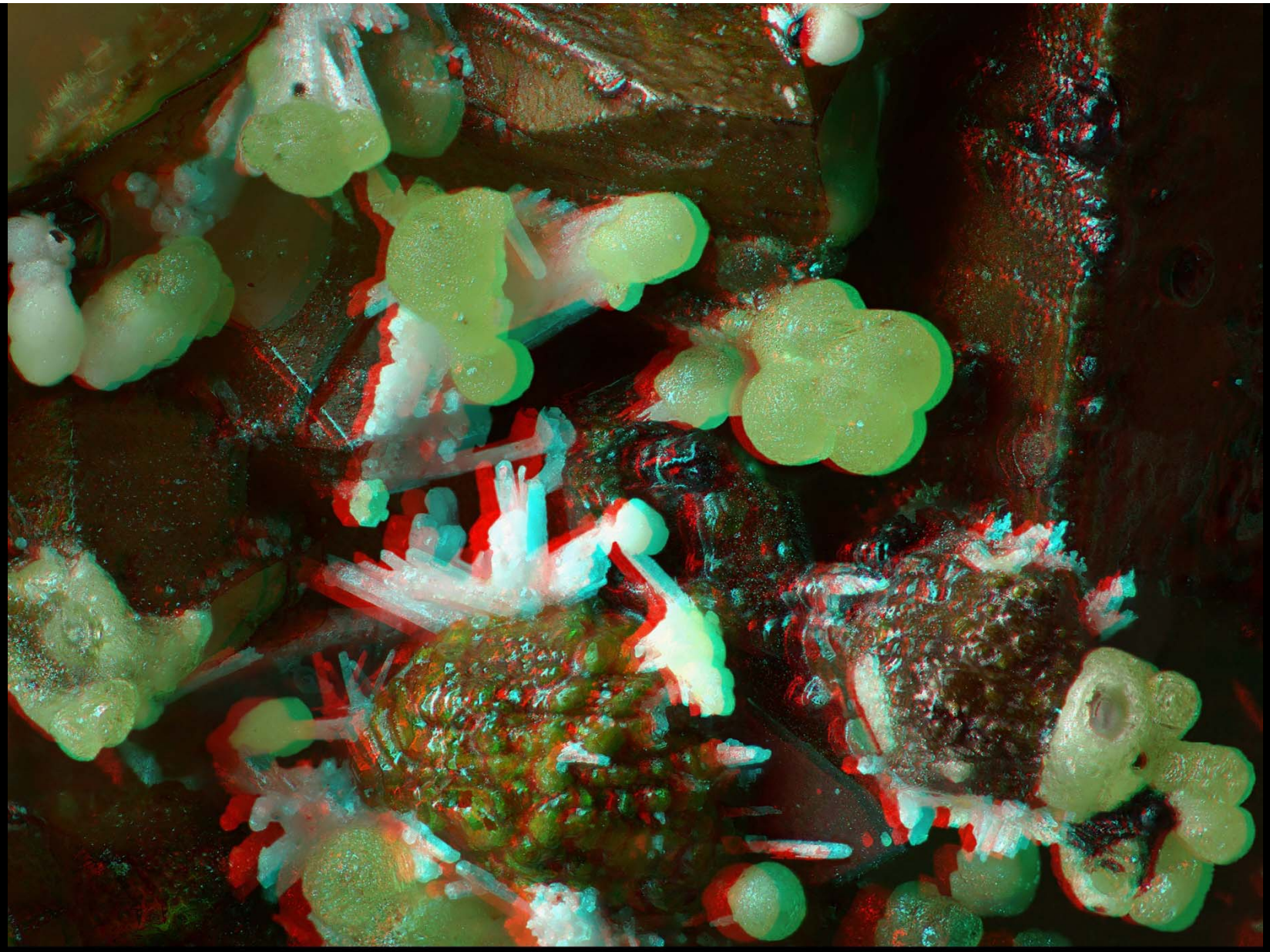


0.1 mm

Duftite $PbCu(AsO_4)(OH)$

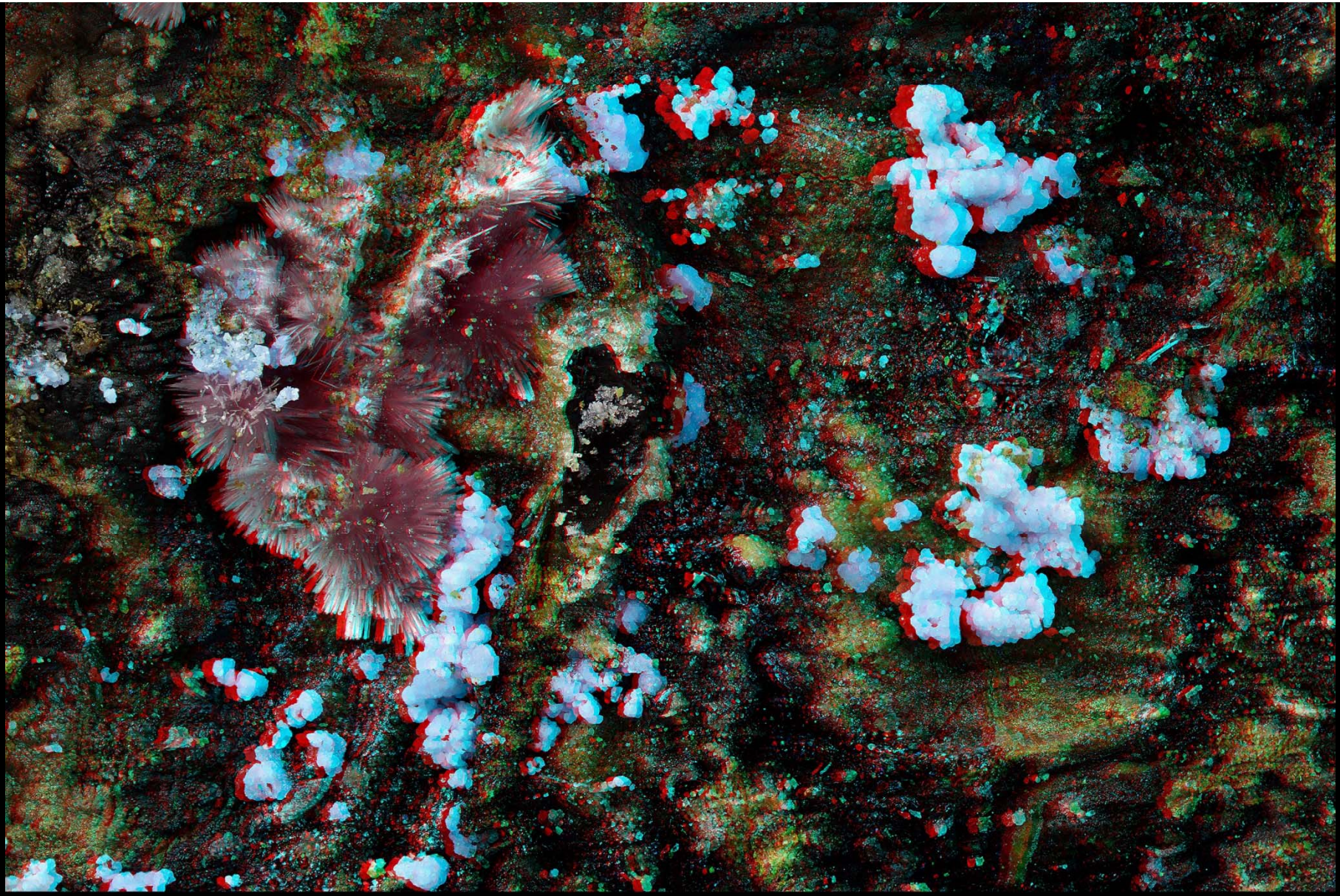
Field width 1.08 mm.

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

Left + right stacks of 151 and 127 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



1 mm

Erythrite $Co_3(AsO_4)_2 \cdot 8H_2O$

Field width 5.30 mm.

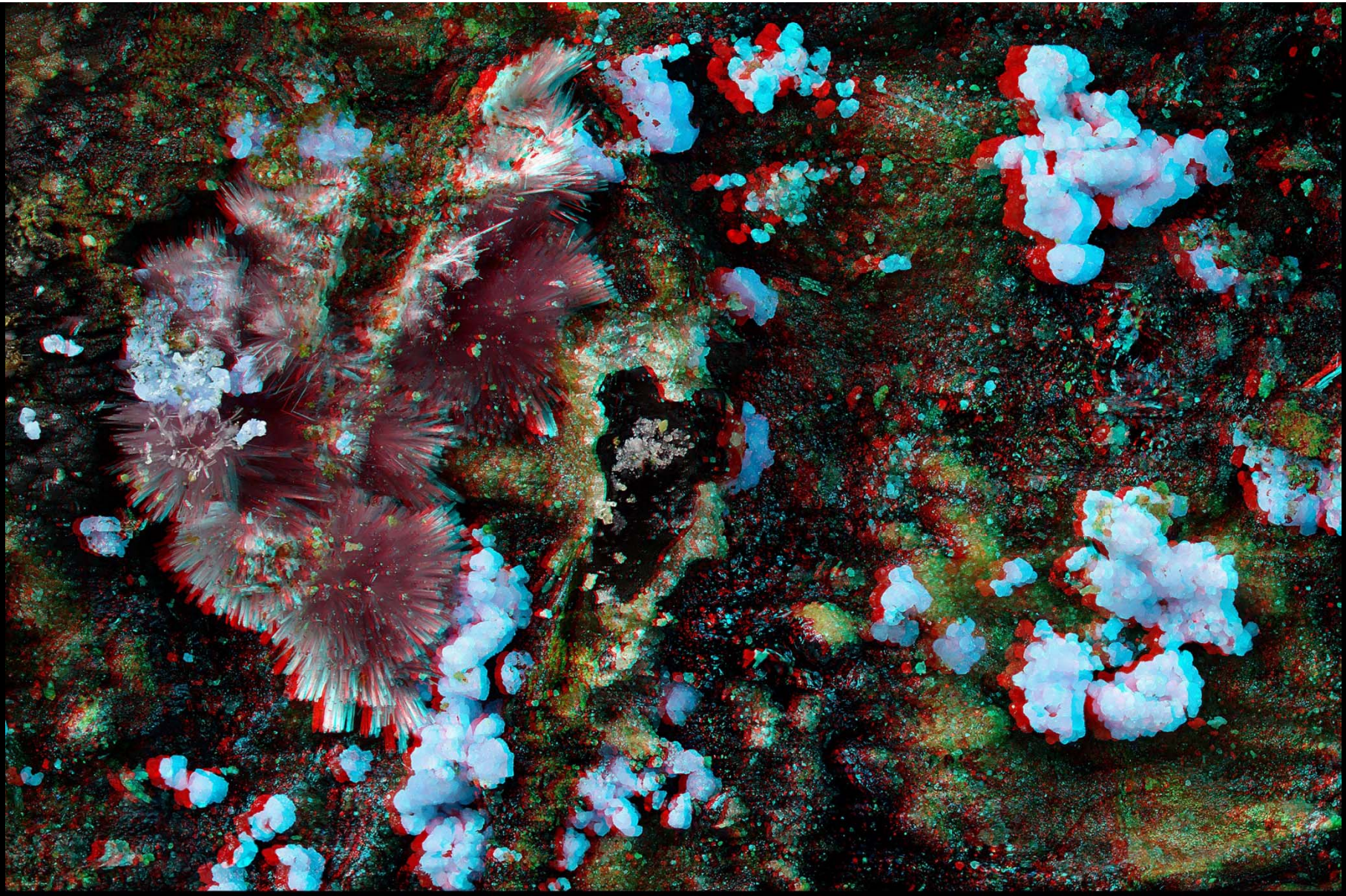
Deep pink radiating sprays on a probable manganese oxide substrate with blue lavendulan (almost certainly).

