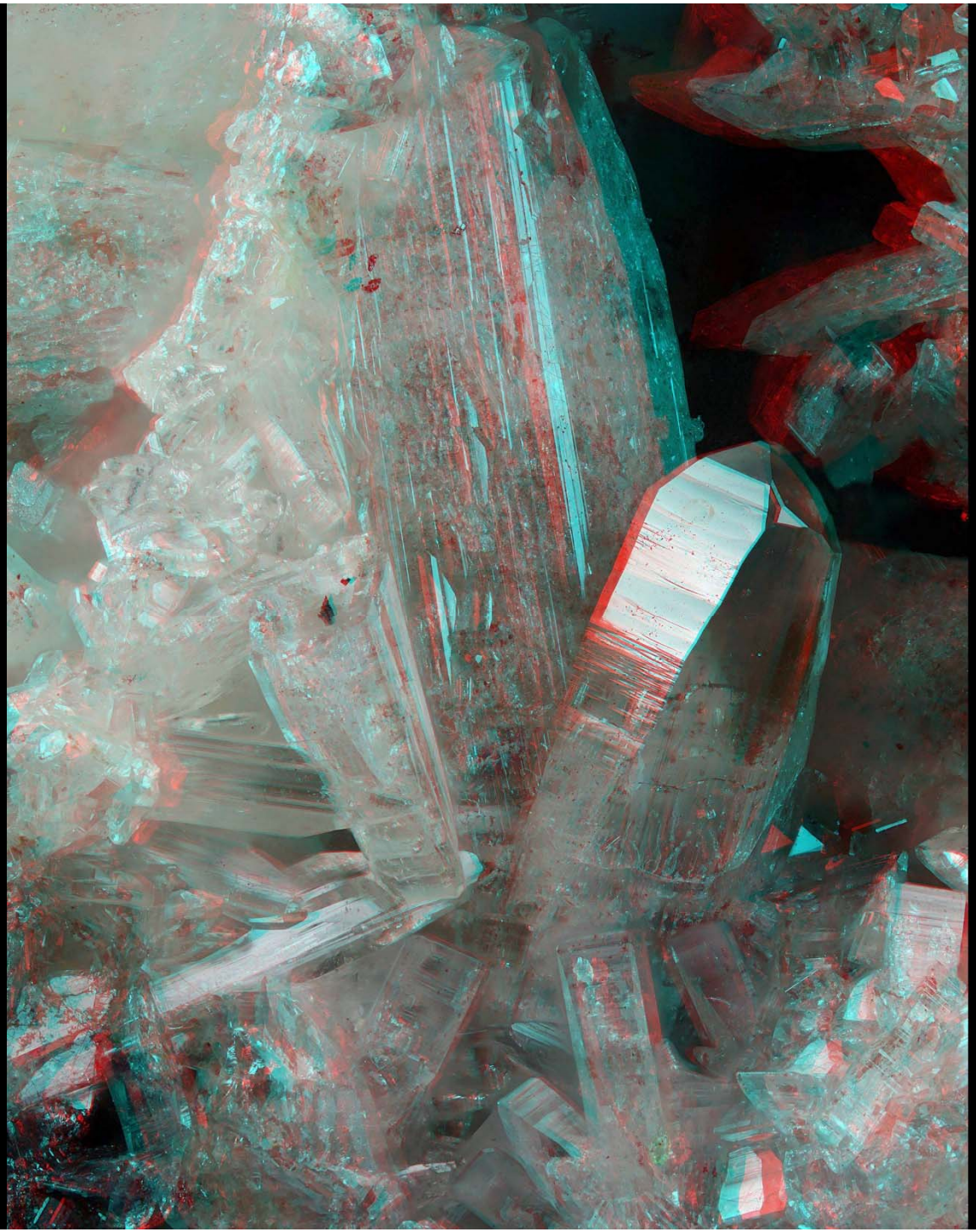
Photography: John Chapman.

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

Left + right stacks of 119 and 121 20-micrometre steps
at 6 degrees via Stackshot rail, with Luminar at fully open
aperture, combined in CombineZM and
rendered in Stereophotomaker.

1 mm

Field height 3.65 mm



Anglesite $PbSO_4$

Well-formed prismatic to tabular crystal with curved striated sides and an internal dark chocolate brown veiling, together with small chisel-bladed crystals at the base of a large crude striated lenticular crystal. To its left is a broken hollow chisel-shaped crystal.
Whitwell Quarry SK 530 753, Derbyshire.

Specimen: David Green collection, No. WQ041.

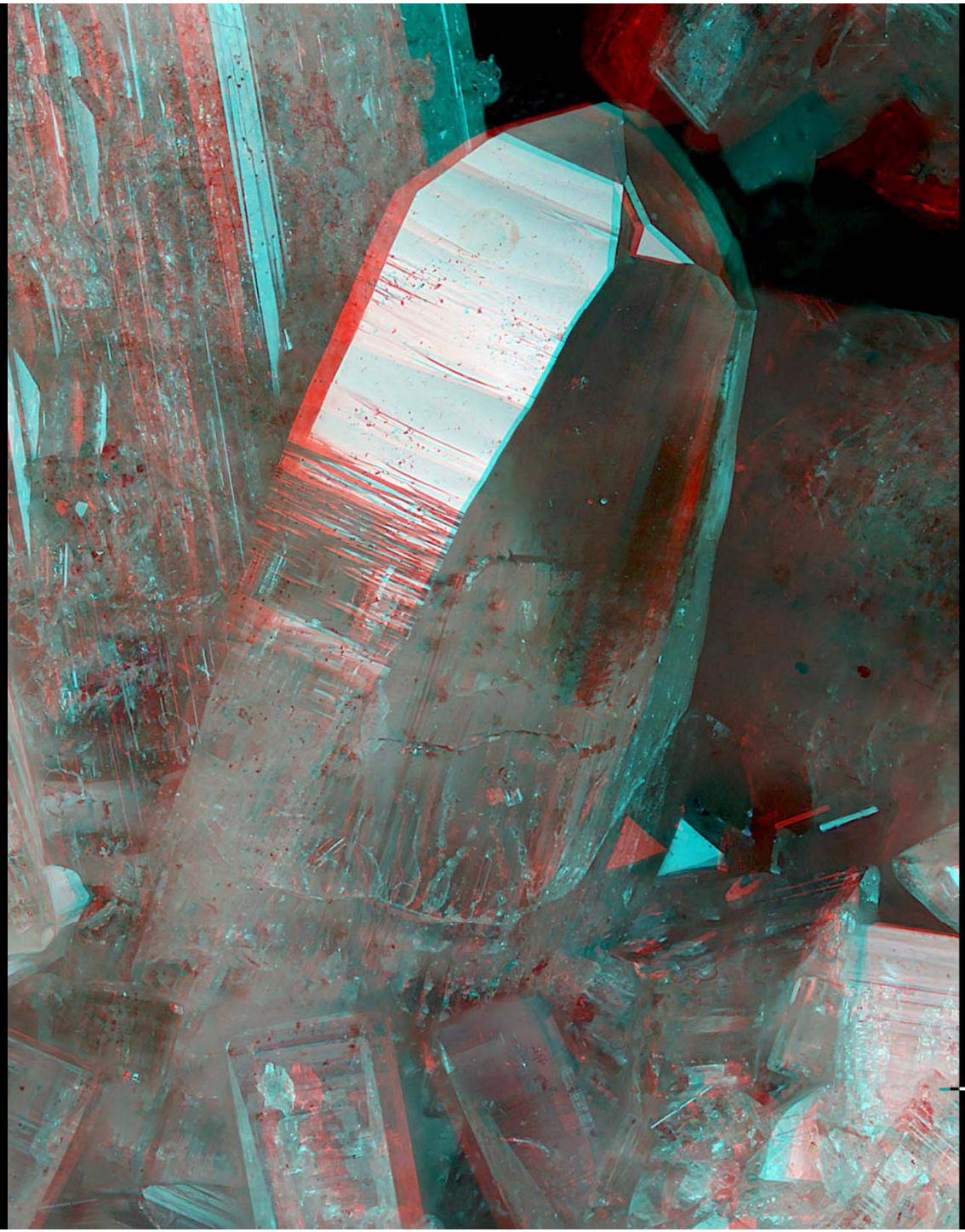
Photography: John Chapman.

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

Left + right stacks of 140 and 154 20-micrometre steps at 6 degrees via Stackshot rail combined in CombineZM and rendered in Stereophotomaker.

1 mm

Field height 3.155 mm



Anglesite $PbSO_4$

Well-formed prismatic to tabular crystal with curved striated sides and an internal dark chocolate brown veiling, together with small chisel-bladed crystals at the base of a large crude striated lenticular shaped crystal.

Whitwell Quarry SK 530 753, Derbyshire.

Specimen: David Green collection, No. WQ041.

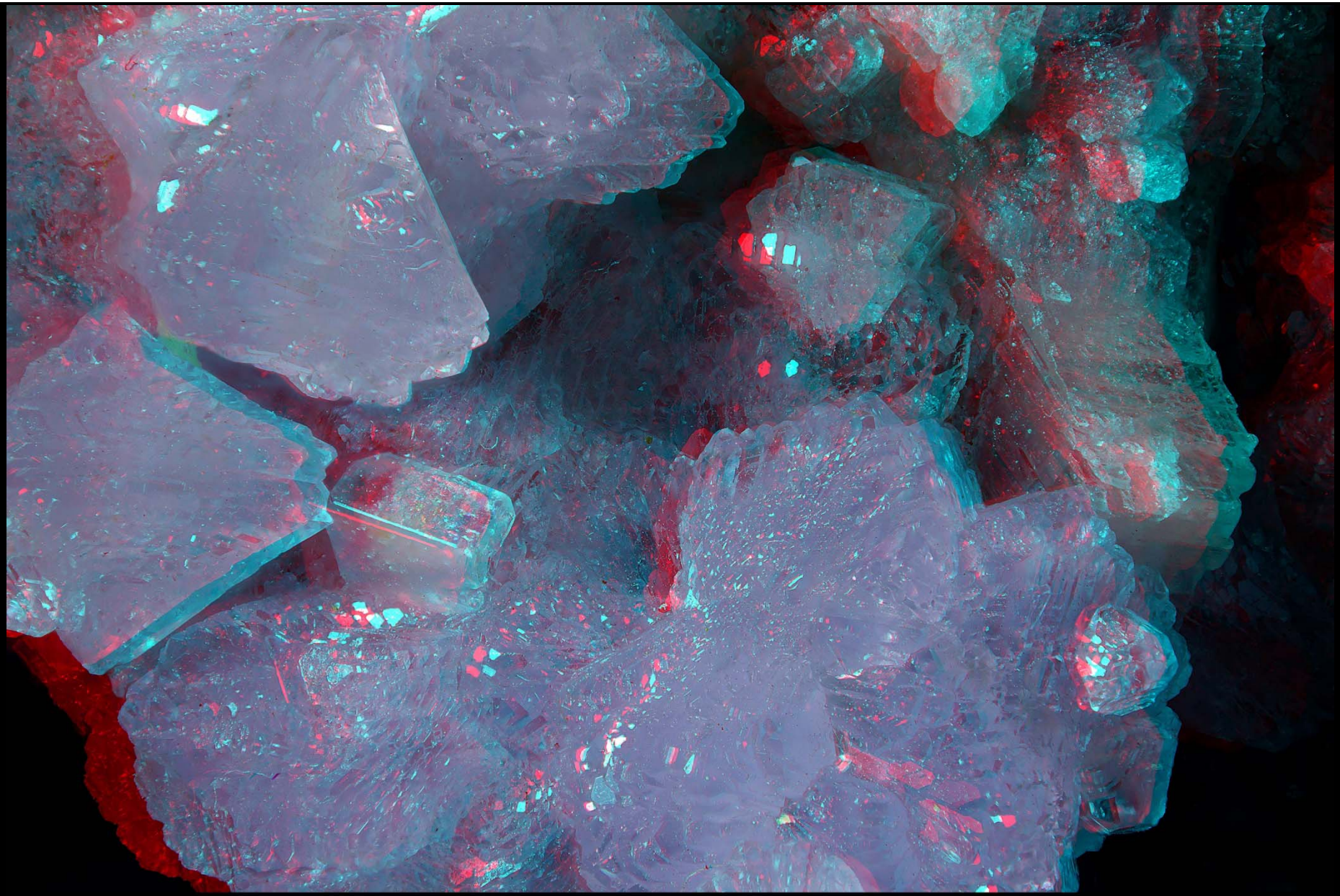
Photography: John Chapman.

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

Left + right stacks of 140 and 154 20-micrometre steps at 6 degrees via Stackshot rail combined in CombineZM and rendered in Stereophotomaker.

0.5 mm 0.1 mm

Field height 1.30 mm



1 mm

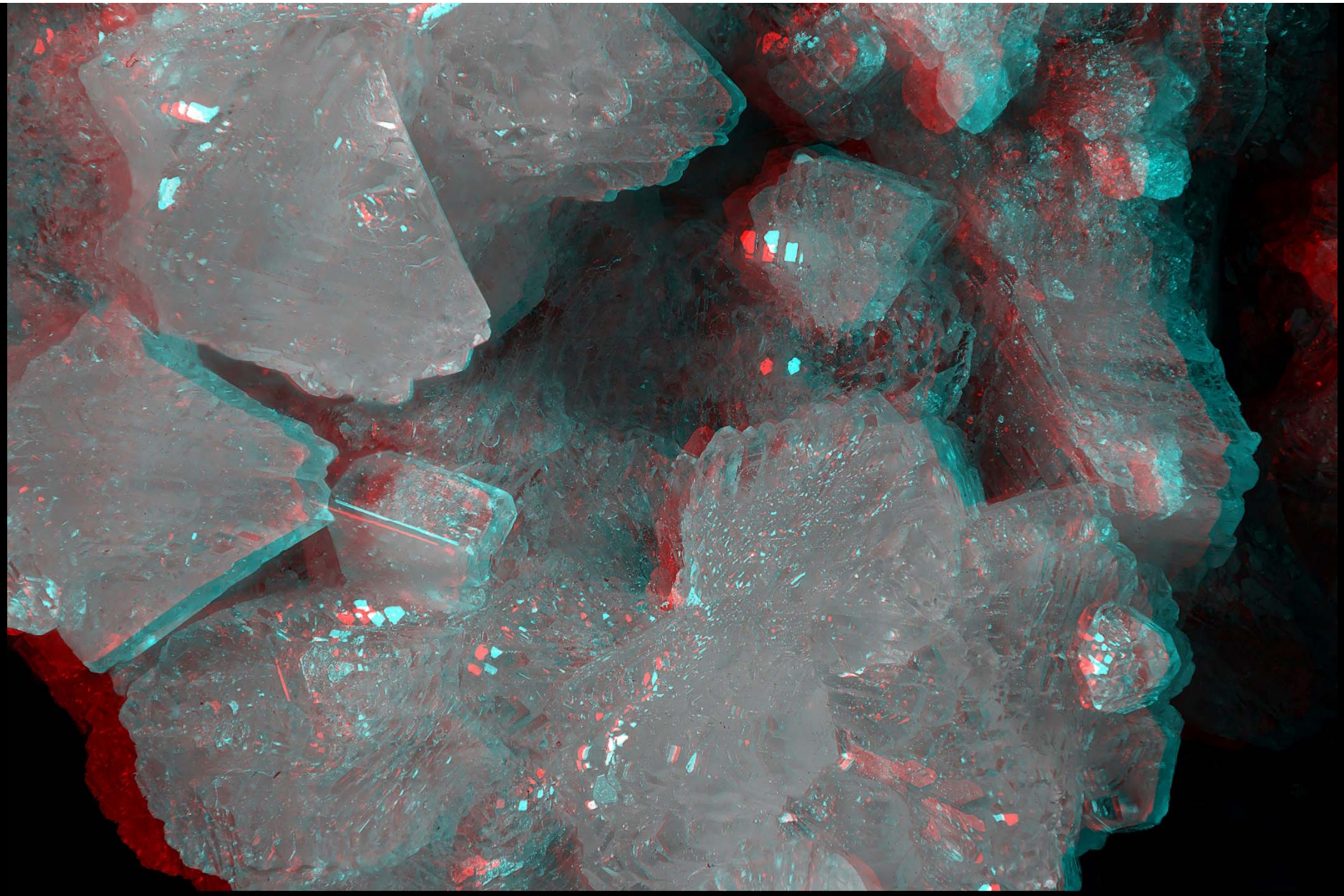
Anhydrite $Ca(SO_4)$

Field width 20.9 mm.

Colourless blocky crystals amongst blue boracite crystals. Boulby Mine, Loftus, Cleveland.

Specimen: the late Max Freier collection. Photography: John Chapman.

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 143 and 151 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



1 mm

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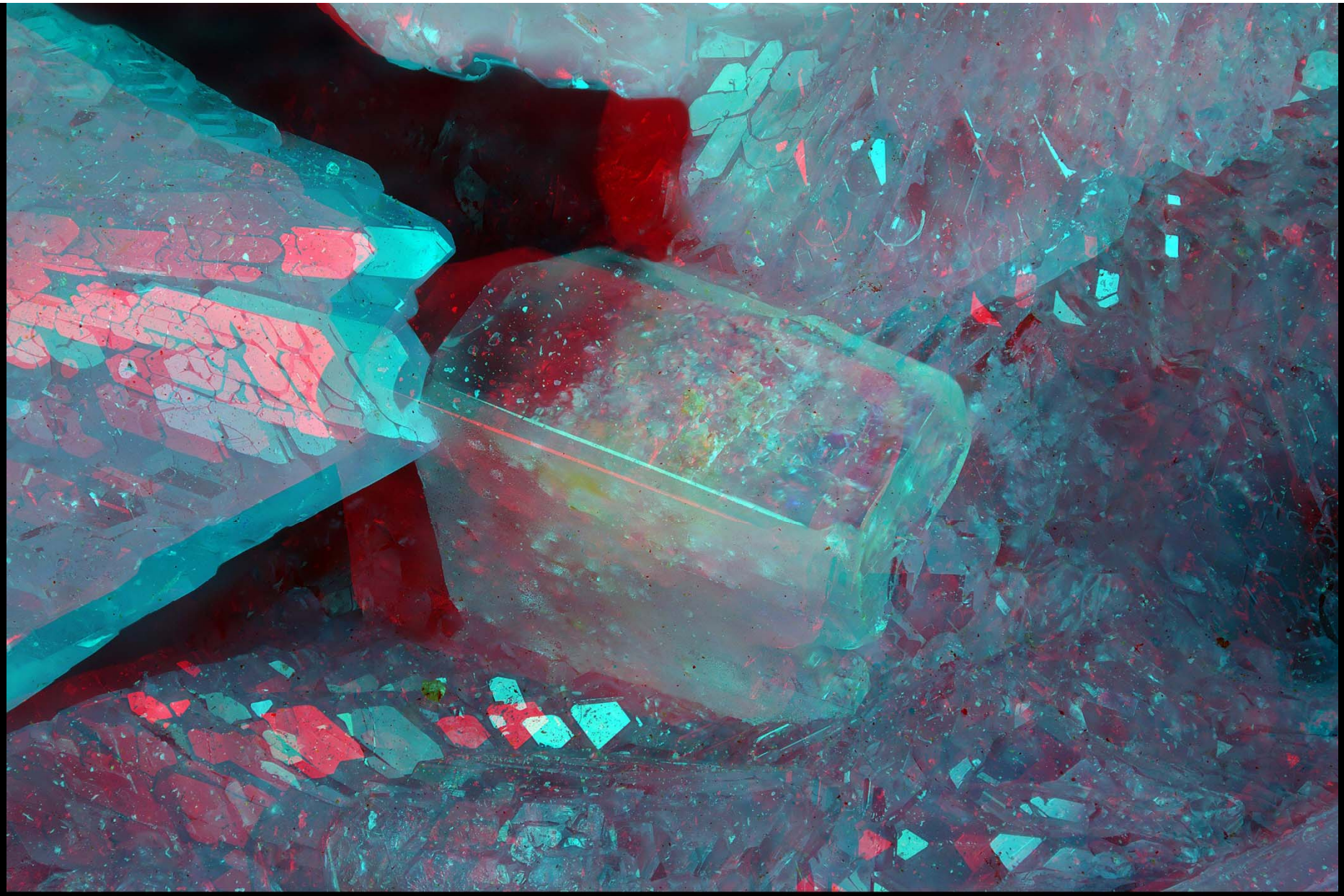
Left + right stacks of 143 and 151 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



1 mm

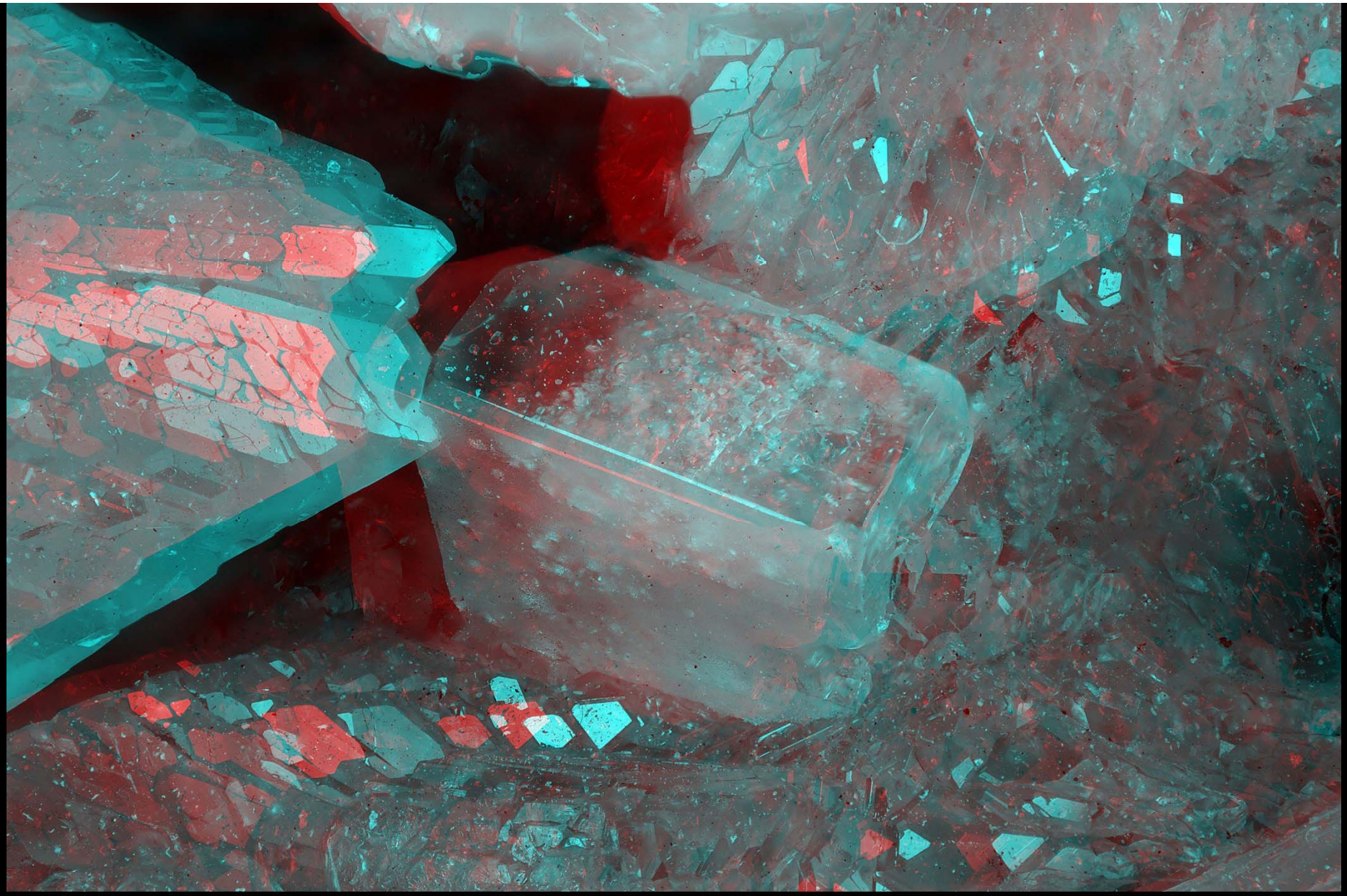
Anhydrite $Ca(SO_4)$

Field width 6.69 mm.

Colourless blocky crystals amongst blue boracite crystals. Boulby Mine, Loftus, Cleveland.

Specimen: the late Max Freier collection. Photography: John Chapman.

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 143 and 131 40-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Anhydrite $Ca(SO_4)$

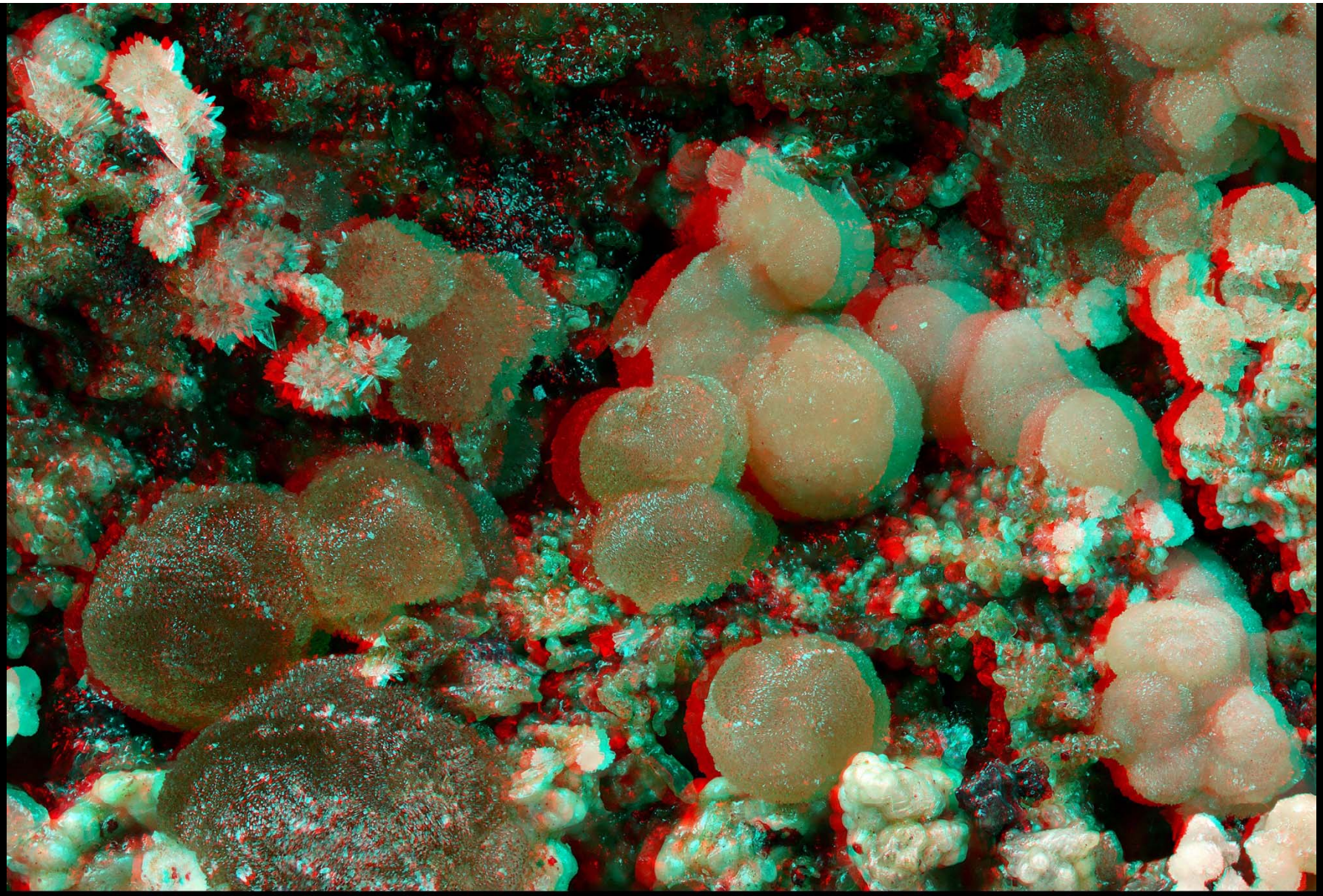
Field width 6.69 mm.

Colourless blocky crystals amongst blue boracite crystals. Boulby Mine, Loftus, Cleveland.

Specimen: the late Max Freier collection. Photography: John Chapman.

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 143 and 131 40-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Annabergite $Ni_3(AsO_4)_2.8H_2O$

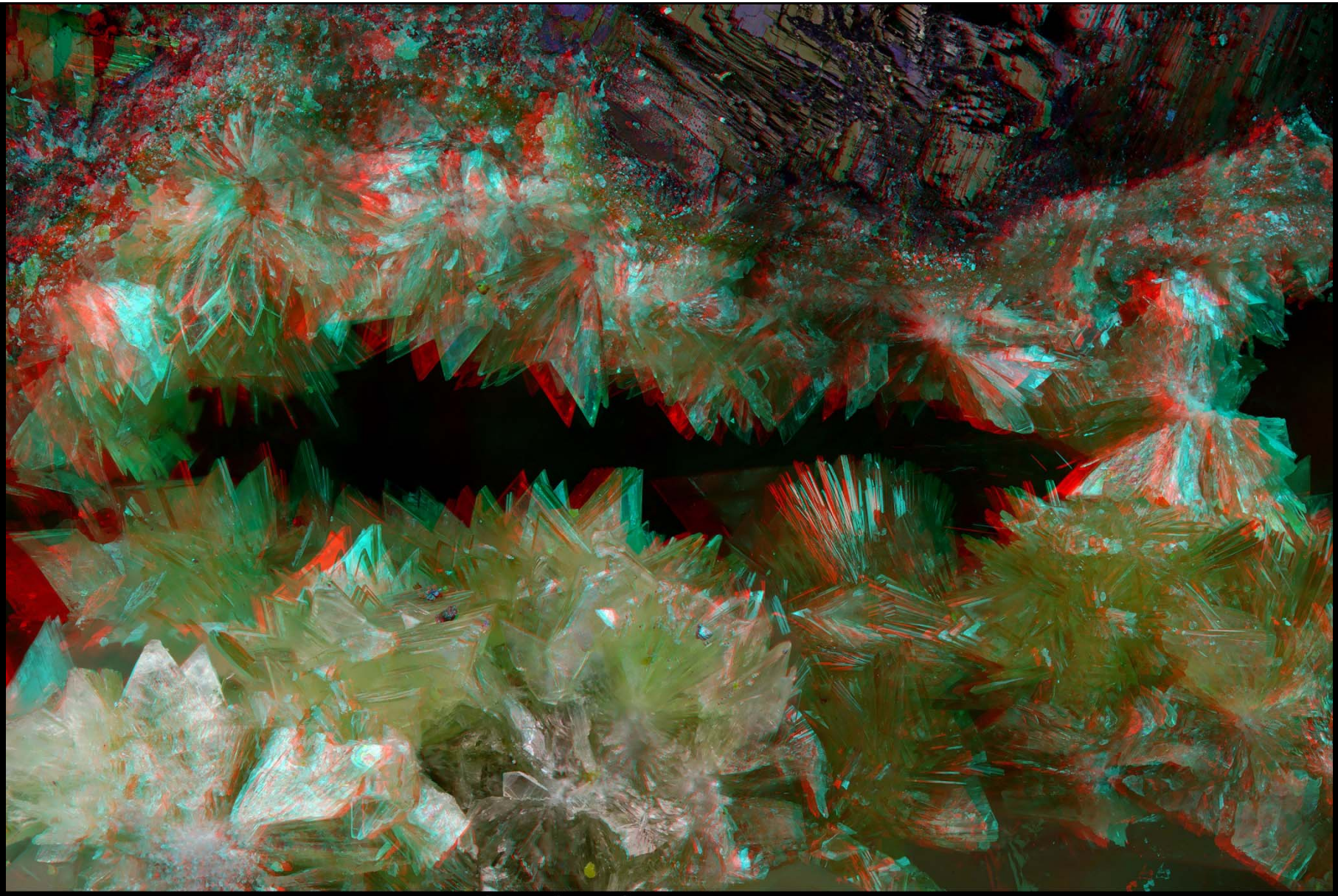
Field width 3.63 mm.

Pink zinc- and cobalt-rich balls with Ni:Co:Zn ratios of 8:1.4:2.

Lower Flats, Hardshins Level, Murton Mine NY 7595 2252, Scordale, Cumbria.

Specimen: David Green collection, No. MT157. 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 124 and 115 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

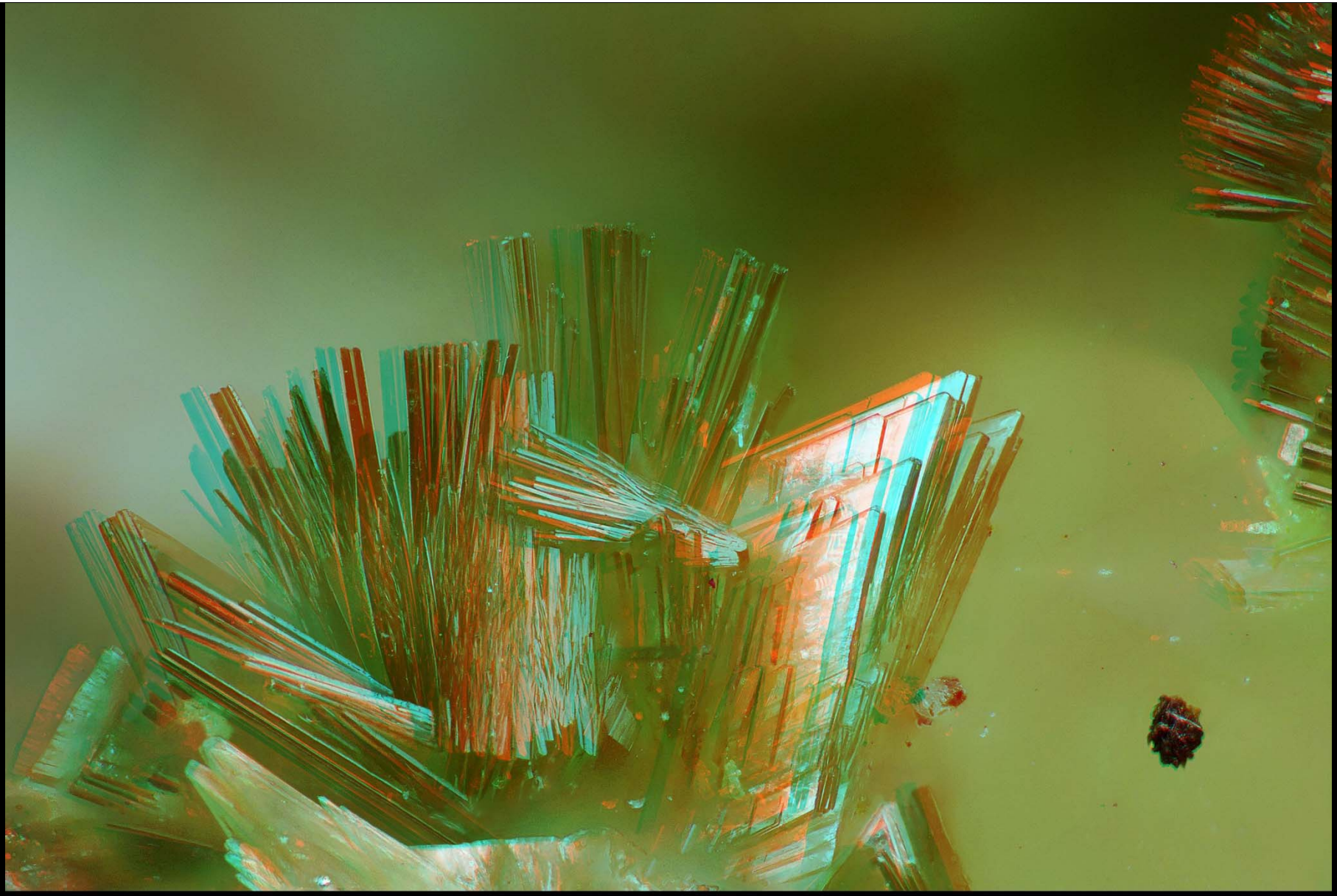


1 mm

Annabergite $Ni_3(AsO_4)_2.8H_2O$

Field width 3.68 mm.

Khaki green stacked and slightly divergent monoclinic blades formed from supergene oxidation of gersdorffite.
Murton Mine, small area in the entrance flats to the east of the Hardshins Level crosscut, NY 7595 2252, Scordale, Cumbria.
Specimen: David Green collection, No. MT251. 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 illumination.
Left + right stacks of 129 and 133 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Annabergite $Ni_3(AsO_4)_2.8H_2O$

Field width 1.34 mm.

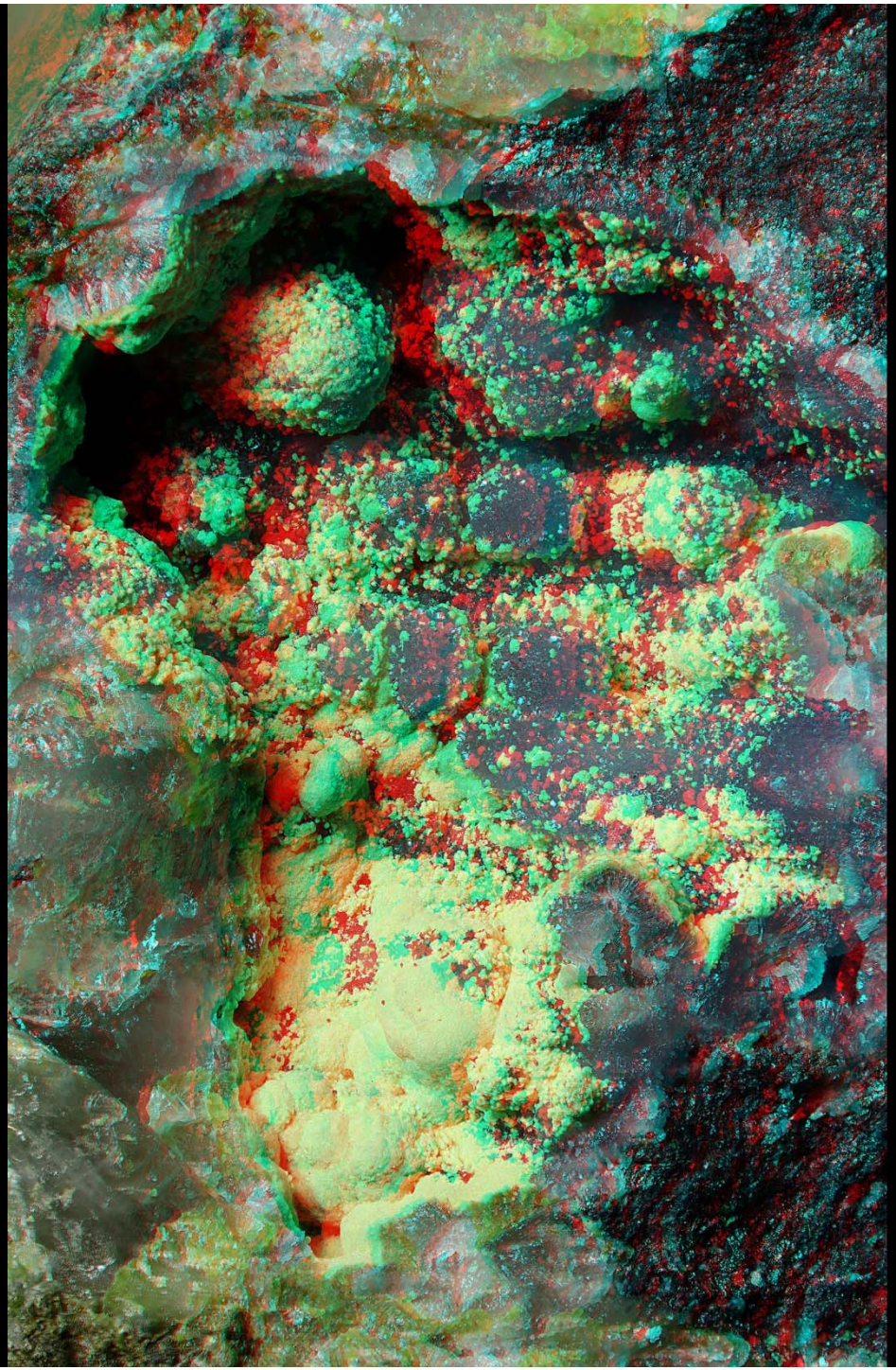
Khaki green stacked and slightly divergent monoclinic blades formed from supergene oxidation of gersdorffite.