From the cliff fall at Lushington Beach from the Wheal Fox Mine (part of Wheal Lushington), Porthtowan, St Agnes, Cornwall.

Specimen: collected in April 2011 by Rob Selley, 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 150 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 67 and 56 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Erythrite $Co_3(AsO_4)_2 \cdot 8H_2O$

Field width 4.30 mm.

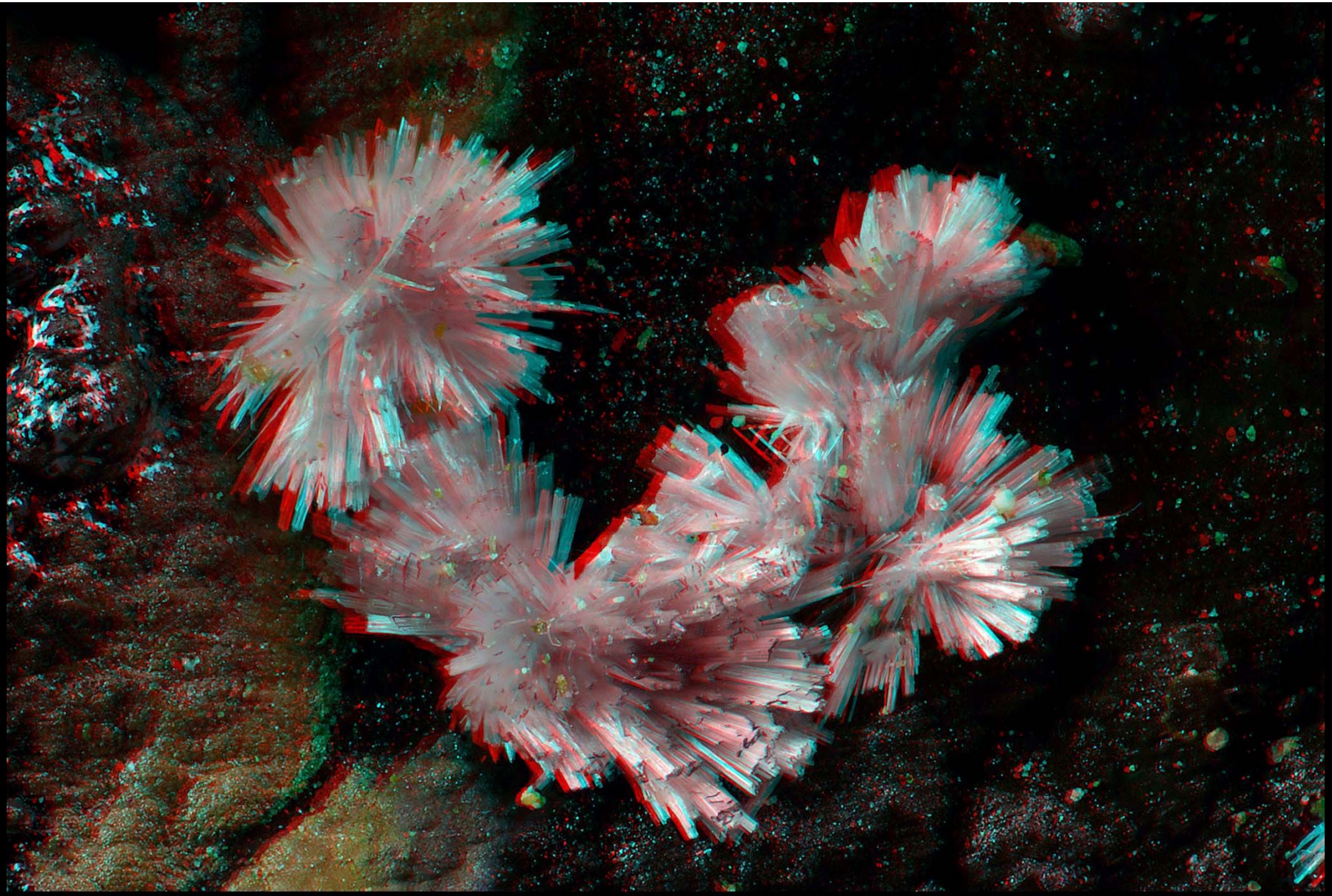
Deep pink radiating sprays on a probable manganese oxide substrate with blue lavendulan (almost certainly).

From the cliff fall at Lushington Beach from the Wheal Fox Mine (part of Wheal Lushington), Porthtowan, St Agnes, Cornwall.

Specimen: collected in April 2011 by Rob Selley, 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 150 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 67 and 56 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Erythrite $Co_3(AsO_4)_2 \cdot 8H_2O$

Field width 1.52 mm.

0.1 mm

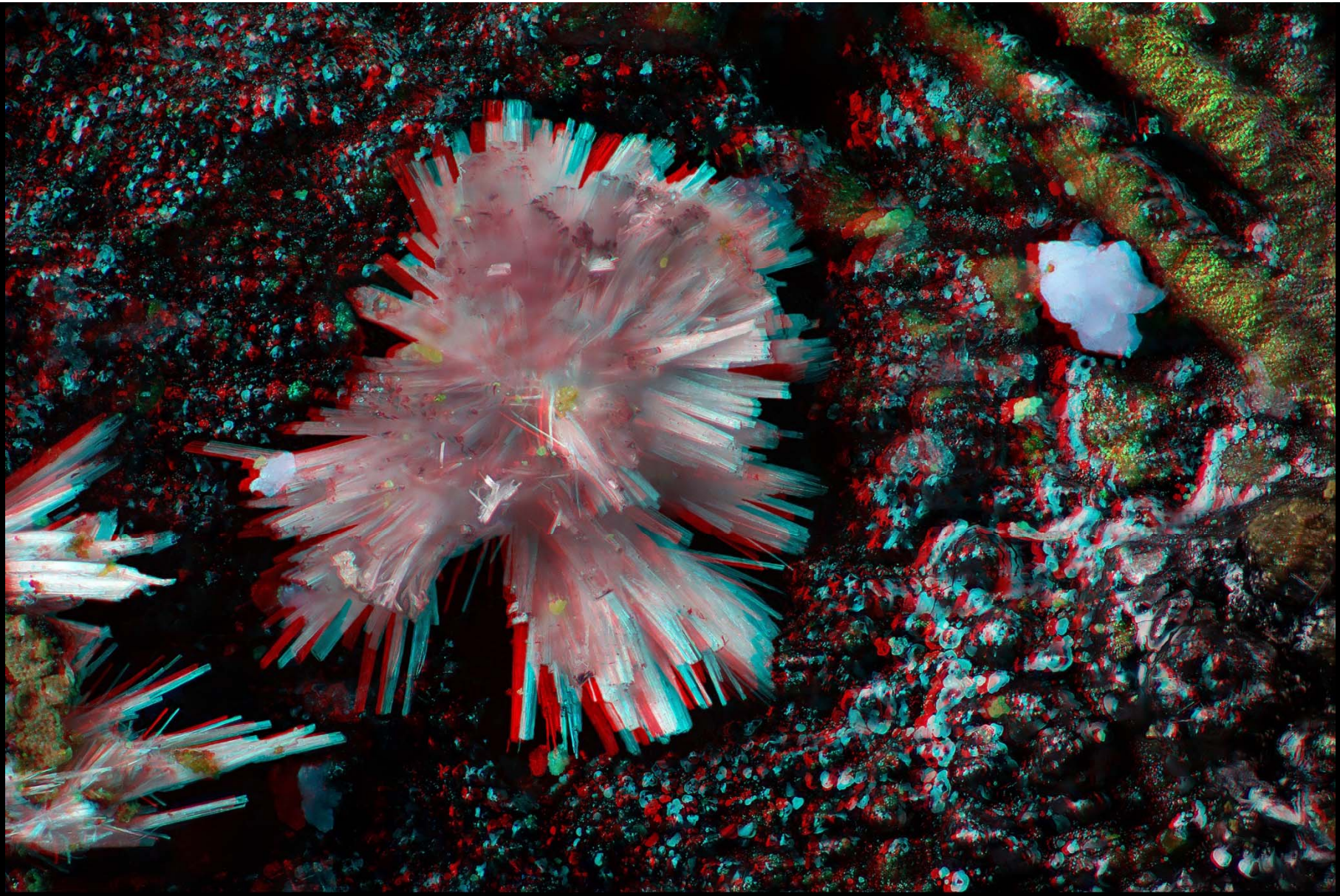
Deep pink radiating sprays on a probable manganese oxide substrate.

From the cliff fall at Lushington Beach from the Wheal Fox Mine (part of Wheal Lushington), Porthtowan, St Agnes, Cornwall.

Specimen: collected in April 2011 by Rob Selley, now in David 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 85 and 81 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Erythrite $Co_3(AsO_4)_2 \cdot 8H_2O$

Field width 1.21 mm.

Deep pink radiating sprays on a probable manganese oxide substrate with blue lavendulan (almost certainly).

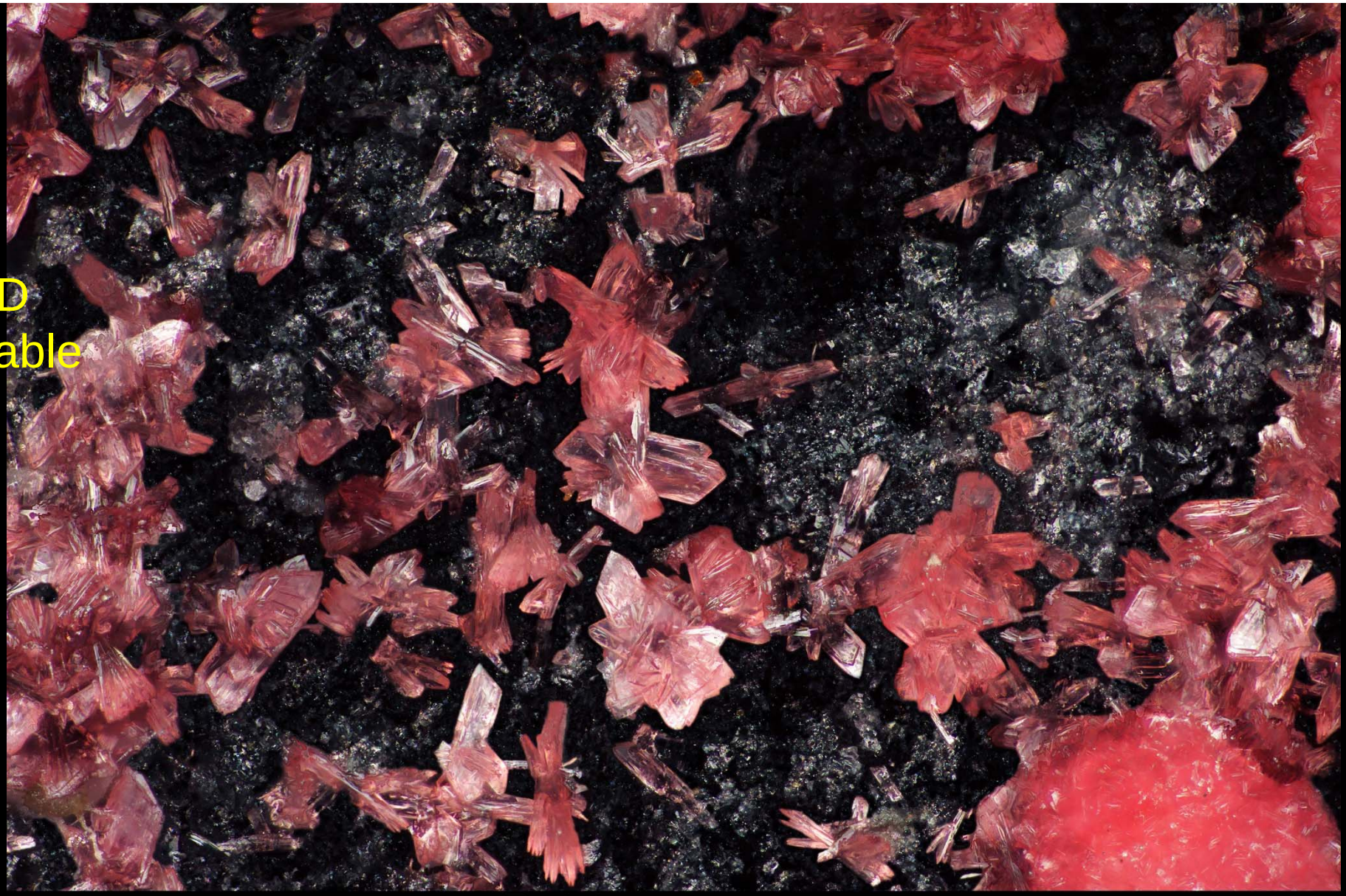
From the cliff fall at Lushington Beach from the Wheal Fox Mine (part of Wheal Lushington), Porthtowan, St Agnes, Cornwall.

Specimen: collected in April 2011 by Rob Selley, now in David Green collection. Photography: John Chapman, February 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 82 and 91 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

No 3D available



0.1 mm

Field width 1.25 mm.

Erythrite $Co_3(AsO_4)_2 \cdot 8H_2O$

Clusters and spherulites of monoclinic crystals on gypsum-bearing clast in quartz.
Tynebottom Mine, Carrigill, Alston Moor, Eden, Cumbria.

Specimen: found by Chris Jewson in Jan 1991 and now in 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 129 2- and 4-micrometre steps via Stackshot rail, combined in CombineZM and processed in Photoshop CC.

No 3D available

0.1 mm

Erythrite $Co_3(AsO_4)_2 \cdot 8H_2O$

Field width 0.788 mm.

Clusters and spherulites of monoclinic crystals on gypsum-bearing clast in quartz.
Tynebottom Mine, Carrigill, Alston Moor, Eden, Cumbria.
Specimen: found by Chris Jewson in Jan 1991 and now in 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 129 2- and 4-micrometre steps via Stackshot rail, combined in CombineZM and processed in Photoshop CC.

0.1 mm

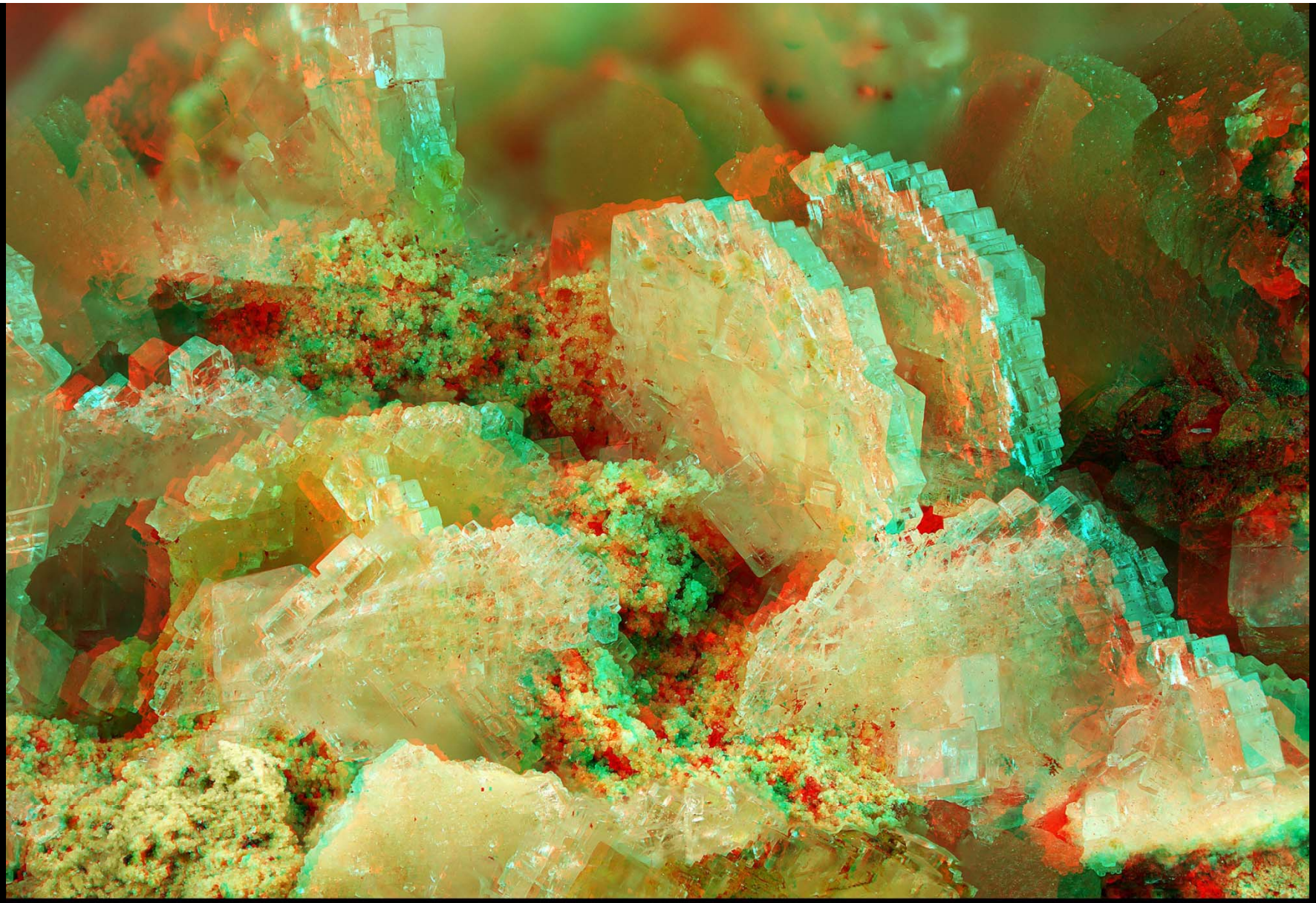
Erythrite $Co_3(AsO_4)_2 \cdot 8H_2O$

Field width 0.50 mm.

Clusters and spherulites of monoclinic crystals on gypsum-bearing clast in quartz.
Tynebottom Mine, Carrigill, Alston Moor, Eden, Cumbria.

Specimen: found by Chris Jewson in Jan 1991 and now in 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 122 1- and 2-micrometre steps via Stackshot rail, combined in CombineZM and processed in Photoshop CC.



1 mm

Fluorite CaF_2

Field width 12.1 mm.

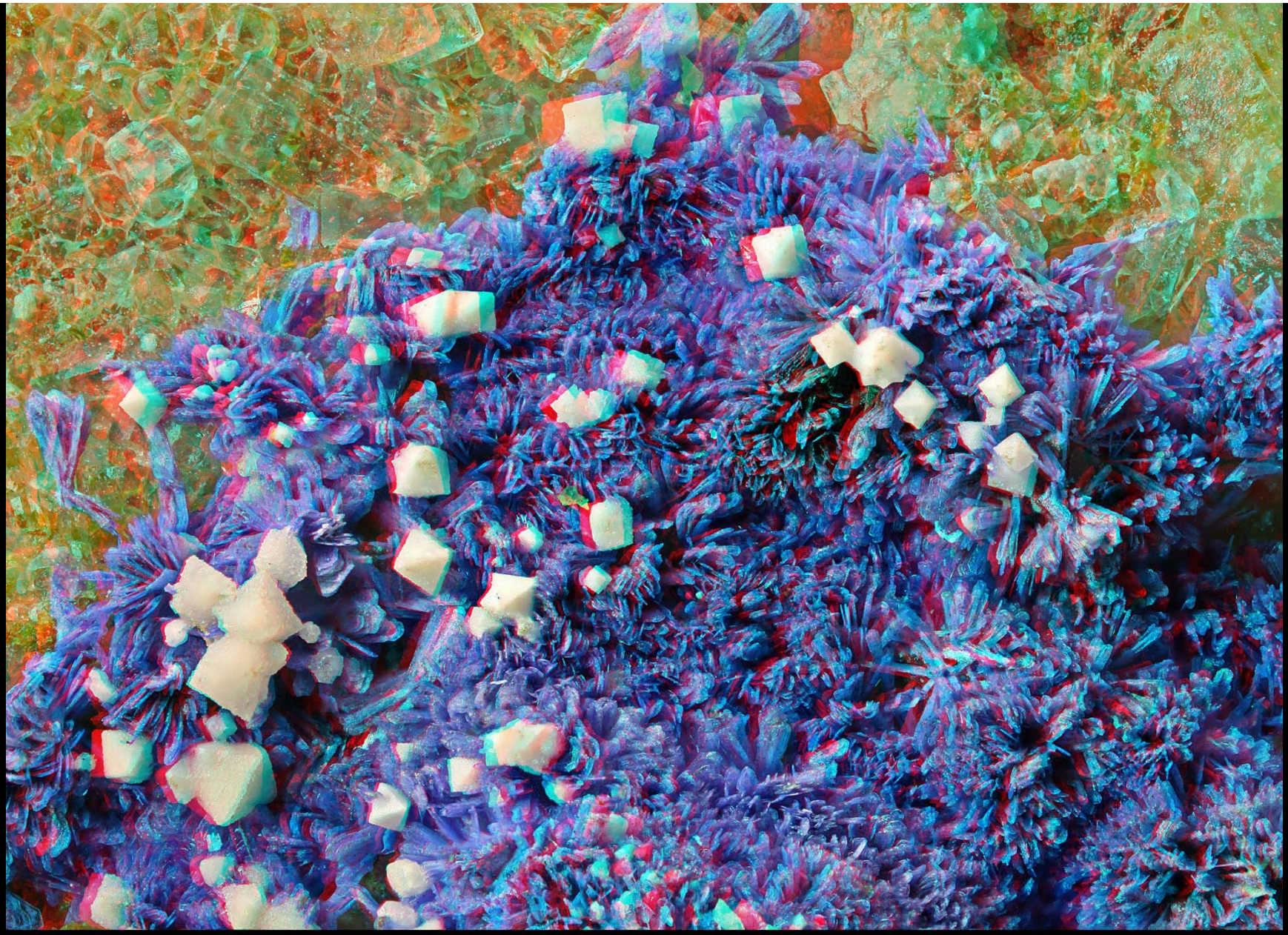
Unusual platy composite fan-like cogwheels with calcite.

Old Town Quarry NZ 256 245, Newton Aycliffe, Co. Durham.

Specimen: ex Colin Robinson. Photography: John Chapman, October 2023.