Murton Mine, small area in the entrance flats to the east of the Hardshins Level crosscut, NY 7595 2252, Scordale, Cumbria.

Specimen: David Green collection, No. MT251. Photography: John Chapman, July 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 171 and 136 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM.



Arthurite $CuFe^{3+}_2(AsO_4)_2(OH)_2 \cdot 4H_2O$

Pale green powdery on blue-grey scorodite $Fe^{3+}(AsO_4) \cdot 2H_2O$ with arsenopyrite (top right).

Hingston Down Consols (Hitchins Shaft dumps), Gunnislake, near Tavistock, Cornwall.

Specimen: Peter Golley collection, No. 1593.

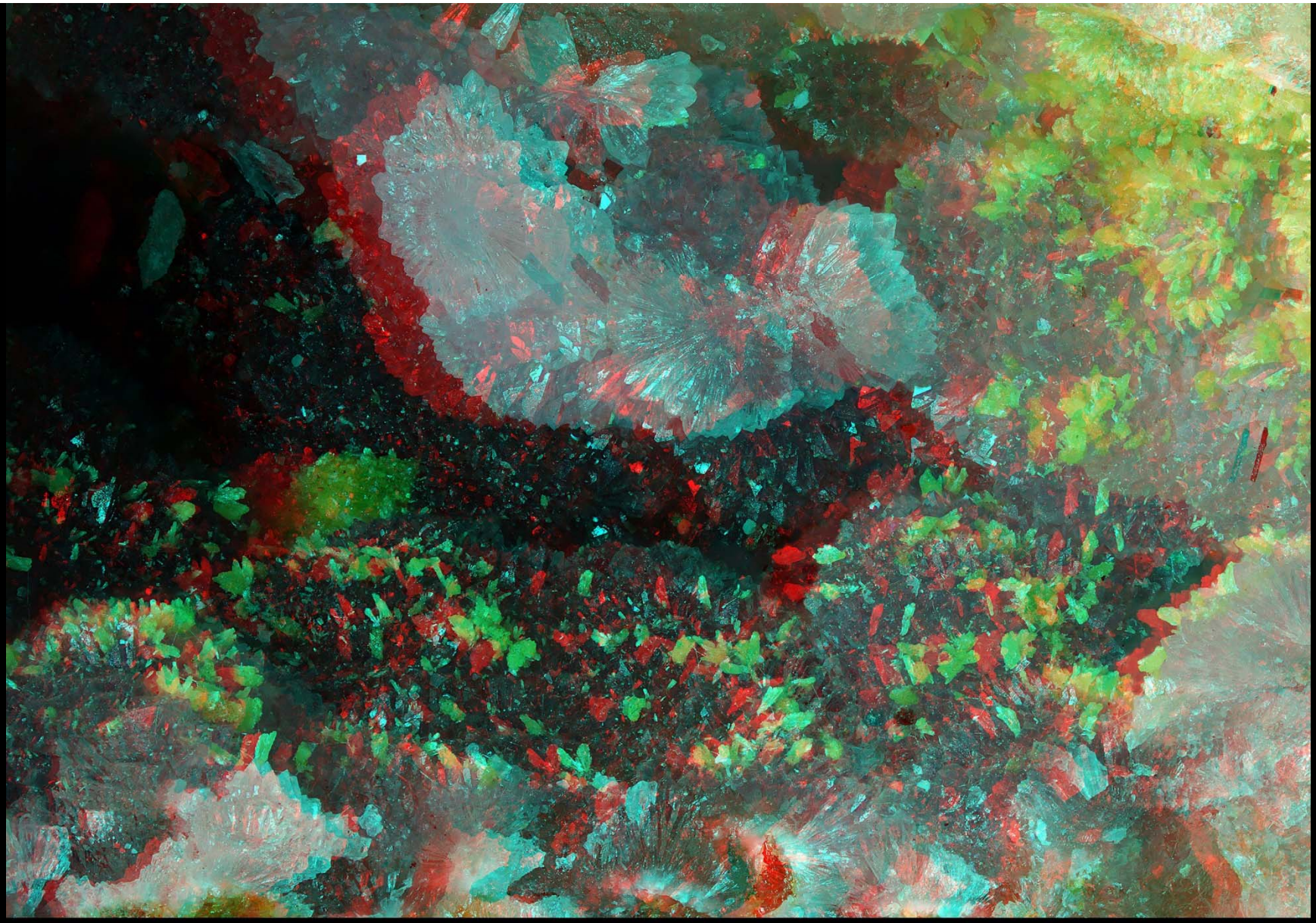
Photography: John Chapman, March 2024.

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 127 and 115 60-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.

1 mm

Field height 18.2 mm.



1 mm

Arthurite $CuFe^{3+}_2(AsO_4)_2(OH)_2 \cdot 4H_2O$

Field width 3.41 mm.

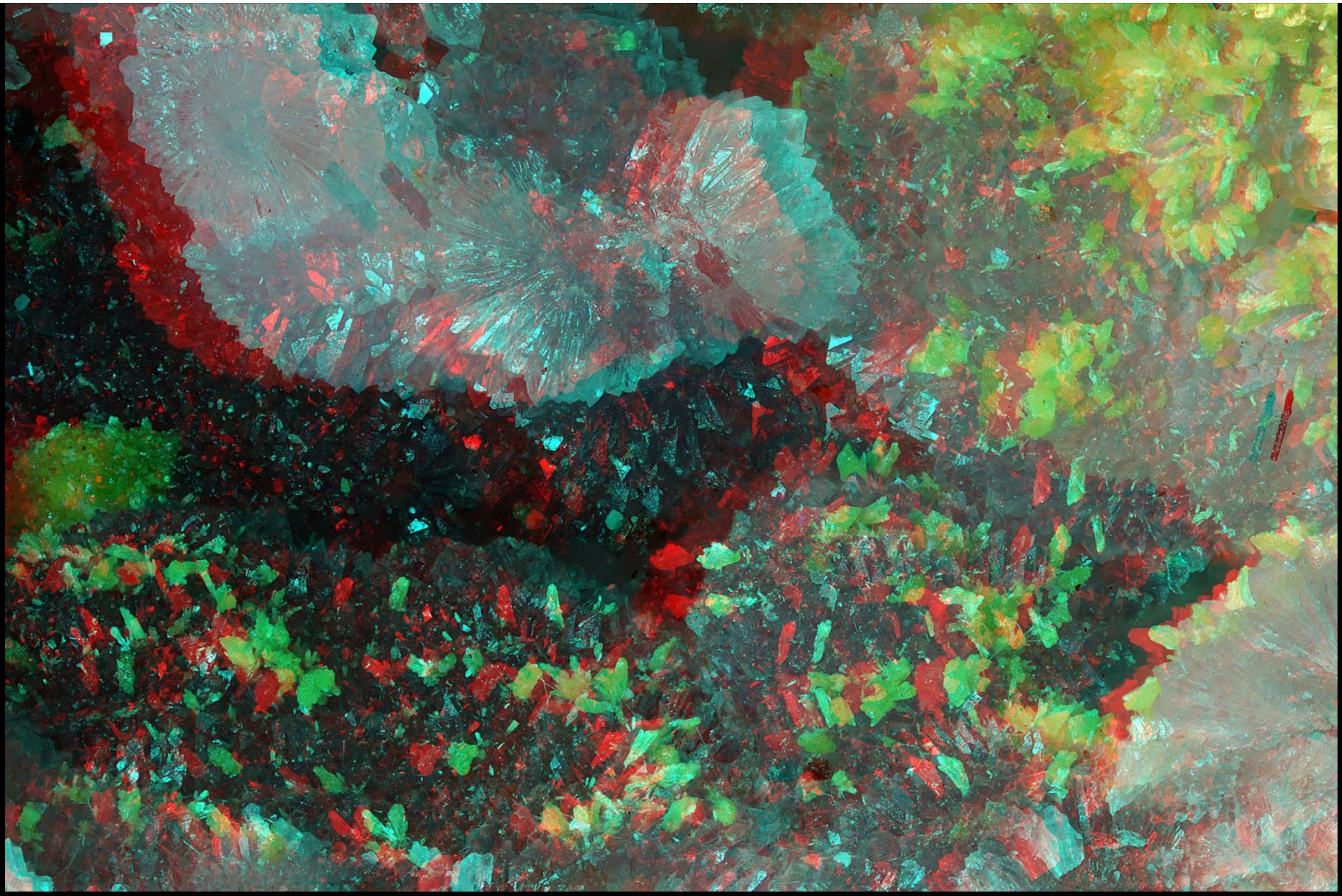
Greenish yellow crystals on blue-grey scorodite $[Fe^{3+}(AsO_4) \cdot 2H_2O]$

Hingston Down Consols (Hitchins Shaft dumps), Gunnislake, near Tavistock, Cornwall.

Specimen: Peter Golley collection, No. 1593. 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 118 and 142 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Arthurite $CuFe^{3+}_2(AsO_4)_2(OH)_2 \cdot 4H_2O$

Field width 2.72 mm.

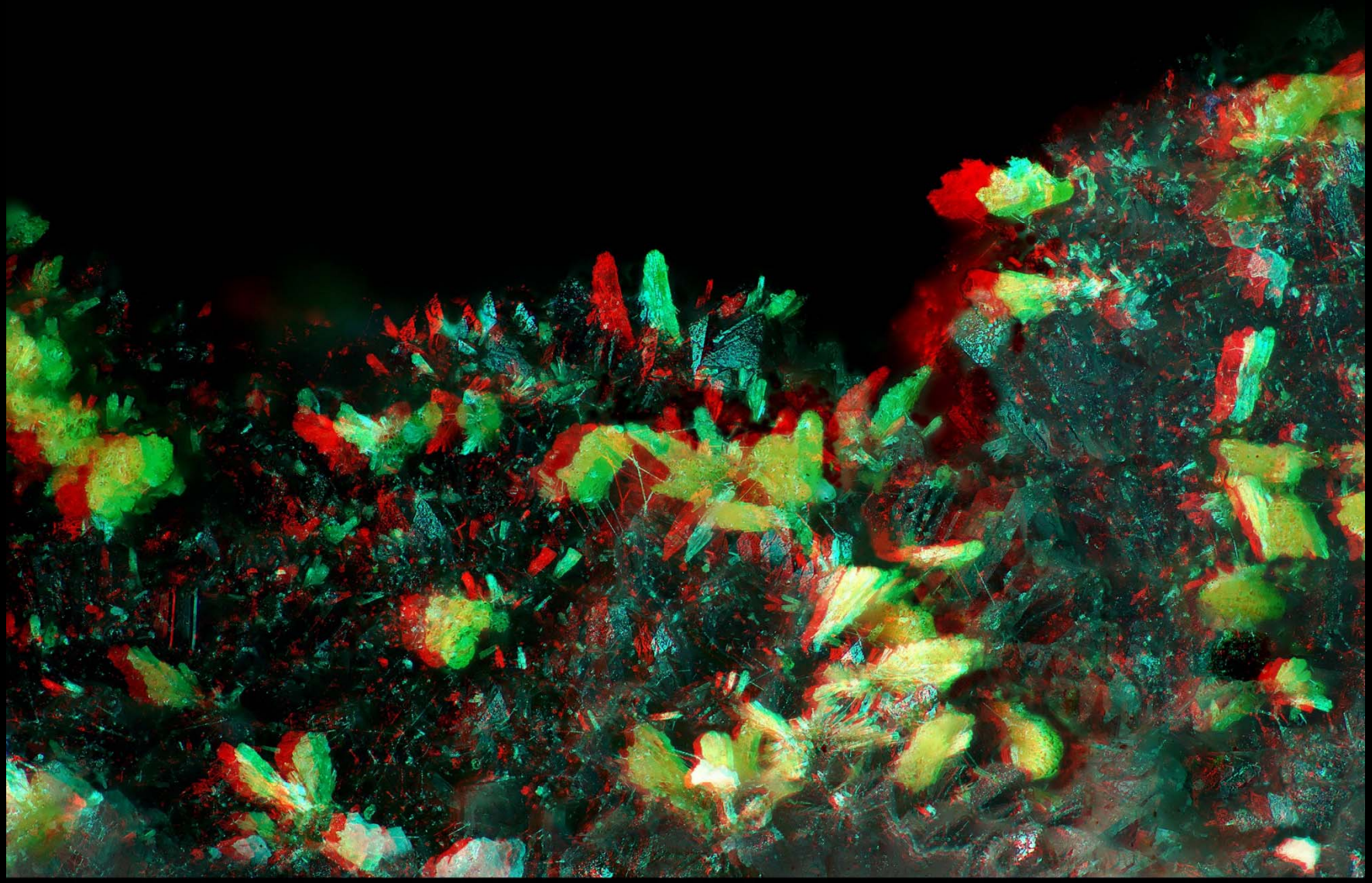
Greenish yellow crystals on blue-grey scorodite $[Fe^{3+}(AsO_4) \cdot 2H_2O]$

Hingston Down Consols (Hitchins Shaft dumps), Gunnislake, near Tavistock, Cornwall.

Specimen: Peter Golley collection, No. 1593. 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 118 and 142 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Arthurite $CuFe^{3+}_2(AsO_4)_2(OH)_2 \cdot 4H_2O$

Field width 1.20 mm.

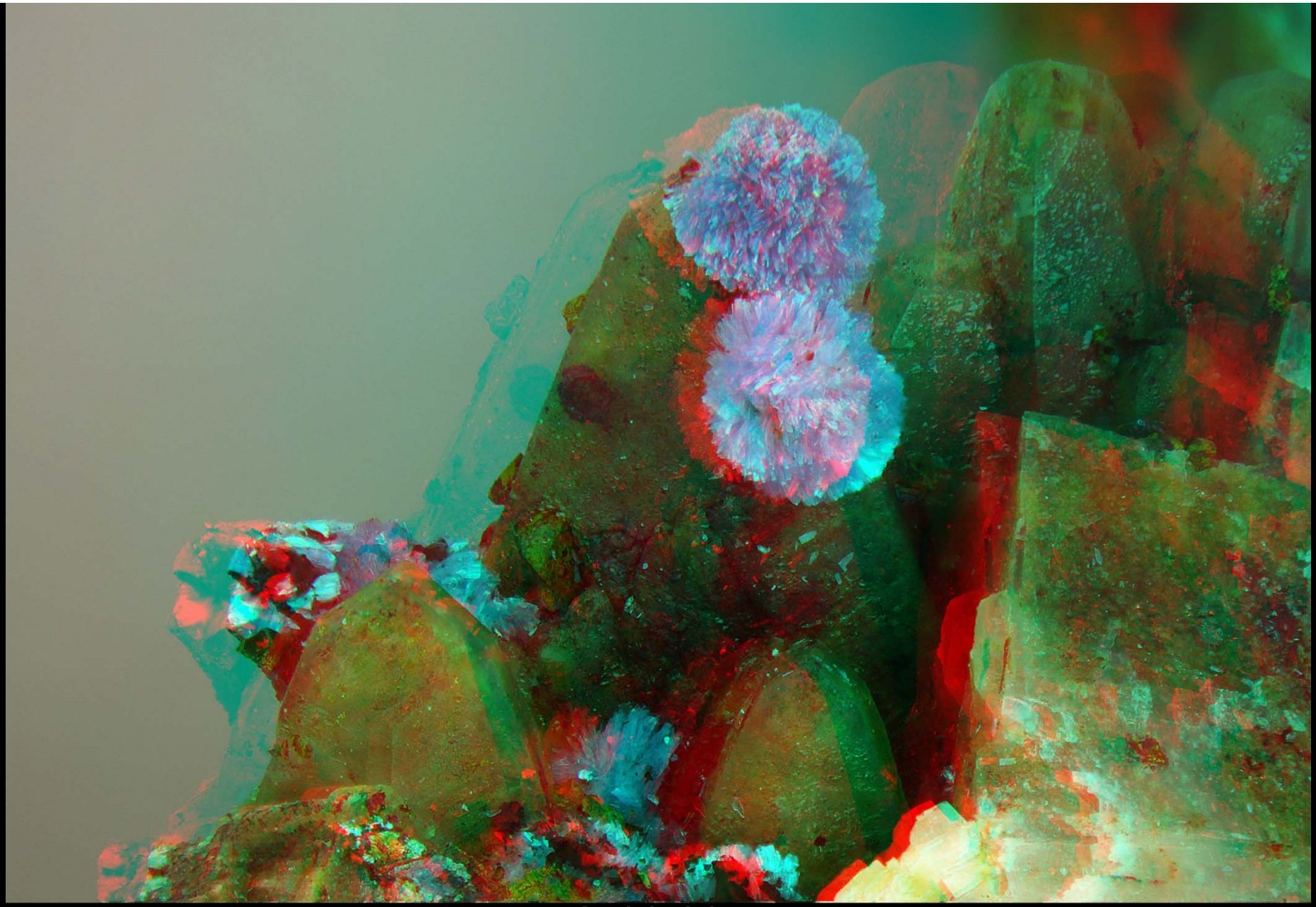
Greenish yellow crystals on blue-grey scorodite $[Fe^{3+}(AsO_4) \cdot 2H_2O]$

Hingston Down Consols (Hitchins Shaft dumps), Gunnislake, near Tavistock, Cornwall.

Specimen: Peter Golley collection, No. 1593. 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 117 and 113 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker



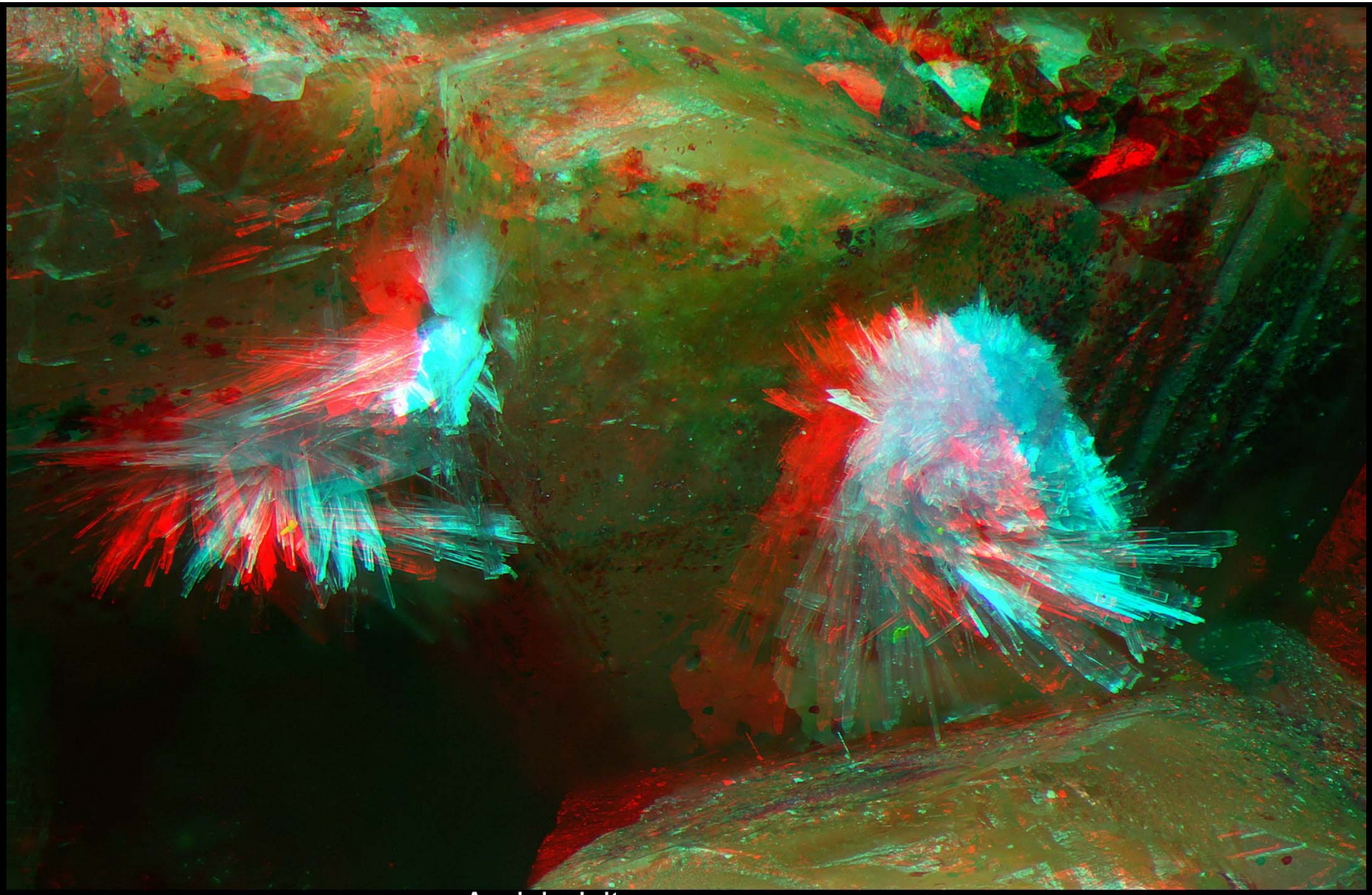
1 mm

Aurichalcite

on dog-tooth calcite. Wet Grooves Mine, Wensleydale.

Field width 15 mm

Specimen: David McCallum collection. Photography: John Chapman.
Carl Zeiss SV8 stereomicroscope with f=125 mm objective and at 1.2x zoom.



Aurichalcite $[(Zn,Cu)_5(CO_3)_2(OH)_6]$

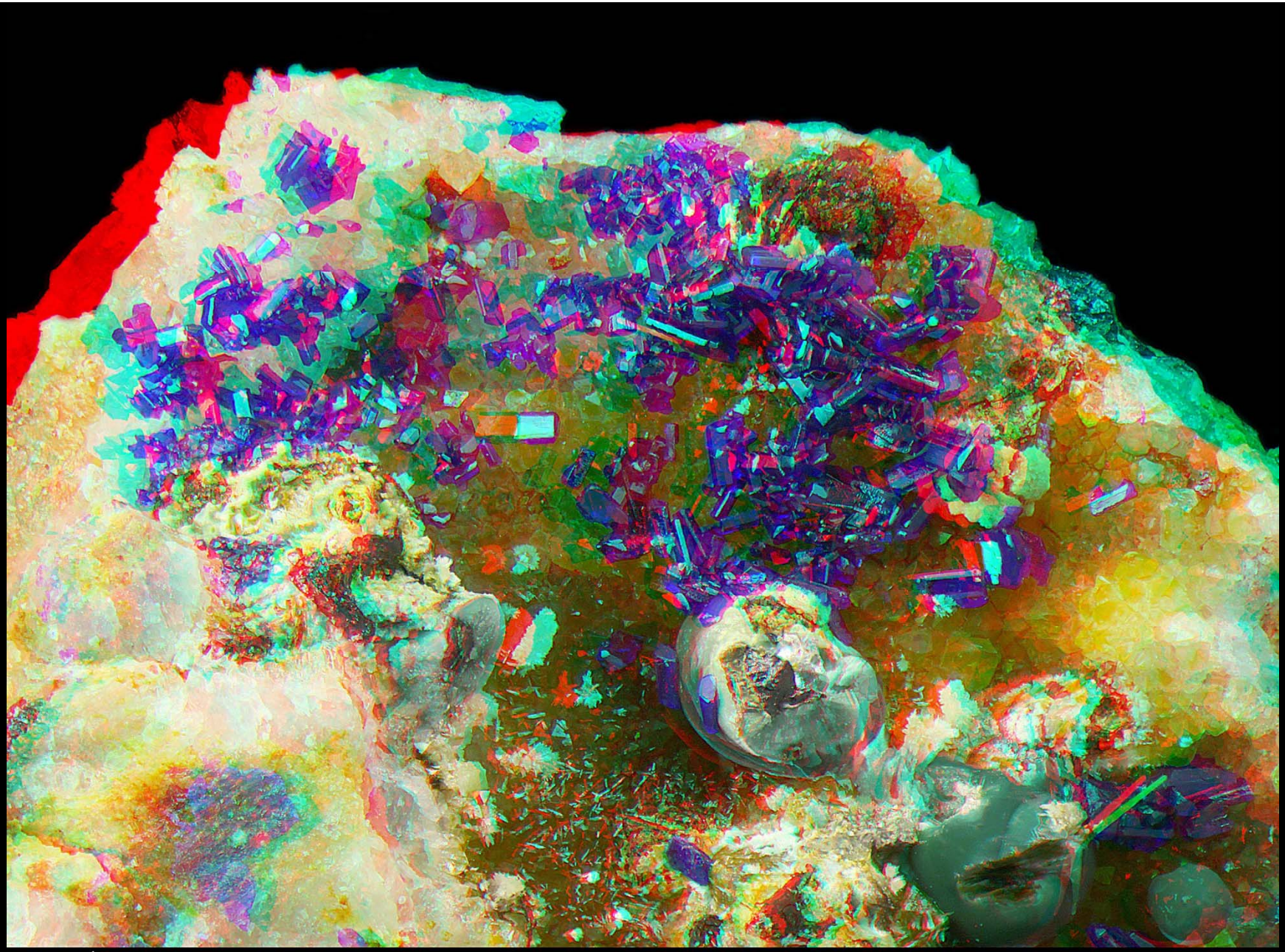
Blue-green transparent laths of orthorhombic system forming loose radiating spherulites on calcite dog-tooth crystal.

1 mm

Wet Grooves Lead Mine, Wensleydale, North Yorkshire. Field width 6.7 mm.

Specimen: found by David McCallum underground, and in David McCallum collection. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) SV8 stereomicroscope with f=125 mm objective, with Schott cold light source fibre optic illumination.



1 mm

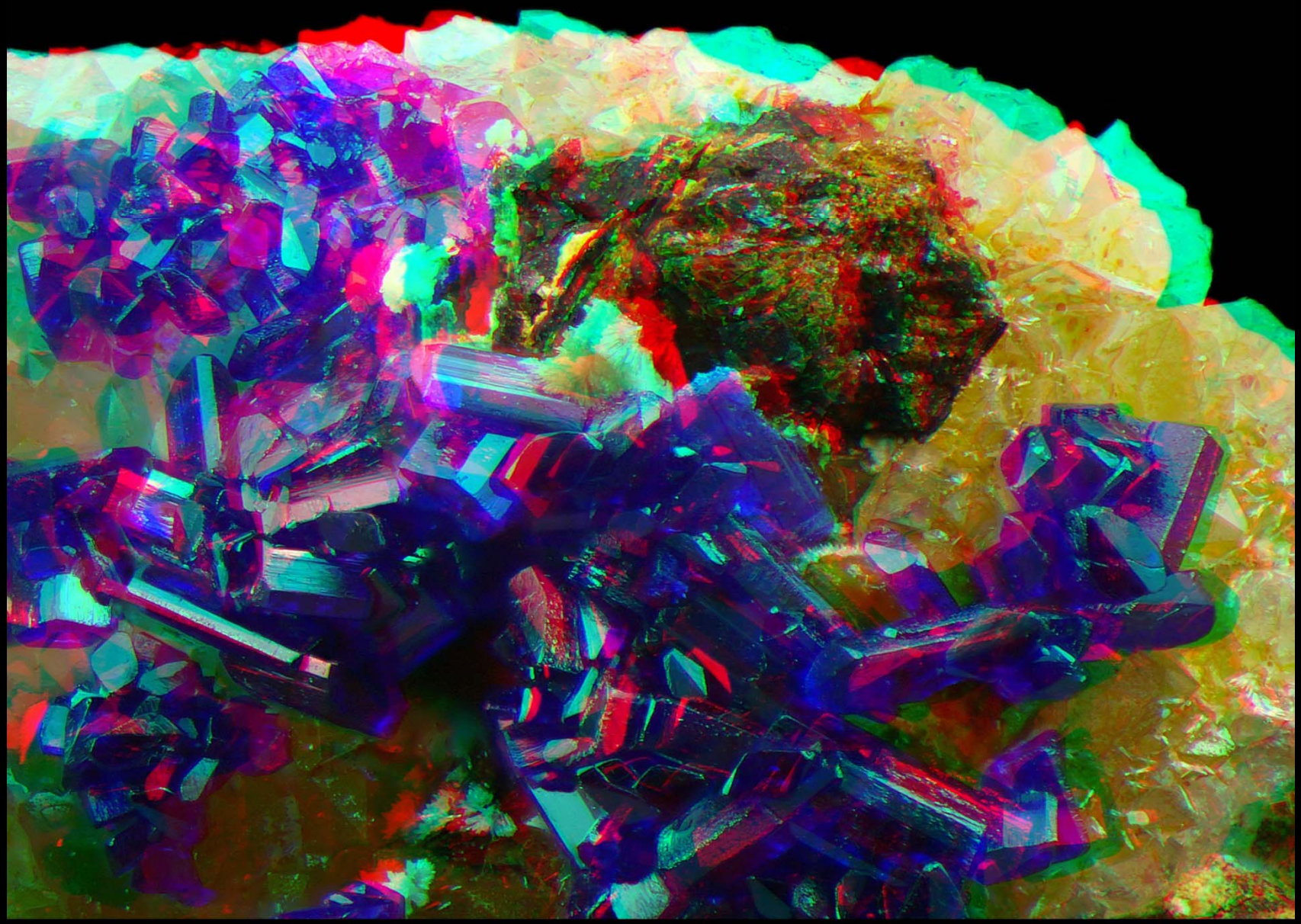
Azurite $Cu_3(CO_3)_2(OH)_2$

Field width 12.2 mm

Well formed euhedral blocky crystals overgrowing malachite spherulites. Murton Mine, Scordale, Cumbria.

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

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 2.0x zoom, with Schott fibre optic lighting.



1 mm

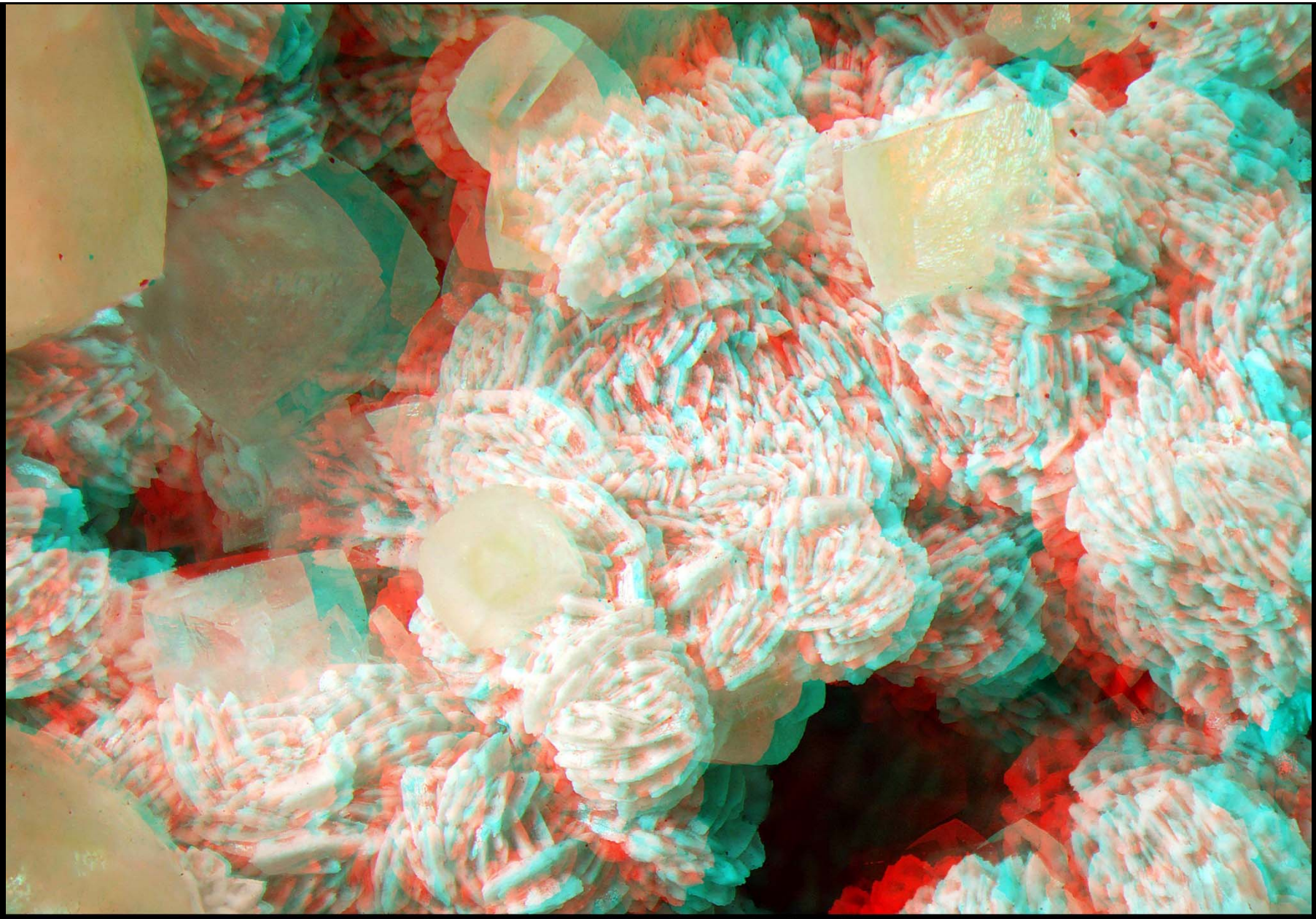
Azurite $Cu_3(CO_3)_2(OH)_2$

Field width 3.5 mm

Well formed euhedral blocky crystals overgrowing malachite spherulites. Murton Mine, Scordale, Cumbria.

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

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=100 mm objective lens and 6.4x zoom, with Schott fibre optic lighting.

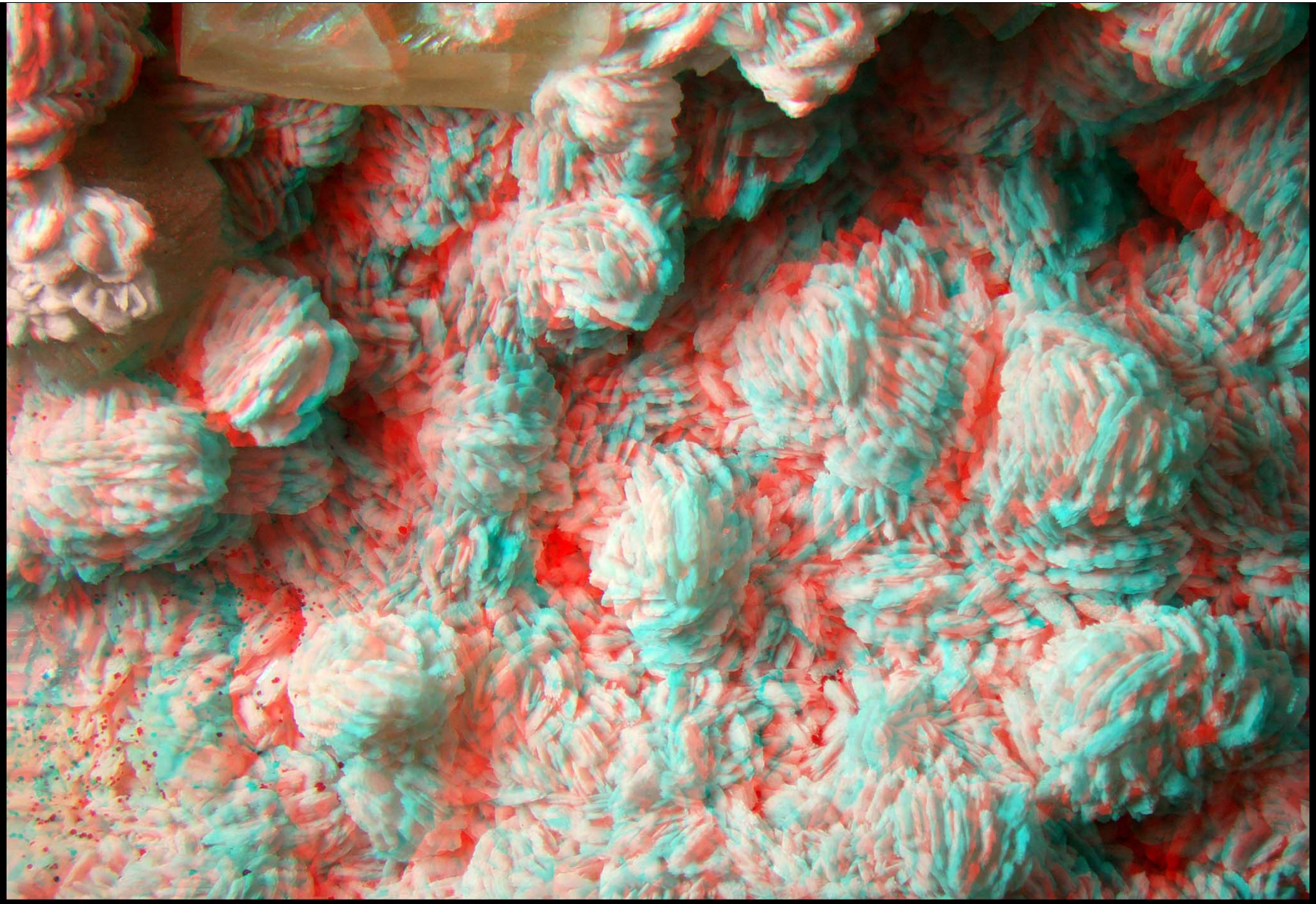


1 mm

Baryte and rhombohedral calcite

Field width 17.0 mm

The baryte has formed ball-like aggregates of variegated crystals and the pale brown calcite crystals tend toward a more cubic shape.
Evaporite formation on magnesian limestone at Tenter Hill A1/M1 upgrading works, Bramham, northeast of Leeds, West Yorkshire.
Specimen: formerly in Michael E. Smith collection and now in Steve Warren collection No. 06/320. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 1.6x zoom, with LED lamp illumination.