Canon EOS 5DSr camera aith Carl Zeiss (West Germany) Luminar 63 mm objective lens on 150 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 113 and 105 75-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



1 mm

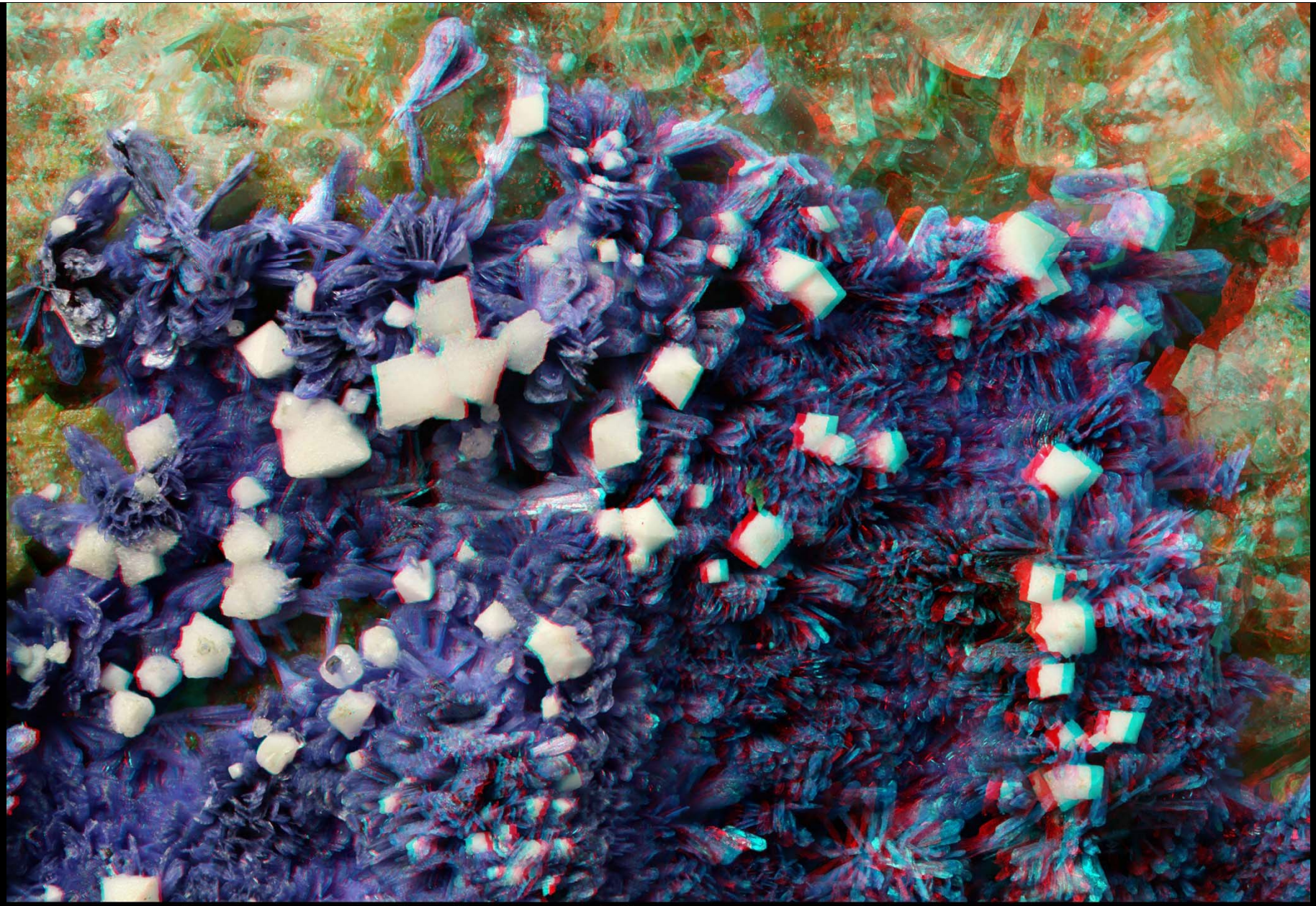
Fluorite, rare white supergene octahedra Field width 3.7 mm

on foliaceus azurite on yellow fluorite. Great Sleddale, Angram Common, Keld, Swaledale, North Yorkshire.

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

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

Stack of 60 20-micrometre steps via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM and processed in PhotoShop CS5. Rt. 3D view.



1 mm

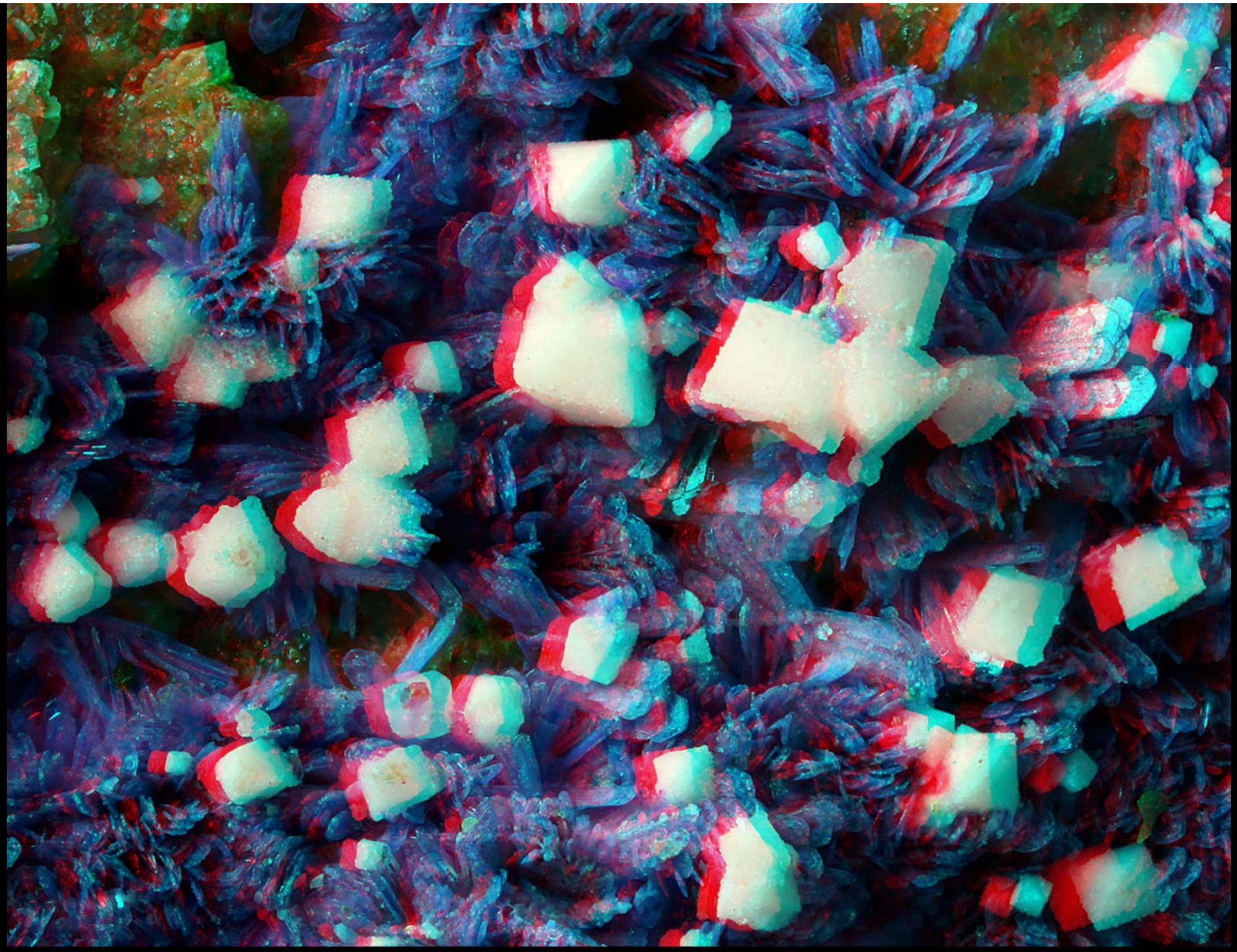
Fluorite, rare white supergene octahedra Field width 3.7 mm

on foliaceus azurite on yellow fluorite. Great Sleddale, Angram Common, Keld, Swaledale, North Yorkshire.

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

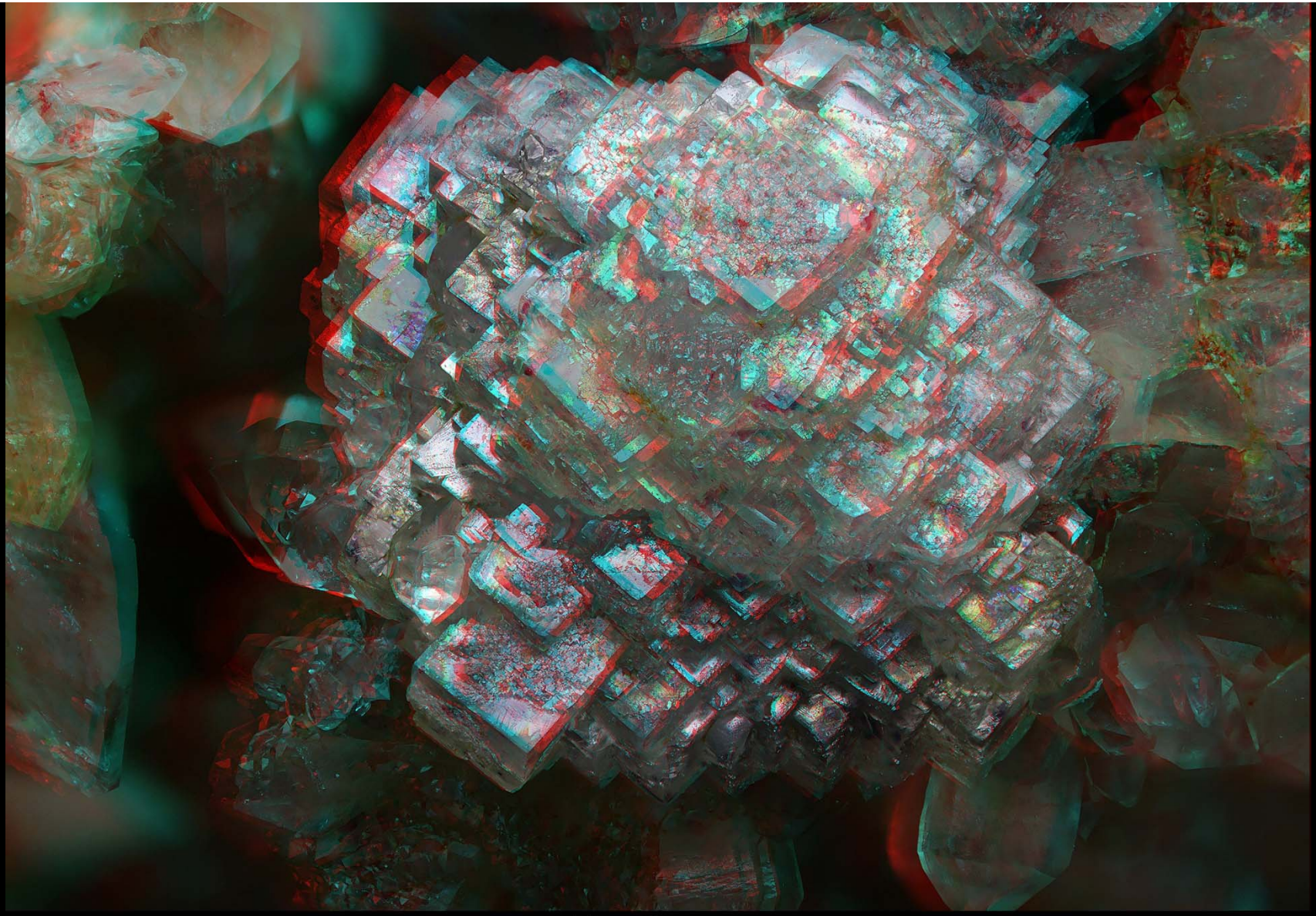
Canon EOS 5D Mk II camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.

Stack of 60 20-micrometre steps via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM and processed in PhotoShop CS5. Rt. 3D view.



0.1 mm 1 mm **Fluorite** CaF_2 Field width 1.92 mm

White octahedral supergene crystals with a sugar-lump surface texture appearance on azurite and malachite overgrowing fluorite.
Identity confirmed through EDS by Christian Rewitzer (Stub 2 sample 5) with results printout on p.5 on 19/01/21.
Great Sled Dale, North Yorkshire. Specimen: found by Charles Lamb and in Charles Lamb collection. Photography: John Chapman.
Canon EOS 5D Mk II camera with Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks (estimated angle only) of 70 and 66 25-micrometre steps via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Fluorite CaF_2

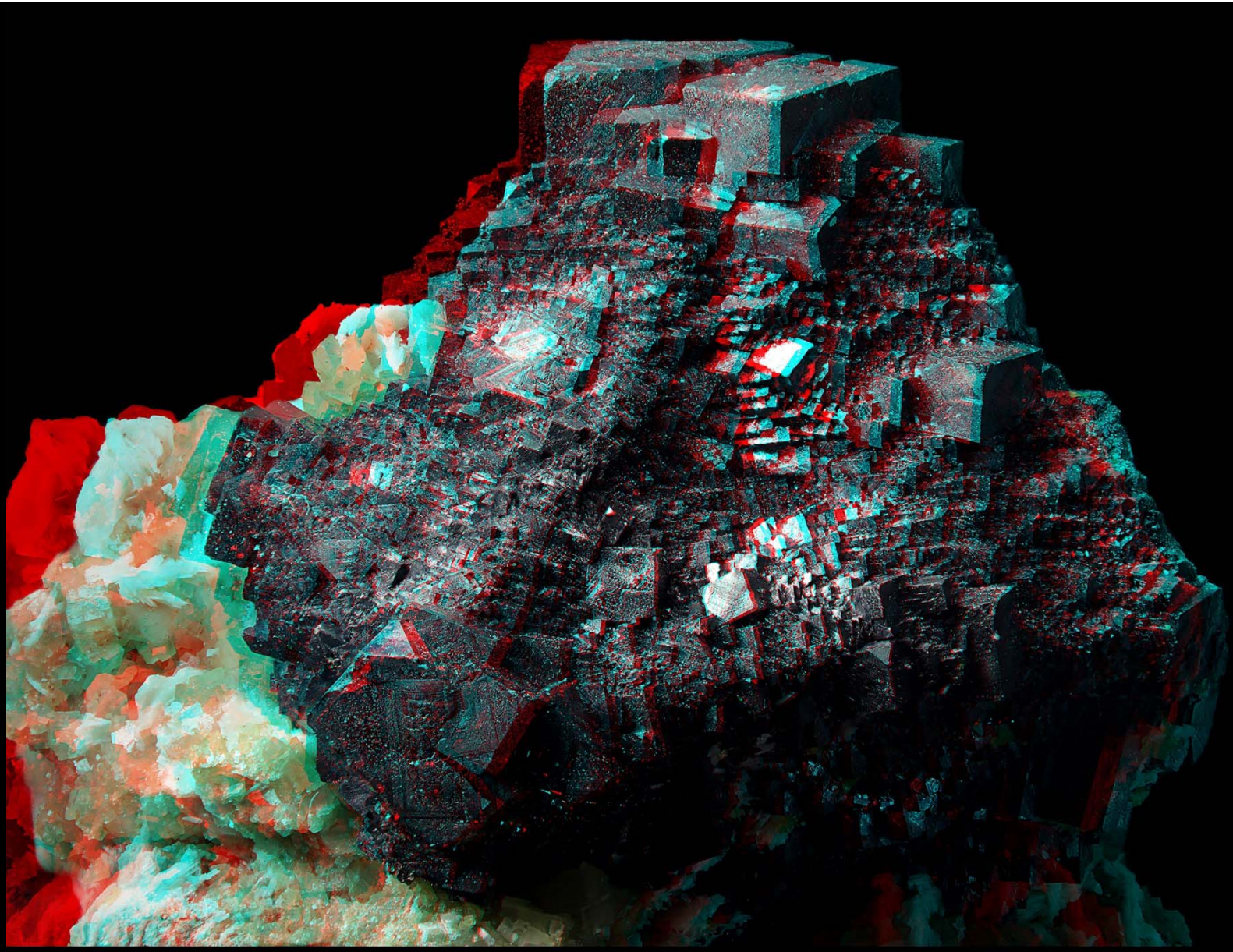
Field width 8.64 mm.

Cubic crystals apparently formed into an octahedron. However, a wavy line (with darker-looking crystals beneath) seems to separate two areas, the upper one being rotated a few degrees clockwise in relation to the lower one.

Mr Walker's Mine, Ballater, Aberdeenshire.

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

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 72 and 78 50-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Galena PbS

Field width 20.21 mm.

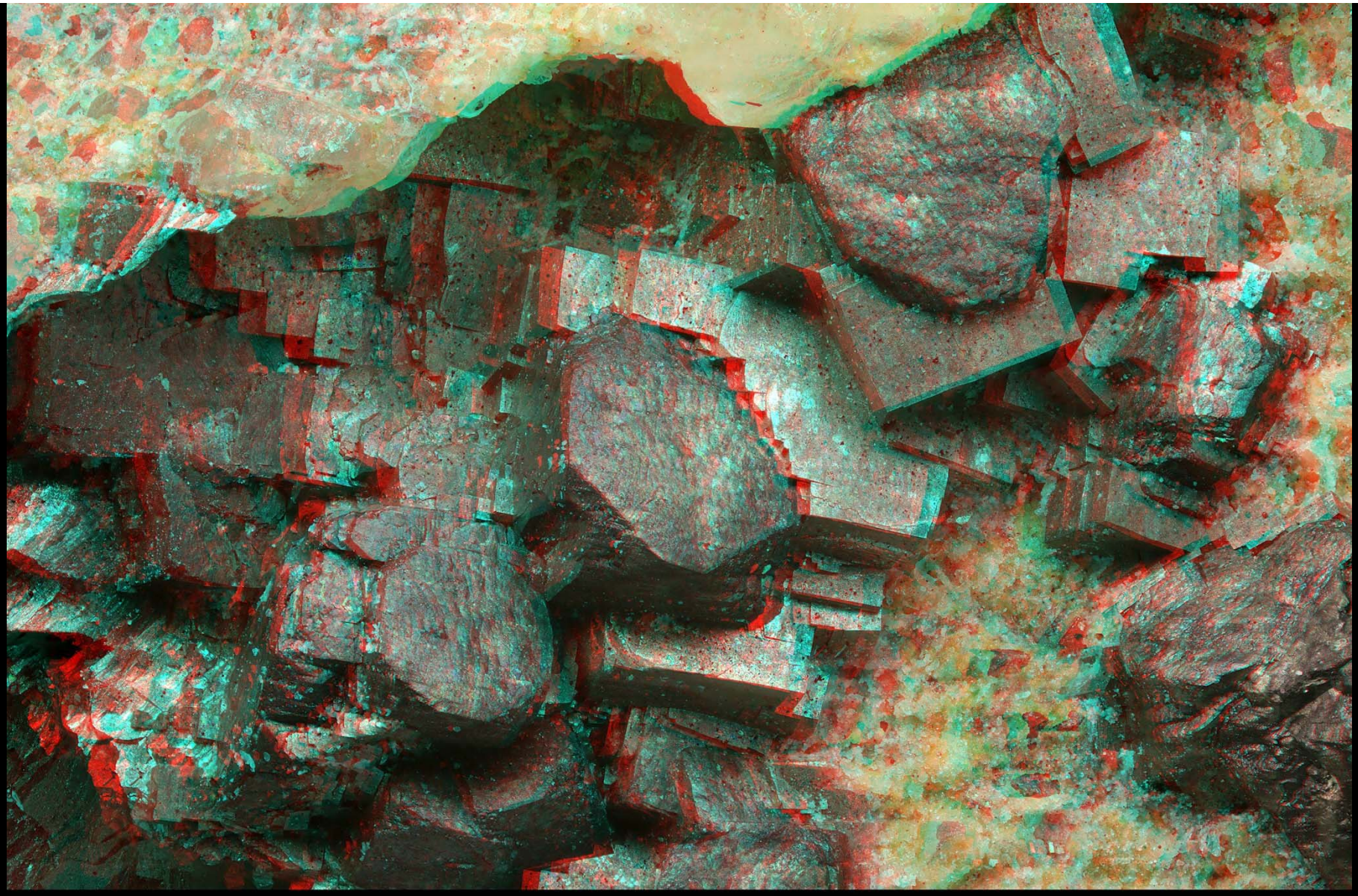
Octahedral form assembled from stepped cubes, with pale brown dolomite and white baryte.

Cloud Hill Quarry SK 4130 2010, Breedon on the Hill, Leicestershire.

Specimen: 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 96 and 97 120-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.