1 mm

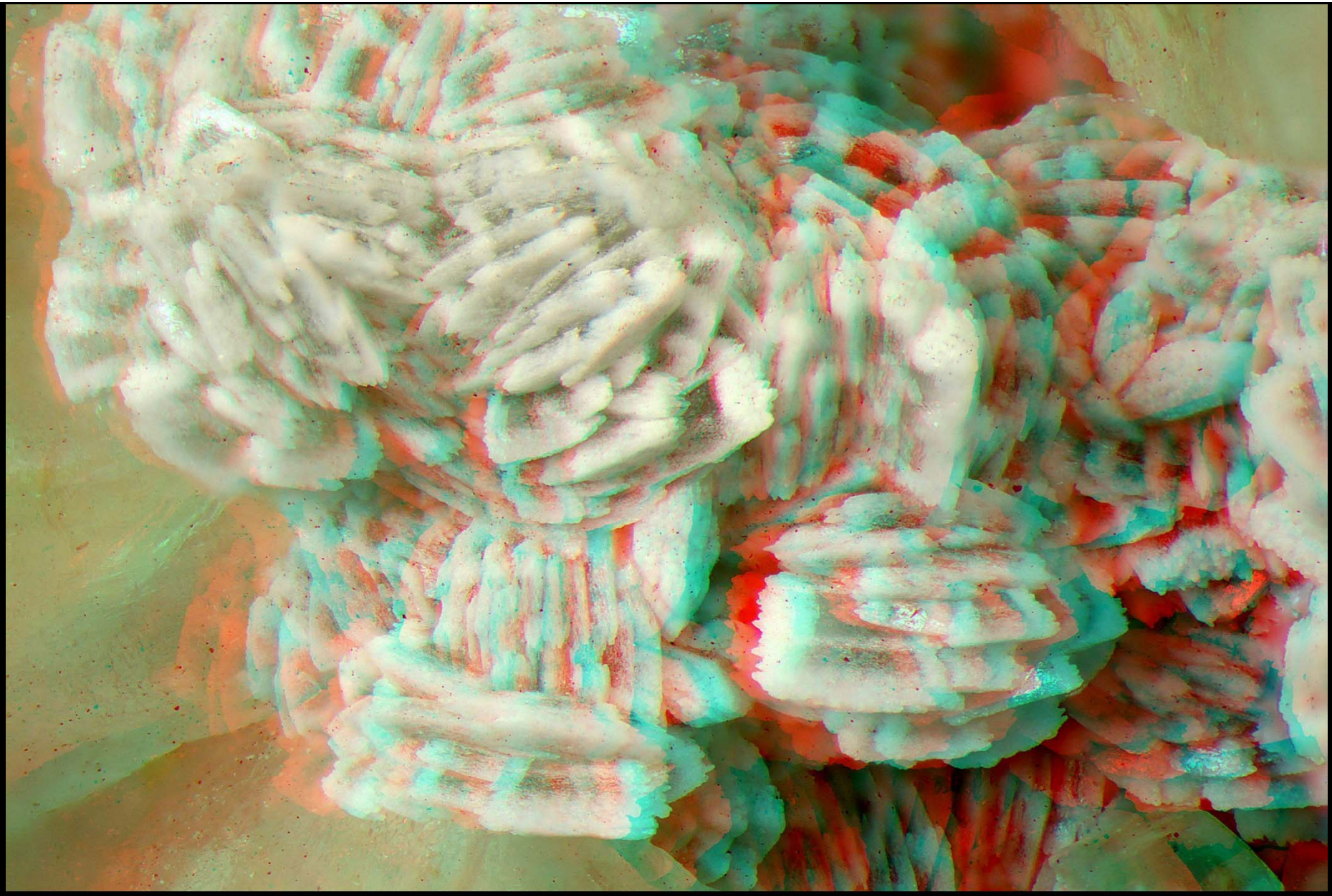
Baryte $BaSO_4$

Field width 26.0 mm

Nodular aggregates of serrated white crystals, with pale brown rhombohedral calcite. Evaporite formation on magnesian limestone at Tenter Hill A1/M1 upgrading works, Bramham, northeast of Leeds, West Yorkshire.

Specimen: formerly in Michael E. Smith collection and now in Steve Warren collection, No. 06/320. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 1.0x zoom, with LED lamp lighting.



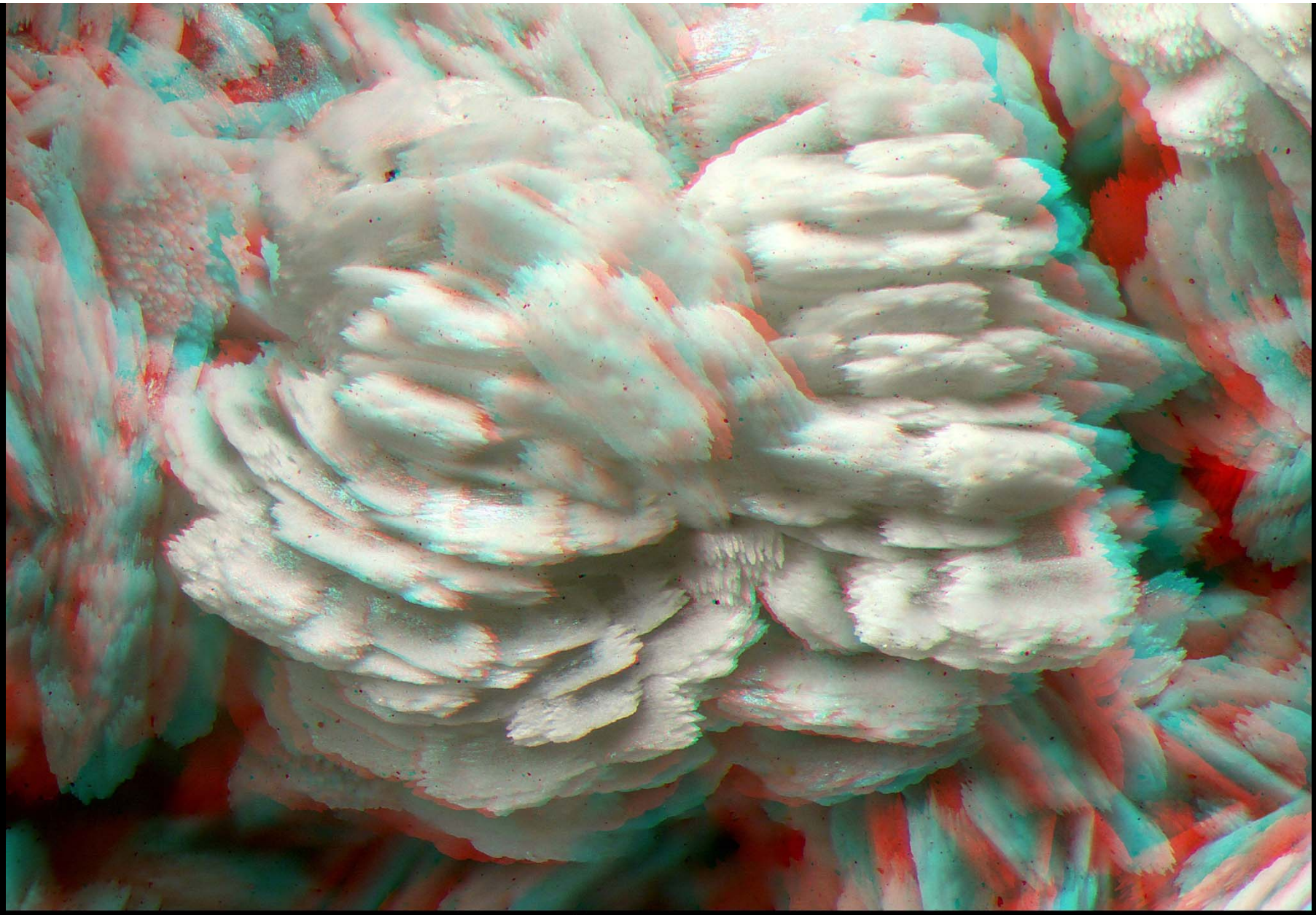
1 mm

Baryte $BaSO_4$

Field width 6.7 mm

Tabular baryte crystals in spheroidal formation with a white late-stage saw-tooth overgrowth of baryte preferentially deposited on pyramid faces. Evaporite formation on magnesian limestone at Tenter Hill A1/M1 upgrading works, Bramham, West Yorkshire. Specimen: formerly in Michael E. Smith collection and now in Steve Warren collection No. 06/320. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 4.0x zoom, with LED lamp illumination.

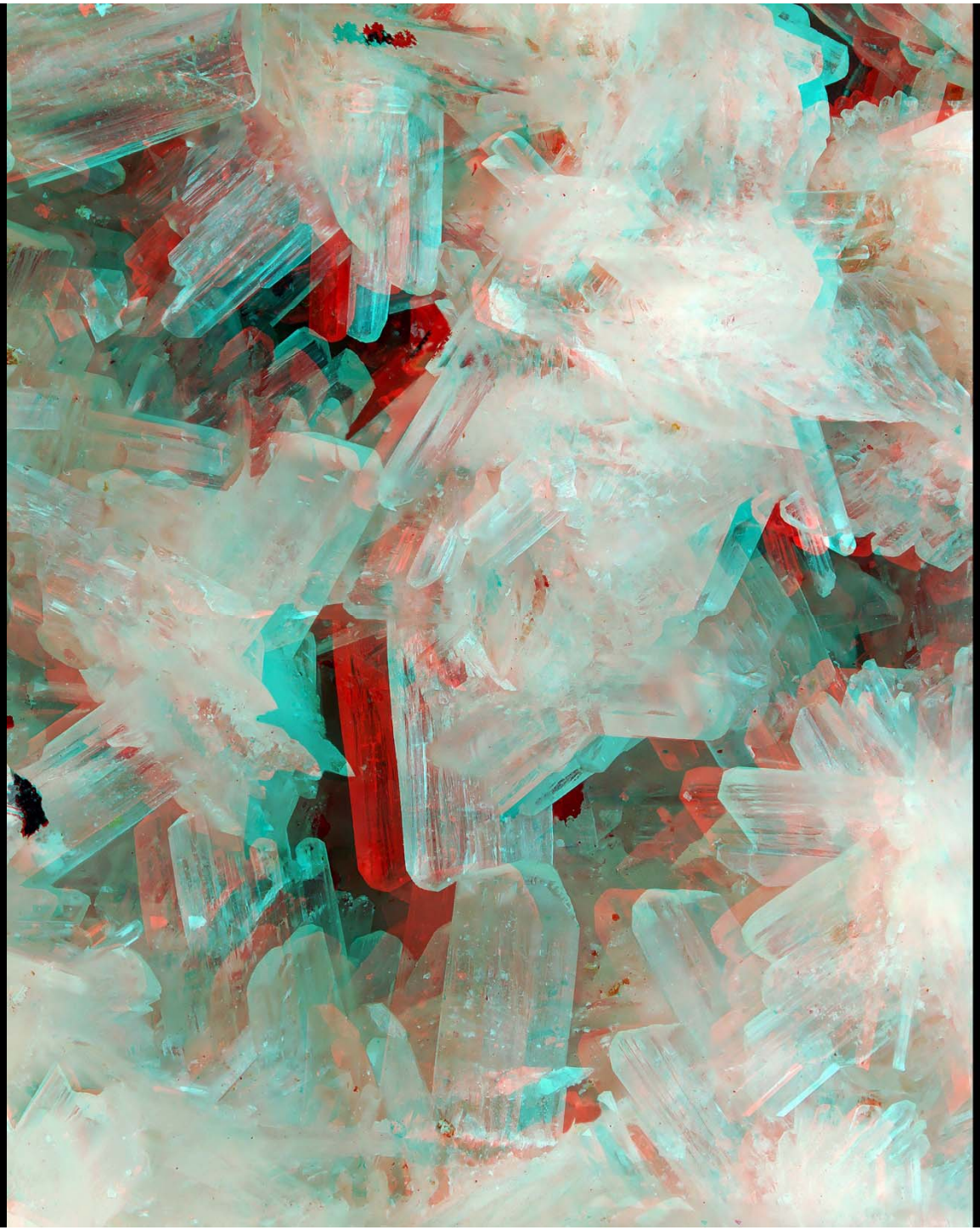


1 mm

Baryte $BaSO_4$ (from pale-coloured corner) Field width 6.7 mm

Tabular baryte crystals in spheroidal formation with a white late-stage saw-tooth overgrowth of baryte preferentially deposited on pyramid faces. Evaporite formation on magnesian limestone at Tenter Hill A1/M1 upgrading works, Bramham, West Yorkshire. Specimen: formerly in Michael E. Smith collection and now in Steve Warren collection No. 06/320. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 4.0x zoom, with LED lamp illumination.



Barytocalcite $BaCa(CO_3)$

Bladed monoclinic crystals.

Buckden Gavel Mine SD 9554 7814, Buckden, Wharfedale,
North Yorkshire.

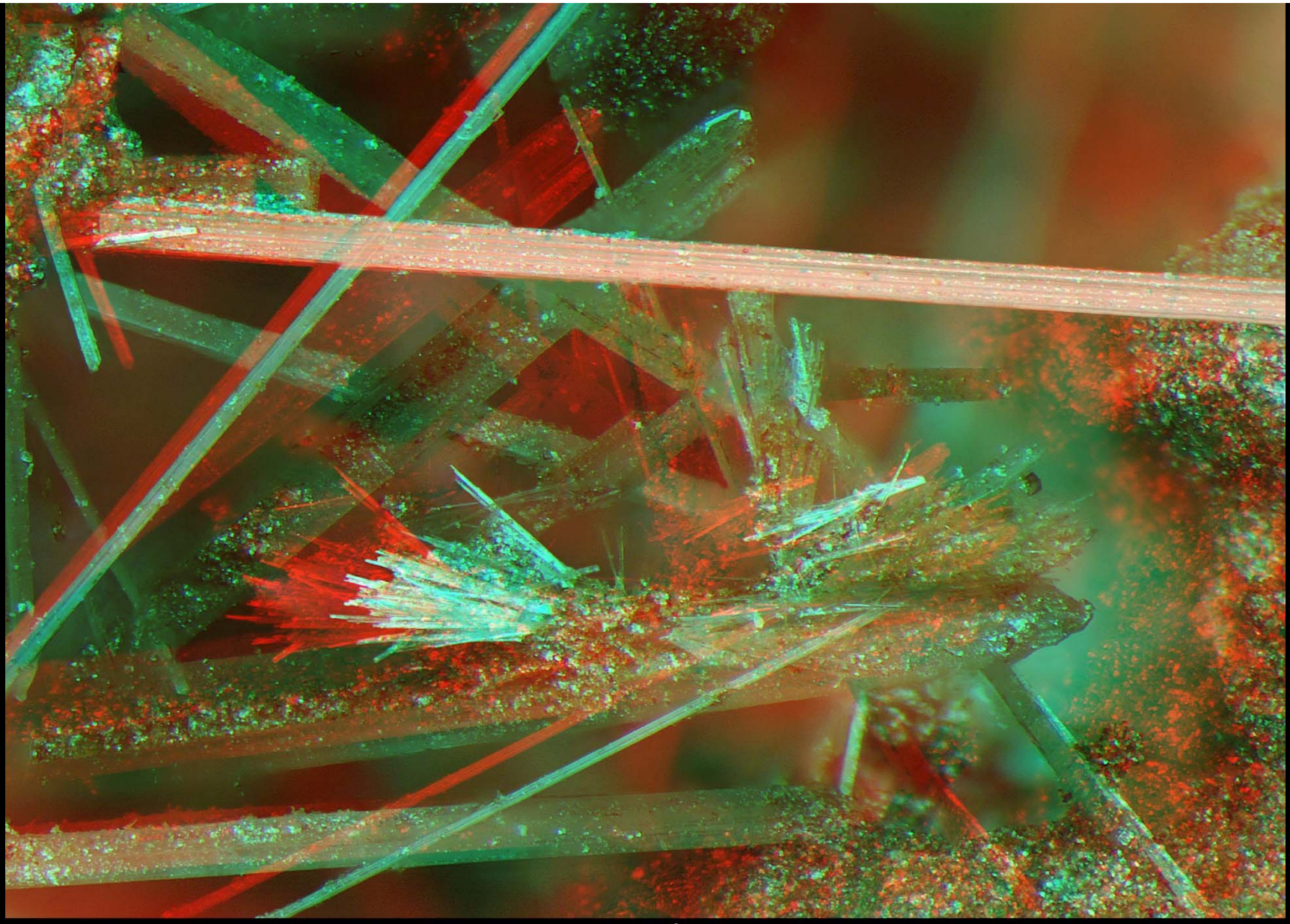
Specimen: David Green collection, collected by David Green Feb 1991.

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 115 and 110 70-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 9.54 mm.



1 mm

Beaverite-Cu $Pb(Fe^{3+}_2Cu)(SO_4)_2(OH)_6$

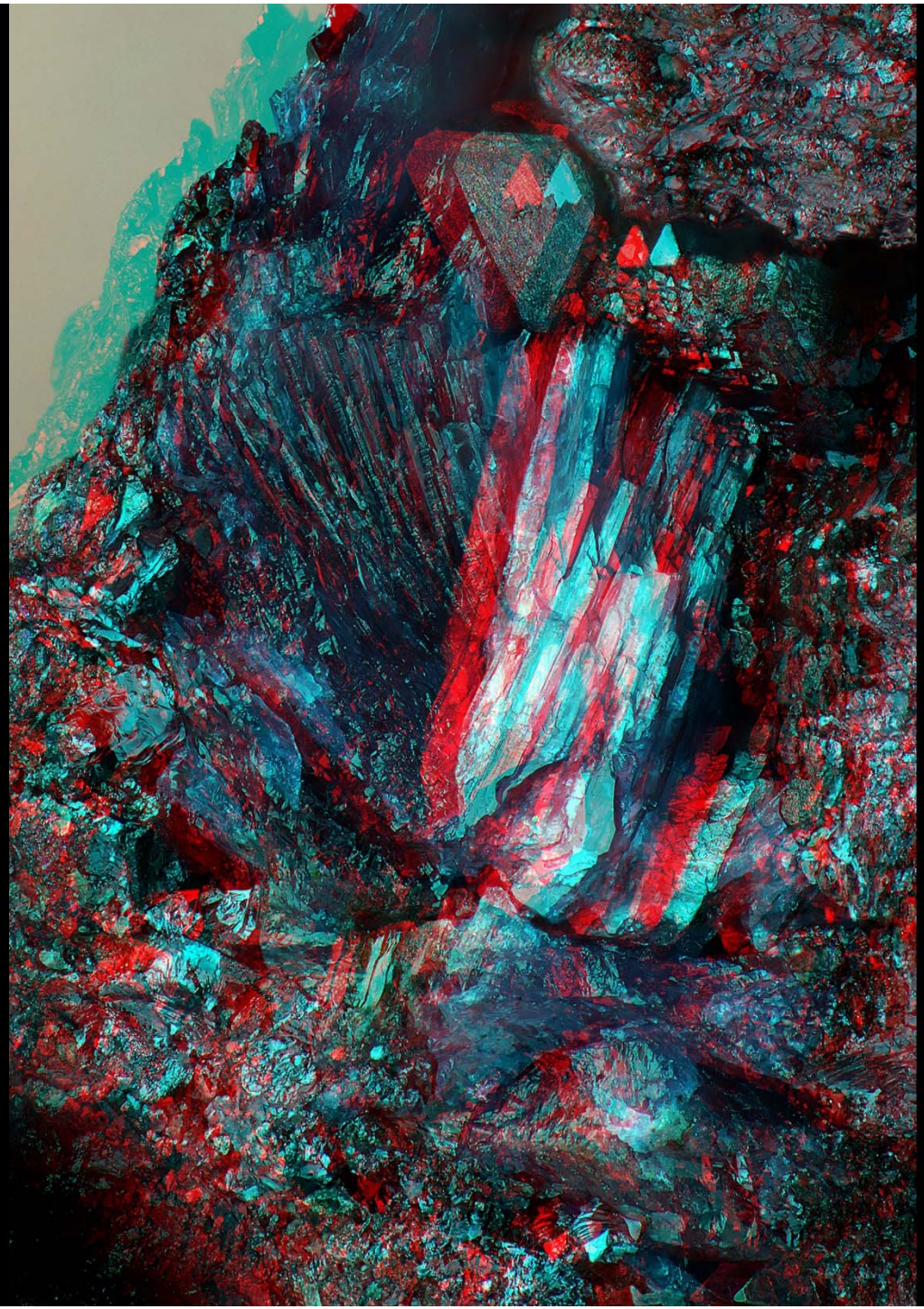
Field width 3.4 mm

on cerussite ‘jackstraw’ crystals on which malachite crystal groups have formed.

Murton Mine, Scordale, near Appleby, Cumbria.

Specimen: found underground and now in David Green collection no. MT012. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=100 mm objective lens and 6,4x zoom, with Schott fibre optic lighting.



Bobkingite $Cu_5Cl_2(OH)_8 \cdot 2H_2O$

Lamellar monoclinic crystals.

New Cliffe Hill Quarry, Stanton under Bardon,
near Markfield, Leicestershire.

Specimen: from the collection of the late Ken Hodge and now in the Neil Hubbard collection.

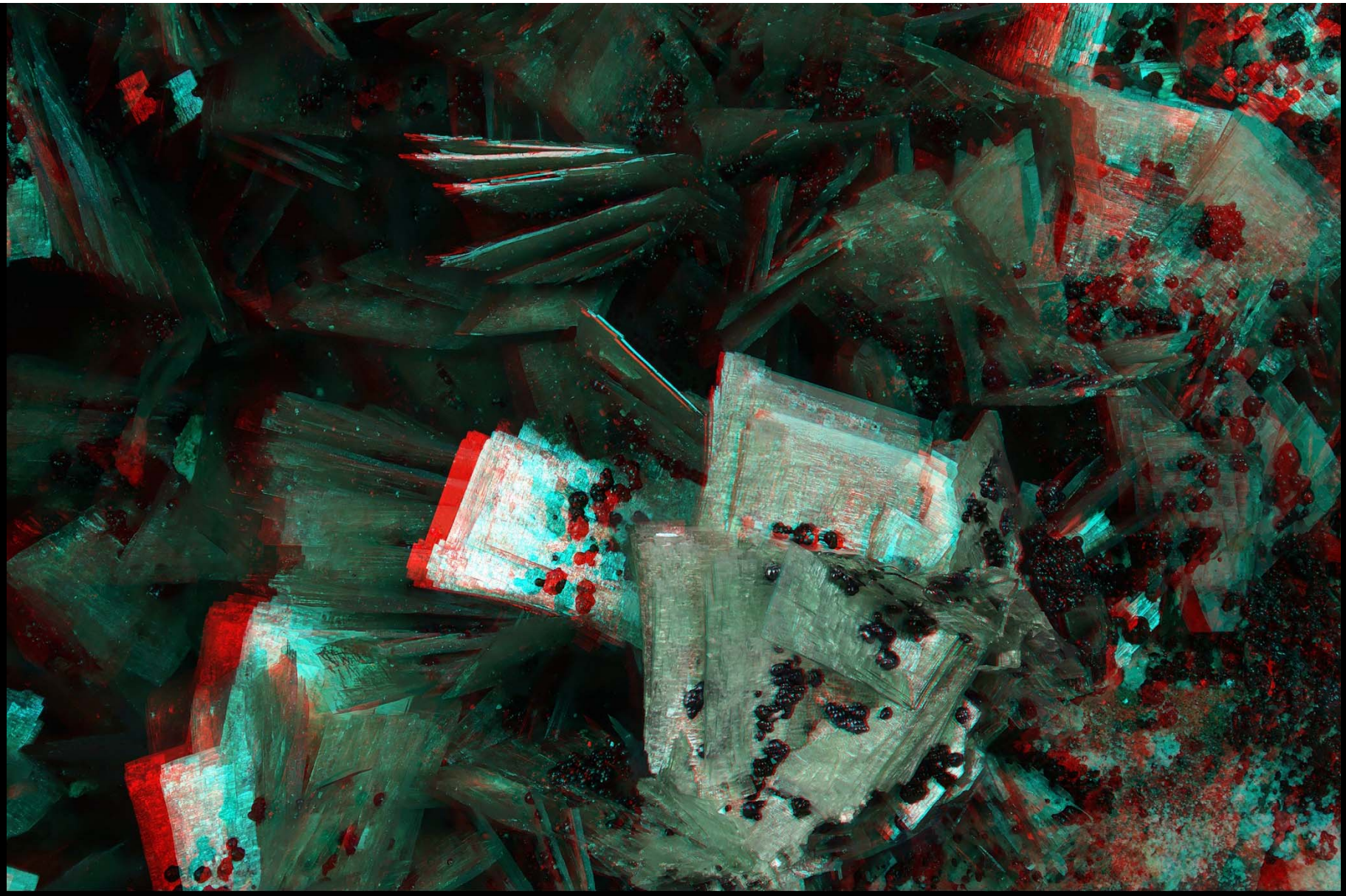
Photography: John Chapman, August 2023.

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

Left + right stacks of 137 and 167 5-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 1.37 mm.



1 mm

Botallackite $Cu_2Cl(OH)_3$

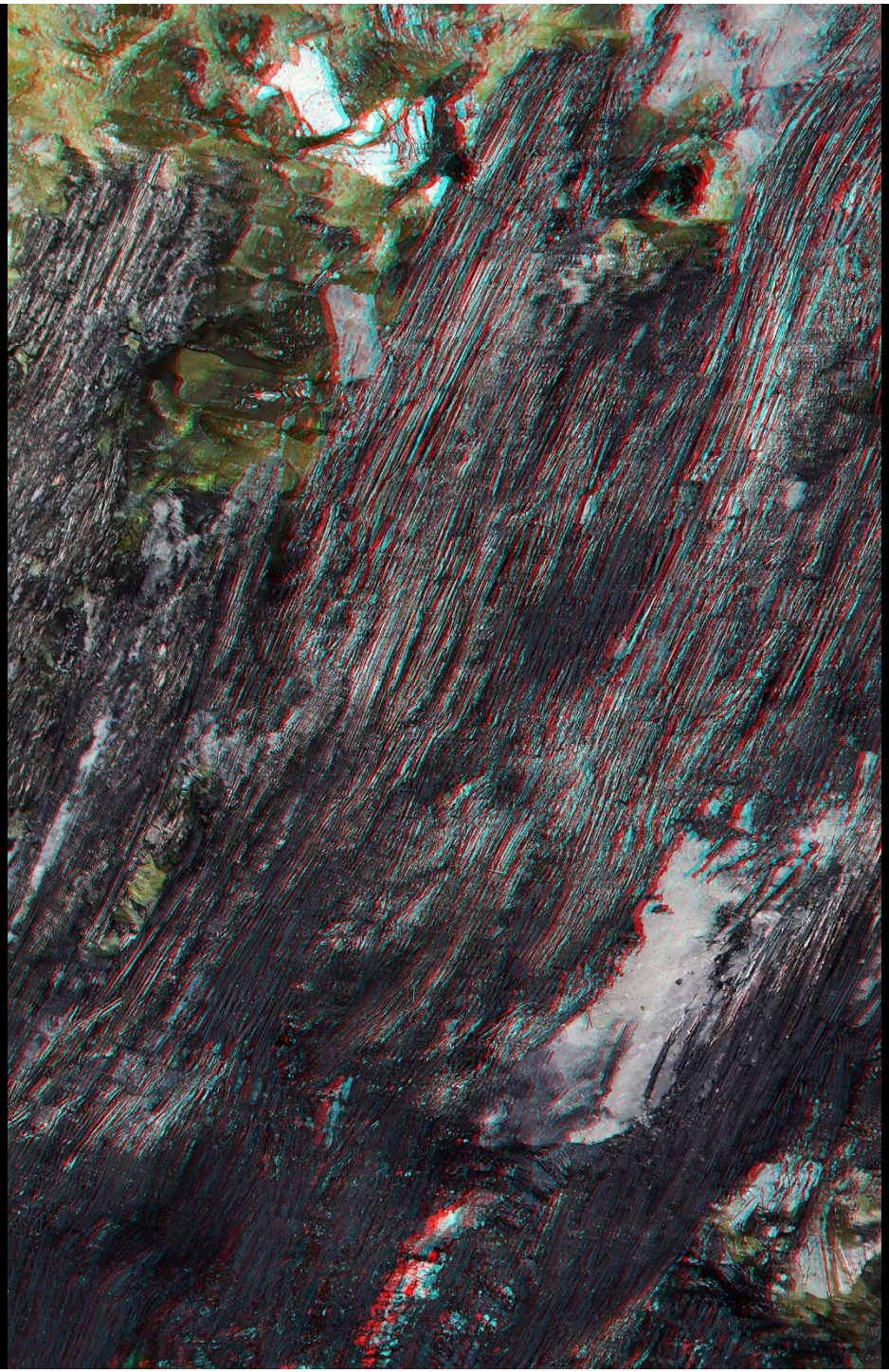
Field width 6.63 mm.

Sub-parallel platy crystal groups with spherulitic goethite.

From the beach below Cligga Mine, Perranzabuloe, Cornwall.

Specimen: Julie Green collection. Photography: John Chapman.

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 129 and 153 30-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Boulangerite $Pb_5Sb_4S_{11}$

Oriented and foliated acicular formation in fracture in brecciated carbonate matrix, with yellow sphalerite. Said to be one of only two specimens.

(Mogul Mine) Silvermines, Co. Tipperary, Ireland. Reportedly found in feeder veins near "silver chamber" (Stephen Moreton pers. comm.).

Specimen: collected by the mine geologist and in David Green collection via Richard Bateman.

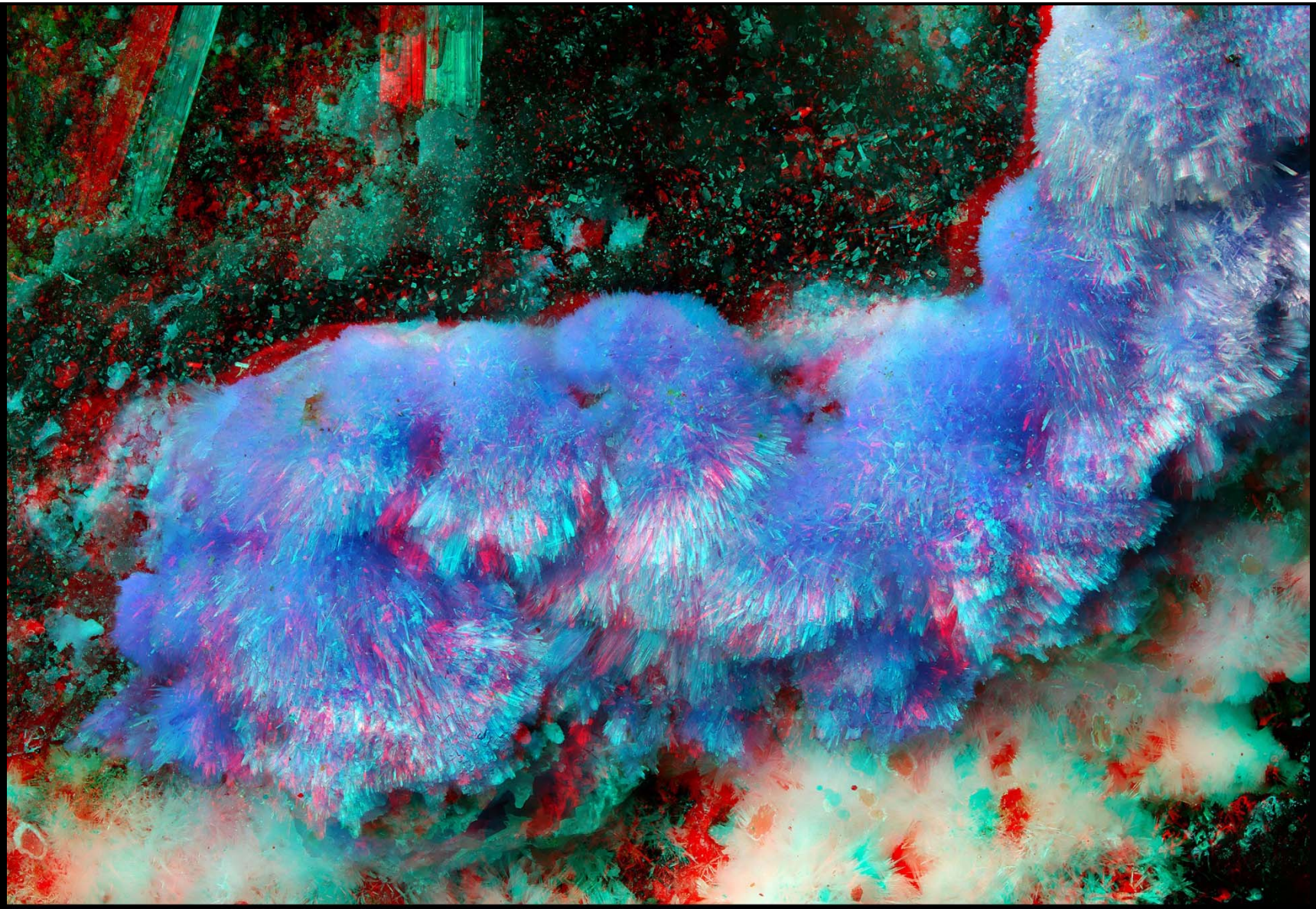
Photography: John Chapman, January 2024.

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 48 and 56 60-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 13.3 mm.



1 mm

Bridgesite-(Ce) $CaCe_2Cu_6(SO_4)_4(OH)_{12}.8H_2O$

Field width 4.14 mm.

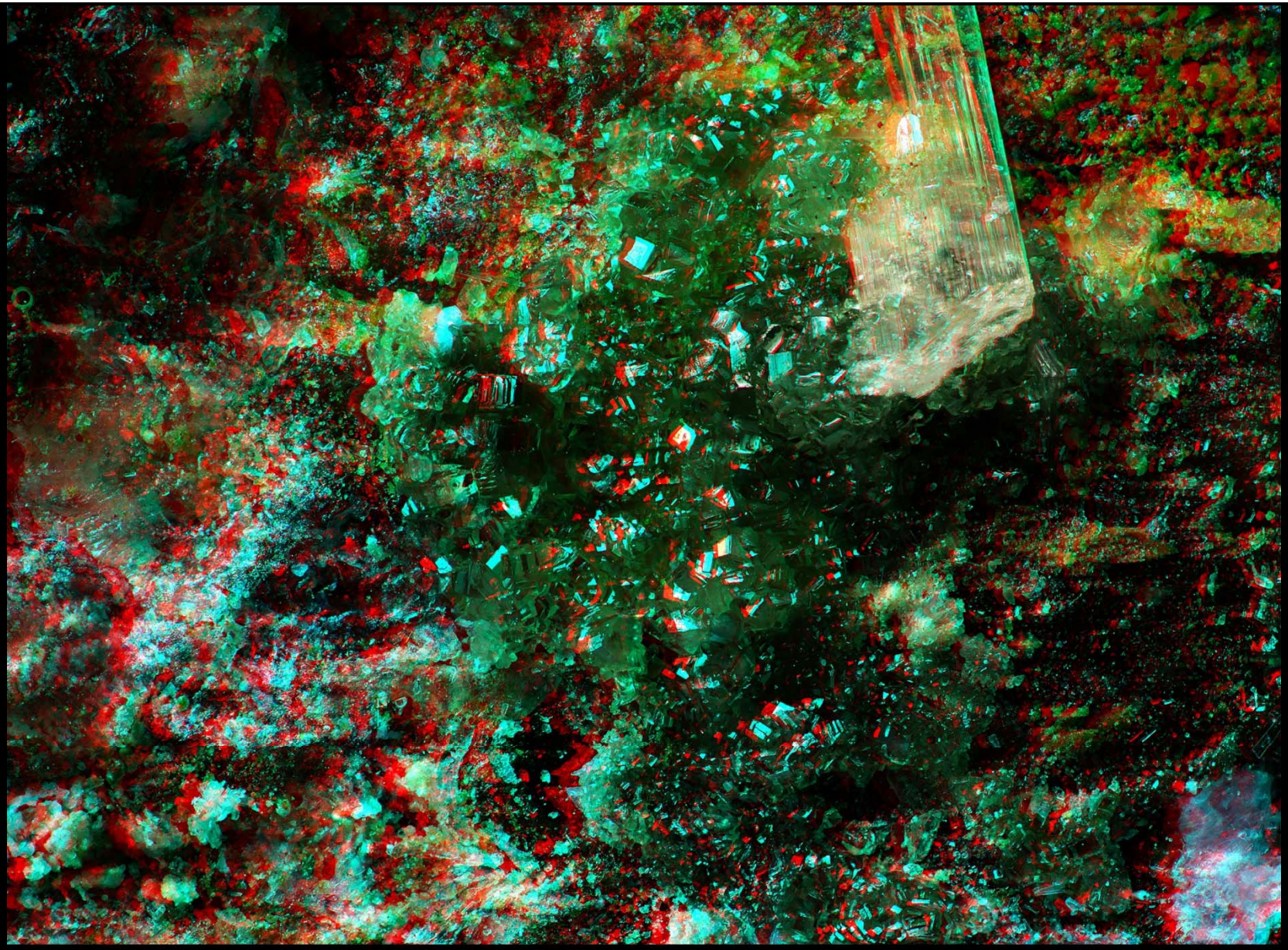
Sky blue acicular crystals giving a silky appearance with (from top to bottom) colourless gypsum, drusy dark green brochantite, white acicular aragonite and minor green malachite.

Post-mining formations from copper-rich water falling on limestone, Dryburn and Washpool flats, Tynebottom Mine, Garrigill, Cumbria

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

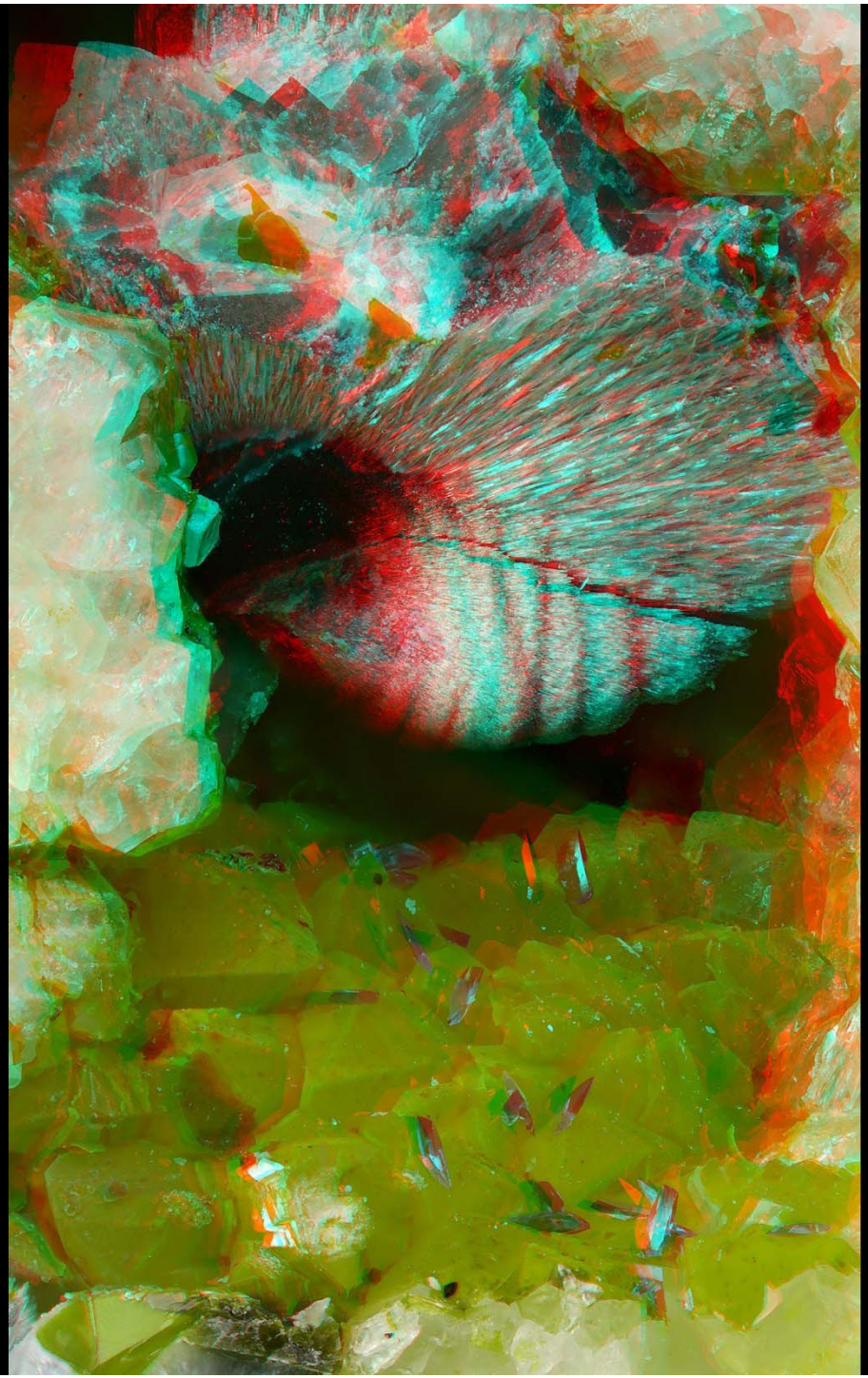
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 140 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 136 and 158 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm 1 mm **Brochantite** $Cu_4(SO_4)(OH)_6$ Field width 1.96 mm.

Platy post-mining crystals, some thick hexagons, produced by copper-rich water dripping on to limestone.
Dryburn and Washpool flats, Tynebottom Mine, Garrigill, Cumbria, on same specimen as bridgesite.
Specimen: David Green collection. Photography: John Chapman, July 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 78 and 82 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined n CombineZM.



Brochantite $Cu_4(SO_4)(OH)_6$

Transparent emerald green monoclinic crystals
having curved faces,
with malachite, baryte and quartz.

Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection.

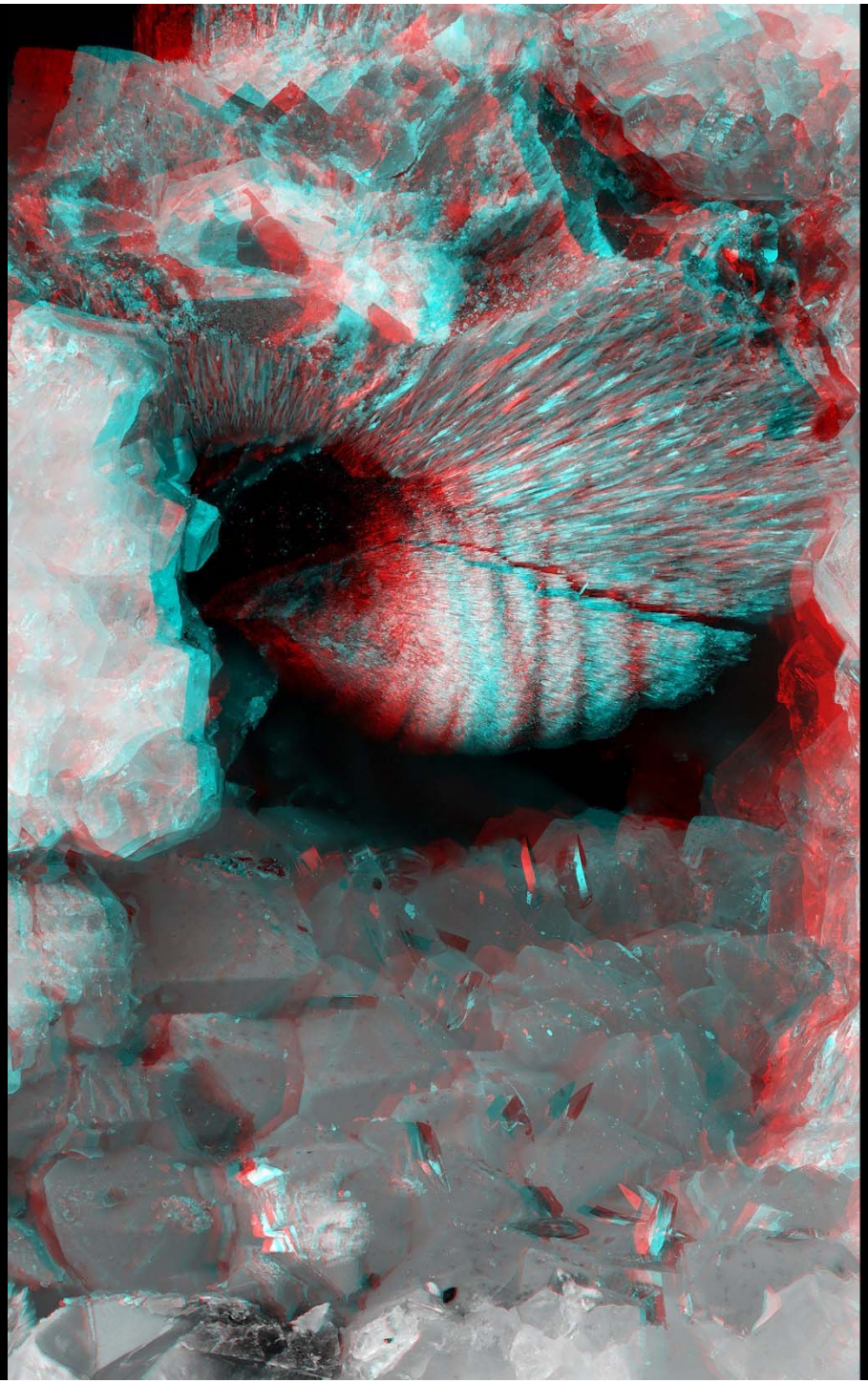
Photography: John Chapman, September 2023.

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 135 and 122 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 3.71 mm.



Brochantite $Cu_4(SO_4)(OH)_6$

Transparent emerald green monoclinic crystals
having curved faces,
with malachite, baryte and quartz.

Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection.

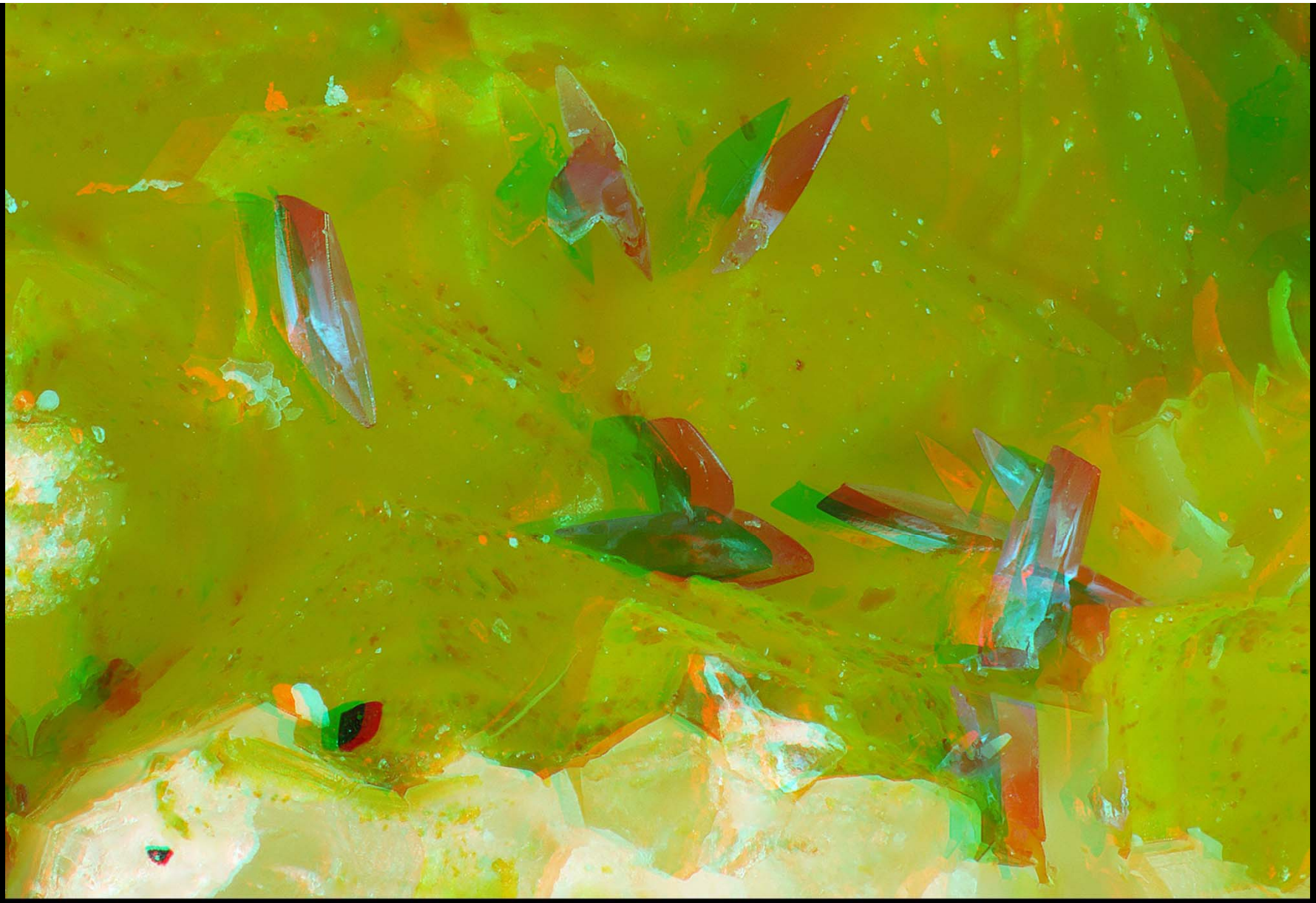
Photography: John Chapman, September 2023.

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 135 and 122 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 3.71 mm.



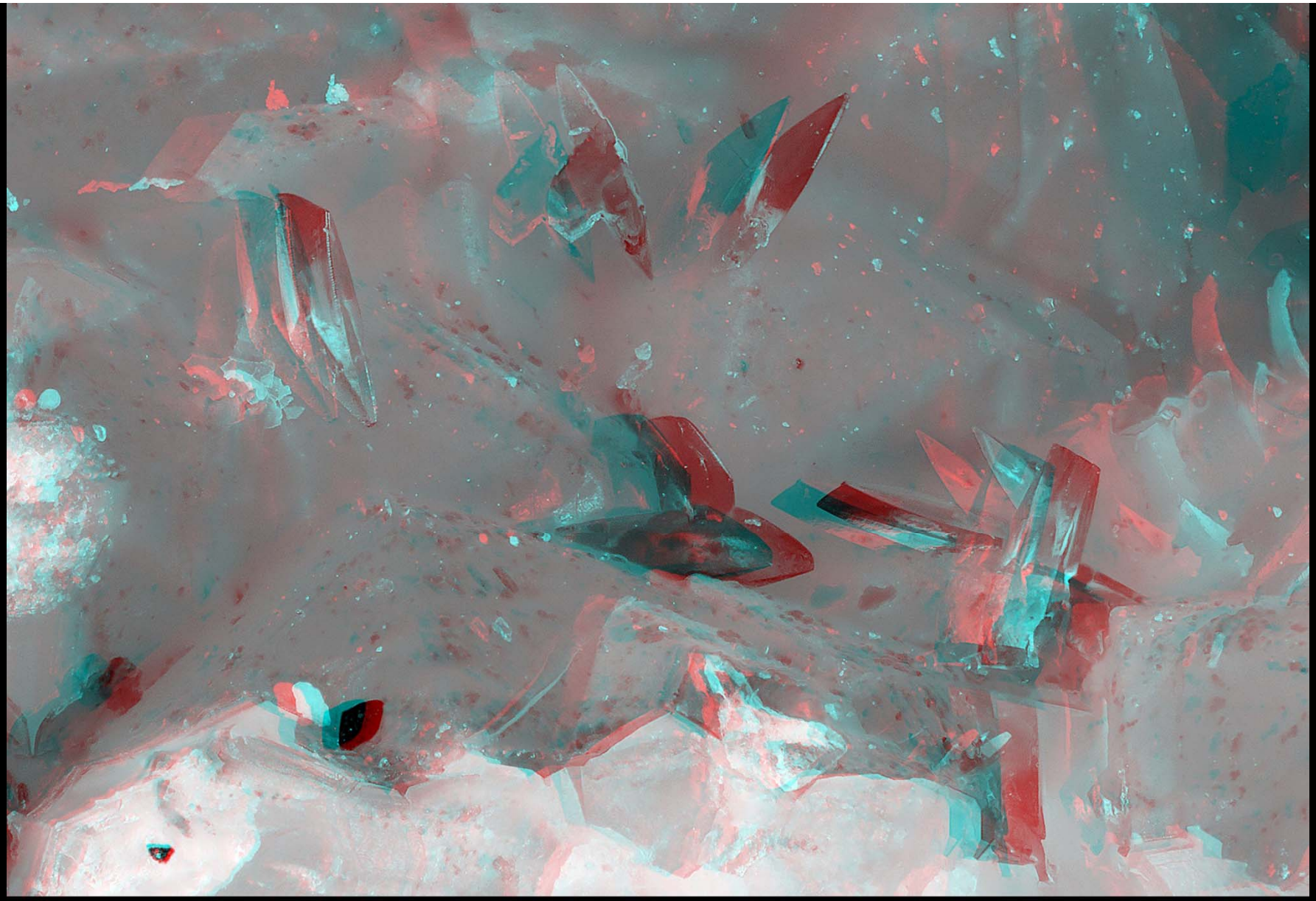
0.1 mm

Brochantite $Cu_4(SO_4)(OH)_6$

Field height 0.825 mm.

Transparent emerald green monoclinic crystals having curved faces, with malachite, baryte and quartz.
Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection. Photography: John Chapman, September 2023.
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 + middle stacks of 199 and 188 1-micrometre steps at 4 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



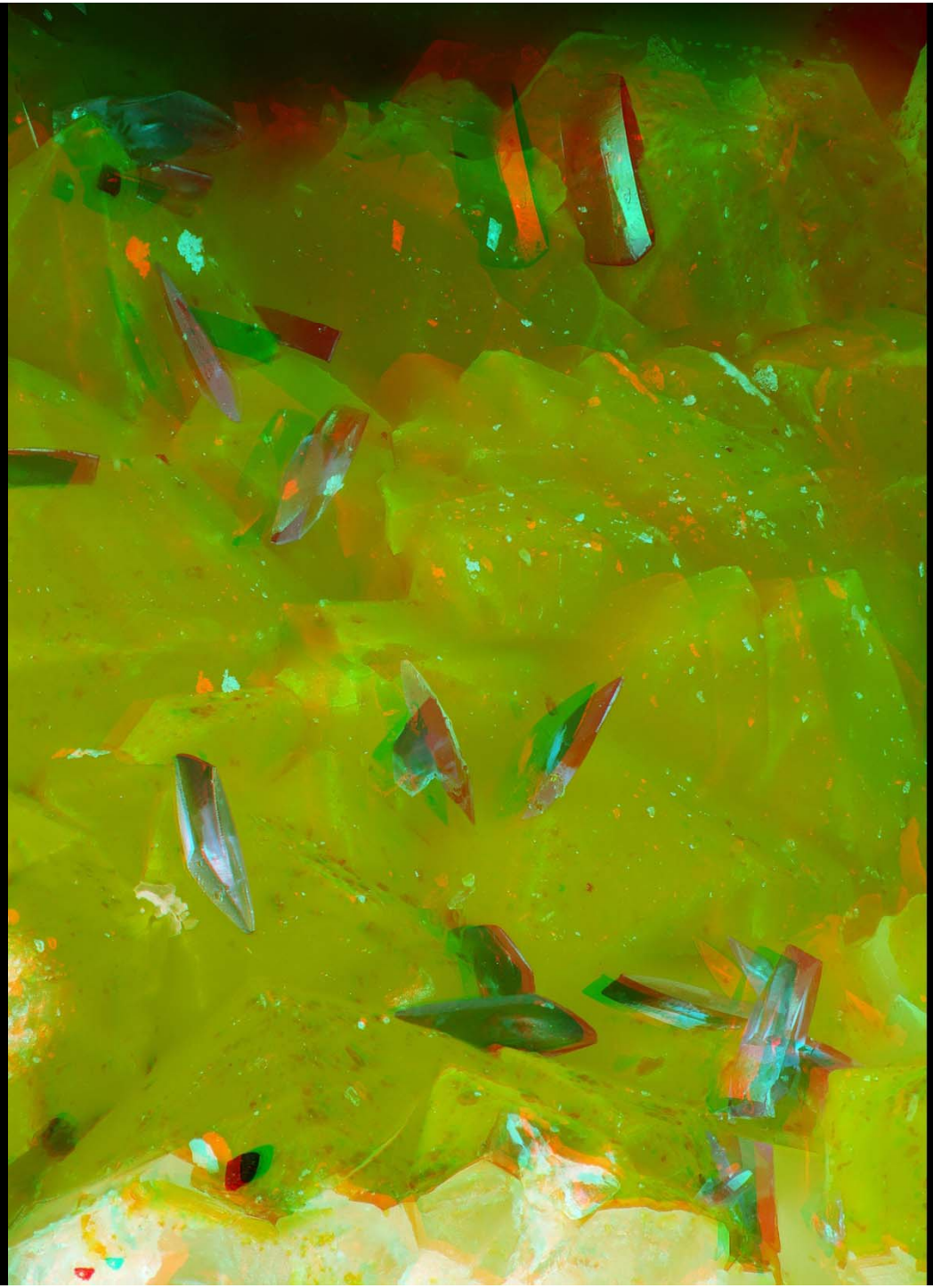
0.1 mm

Brochantite $Cu_4(SO_4)(OH)_6$

Field height 0.825 mm.

Transparent emerald green monoclinic crystals having curved faces, with malachite, baryte and quartz.
Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection. Photography: John Chapman, September 2023.
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 + middle stacks of 199 and 188 1-micrometre steps at 4 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Brochantite $Cu_4(SO_4)(OH)_6$

Transparent emerald green monoclinic crystals
having curved faces,
with malachite, baryte and quartz.

Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection.

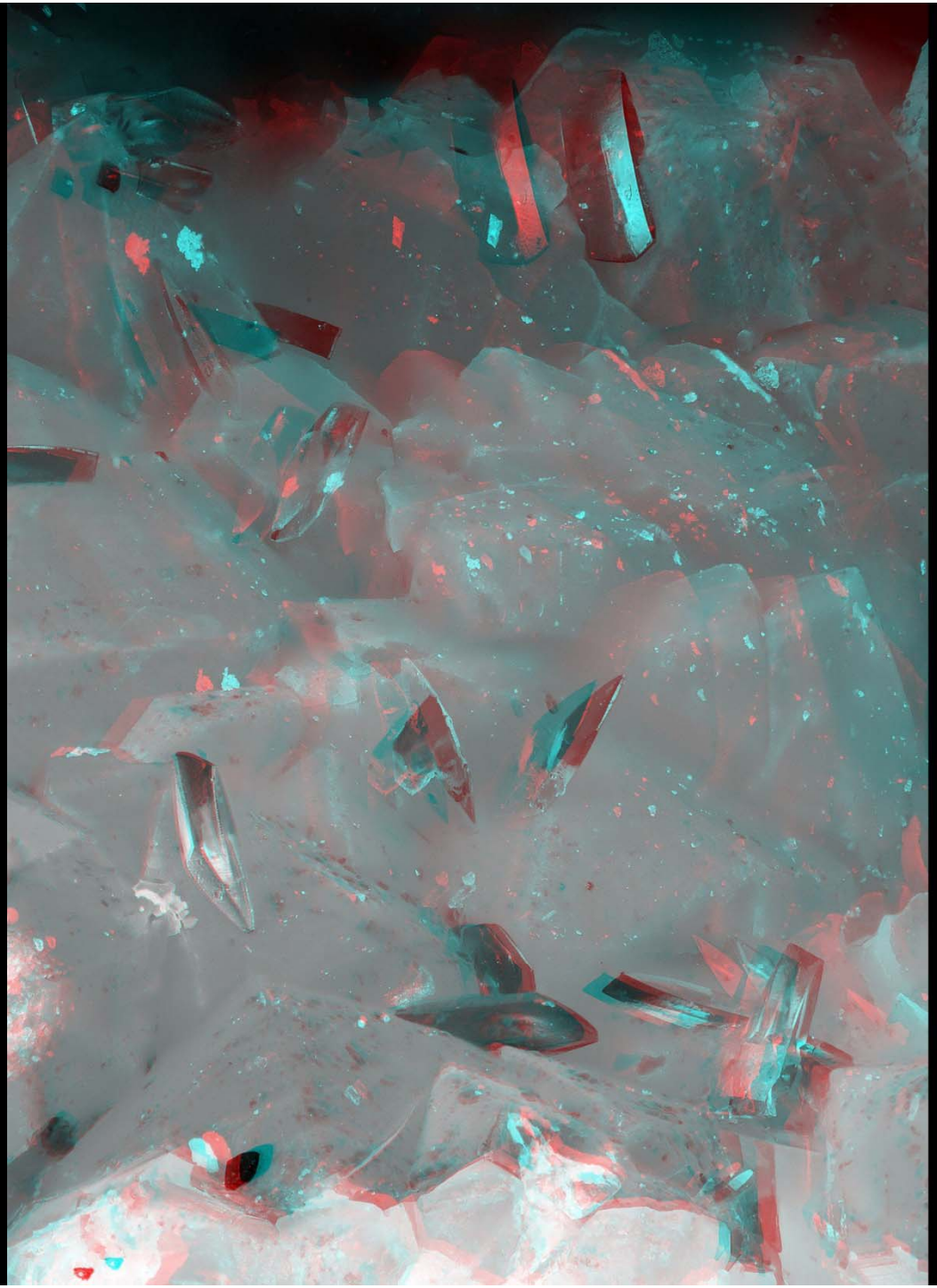
Photography: John Chapman, September 2023.

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 199 and 198 1-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 1.37 mm.



Brochantite $Cu_4(SO_4)(OH)_6$

Transparent emerald green monoclinic crystals
having curved faces,
with malachite, baryte and quartz.

Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection.

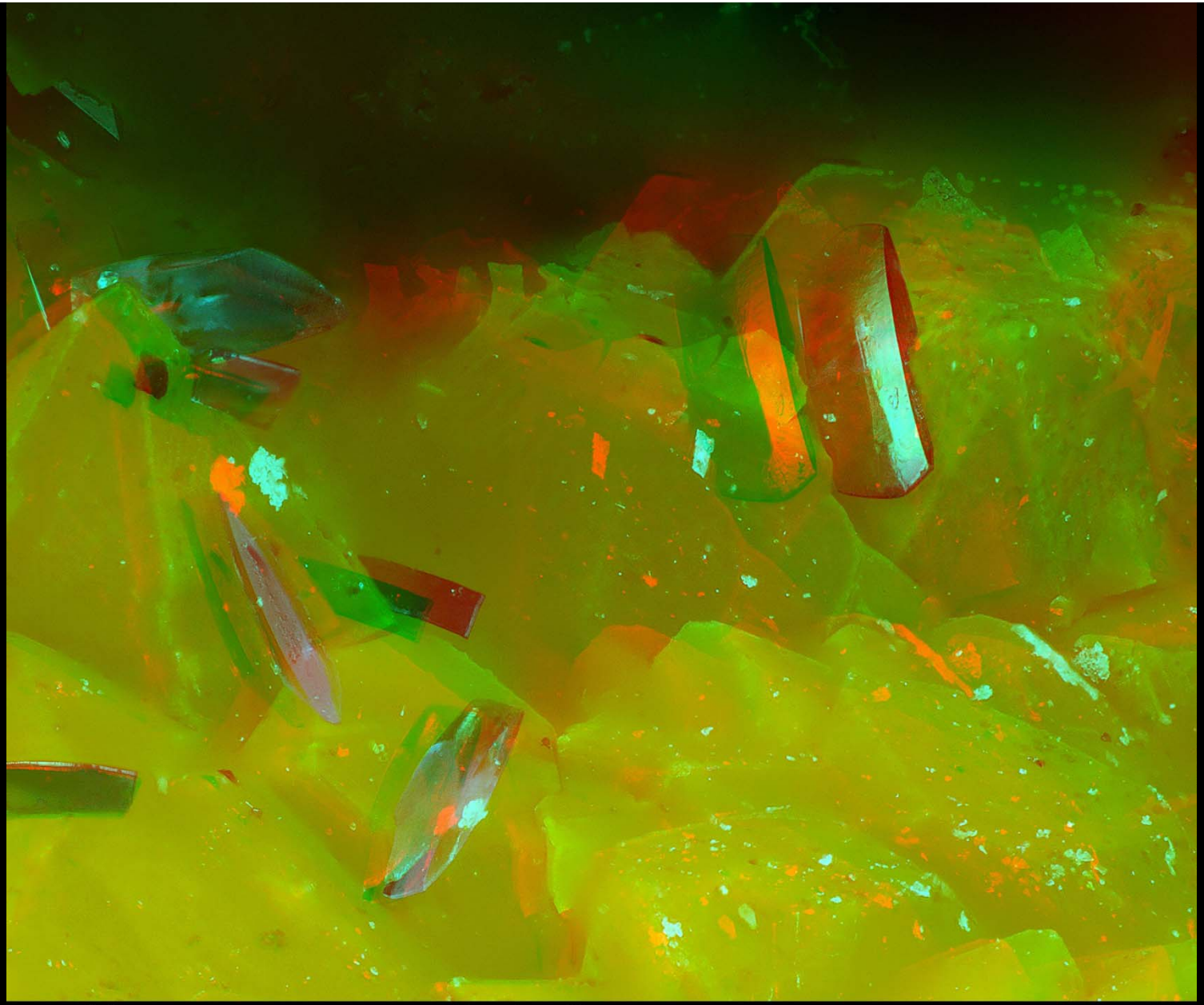
Photography: John Chapman, September 2023.

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 199 and 198 1-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 1.37 mm.



0.1 mm

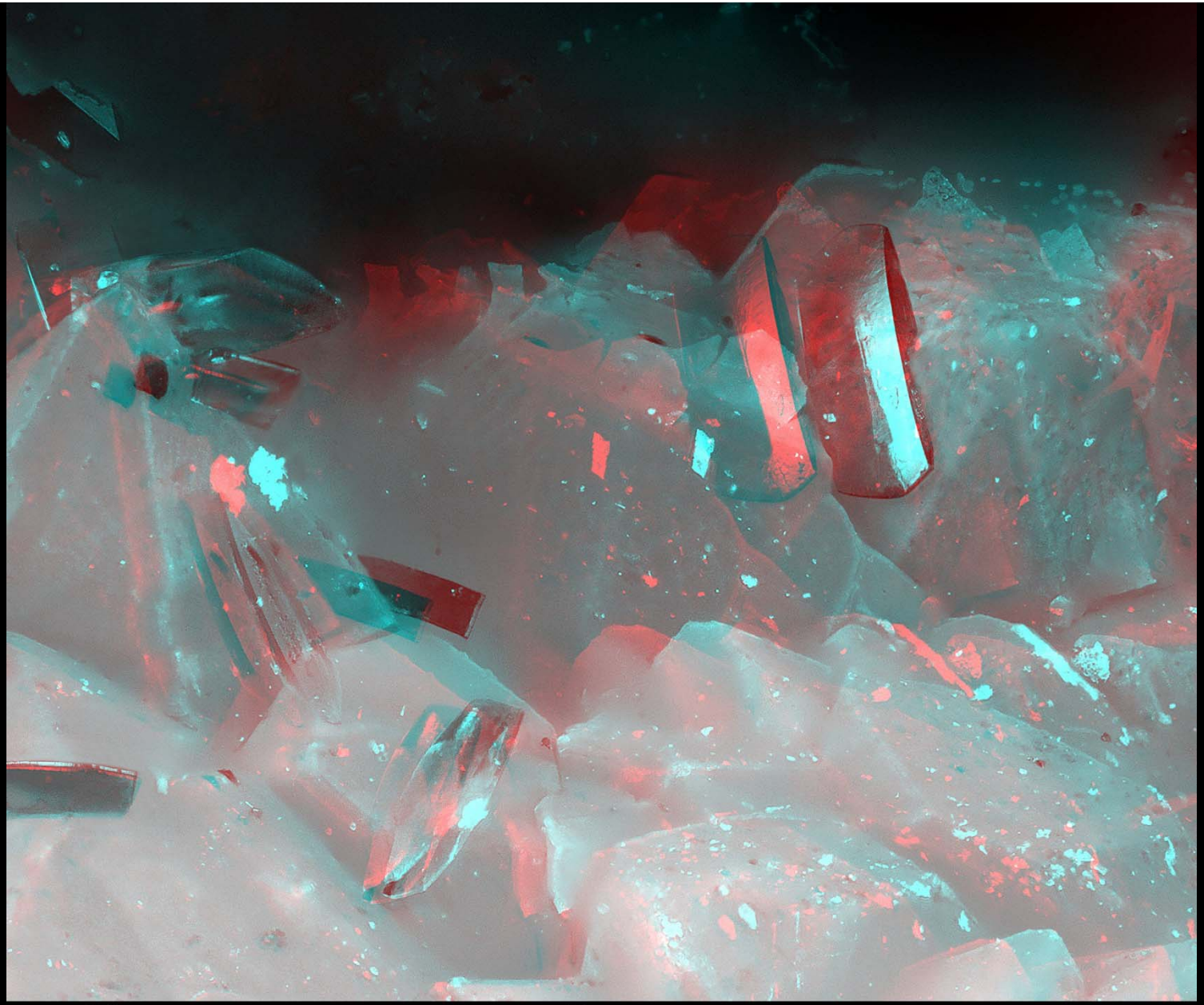
Brochantite $Cu_4(SO_4)(OH)_6$

Field height 0.891 mm.

Transparent emerald green monoclinic crystals having curved faces, with malachite, baryte and quartz.
Longlands Fell Mine, Uldale, Cumbria.

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

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 199 and 198 1-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



0.1 mm

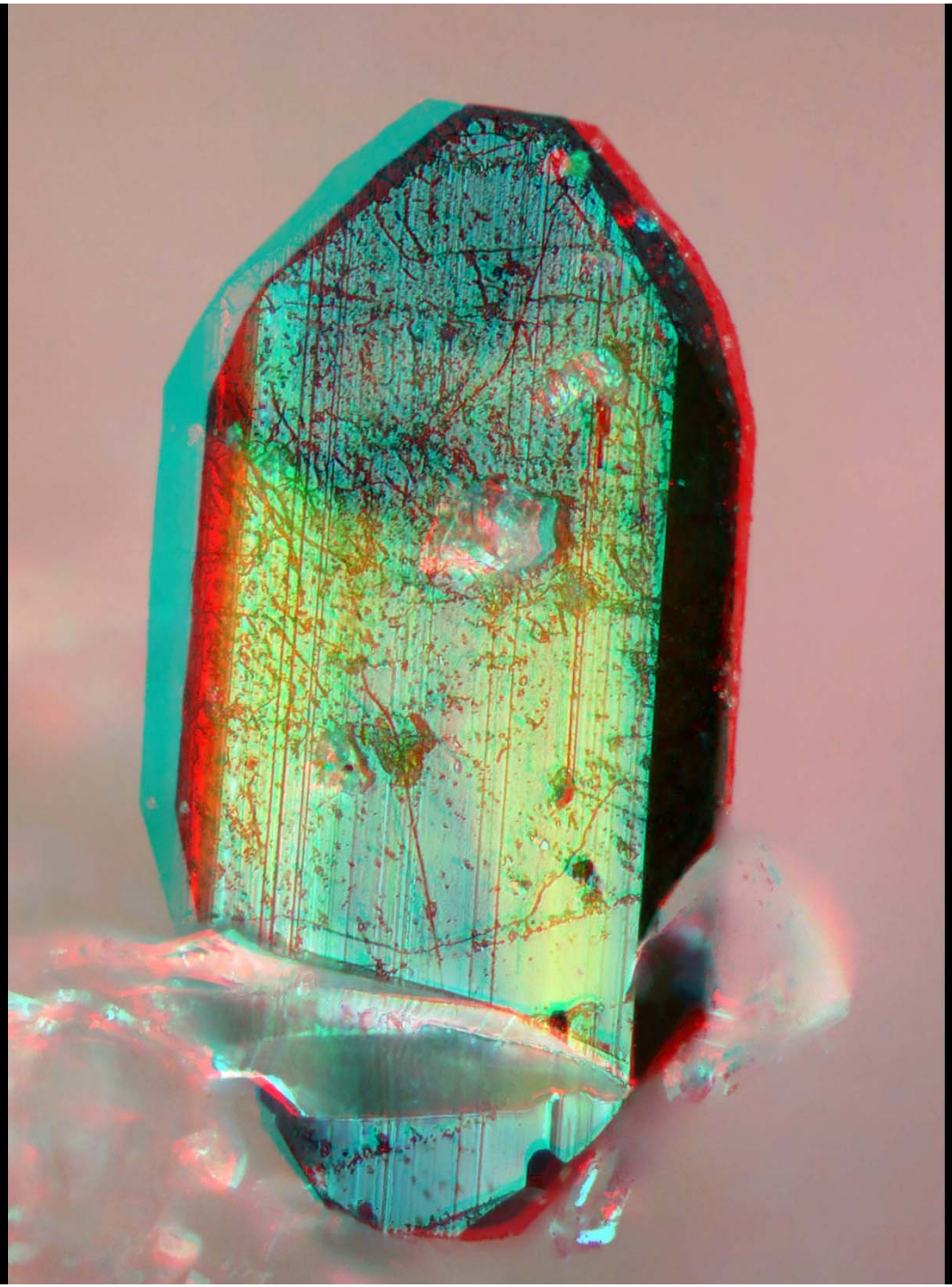
Brochantite $Cu_4(SO_4)(OH)_6$

Field height 0.891 mm.

Transparent emerald green monoclinic crystals having curved faces, with malachite, baryte and quartz.
Longlands Fell Mine, Uldale, Cumbria.

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

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 199 and 198 1-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Brookite TiO_2

Double terminated striated crystal on quartz
in crack in silicified rhyolitic tuff turbidite.

Cymorthin 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 + right stacks of 74 and 88 2-micrometre steps at 6 degrees via Stackshot rail.
combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 0.397 mm.

1 mm

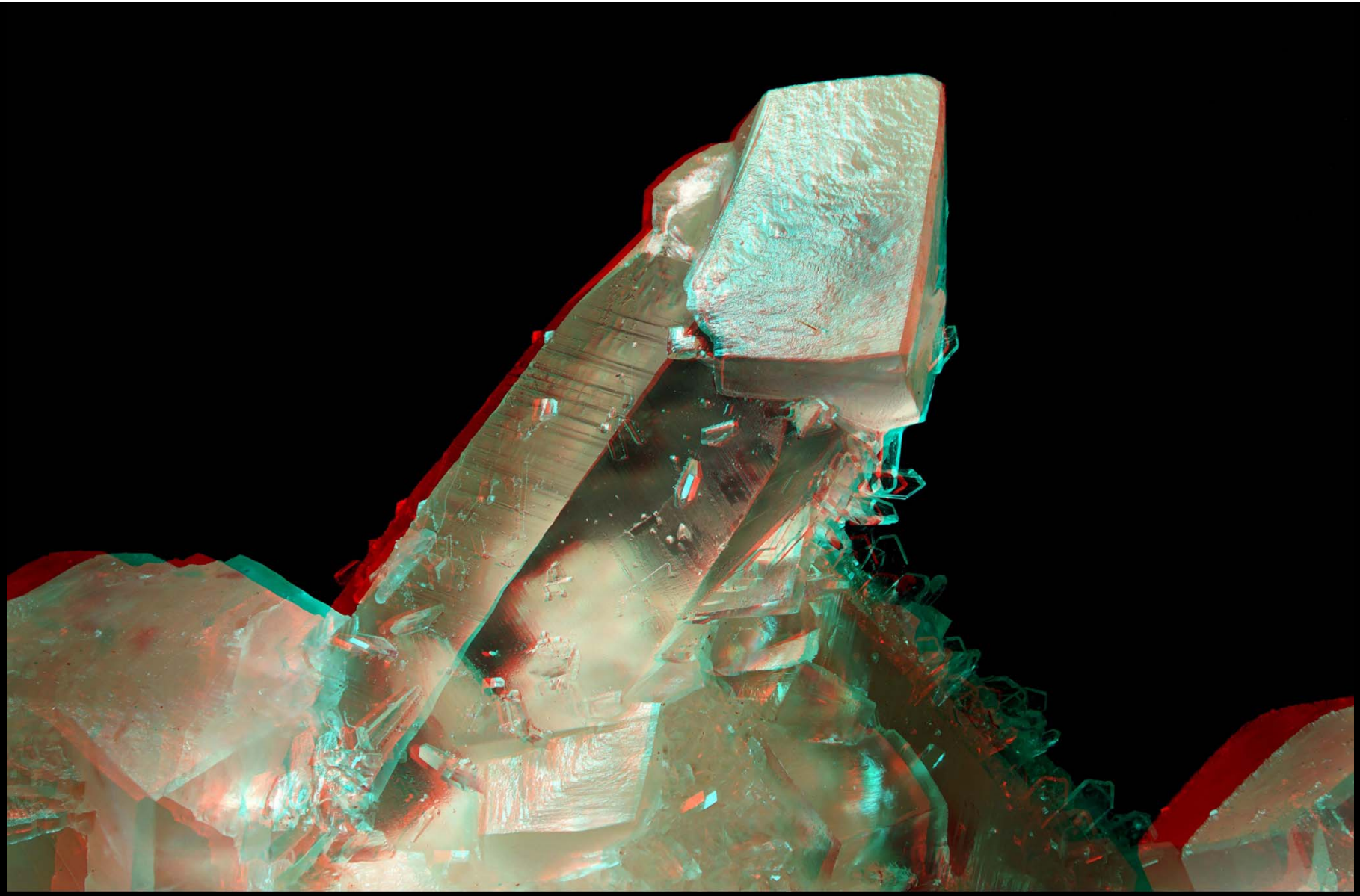
Calcite $Ca(CO_3)$ with drusy stilbite.