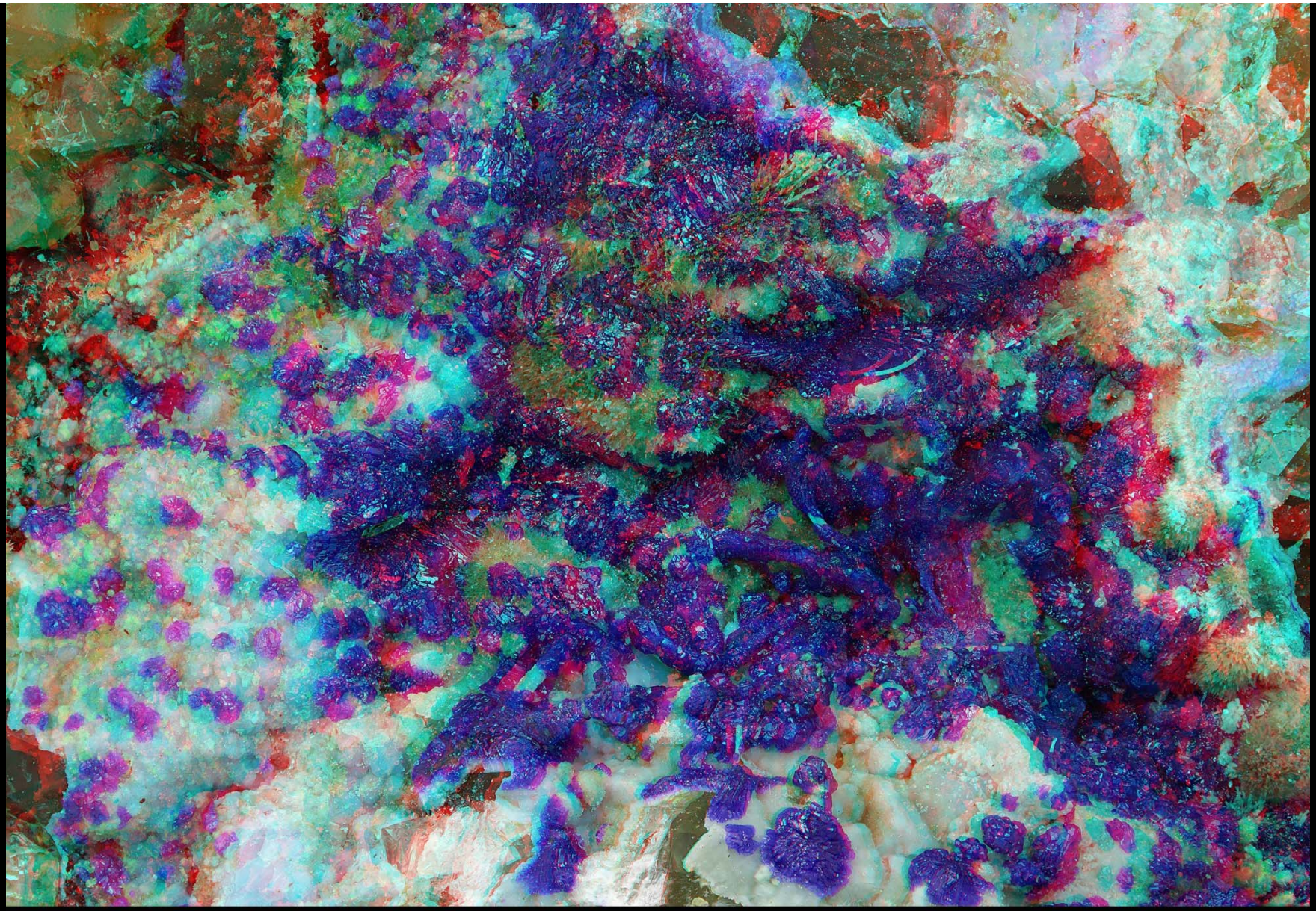


1 mm

Galena PbS and pyrite FeS_2

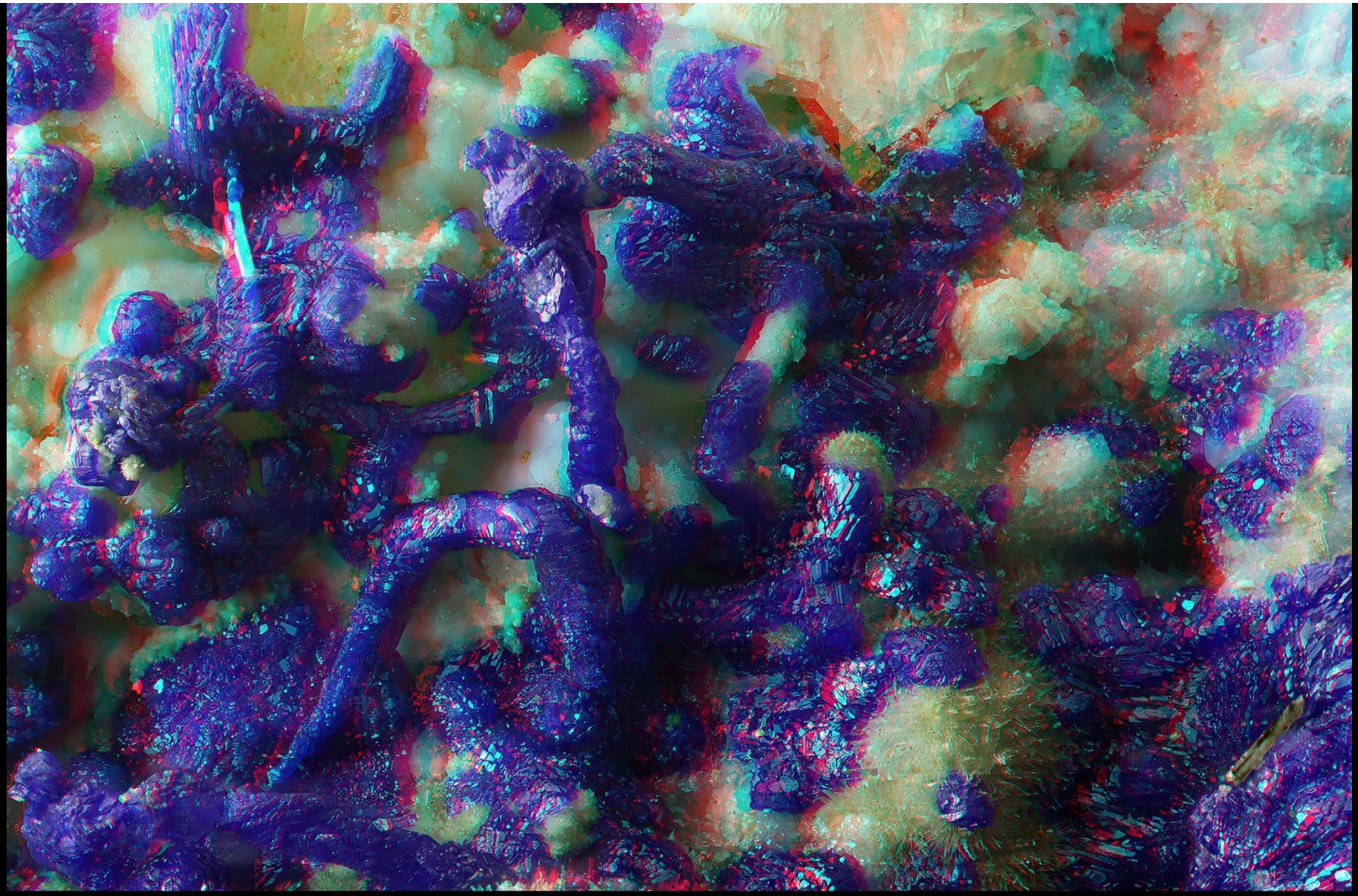
Field width 5.48 mm.

Cubic pyrite crystals overgrow cuboctahedral galena crystals in a lamellar calcite formation.
Nether Glen Quarry, Glen of Rothes, Elgin, Moray.
Specimen: Calum Anton collection. Photography: John Chapman, September 2023.
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 40mm objective lens on 223 mm bellows extension, with Schott fibre optic illuination.
Left + right stacks of 80 and 96 30-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



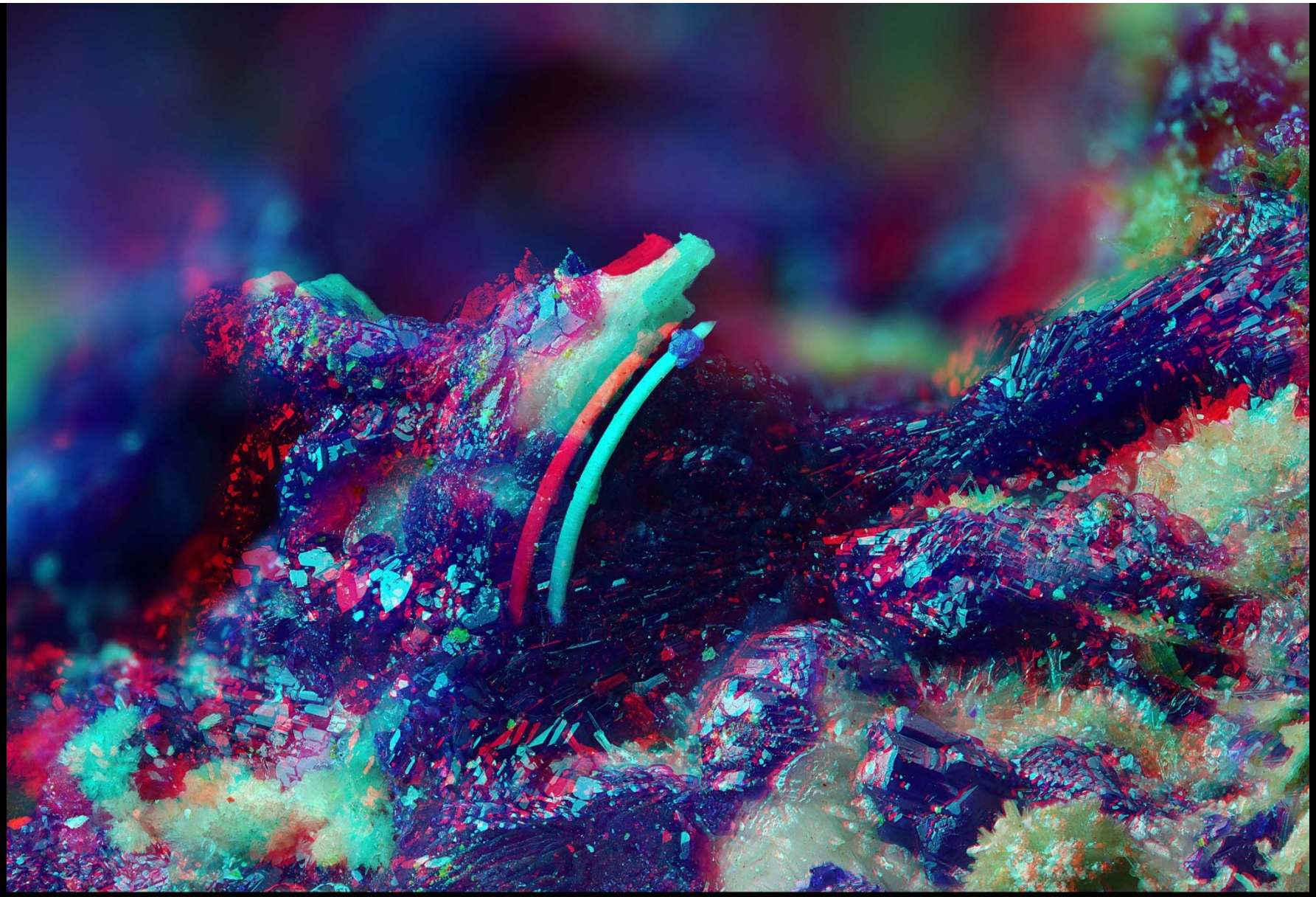
1 mm

Azurite $[Cu_3(CO_3)_2(OH)_2]$ on ramshorn malachite $[Cu_2(CO_3)(OH)_2]$
with pale blue chrysocolla $[Cu_2\text{-}xAlx)H_2\text{-}xSi_2O_5(OH)_4 \cdot nH_2O]$ and eggshell blue georgite $[Cu_2(CO_3)(OH)_2]$ in a crust.
Entrance flats, Hardshins Level, Murton Mine NY 7595 2252, Scordale, Cumbria.
Specimen: David Green collection, No. MT235. Photography: John Chapman. Field width 14.8 mm.
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 94 and 97 70-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



1 mm

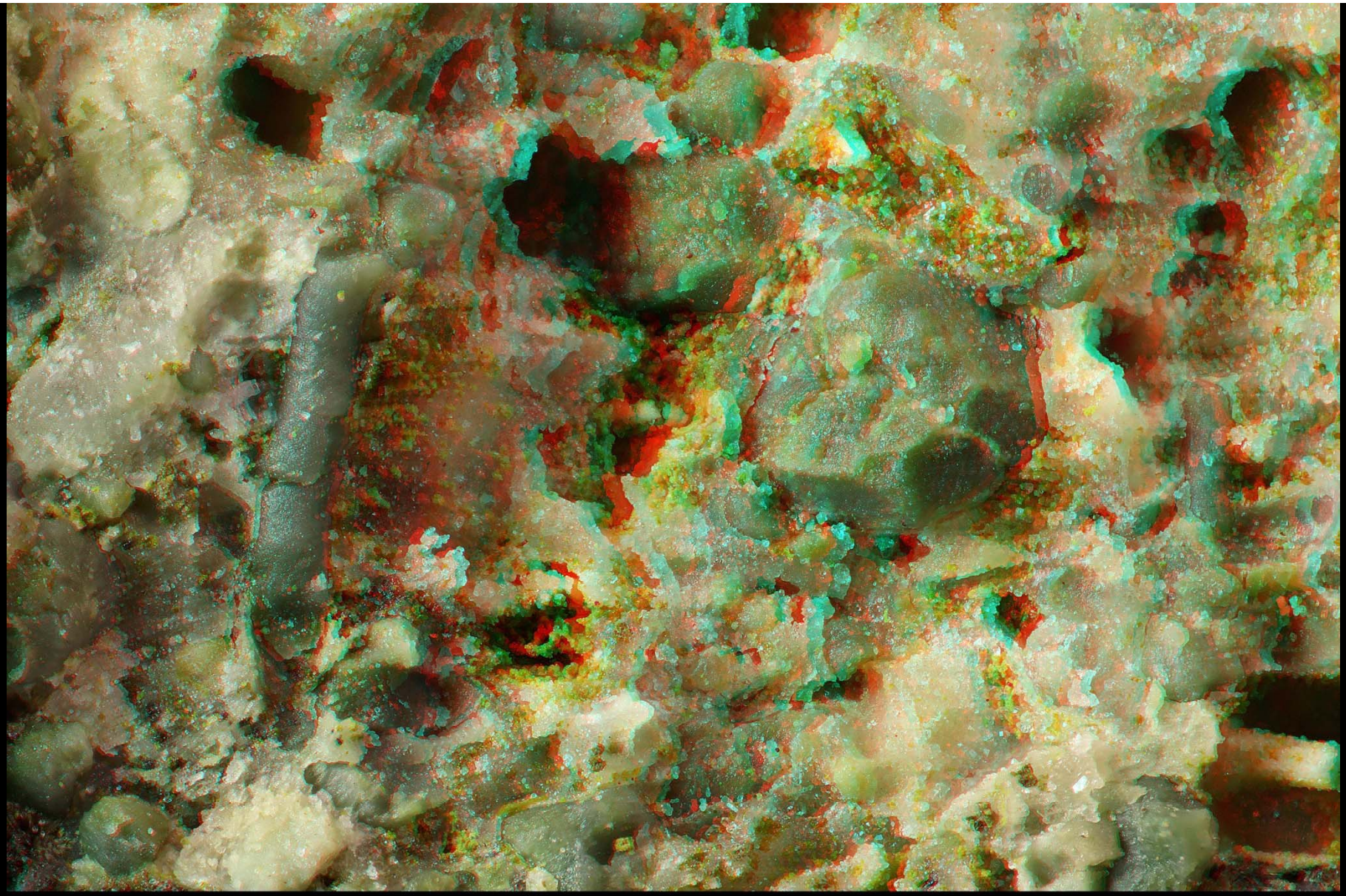
Azurite $[Cu_3(CO_3)_2(OH)_2]$ on ramshorn malachite $[Cu_2(CO_3)(OH)_2]$
with pale blue chrysocolla $[Cu_2\text{-}xAlx)H_2\text{-}xSi_2O_5(OH)_4 \cdot nH_2O]$ and eggshell blue georgite $[Cu_2(CO_3)(OH)_2]$ in a crust.
Entrance flats, Hardshins Level, Murton Mine NY 7595 2252, Scordale, Cumbria.
Specimen: David Green collection, No. MT235. Photography: John Chapman. Field width 6.62 mm.
Canon EOS 5DSr camera with Carl Zeıss (West Germany) Luminar 40 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 159 and 151 30-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm Azurite $[Cu_3(CO_3)_2(OH)_2]$ on ramshorn malachite $[Cu_2(CO_3)(OH)_2]$
with pale blue chrysocolla $[(Cu_{2-x}Al_x)H_{2-x}Si_2O_5(OH)_4 \cdot nH_2O]$ and eggshell blue georgite $[Cu_2(CO_3)(OH)_2]$ in a crust.
Entrance flats, Hardshins Level, Murton Mine NY 7595 2252, Scordale, Cumbria.
Specimen: David Green collection, No. MT235. Photography: John Chapman. Field width 3.62 mm.
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 132 15-micrometre steps at 4 degrees via Stackshot rail, with Luminar a fully open aperture, combined in CombineZM.