Field width 18.1 mm.

Two generations: rhombohedral crystals on the terminations of elongated prismatic (’nail-head’) individuals.
Camas na h’Uamha, Duirinish, Isle of Skye.

Specimen: collected by Mike Wood and in 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 62 and 76 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM



1 mm

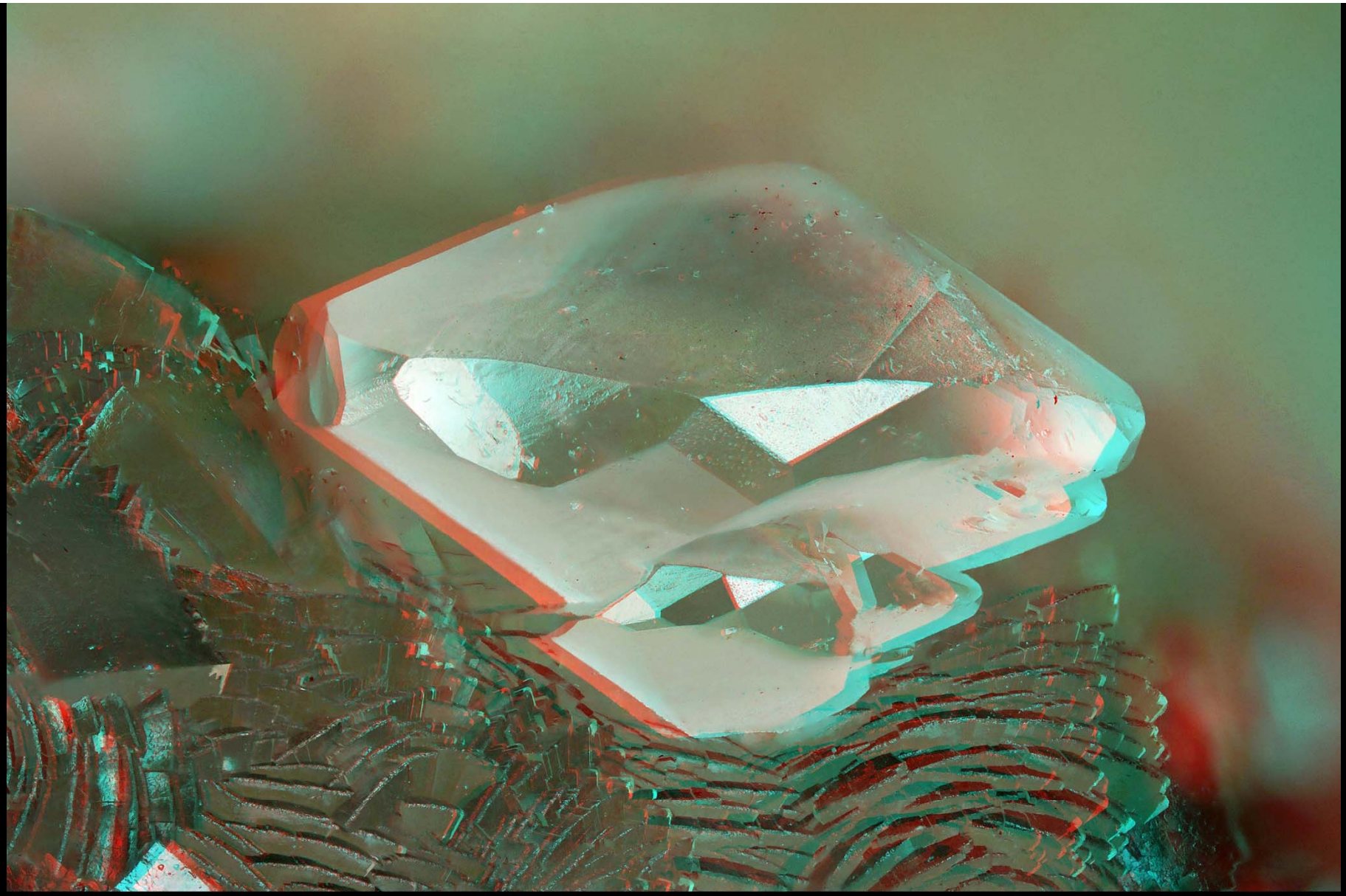
Calcite $Ca(CO_3)$ with drusy stilbite. Field width 18.1 mm.

Two generations: rhombohedral crystals on the terminations of elongated prismatic ('nail-head') individuals.
Camas na h'Uamha, Duirinish, Isle of Skye.

Specimen: collected by Mike Wood and in 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 94 and 90 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



1 mm

Calcite $Ca(CO_3)$

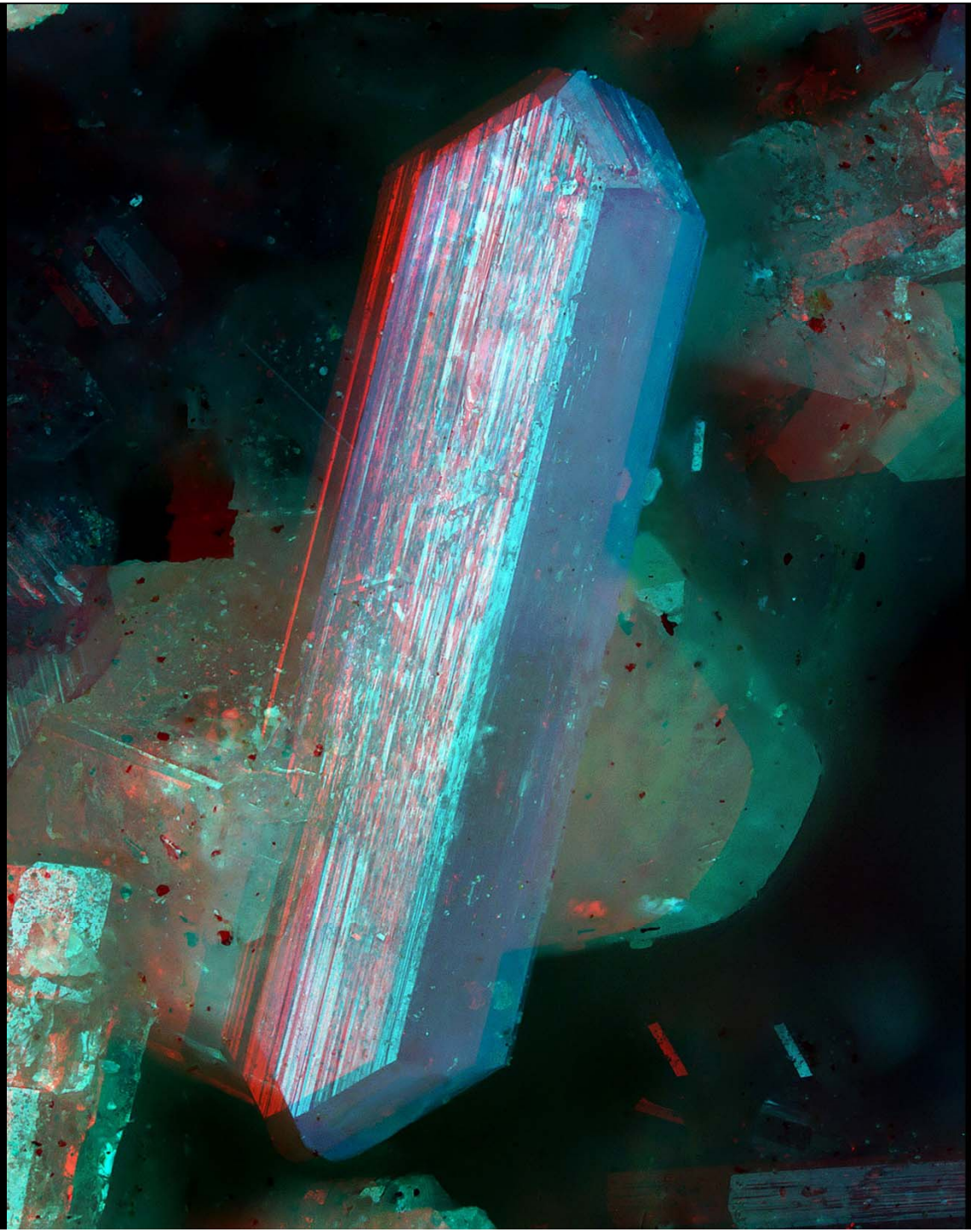
Field width 3.70 mm.

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 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 134 and 117 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Caledonite $Cu_2Pb_5(SO_4)_3(CO_3)(OH)_6$

Double terminated, with cerussite and leadhillite.

Wanlock Dod - Whytes Cleugh, Wanlockhead, Dumfries and Galloway.

Specimen: found by Charles Lamb and in Peter Briscoe collection.

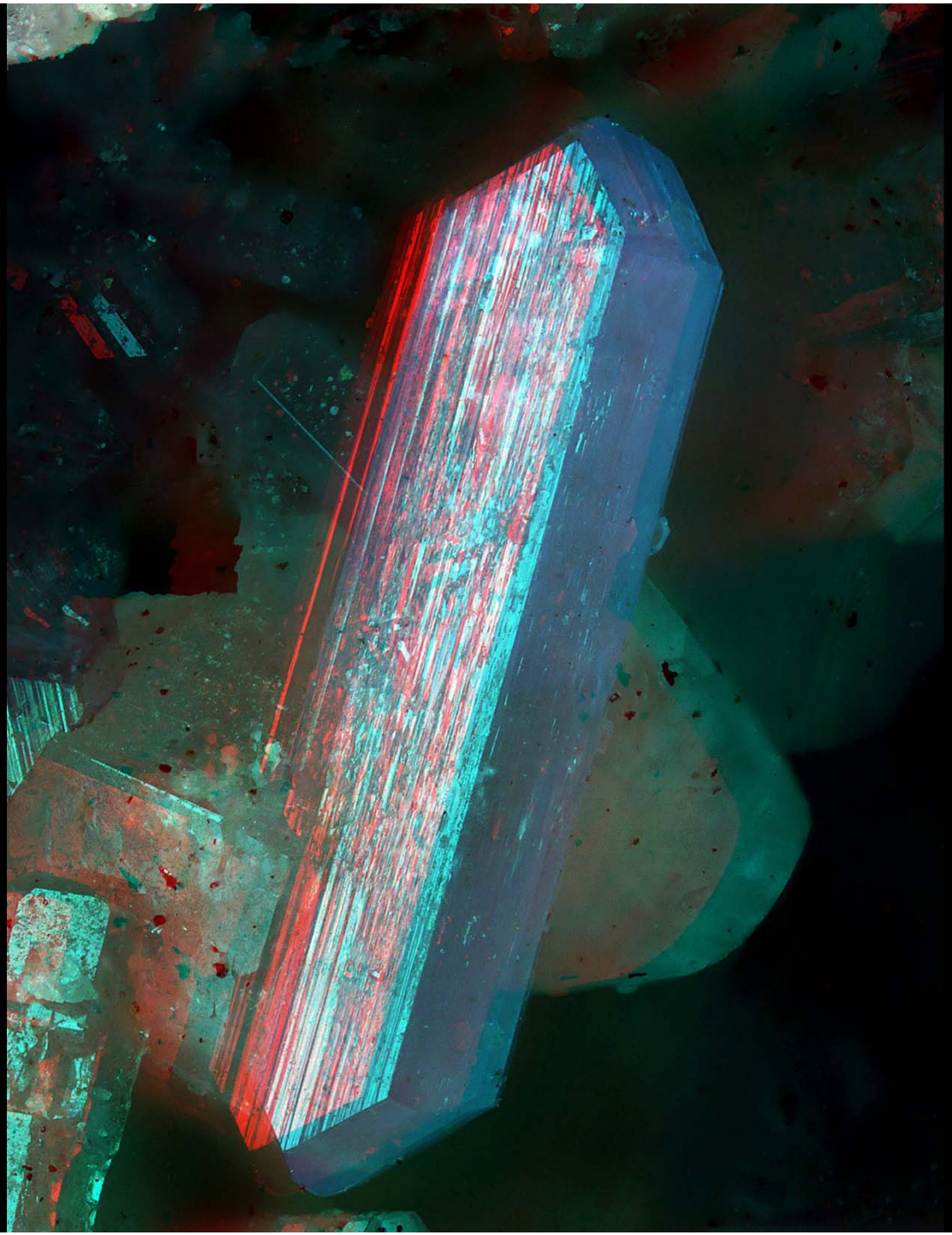
Photography: John Chapman, July 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 223 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 123 and 116 15-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

1 mm

Field height 1.85 mm.



Caledonite $Cu_2Pb_5(SO_4)_3(CO_3)(OH)_6$

Double terminated, with cerussite and leadhillite.

Wanlock Dod - Whytes Cleugh, Wanlockhead, Dumfries and Galloway.

Specimen: found by Charles Lamb and in Peter Briscoe collection.

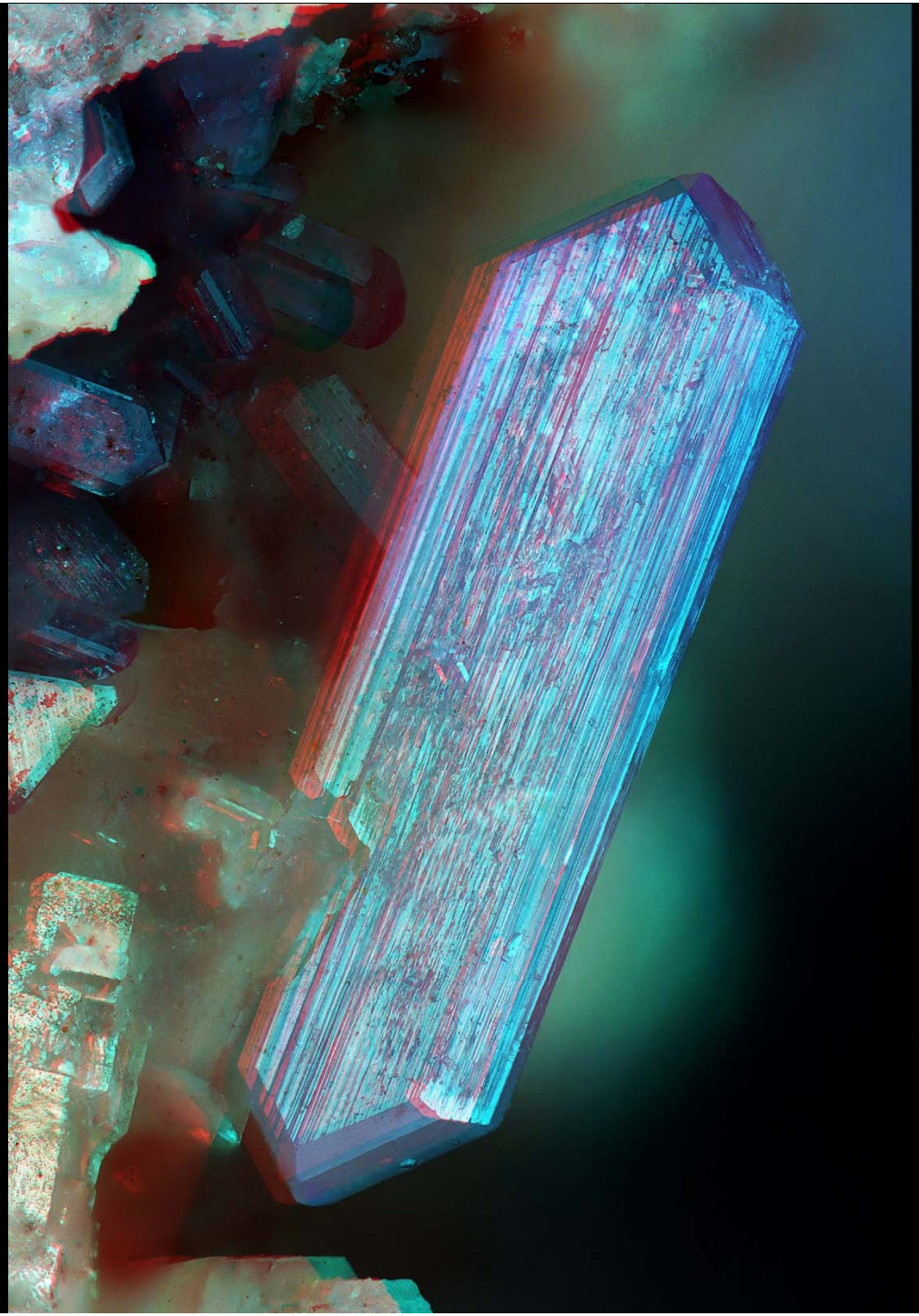
Photography: John Chapman, July 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 223 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 154 and 143 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 1.89 mm.



Caledonite $Cu_2Pb_5(SO_4)_3(CO_3)(OH)_6$

Double terminated, with cerussite and leadhillite.

Wanlock Dod - Whytes Cleugh, Wanlockhead,
Dumfries and Galloway.

Specimen: found by Charles Lamb and in Peter Briscoe collection.

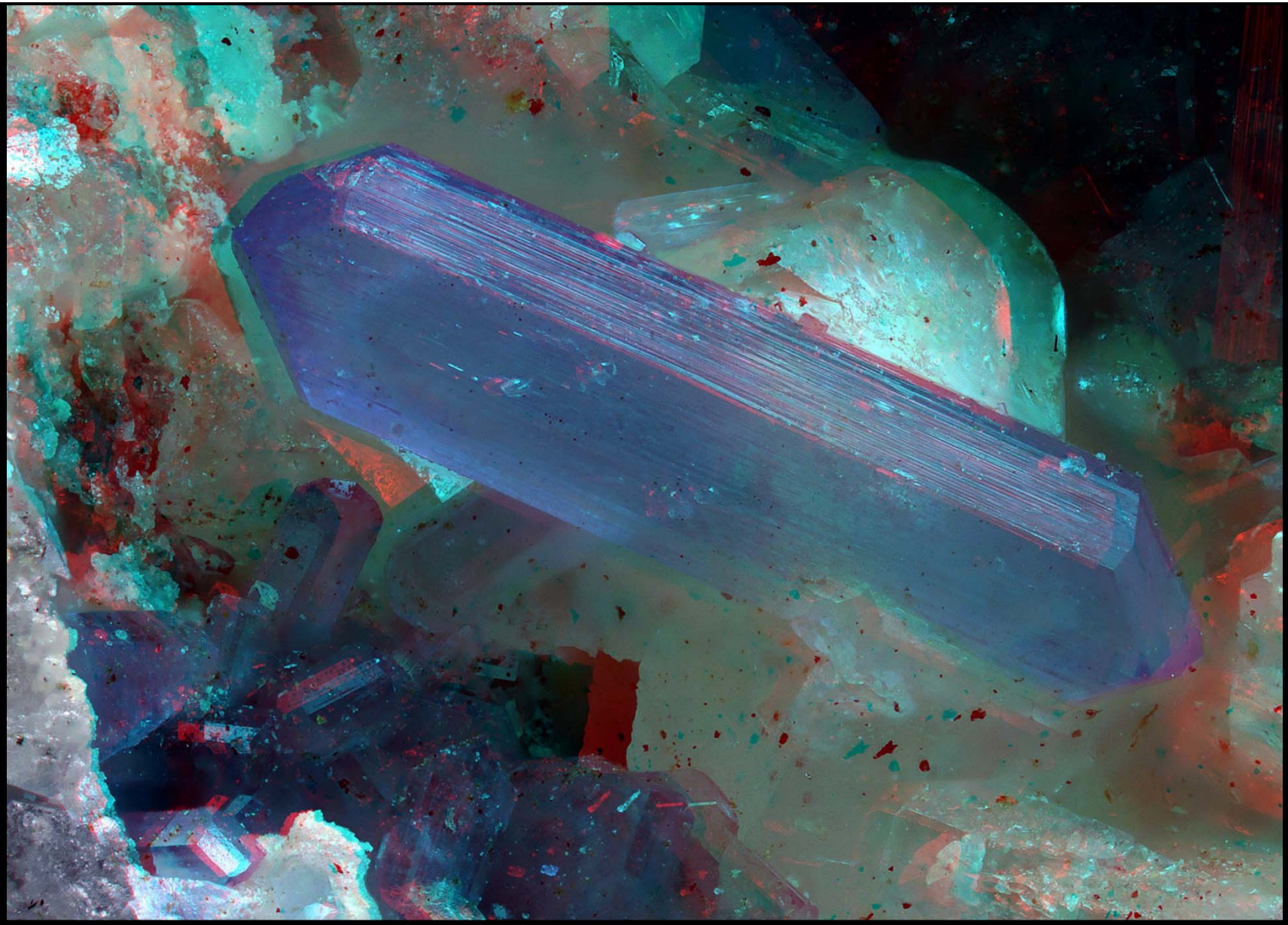
Photography: John Chapman, July 2023.

Canon EOS 5DSr camera with Mitutoyo 10x/0.28 M Plan Apo objective lens on Thorlabs tubes and apo tube lens, and with Canon 1.4x teleconverter, with Schott fibre optic illumination.

Left + right stacks of 108 and 81 10-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

Field height 2.04 mm.

1 mm



1 mm

Caledonite $Cu_2Pb_5(SO_4)_3(CO_3)(OH)_6$

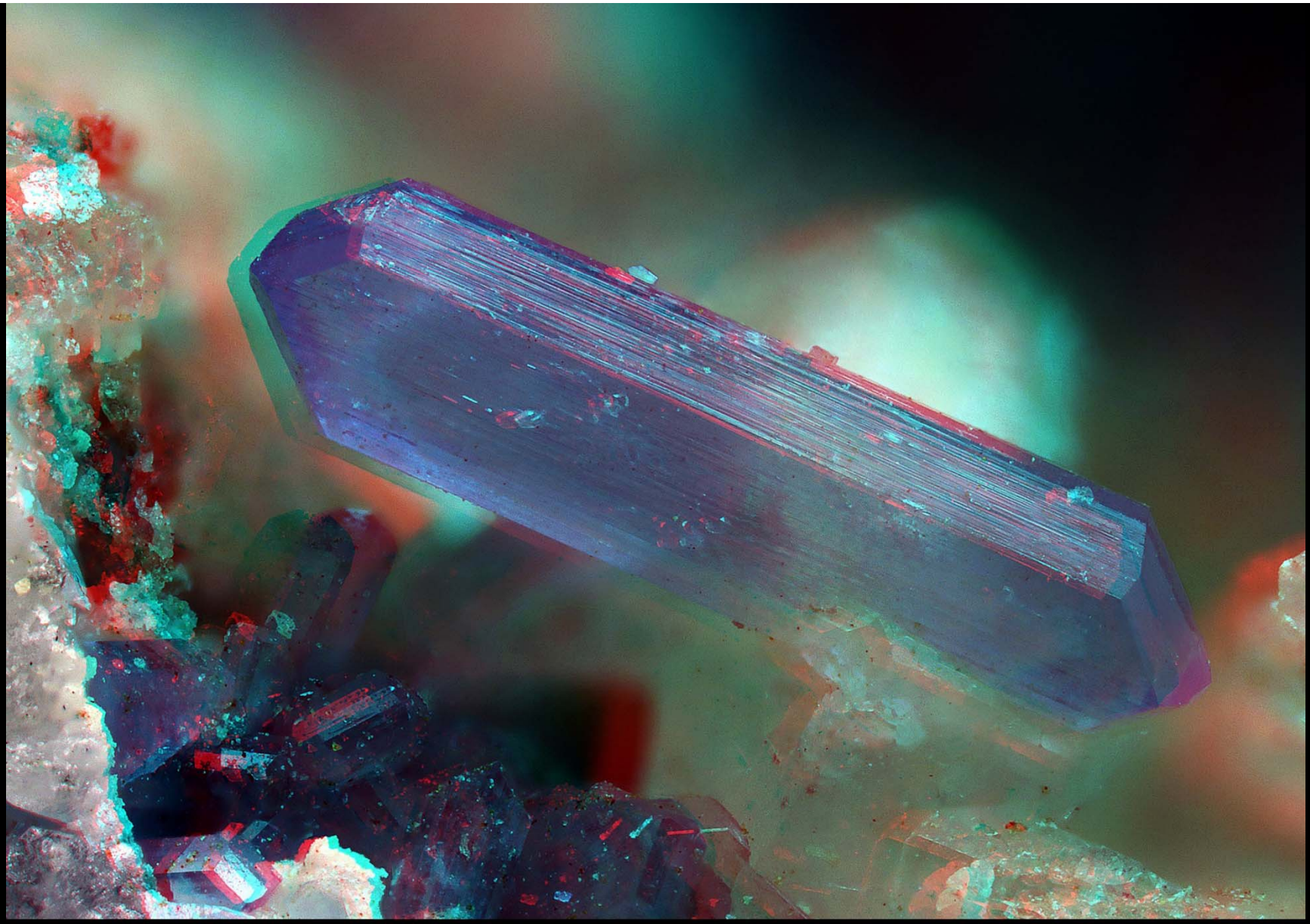
Field height 2.12 mm.

Double terminated, with cerussite and leadhillite.

Wanlock Dod - Whytes Cleugh, Wanlockhead, Dumfries and Galloway.

Specimen: found by Charles Lamb and in Peter Briscoe collection. Photography: John Chapman, July 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 223 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 171 and 154 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Caledonite $Cu_2Pb_5(SO_4)_3(CO_3)(OH)_6$

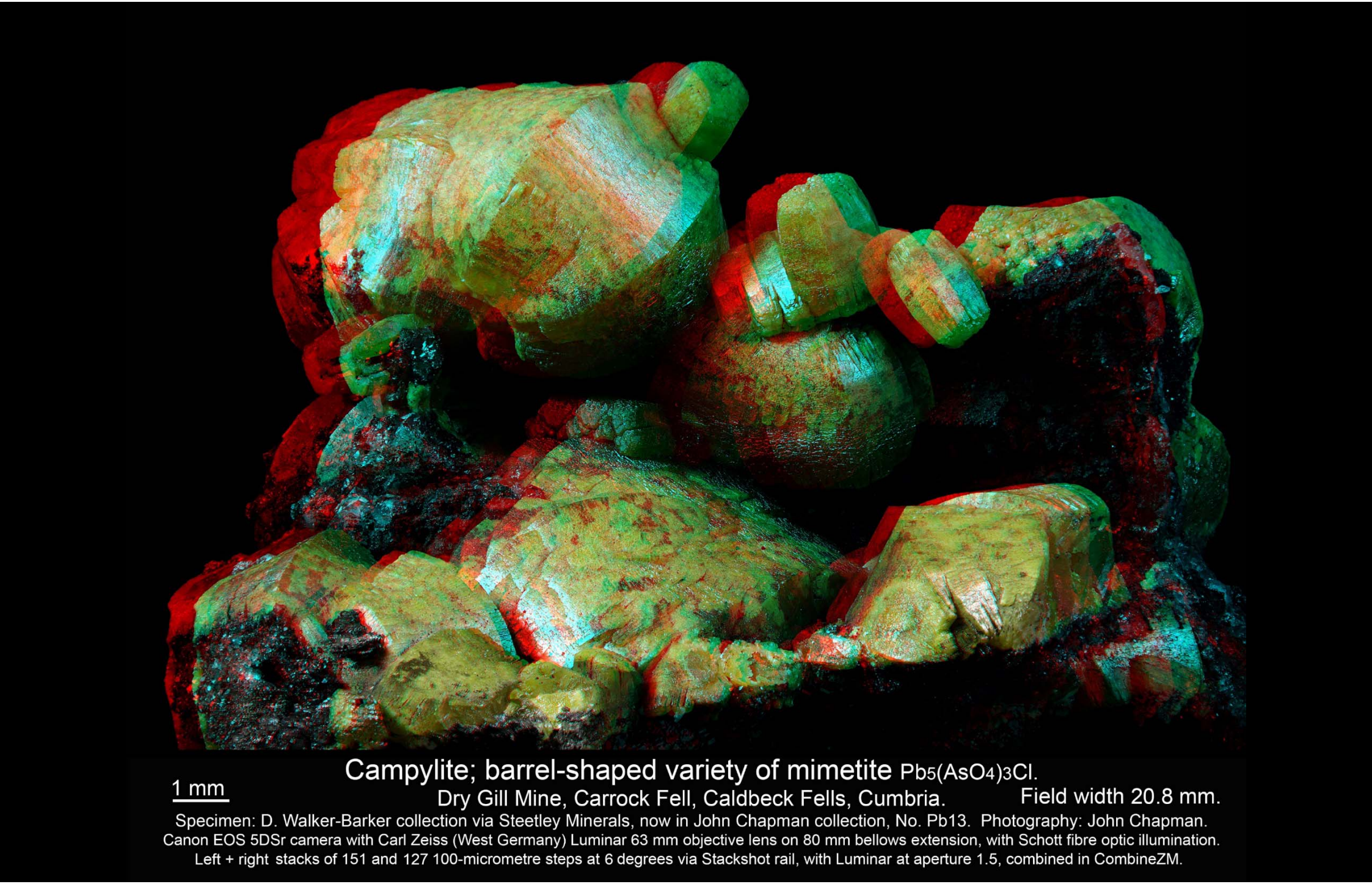
Field height 2.06 mm.

Double terminated, with cerussite and leadhillite.

Wanlock Dod - Whytes Cleugh, Wanlockhead, Dumfries and Galloway.

Specimen: found by Charles Lamb and in Peter Briscoe collection. Photography: John Chapman, July 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 223 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 171 and 154 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

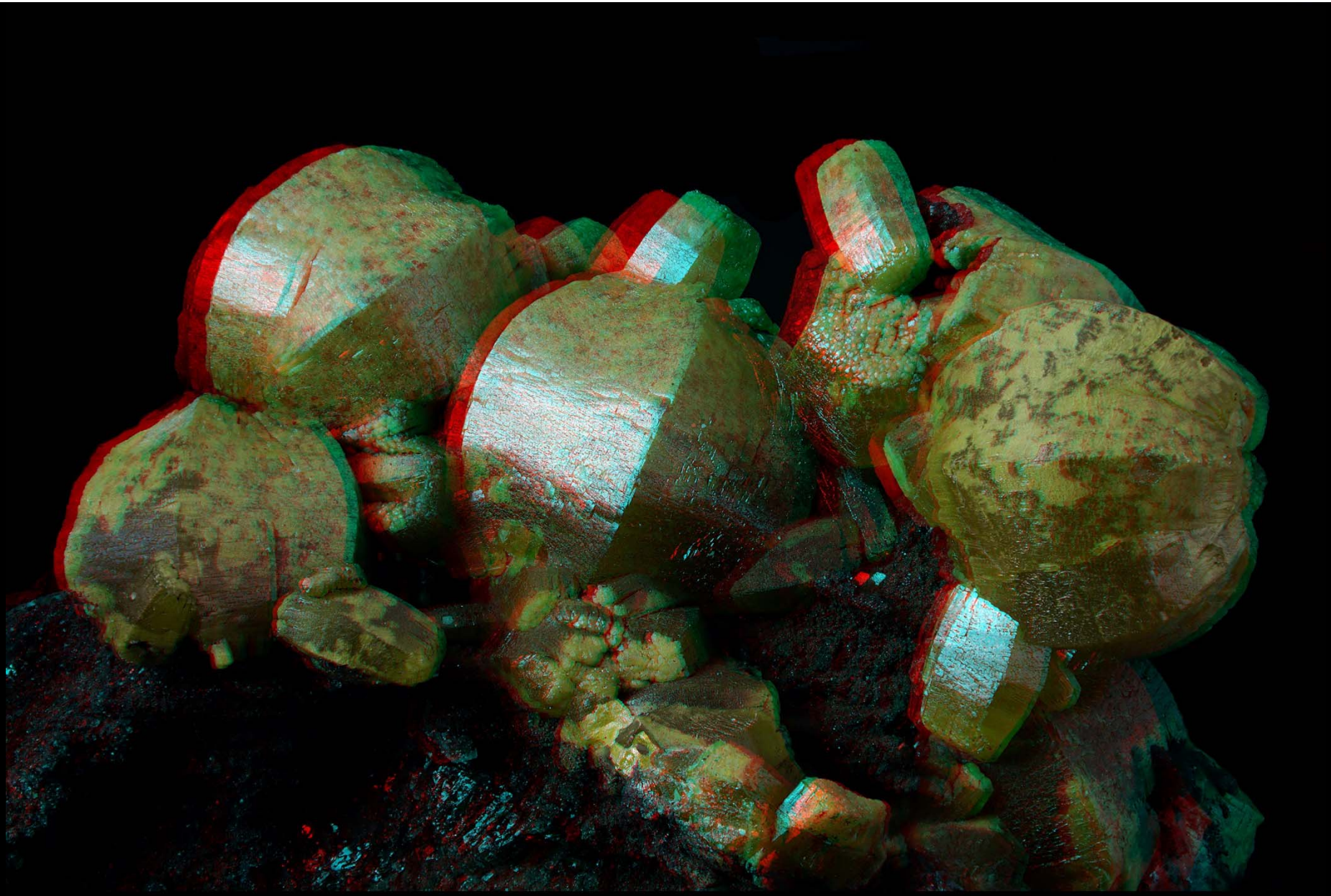


Campylite; barrel-shaped variety of mimetite $Pb_5(AsO_4)_3Cl$.

1 mm

Dry Gill Mine, Carrock Fell, Caldbeck Fells, Cumbria. Field width 20.8 mm.

Specimen: D. Walker-Barker collection via Steetley Minerals, now in John Chapman collection, No. Pb13. Photography: John Chapman.
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 151 and 127 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



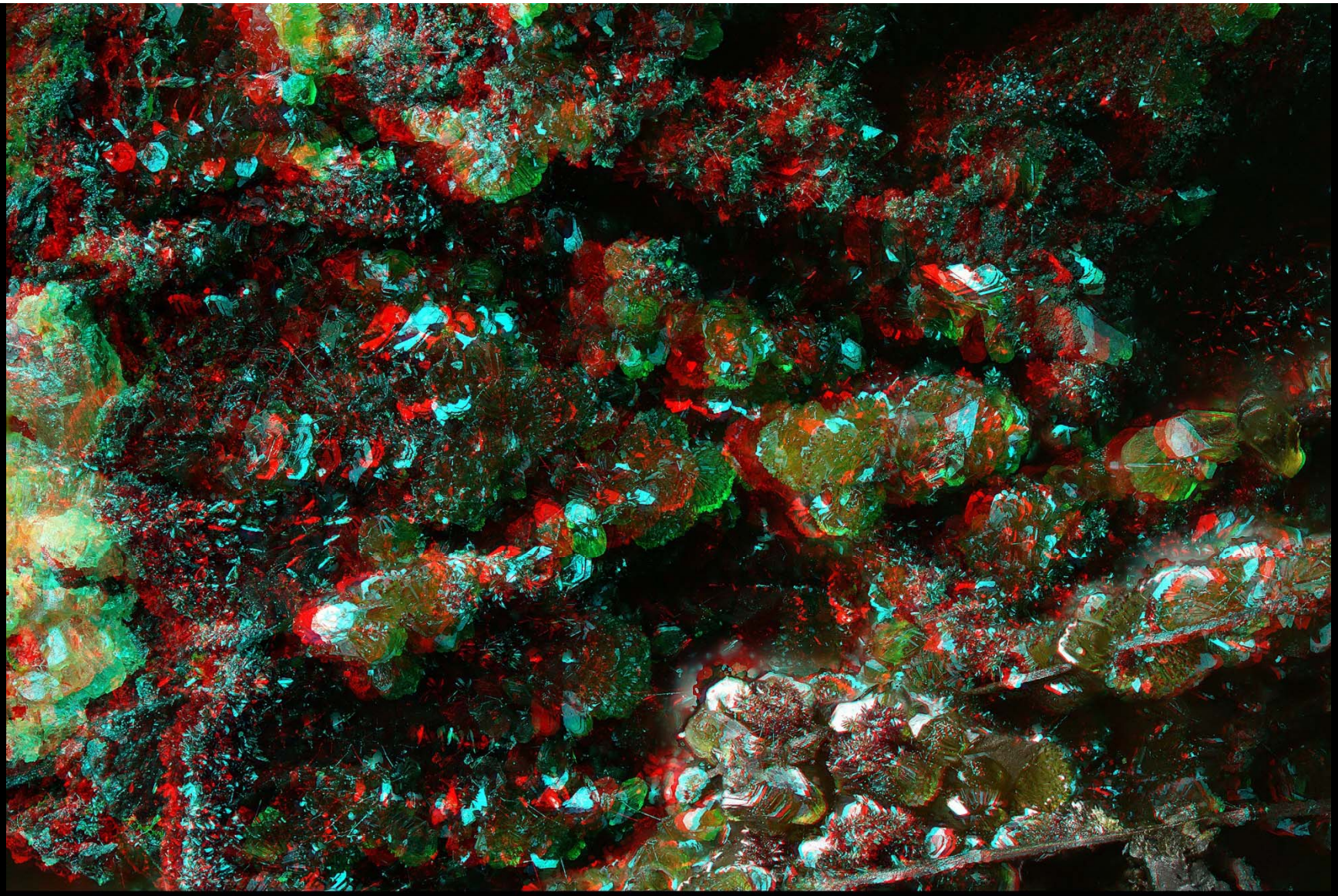
Campylite; barrel-shaped variety of mimetite $Pb_5(AsO_4)_3Cl$.

1 mm

Dry Gill Mine, Carrock Fell, Caldbeck Fells, Cumbria.

Field width 20.5 mm.

Specimen: D. Walker-Barker collection via Steetley Minerals, now in John Chapman collection, No. Pb13. Photography: John Chapman.
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 125 and 127 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



1 mm

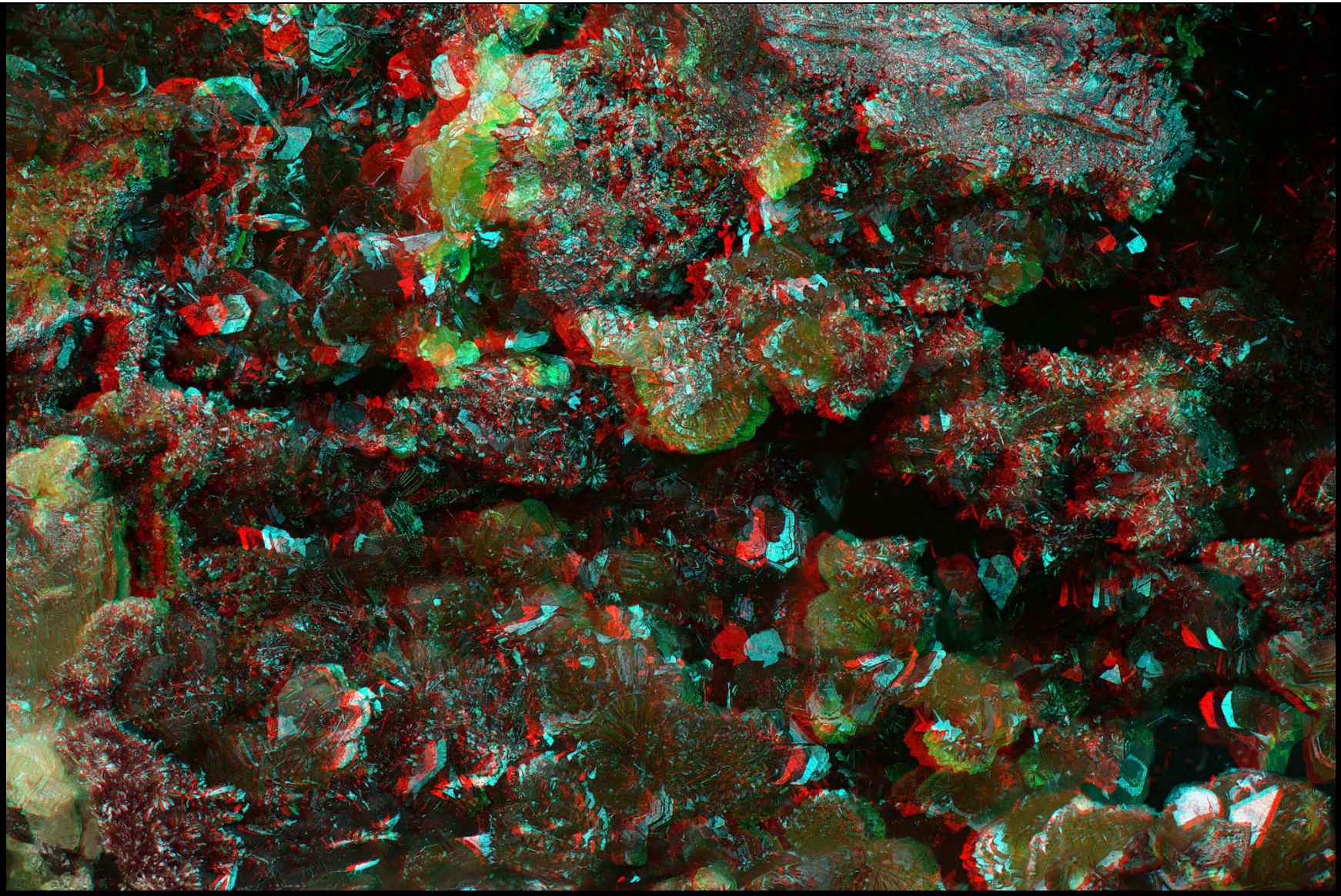
Carminite $PbFe^{2+}_2(AsO_4)_2(OH)_2$

Field width 3.75 mm.

Carmine red radiating groups of crystals amongst a complex assemblage of several yellow to brown minerals, each crystal cluster consisting of invisibly zoned, variable proportions of segnitite $[PbFe^{3+}_3(AsO_4)(AsO_3OH)(OH)_6]$, plumbogummite $[PbAl_3(PO_4)(PO_3OH)(OH)_6]$, philipsbornite $[PbAl_3(AsO_4)(AsO_3OH)(OH)_6]$ and kintoreite $[PbFe^{3+}_3(PO_4)(PO_3OH)(OH)_6]$. The pale yellow-brown phase at left is probably a combination of beudantite $[PbFe^{3+}_3(AsO_4)(SO_4)(OH)_6]$ and segnitite.

Burdell Gill NY 3075 3247, Caldbeck Fells, Cumbria. Specimen: David Green collection. Photography: John Chapman, Nov 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. Stack of 121 15-micrometre steps via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM and processed in Photoshop CC.

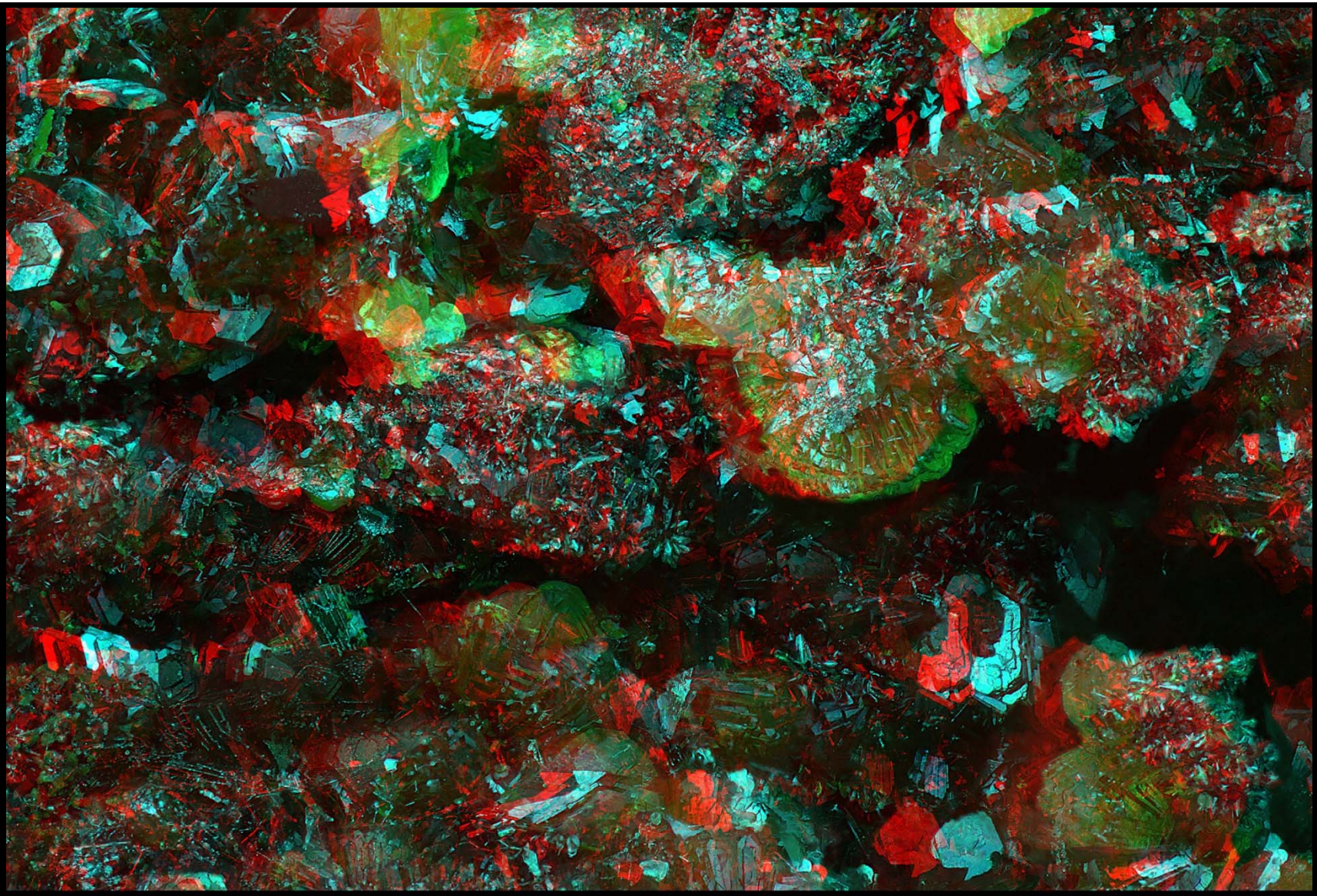


1 mm **Carminite** $PbFe^{2+}_2(AsO_4)_2(OH)_2$ Field width 2.59 mm.

Carmine red radiating groups of crystals amongst a complex assemblage of several yellow to brown minerals, each crystal cluster consisting of invisibly zoned, variable proportions of segnitite [$PbFe^{3+}_3(AsO_4)(AsO_3OH)(OH)_6$], plumbogummite [$PbAl_3(PO_4)(PO_3OH)(OH)_6$], philipsbornite [$PbAl_3(AsO_4)(AsO_3OH)(OH)_6$] and kintoreite [$PbFe^{3+}_3(PO_4)(PO_3OH)(OH)_6$]. The pale yellow-brown phase at left is probably a combination of beudantite [$PbFe^{3+}_3(AsO_4)(SO_4)(OH)_6$] and segnitite.

Burdell Gill NY 3075 3247, Caldbeck Fells, Cumbria. Specimen: David Green collection. Photography: John Chapman, Nov 2023.

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 139 and 151 8-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



0.1 mm

Carminite $PbFe^{2+}_2(AsO_4)_2(OH)_2$

Field width 1.44 mm.

Carmine red radiating groups of crystals amongst a complex assemblage of several yellow to brown minerals, each crystal cluster consisting of invisibly zoned, variable proportions of segnitite $[PbFe^{3+}_3(AsO_4)(AsO_3OH)(OH)_6]$, plumbogummite $[PbAl_3(PO_4)(PO_3OH)(OH)_6]$, philipsbornite $[PbAl_3(AsO_4)(AsO_3OH)(OH)_6]$ and kintoreite $[PbFe^{3+}_3(PO_4)(PO_3OH)(OH)_6]$. The pale yellow-brown phase at left is probably a combination of beudantite $[PbFe^{3+}_3(AsO_4)(SO_4)(OH)_6]$ and segnitite.

Burdell Gill NY 3075 3247, Caldbeck Fells, Cumbria. Specimen: David Green collection. Photography: John Chapman, Nov 2023.

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 139 and 151 8-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

No 3D available

Carminite $PbFe^{3+}_2(AsO_4)_2(OH)_2$

Radiating clusters on goethite together with an unidentified white phase.

Burdell Gill, Coombe Height, Caldbeck Fells, Cumbria.

Specimen: David Green collection.

Photography: John Chapman, November 2023.

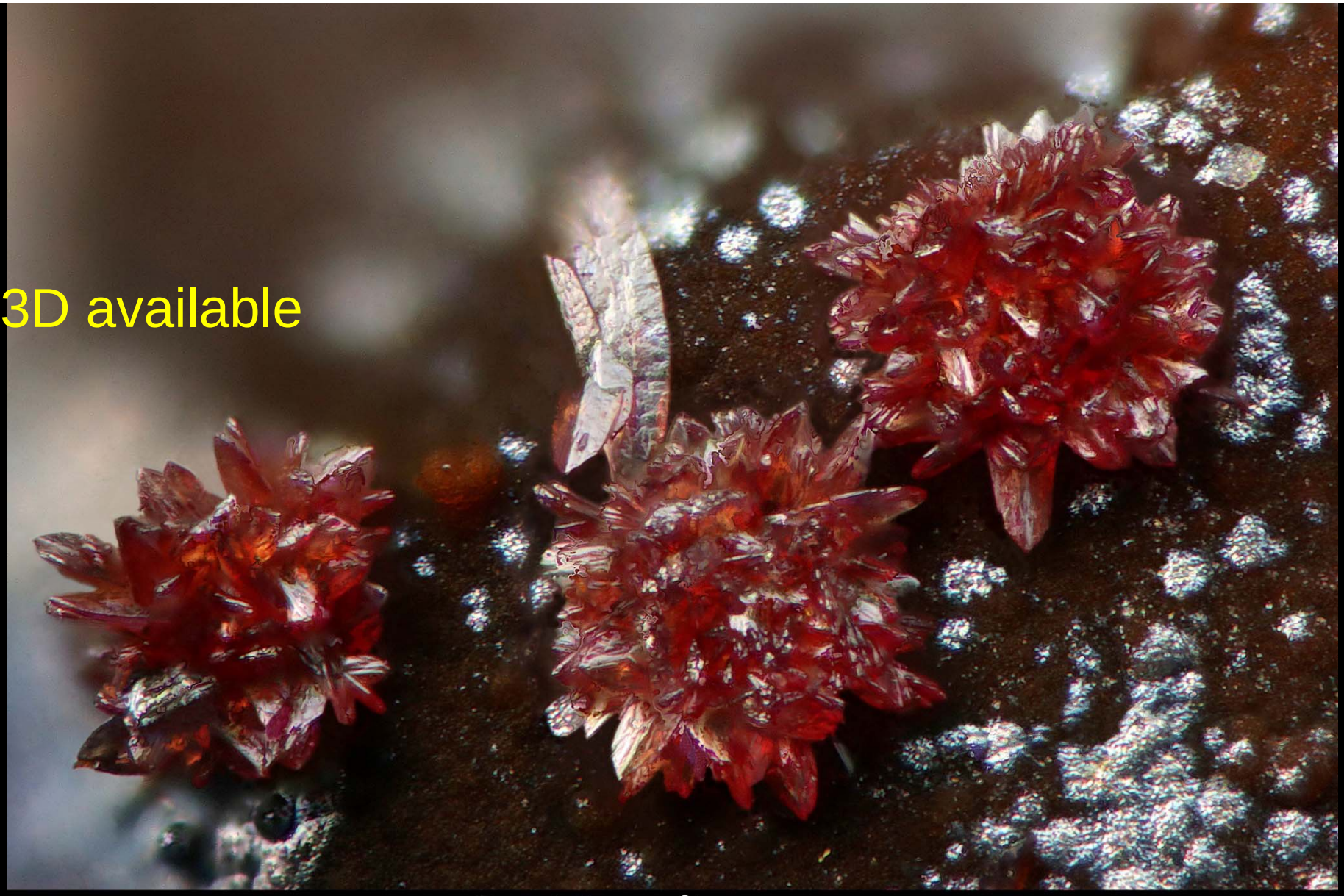
Canon EOS 5DSr camera with Leica 140x/0.40 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Stack of 111 4-micrometre steps via Stackshot rail, combined in CombineZM and processed in Photoshop CC.

0.1 mm

Field height 1.25 mm.

No 3D available



1 mm

Carminite $PbFe^{3+}_2(AsO_4)_2(OH)_2$

Field width 0.403 mm.

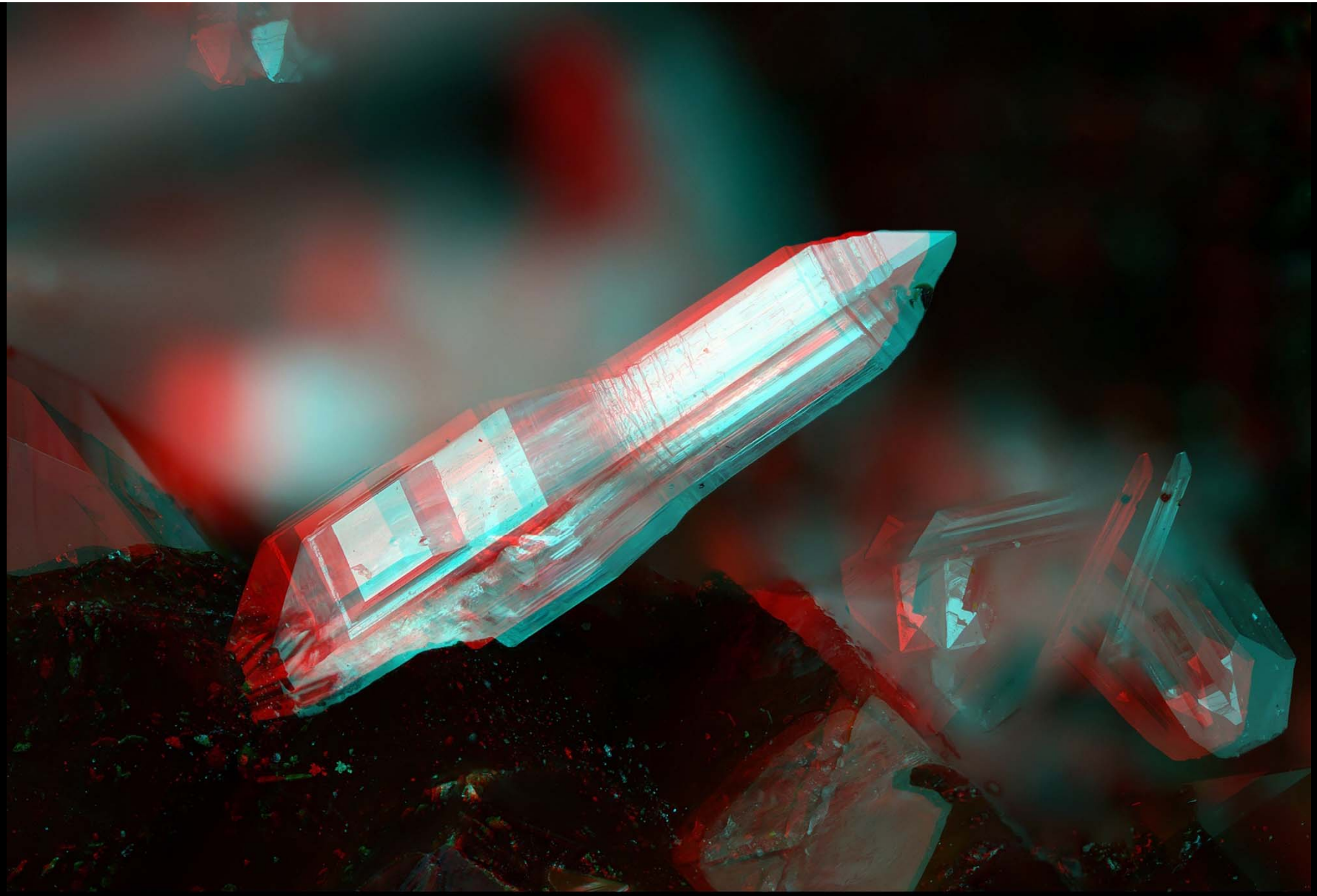
Radiating clusters on goethite together with an unidentified white phase.

Burdell Gill, Coombe Height, Caldbeck Fells, Cumbria.

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

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

Stack of 1- and 2-micrometre steps via Stackshot rail, combined in CombineZM and processed in Photoshop CC.



1 mm

Cerussite $Pb(CO_3)$

Field width 3.06 mm.

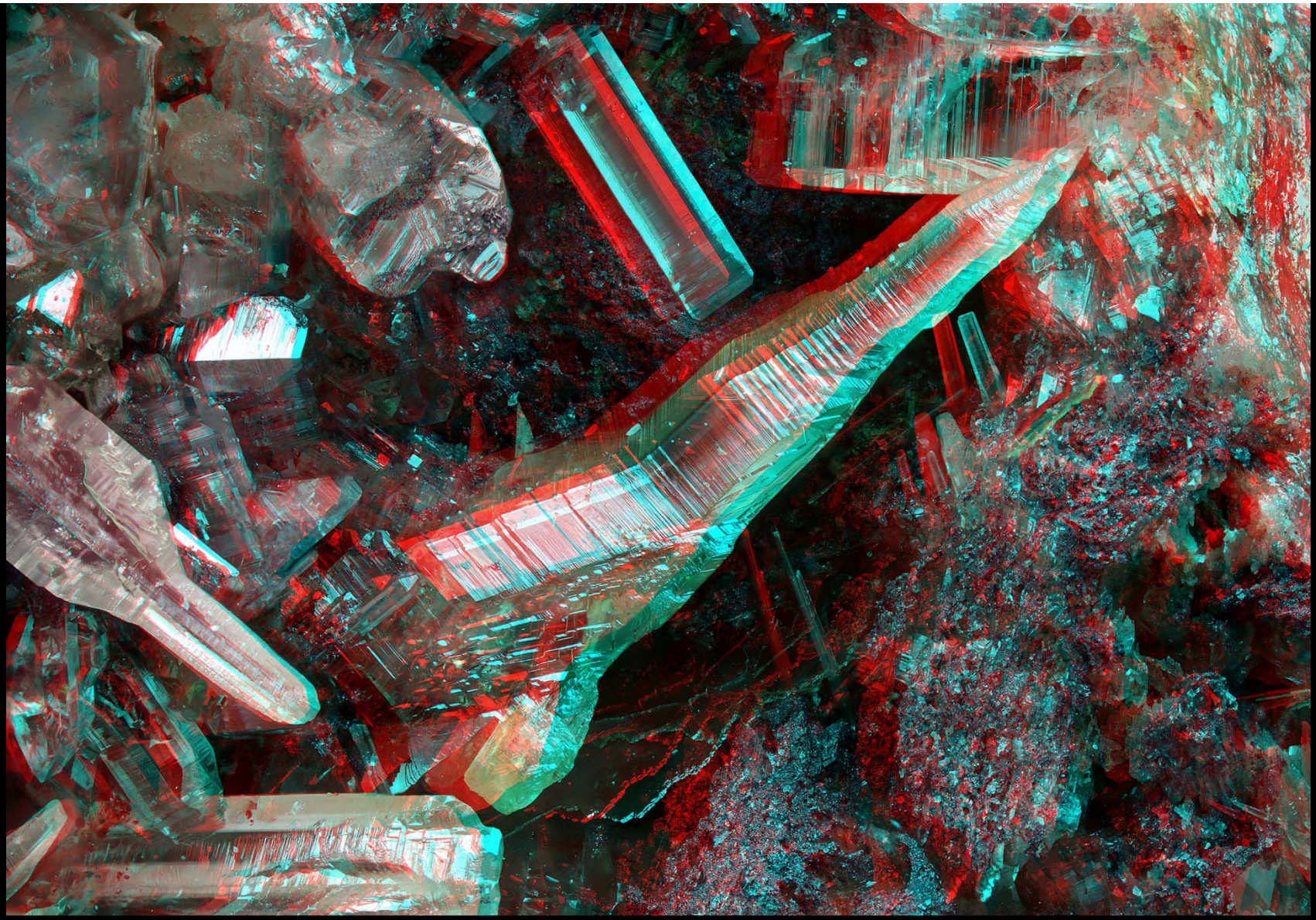
Colourless transparent pseudohexagonal prisms overgrowing goethite-coated quartz.

Entrance flat, Murton Mine, NY 7595 2252, Scordale, Cumbria.

Specimen: David Green collection, No. MT347. Photography: John Chapman, September 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 92 and 86 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Cerussite $PbCO_3$

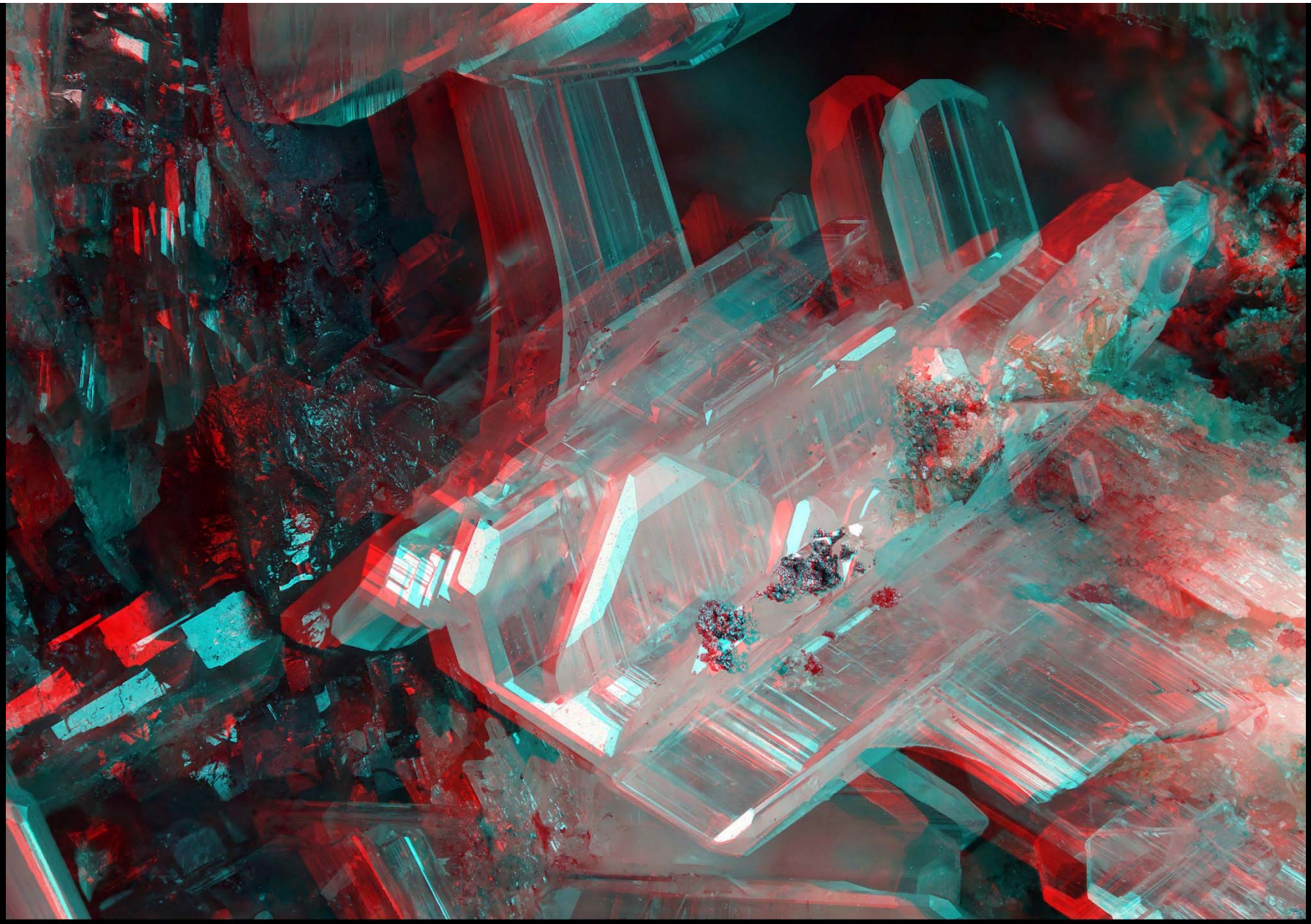
Field width 3.38 mm

A strangely distorted yellow crystal, together with extremely thin plates and needles, illustrating the varied crystal habits that can develop in galena blocks if the carbonate ion activity is restricted.

Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: David Green collection, No. MM1946. 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 illumination.
Left + right stacks of 139 and 121 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Cerussite $PbCO_3$

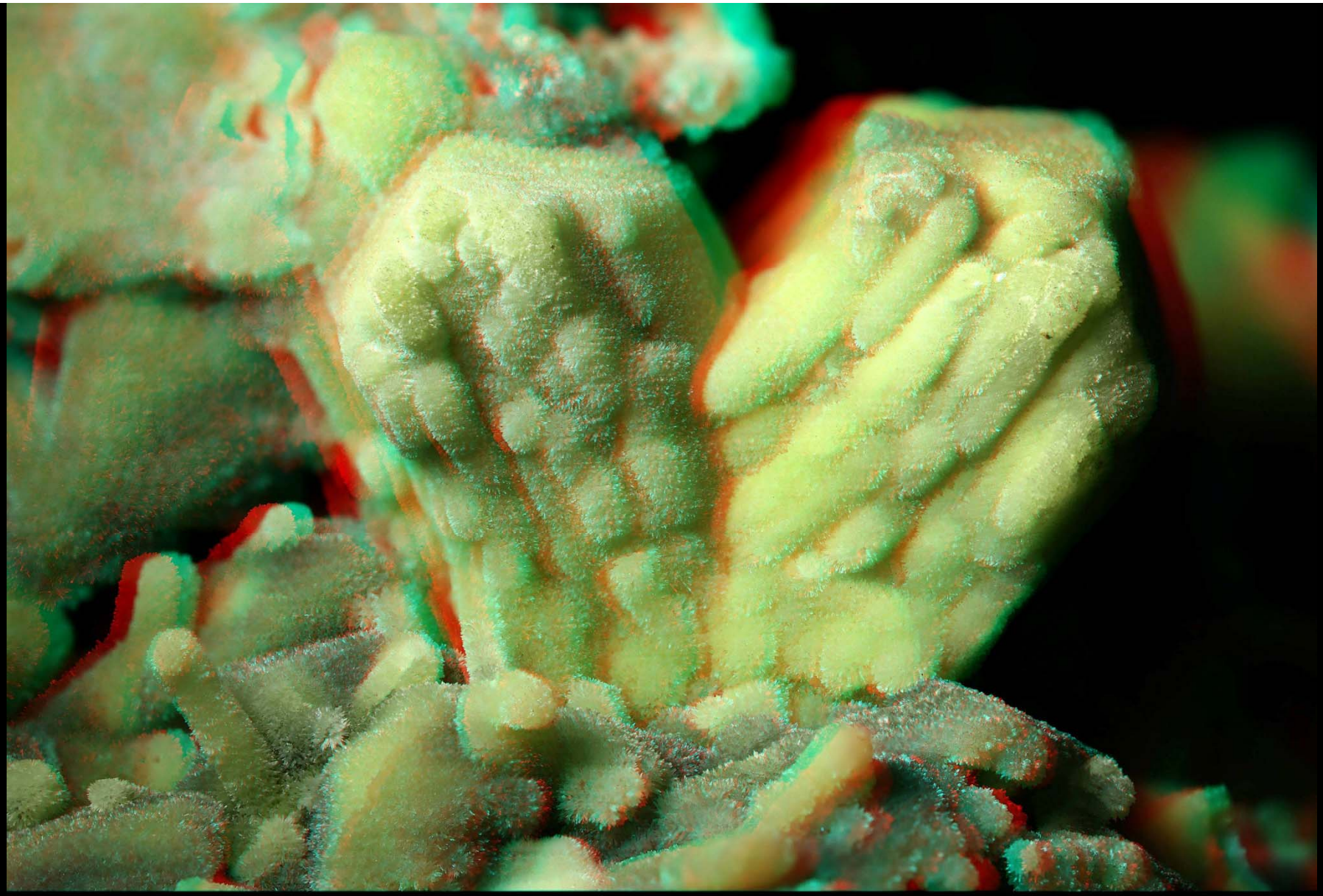
Field width 7.8 mm

V-twin crystals on leadhillite with minor susannite. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: found by David McCallum, No. E147, and now in David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Carl Zeiss (West Germany) Luminar 40 mm objective lens on 140 mm bellows extension, with Schott fibre optic illumination.

L+R stacks of 141 and 130 steps via Stackshot rail at 10 degrees, with Luminar at fully open aperture, combined in CombineZM.

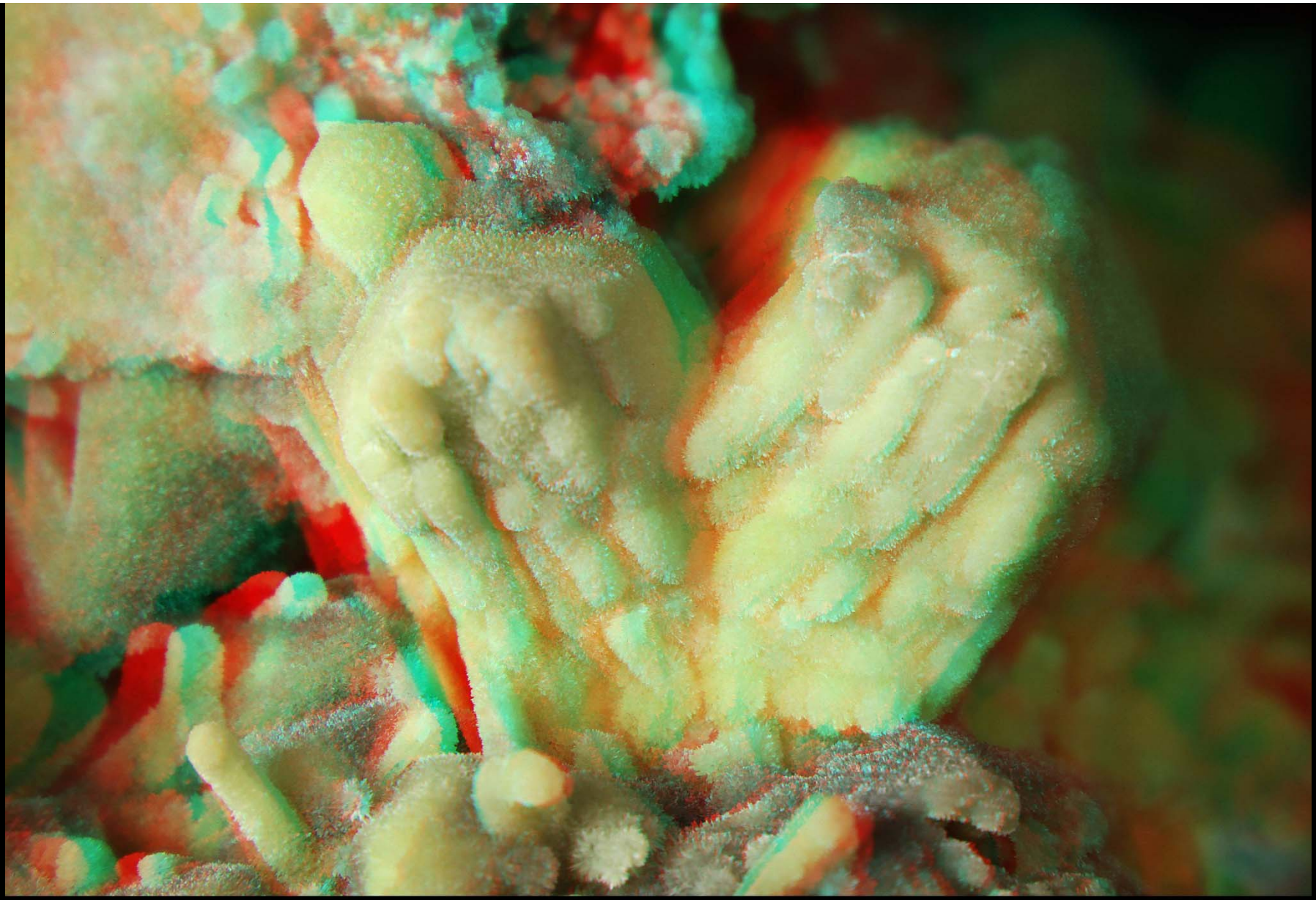


1 mm

Phosphohedyphane $Ca_2Pb_3(PO_4)_3Cl$

Field width 18.4 mm

Pseudomorph after a cerussite V-twin crystal, together with stalactitic forms, on galena.
Whitwell Quarry SK 530 753, Whitwell, Derbyshire.
Specimen: found by David McCallum, No. E131, now in David Green collection. Photography: John Chapman.
Canon EOS 5DSR camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 100mm bellows extension, with Schott fibre optic illmination.
Left + right stacks of 4 and 5 large steps at 6 degrees, with Luminar at aperture 4 (f/9.6), combined in CombineZM and processed in Stereophotomaker.