0.1 mm

Azurite $[Cu_3(CO_3)_2(OH)_2]$ on ramshorn malachite $[Cu_2(CO_3)(OH)_2]$
with pale blue chrysocolla $[Cu_{2-x}Al_x)H_{2-x}Si_2O_5(OH)_4 \cdot nH_2O]$ and eggshell blue georgite $[Cu_2(CO_3)(OH)_2]$ in a crust.
Entrance flats, Hardshins Level, Murton Mine NY 7595 2252, Scordale, Cumbria.
Specimen: David Green collection, No. MT235. Photography: John Chapman. Field width 2.13 mm.
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 132 15-micrometre steps at 4 degrees via Stackshot rail, with Luminar a fully open aperture, combined in CombineZM.



0.1 mm

Glauconite $K_{0.60\text{-}0.85}(Fe^{3+},Mg,Al)_2(Si,Al)_4O_{10}](OH)_2$ (not IMA approved name)

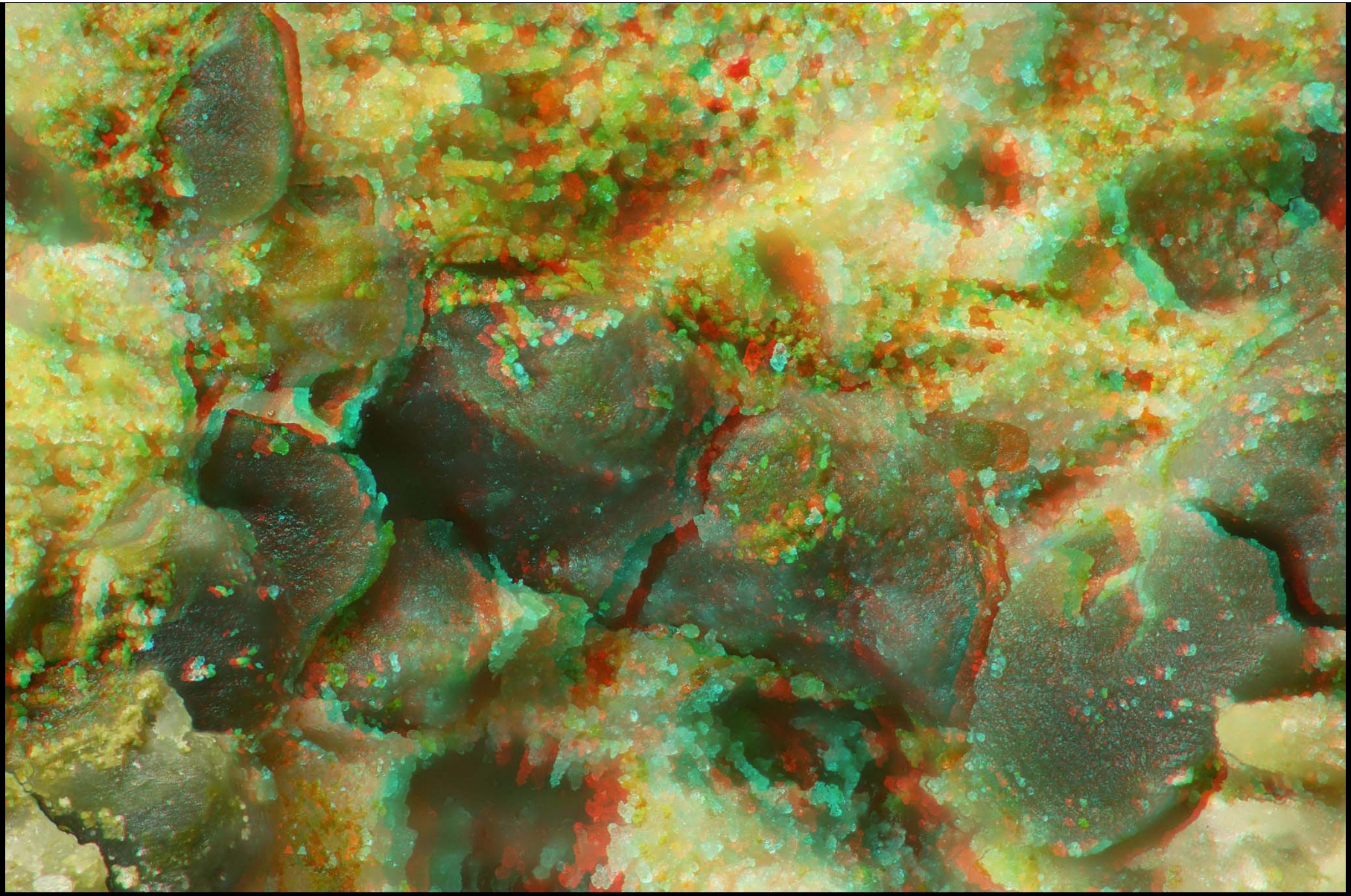
Dark green ‘pellets’ in silicified Crow Limestone containing very many crinoid fossils.

Hungry Hushes, NY 98665 02889, Arkengarthdale, North Yorkshire.

Field width 2.17 mm.

Specimen: found by David McCallum and in John Chapman collection, No. HH . 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 97 and 86 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Glauconite $K_{0.60\text{-}0.85}(Fe^{3+},Mg,Al)_2(Si,Al)_4O_{10}](OH)_2$ (not IMA approved name)

Dark green ‘pellets’ in silicified Crow Limestone containing very many crinoid fossils.

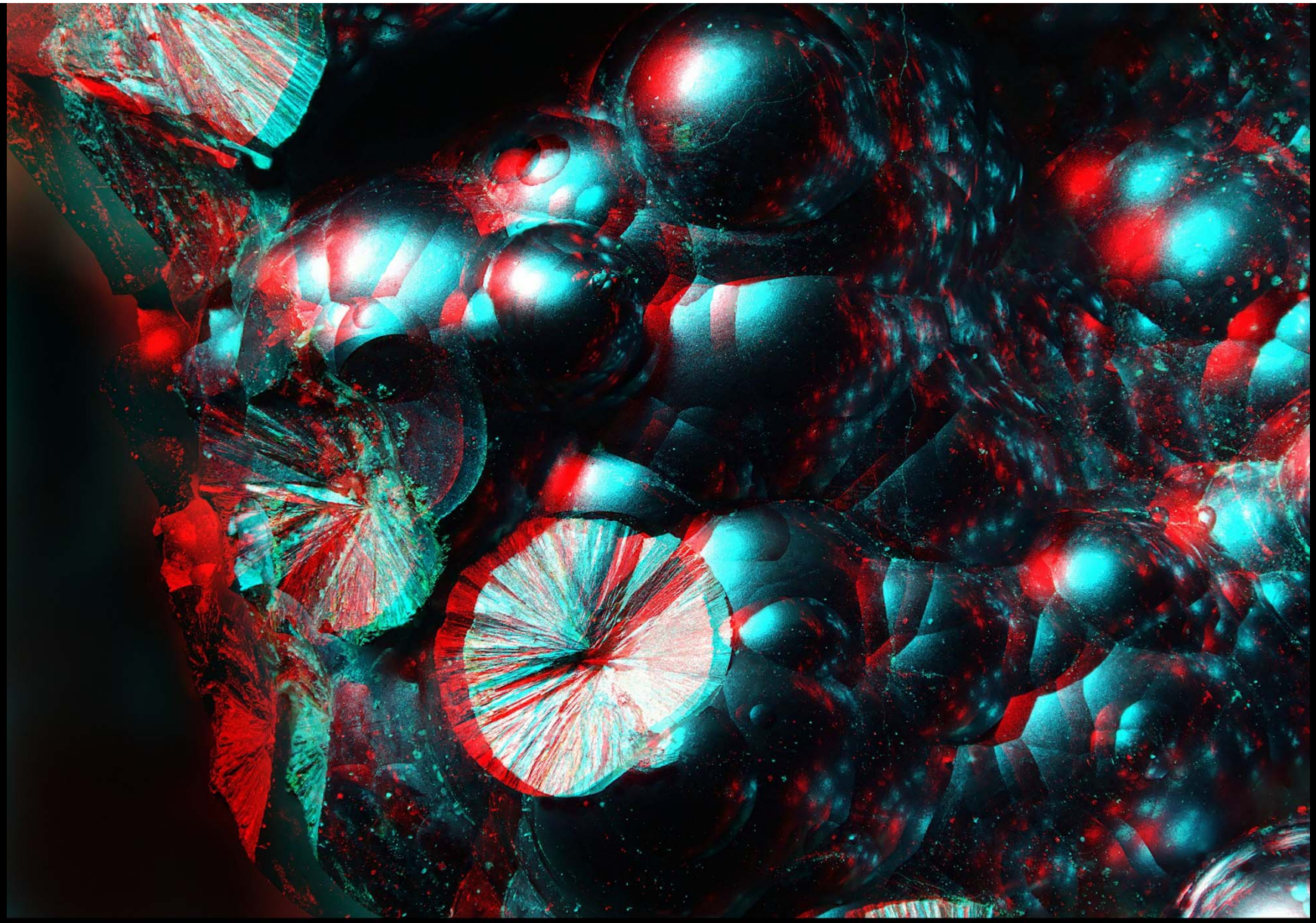
Hungry Hushes, NY 98665 02889, Arkengarthdale, North Yorkshire.

Field width 1.21 mm.