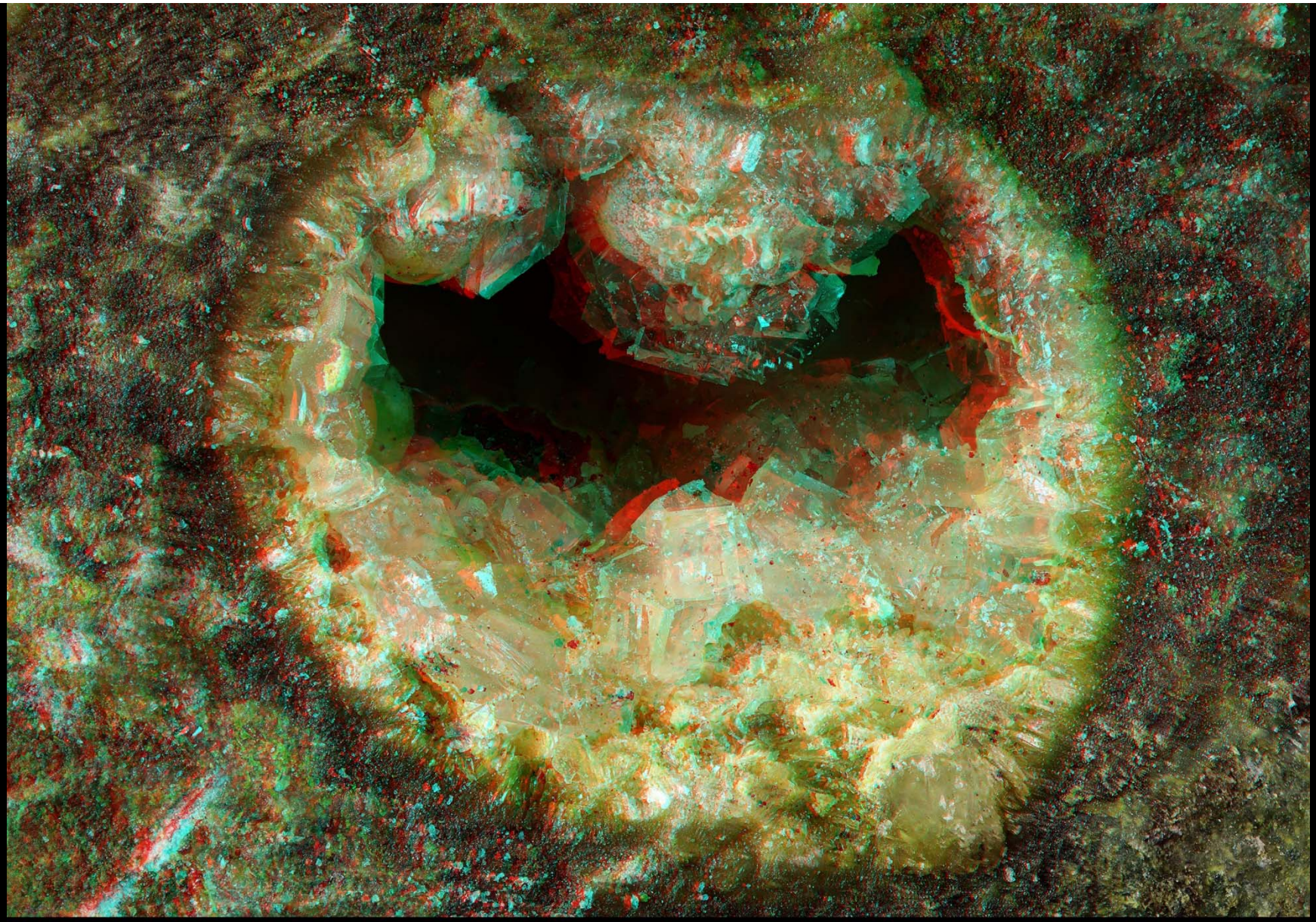


1 mm

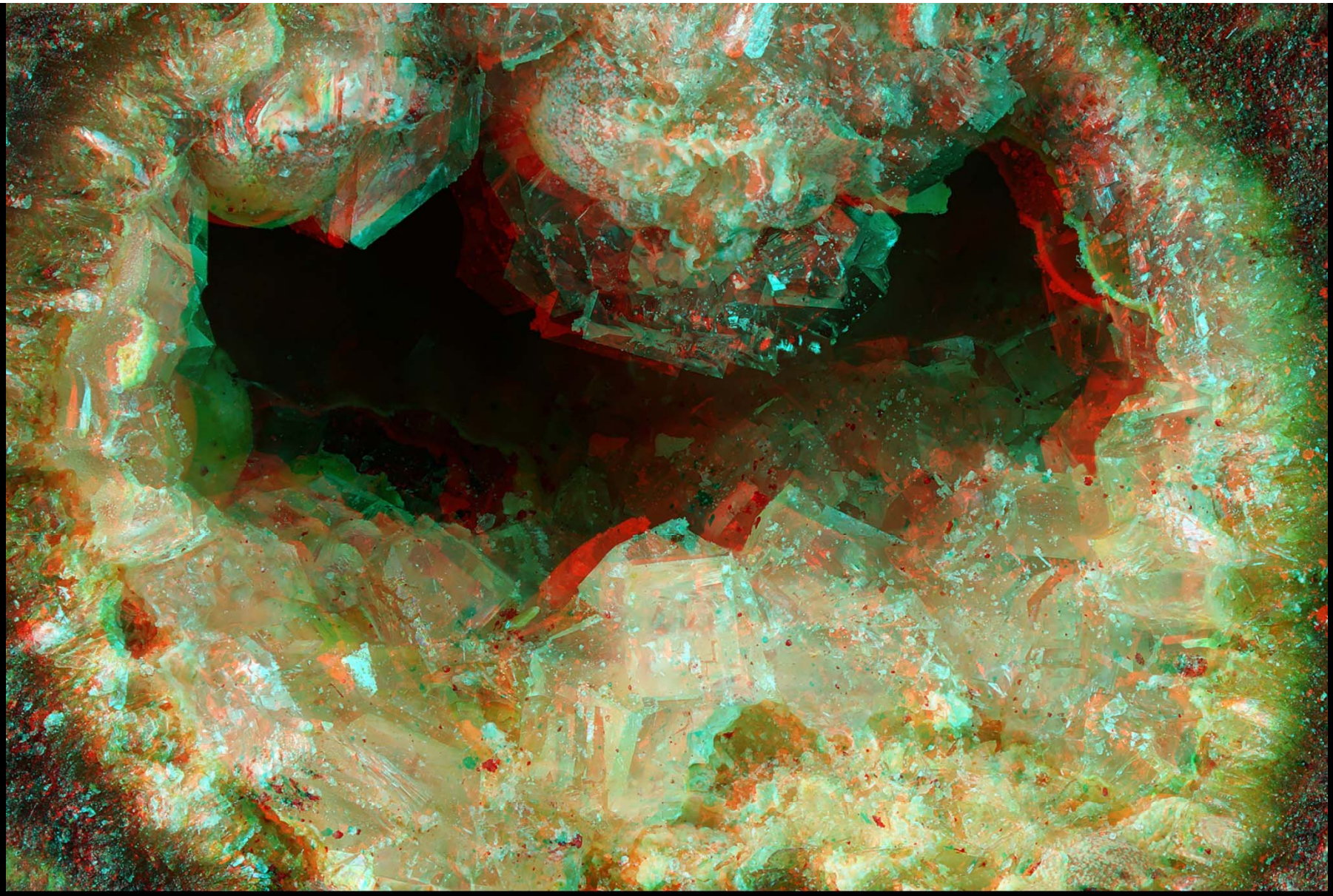
Phosphohedyphane $Ca_2Pb_3(PO_4)_3Cl$

Field width 14.0 mm

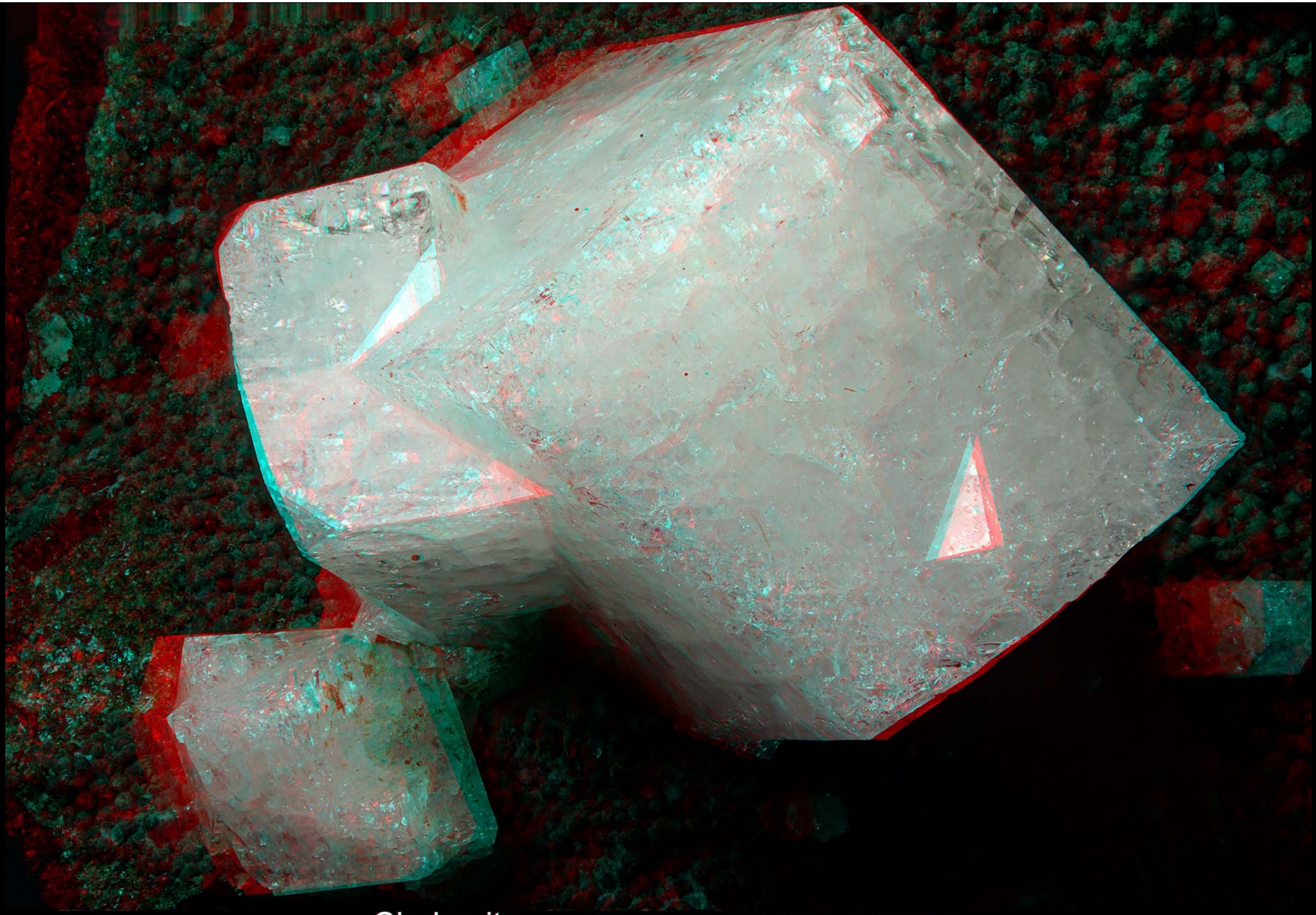
Pseudomorph after a cerussite V-twin crystal, together with stalactitic forms, on galena.
Whitwell Quarry SK 530 753, Whitwell, Derbyshire.
Specimen: found by David McCallum, No. E131, now in David Green collection. Photography: John Chapman.
Canon EOS 5DSR camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=100 mm objective lens and 1.2 x zoom, with LED lamp illumination.



1 mm ‘Chabazite’: zeolite with either Ca, K, Mg, Na or Sr with [$Al_4Si_8O_{24}$] Field width 5.08 mm.
Sub-cubic crystals together with possible thomsonite subgroup spherulites in vesicle in basic lava.
Slieve na Gravery, Co. Antrim, Northern Ireland.
Specimen: collected by Harry Foy and now in Norman Moles collection, No. 2HO8. Photography: John Chapman 2023.
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 112 and 117 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm ‘Chabazite’: zeolite with either Ca, K, Mg, Na or Sr with [$Al_4Si_8O_{24}$] Field width 3.43 mm.
Sub-cubic crystals together with possible thomsonite subgroup spherulites in vesicle in basic lava.
Slieve na Gravery, Co. Antrim, Northern Ireland.
Specimen: collected by Harry Foy and now in Norman Moles collection, No. 2HO8. Photography: John Chapman 2023.
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 112 and 117 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

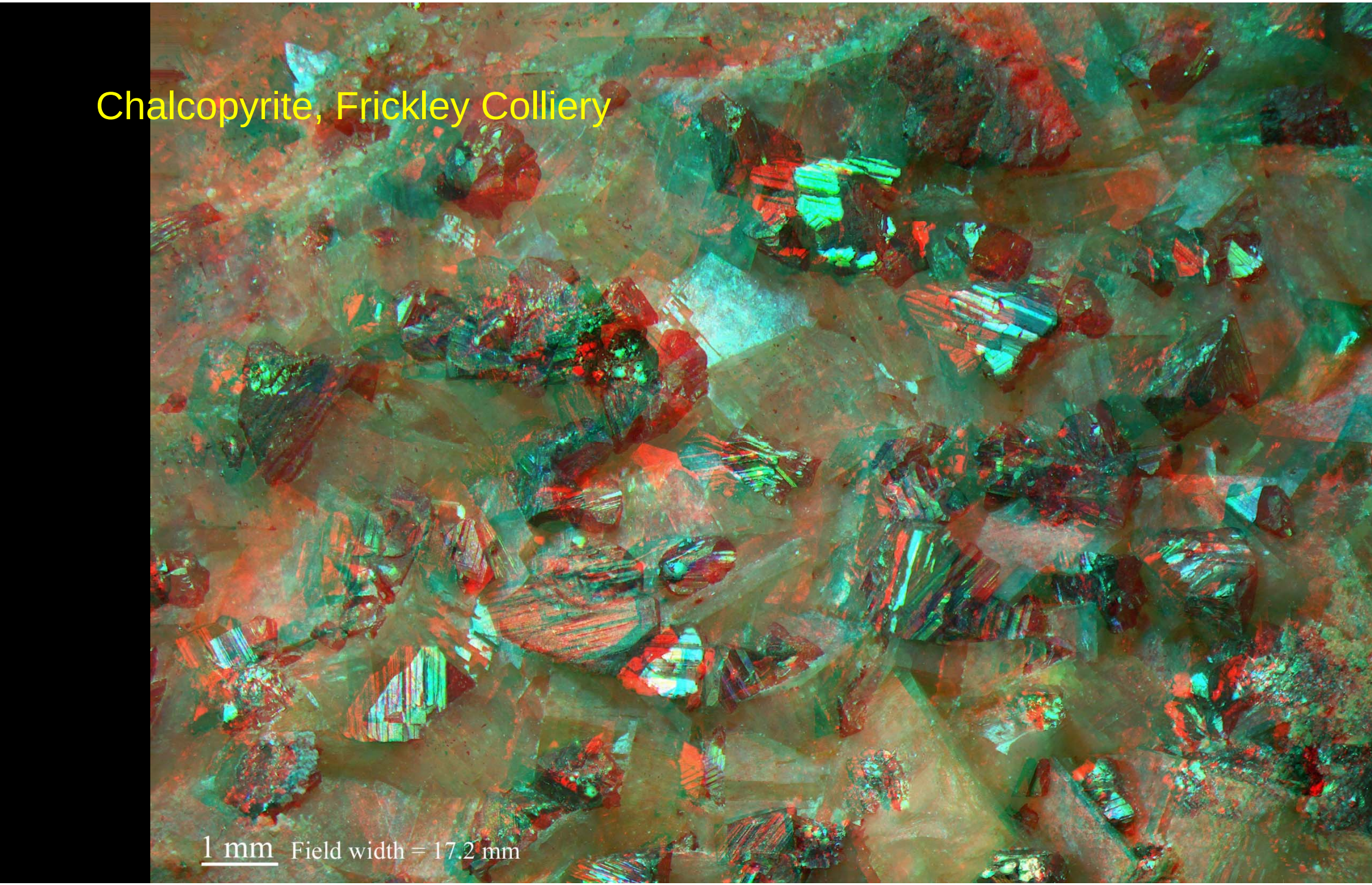


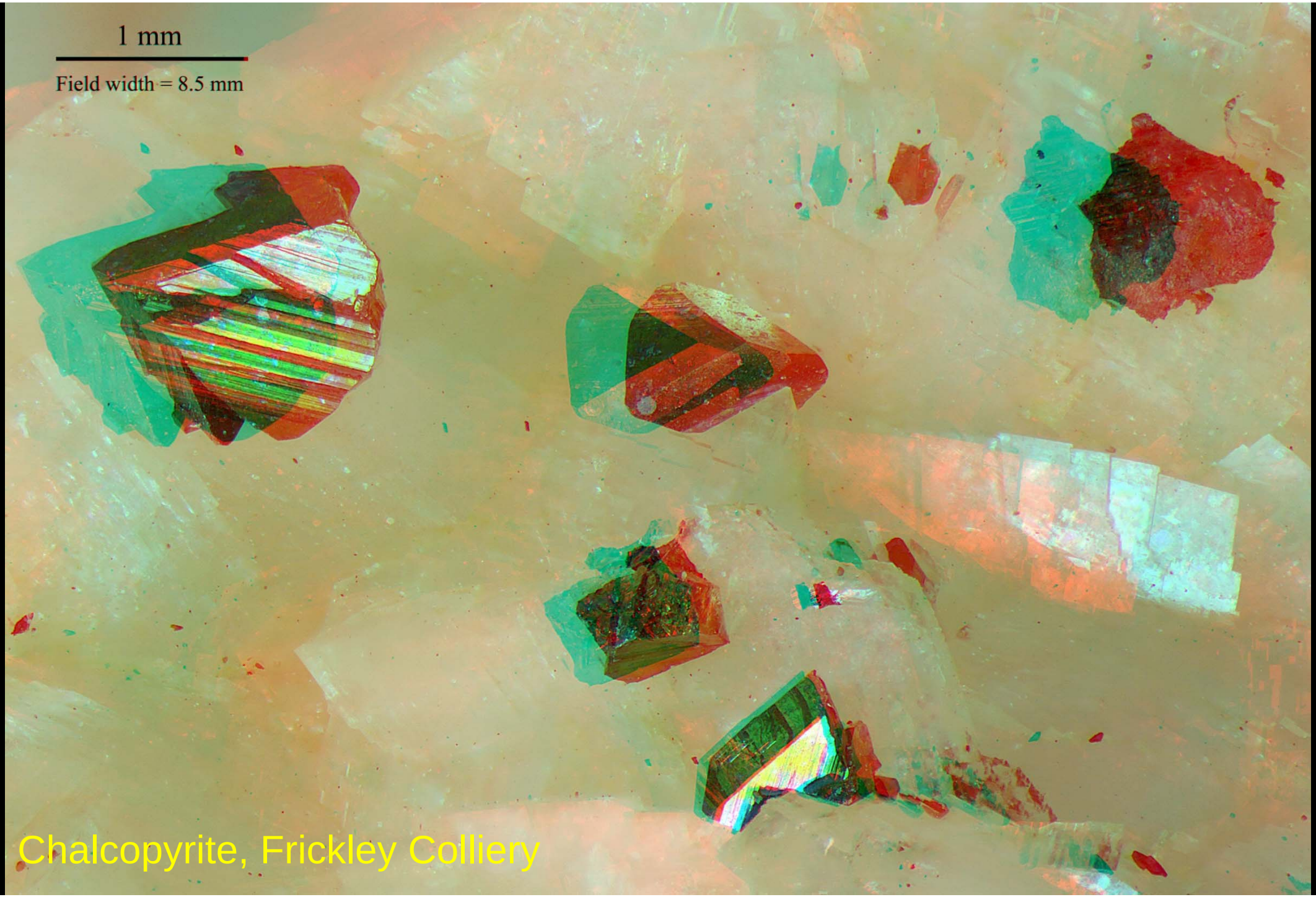
1 mm

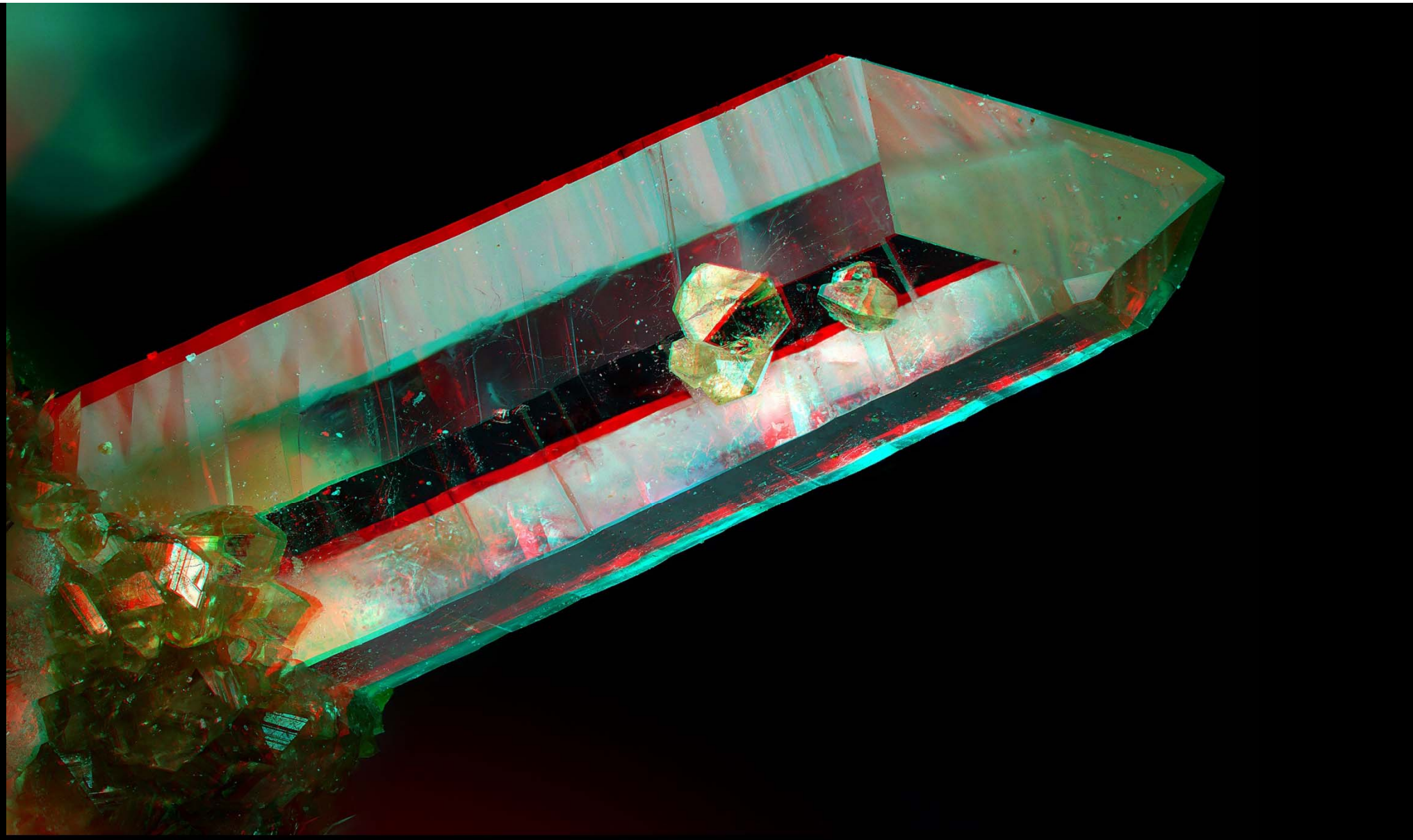
Chabazite, possibly -Ca ($Ca_2[Al_4Si_8O_{24}]\cdot 13H_2O$)
Interpenetration rhombohedra.
Talisker Bay, Minginish, Isle of Skye.

Field width 17.3 mm.

Specimen: David Green collection. Photography: John Chapman, March 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 85 and 88 120-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.


Chalcopyrite, Frickley Colliery
1 mm
Field width = 17.2 mm


1 mm
Field width = 8.5 mm
Chalcopyrite, Frickley Colliery



1 mm

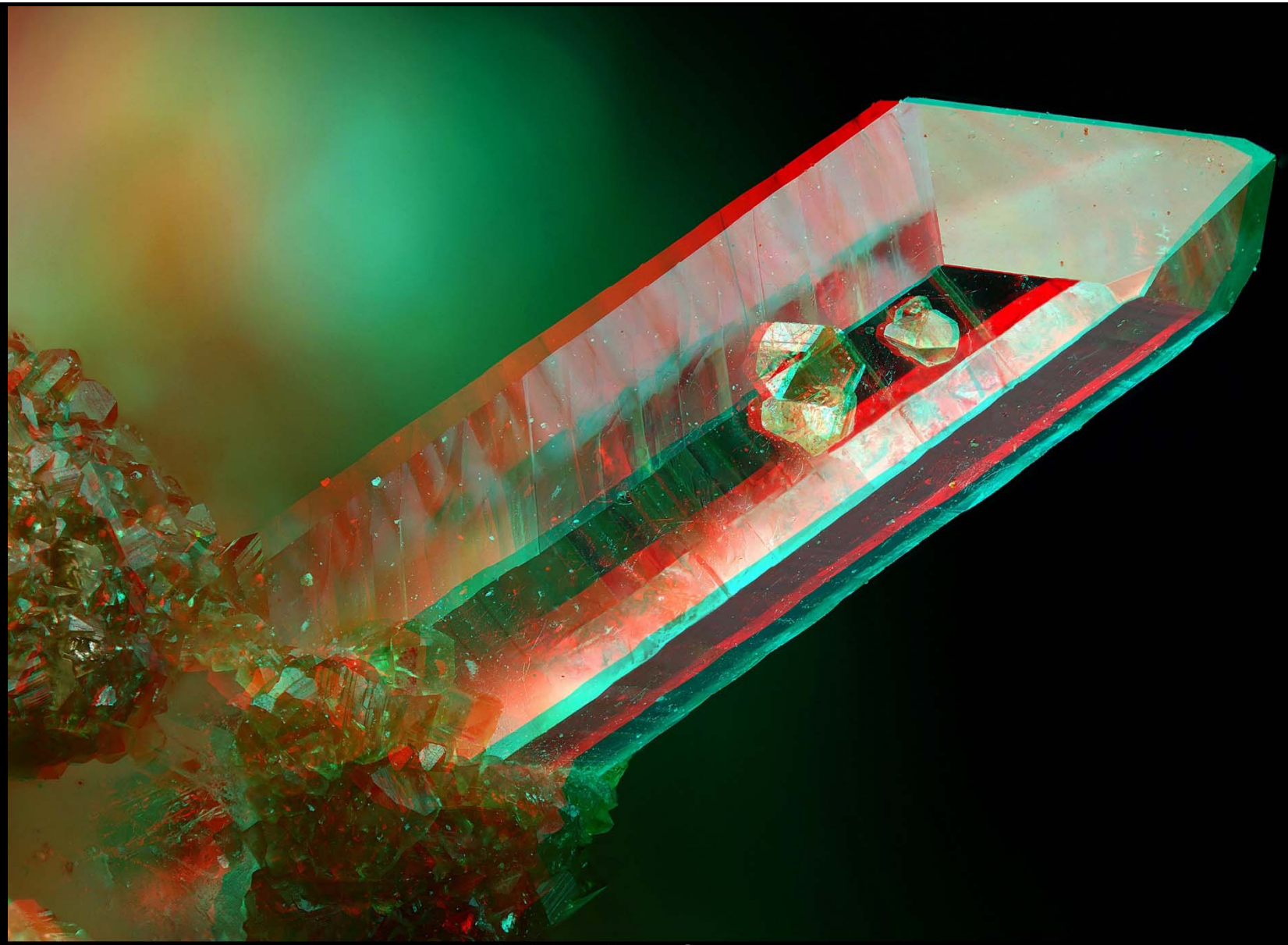
Childrenite $Fe^{2+}Al(PO_4)(OH)_2 \cdot H_2O$

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.



1 mm

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

Field width 5.85 mm.

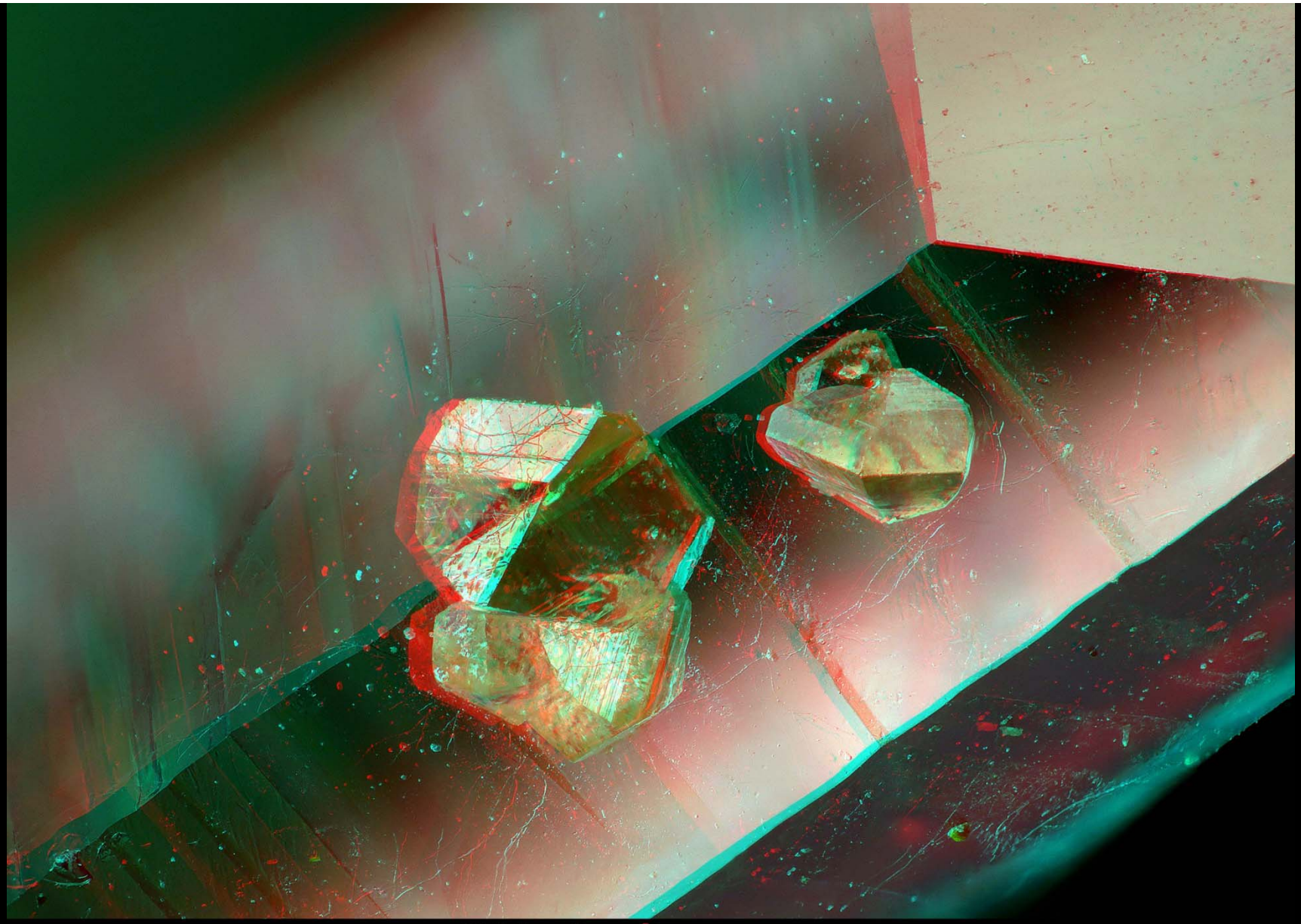
Transparent pale brown pyramidal orthorhombic system crystals on transparent high temperature quartz crystals.

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 80 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 153 and 145 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined at CombineZM.



1 mm

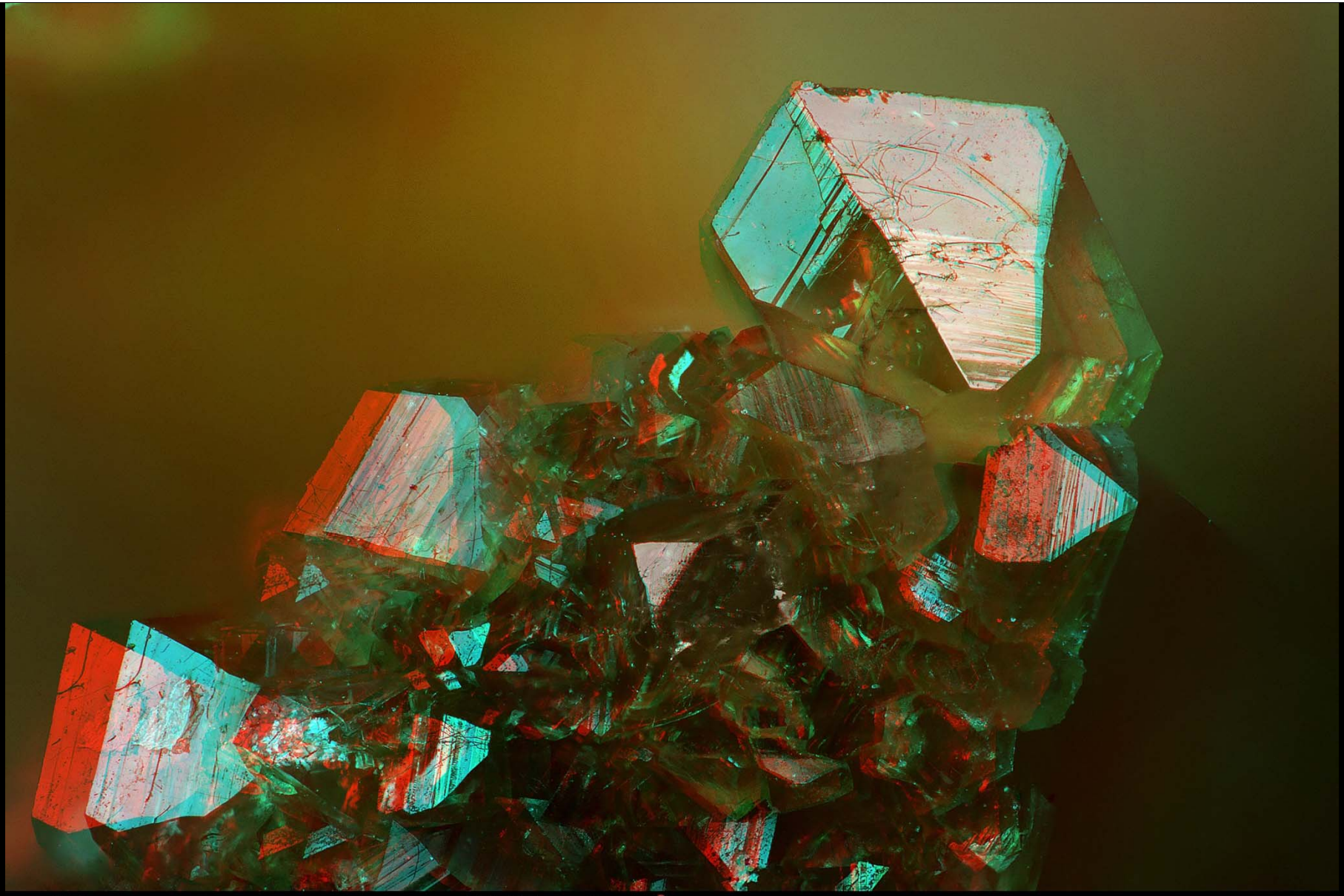
Childrenite $Fe^{2+}Al(PO_4)(OH)_2 \cdot H_2O$

Field width 1.97 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 16 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 77 and 99 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Childrenite $Fe^{2+}Al(PO_4)(OH)_2 \cdot H_2O$ Field width 1.89 mm.

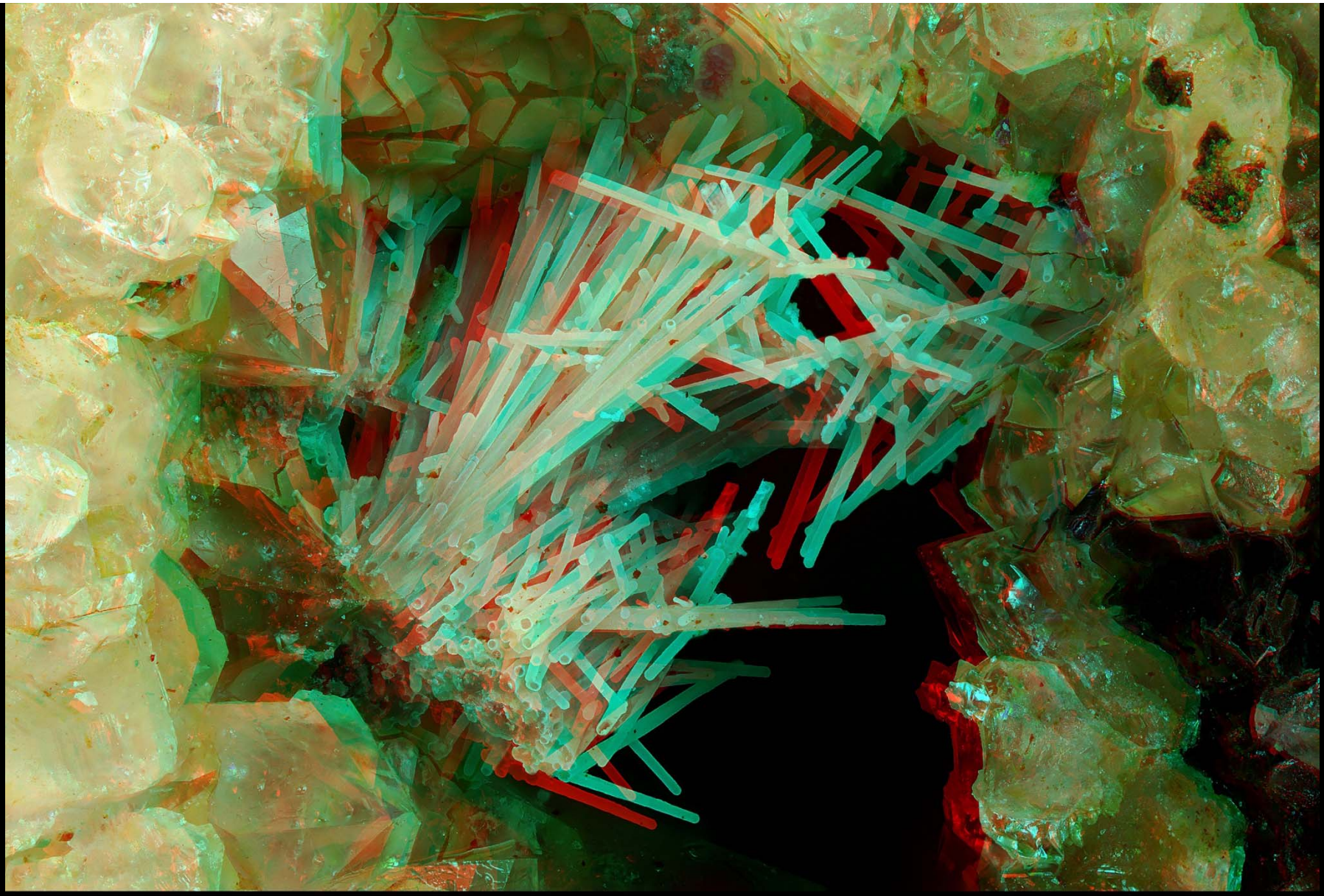
Transparent pale brown pyramidal orthorhombic system crystals clustered around long-type transparent quartz.

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 16 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 88 and 102 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Chrysocolla $(Cu_{2-x}Al_x)H_{2-x}Si_2O_5(OH)_4 \cdot nH_2O$

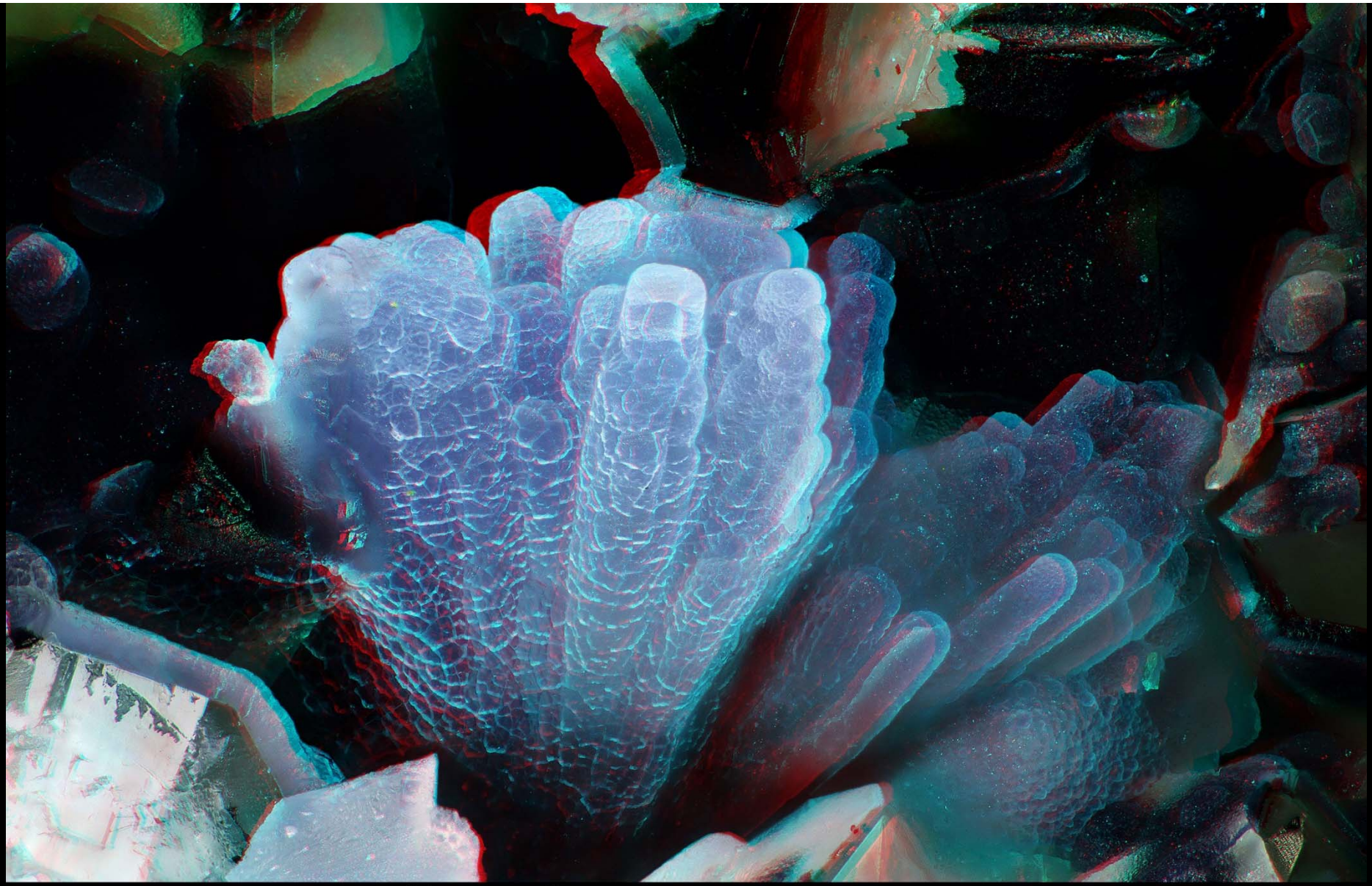
Field width 3.65 mm.

Pseudomorph after malachite within quartz cavity.

Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection. Photography: John Chapman, October 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 121 and 132 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Chrysocolla $(Cu_2\text{-}xAlx)H_2\text{-}xSi_2O_5(OH)_4 \cdot nH_2O$

Field width 1.23 mm.

Cluster of stalactitic forms in quartz with goethite and chalcopyrite.
Longlands Fell Mine, Uldale, Cumbria.

Specimen: found by Paul Nicholson and in Paul Nicholson collection. Photography: John Chapman, October 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 120 and 123 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

No 3D available

0.1 mm

Cinnabar HgS

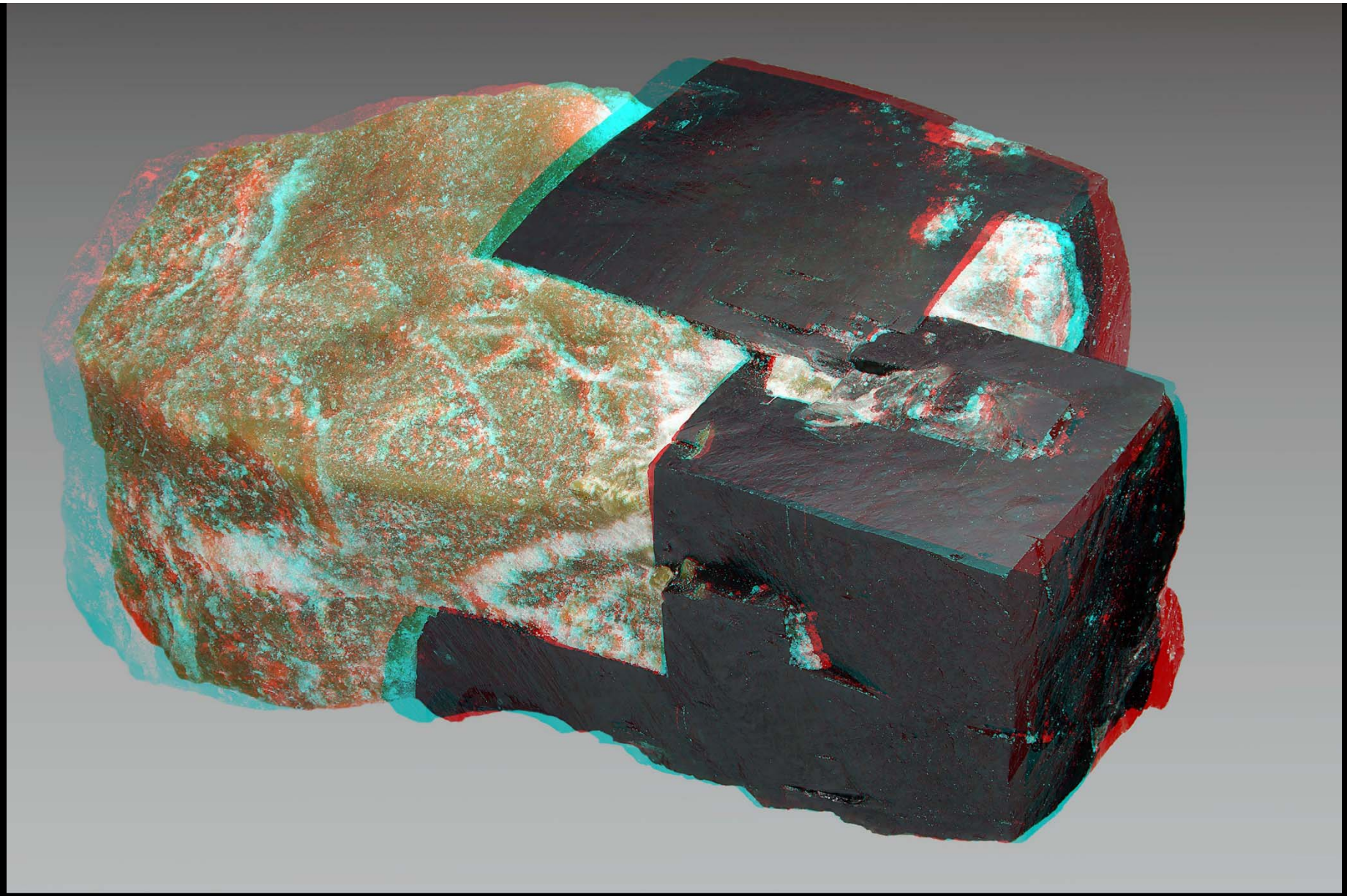
Field width 0.419 mm.

Highly insoluble red nanoparticles formed from supergene solutions by the oxidation of sphalerite, here deposited above and below a hemimorphite crystal. Barras End NY 9879 0108, Arkengarthdale, North Yorkshire.

Specimen: found by John Chapman and in John Chapman collection, No. BEc10. Photography: John Chapman.

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

Stack of 49 2-micrometre steps via Stackshot rail, combined in CombineZM and processed in Photoshop 2023.



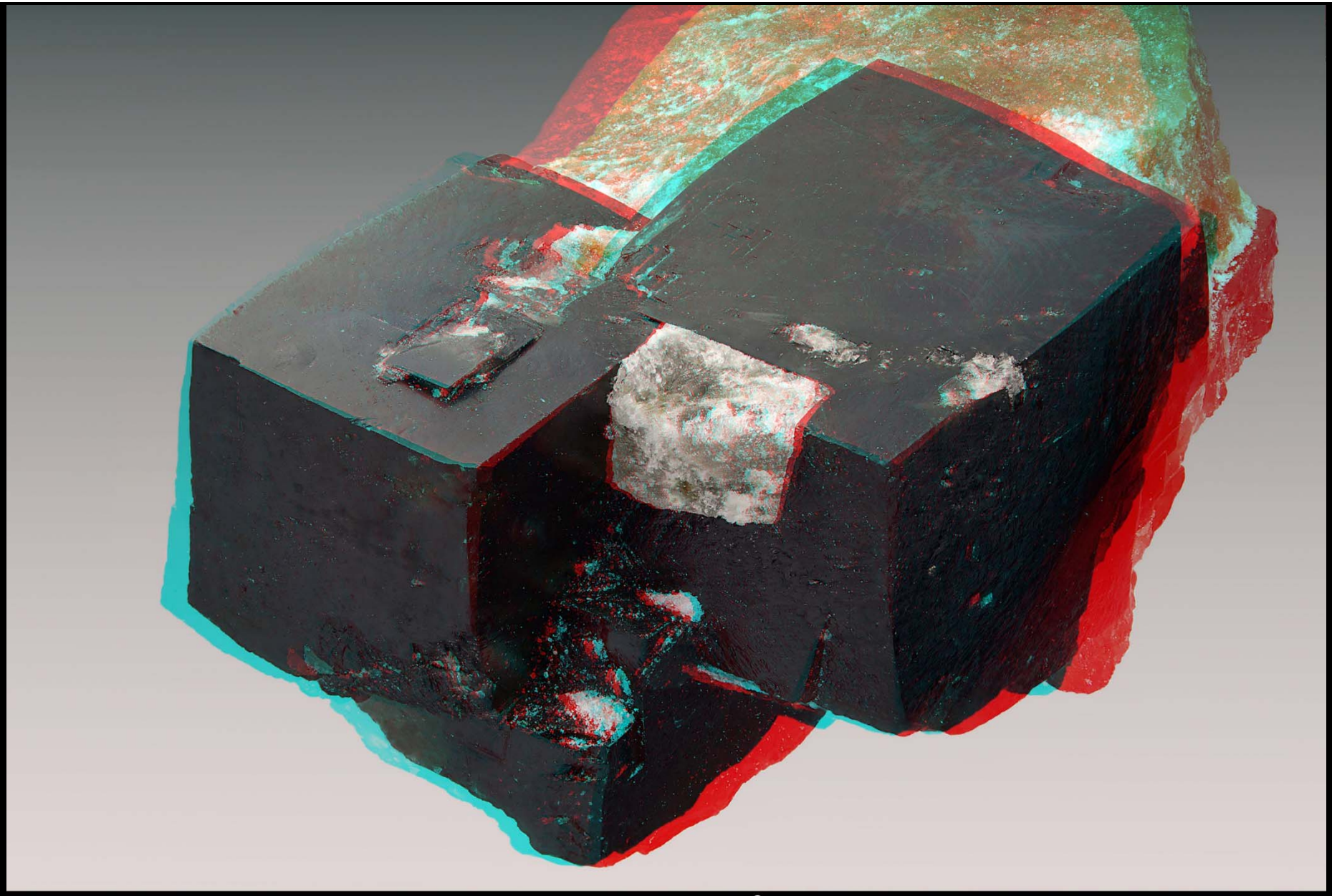
10 mm **Congolite-trembathite** $(Fe^{2+}_3\text{-}Mg_3)B_7O_{13}Cl$ Field width 27.1 mm.

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



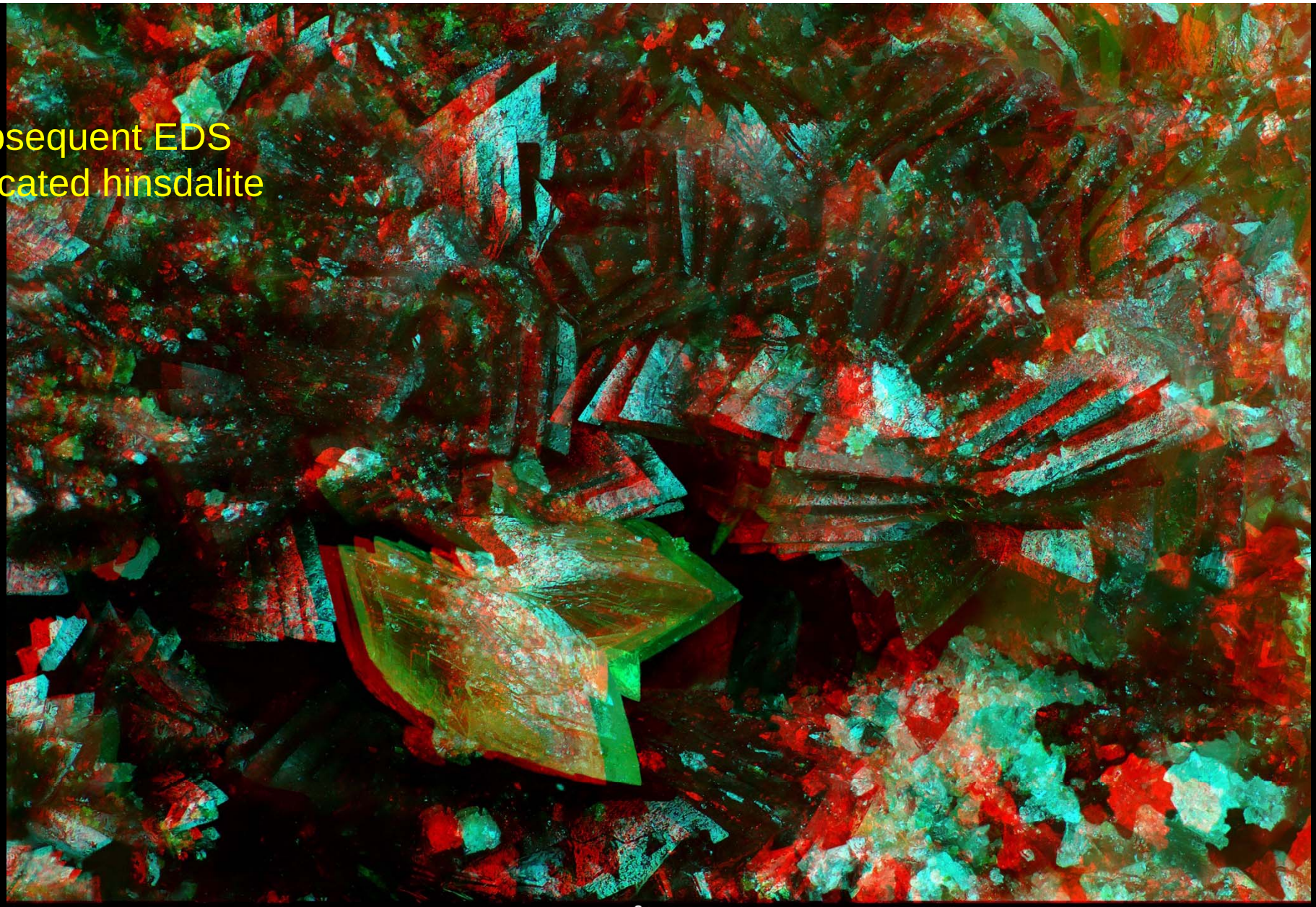
10 mm **Congolite-trembathite** $(Fe^{2+}_3\text{-}Mg_3)B_7O_{13}Cl$ Field width 26.5 mm.

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

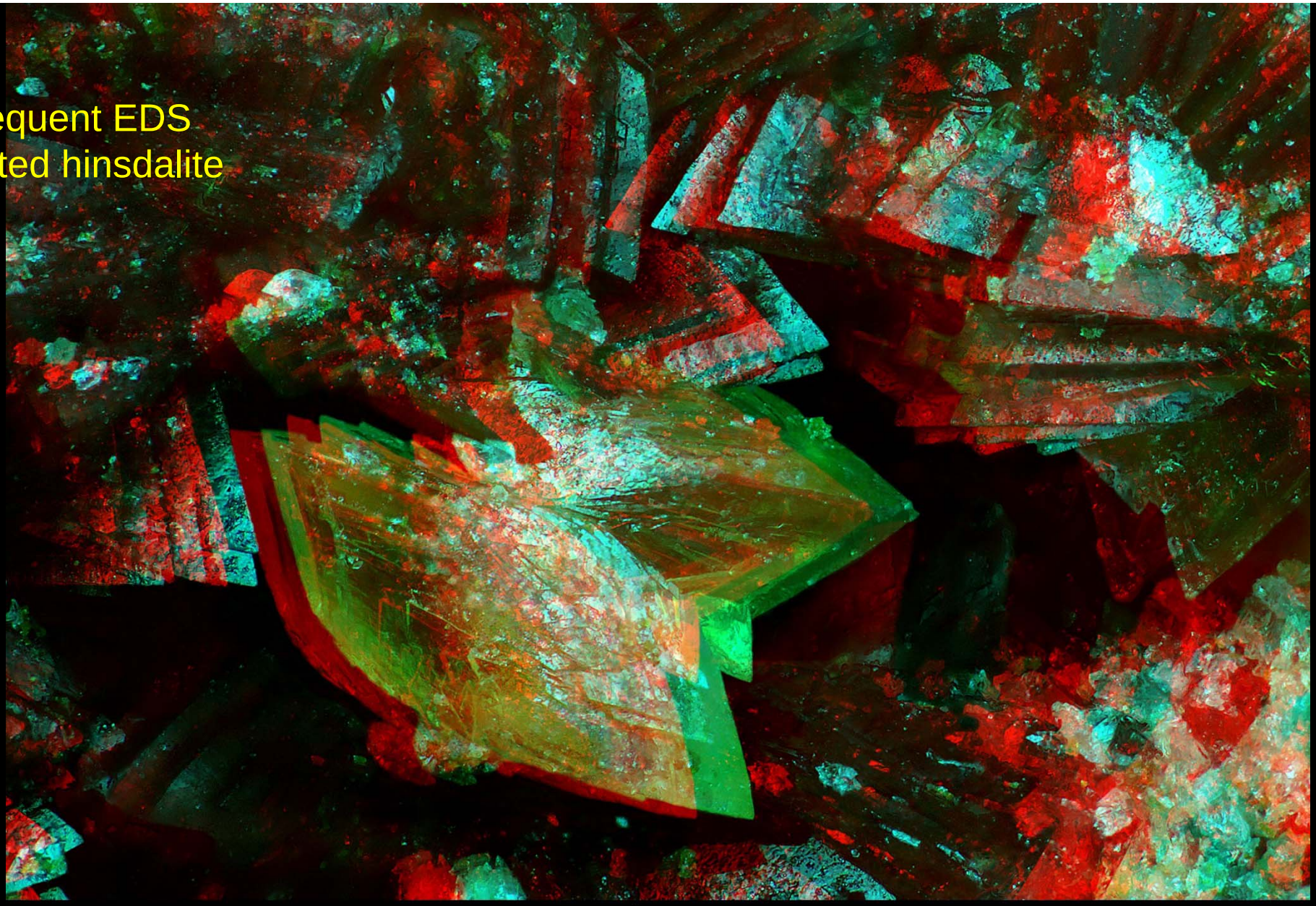
Corkite $PbFe^{3+}_3(SO_4)(PO_4)(OH)_6$ Field width 1.18 mm.

Yellow and brown transparent rhombohedral crystals. Saddleback Old Mine, Mungrisdale, Cumbria.

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

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

Left + right stacks of 138 and 111 5-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



0.1 mm

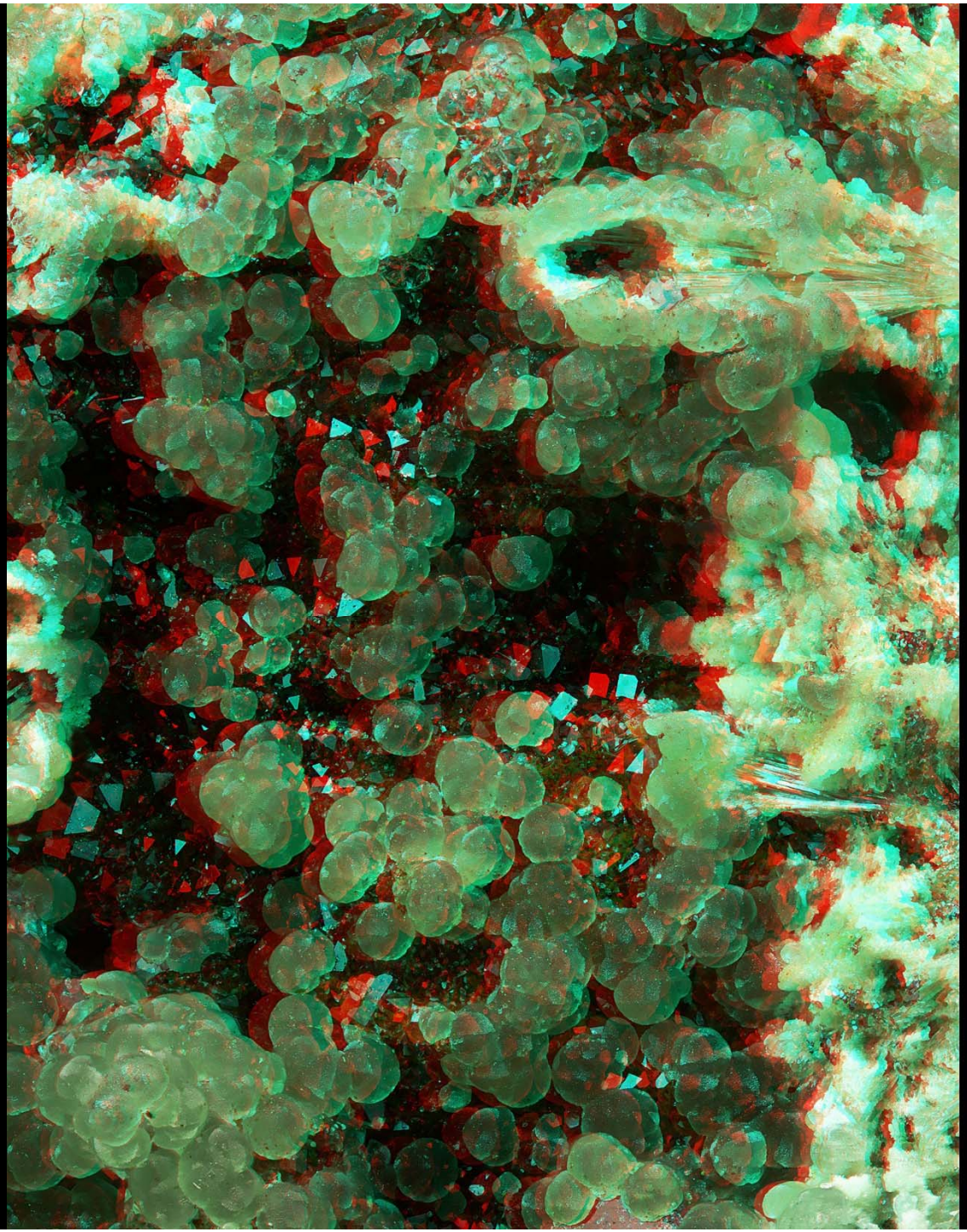
Corkite $PbFe^{3+}_3(SO_4)(PO_4)(OH)_6$ Field width 0.728 mm.

Yellow and brown transparent rhombohedral crystals. Saddleback Old Mine, Mungrisdale, Cumbria.

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

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

Left + right stacks of 138 and 111 5-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Cornwallite $Cu_5(AsO_4)_2(OH)_4$

Spherulitic on goethite coated quartz.

From the 1950s discovery at Potts Gill mine, Caldbeck Fells, Cumbria.

Specimen: formerly in the Norman Thomson collection and now in the David Green collection.

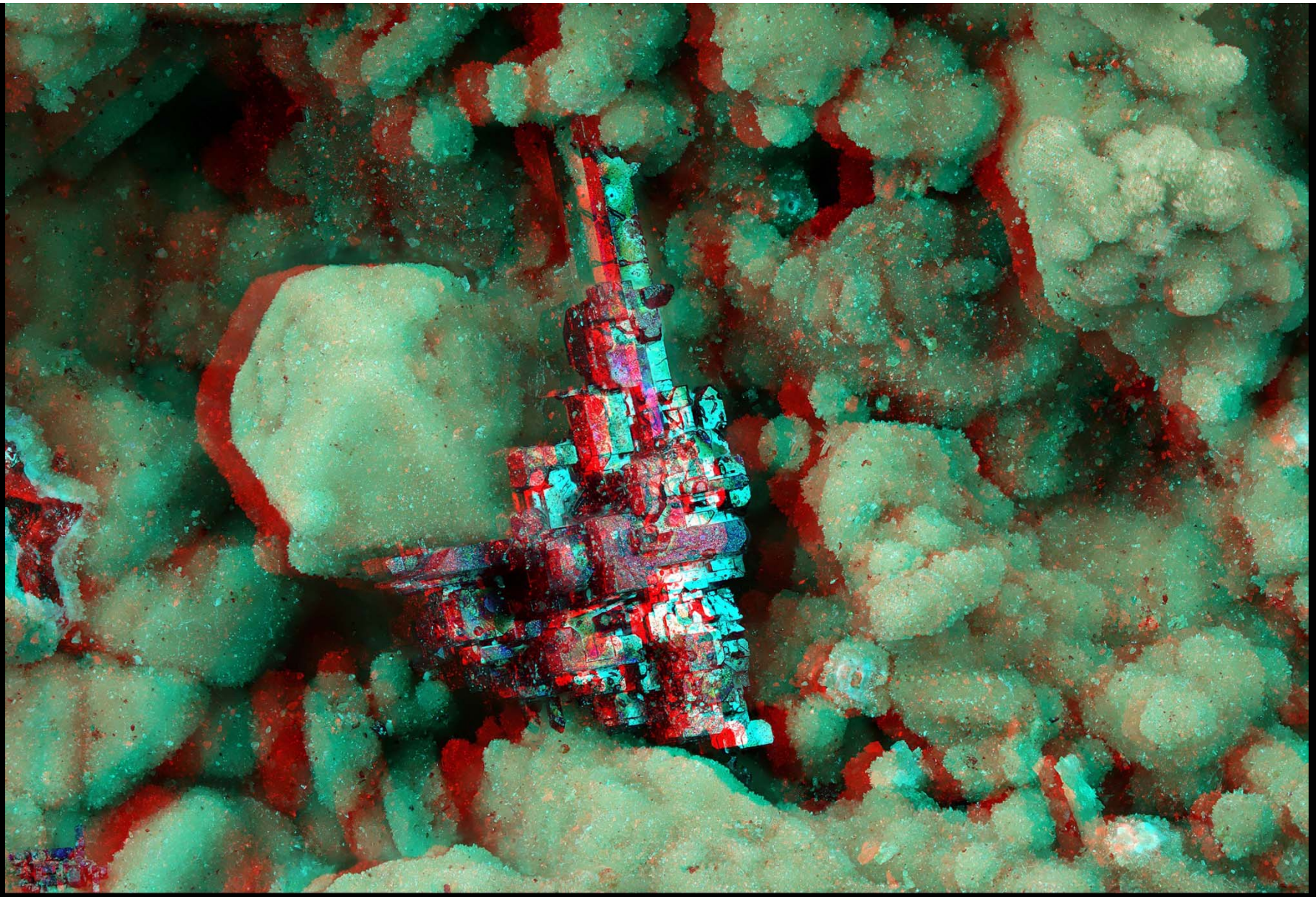
Photography: John Chapman, February 2024.

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 111 and 100 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

Field height 2.90 mm.

1 mm



1 mm

Cuprite Cu_2O

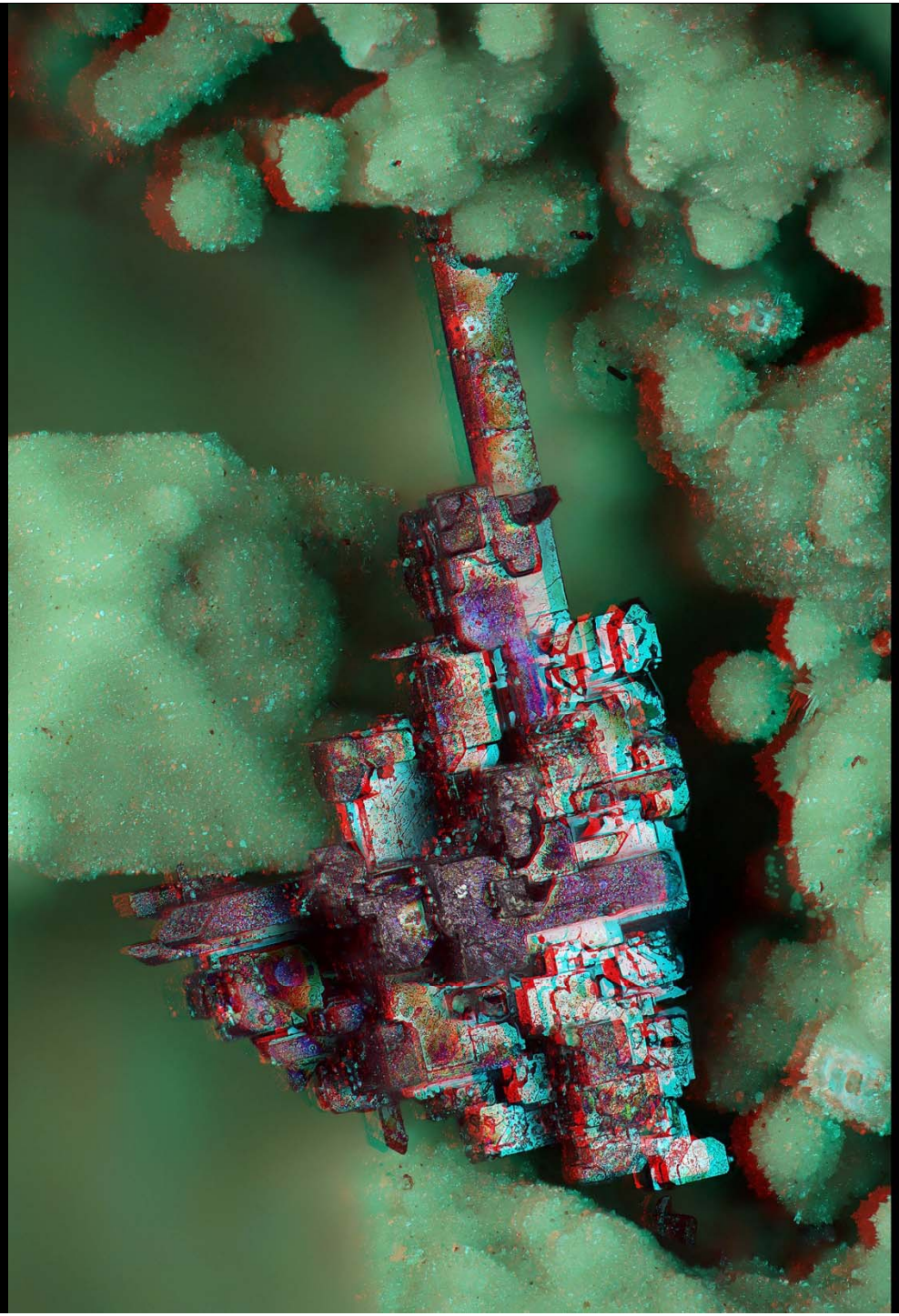
Field height 3.58 mm.

A blocky form intermediate between normal cubic crystals and the fibrous form, chalcotrichite.

New Cliffe Hill Quarry, Leicestershire. On pseudomorphous malachite.

Specimen: Steve Burchmore collection. Photography: John Chapman, November 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.
stacks of 125 and 15-micrometre steps at degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Cuprite Cu_2O

A blocky form intermediate between normal cubic crystals and the fibrous form, chalcotrichite.

New Cliffe Hill Quarry, Leicestershire.

Specimen: Steve Burchmore collection.

Photography: John Chapman, November 2023.

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 134 and 134 6-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm 1 mm Field height 2.29 mm.

No 3D available

0.1 mm

Delafossite $Cu^{1+}Fe^{3+}O_2$

Field width 1.2 mm

Black spheroidal aggregates on iron-stained quartz. Murton Mine, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

Canon EOS 5D Mk II camera with Leica 140x/0.45 objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Stack of 72 5 micrometre steps via Stackshot rail combined in CombineZM and processed in PhotoShop Elements.

0.1 mm

Delafossite $Cu^{1+}Fe^{3+}O_2$

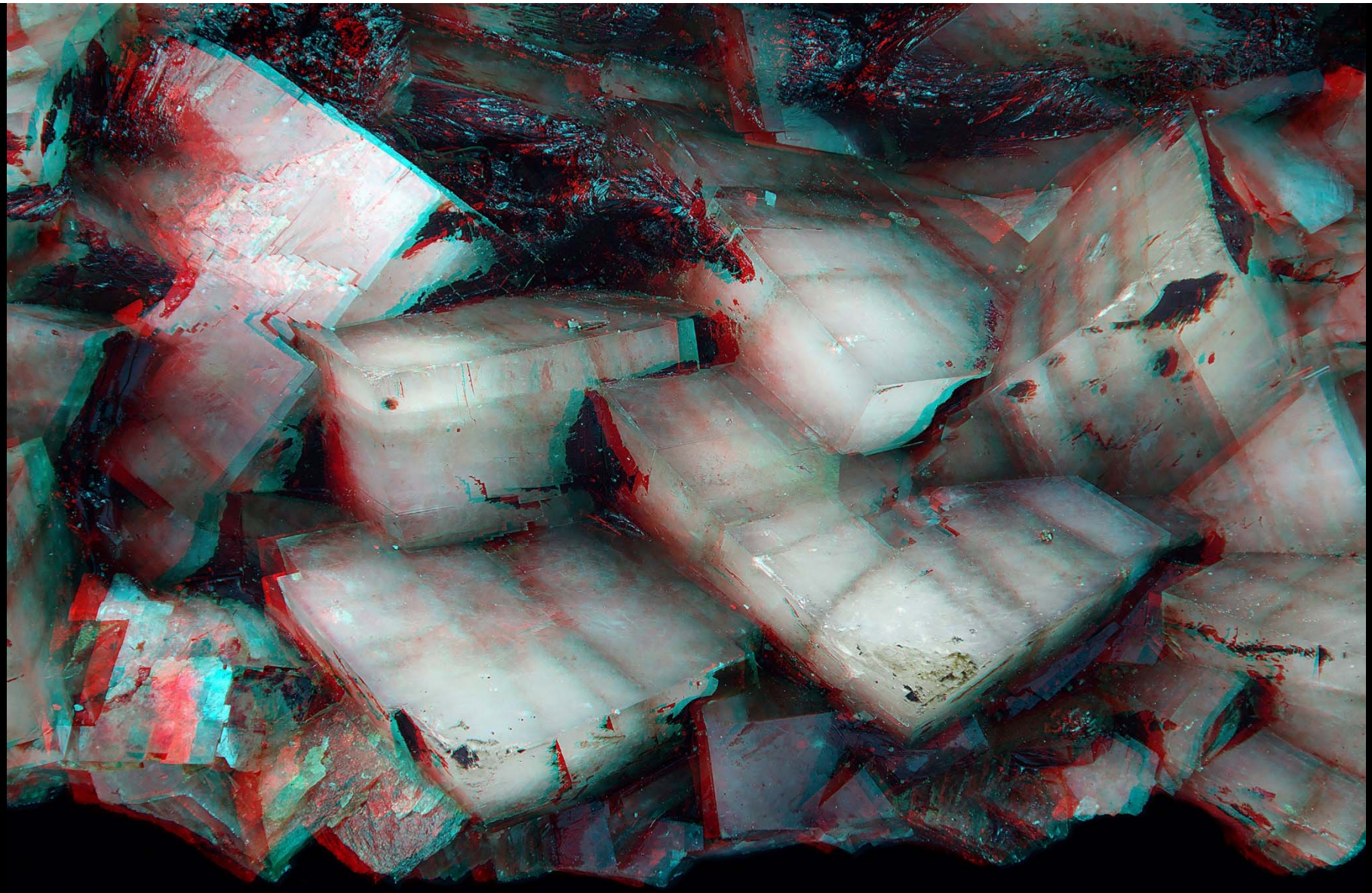
Field width 0.5 mm

Black spheroidal aggregates on iron-stained quartz. Murton Mine, Scordale, near Appleby, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

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

Stack of 72 2 micrometre steps via Stackshot rail combined in CombineZM and processed in PhotoShop Elements.



Dolomite $CaMg(CO_3)_2$

Lustrous rhombs with soft sticky hydrocarbon.

Haigh Yard Seam, Astley Green Colliery, Leigh, Lancashire.

Field width 26.7 mm.

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

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 61 and 82 150-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.

No 3D available

0.1 mm

Duftite $PbCu(AsO_4)(OH)$

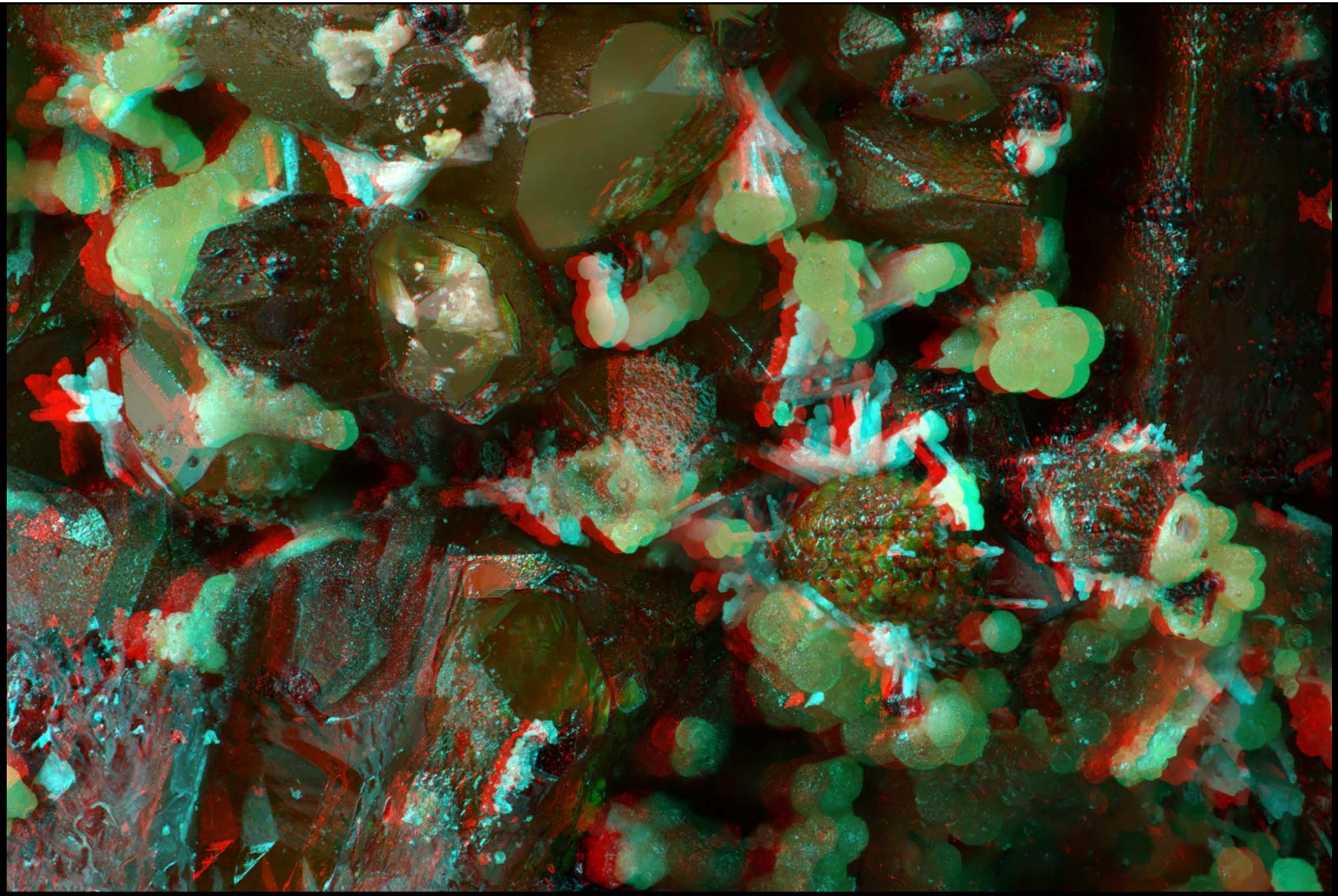
Field width 1.25 mm.

Partially translucent botryoidal. Hardshins Level, Murton Mine NY 7595 2252, Scordale, 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.

Stack of 156 4-micrometre steps via Stackshot rail, combined in CombineZM and processed in Photoshop 2023.



1 mm **Duftite** $PbCu(AsO_4)(OH)$ Field width 2.16 mm.

Green botryoidal overgrowing spiky white mimetite and overgrown by a black manganese oxide in a fluorite-quartz-galena matrix from the roof of a cavity. Hardshins Level, Murton Mine NY 7595 2252, Scordale, Cumbria.

Specimen: David Green collection. Photography: John Chapman.

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 143 and 176 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.