Specimen: found by David McCallum and in John Chapman collection, No. HH169. Photography: John Chapman, February 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 108 and 100 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Goethite $FeO(OH)$

1 mm

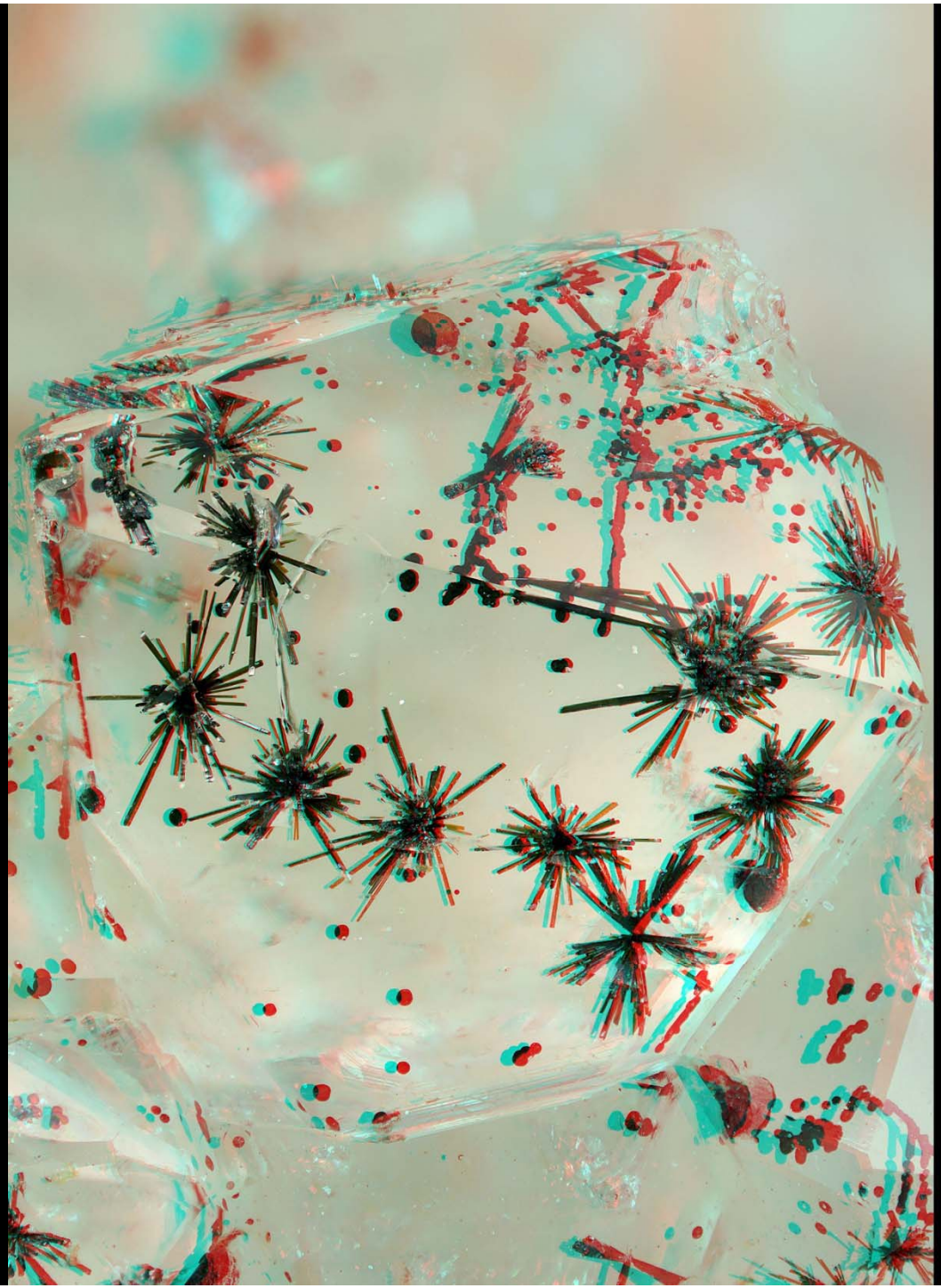
Botryoidal masses on sandstone.

Field width 9.10 mm.

Munday Hill Quarry, Leighton Buzzard, Bedfordshire.

Specimen: David Green collection. Photography: John Chapman, February 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 124 and 124 40-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Goethite FeO(OH)

‘Starbursts’ almost completely inside a transparent quartz crystal.

Dunion Hill Quarry, Jedburgh, Scottish Borders.

Specimen: Calum Anton collection.

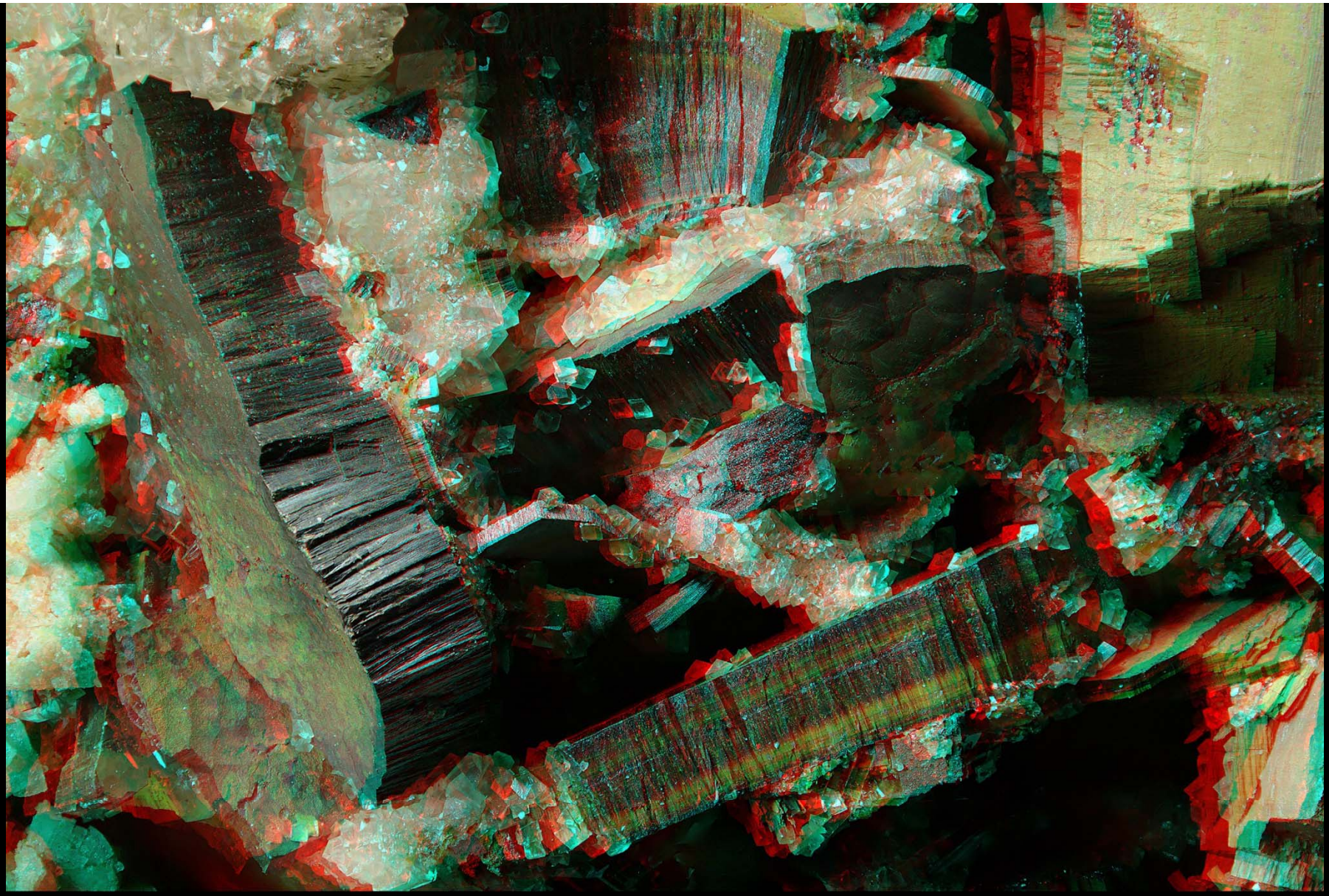
Photography: John Chapman, February 2024.

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 and right stacks of 83 and 71 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 7.69 mm.

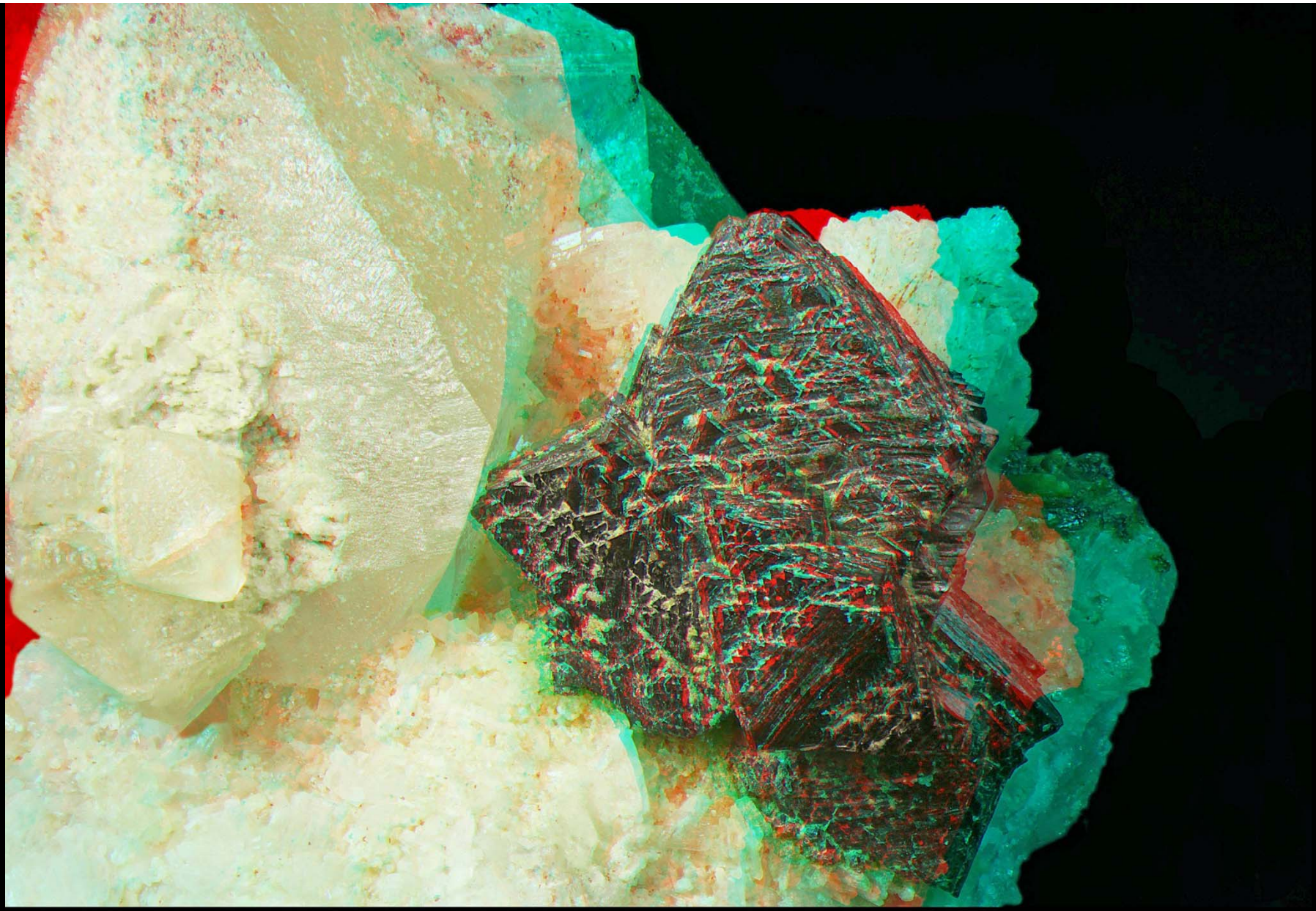


1 mm

Goethite FeO(OH)

Field width 16.5 mm.

Unusual brecciated lamellar formations of botryoidal habit original with tiny colourless dolomite crystals.
Cloud Hill Quarry Ca. SK 410 211, Breedon, Leicestershire.
Specimen: David Green collection. Photography: John Chapman, November 2023.
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 90 and 93 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.



1 mm

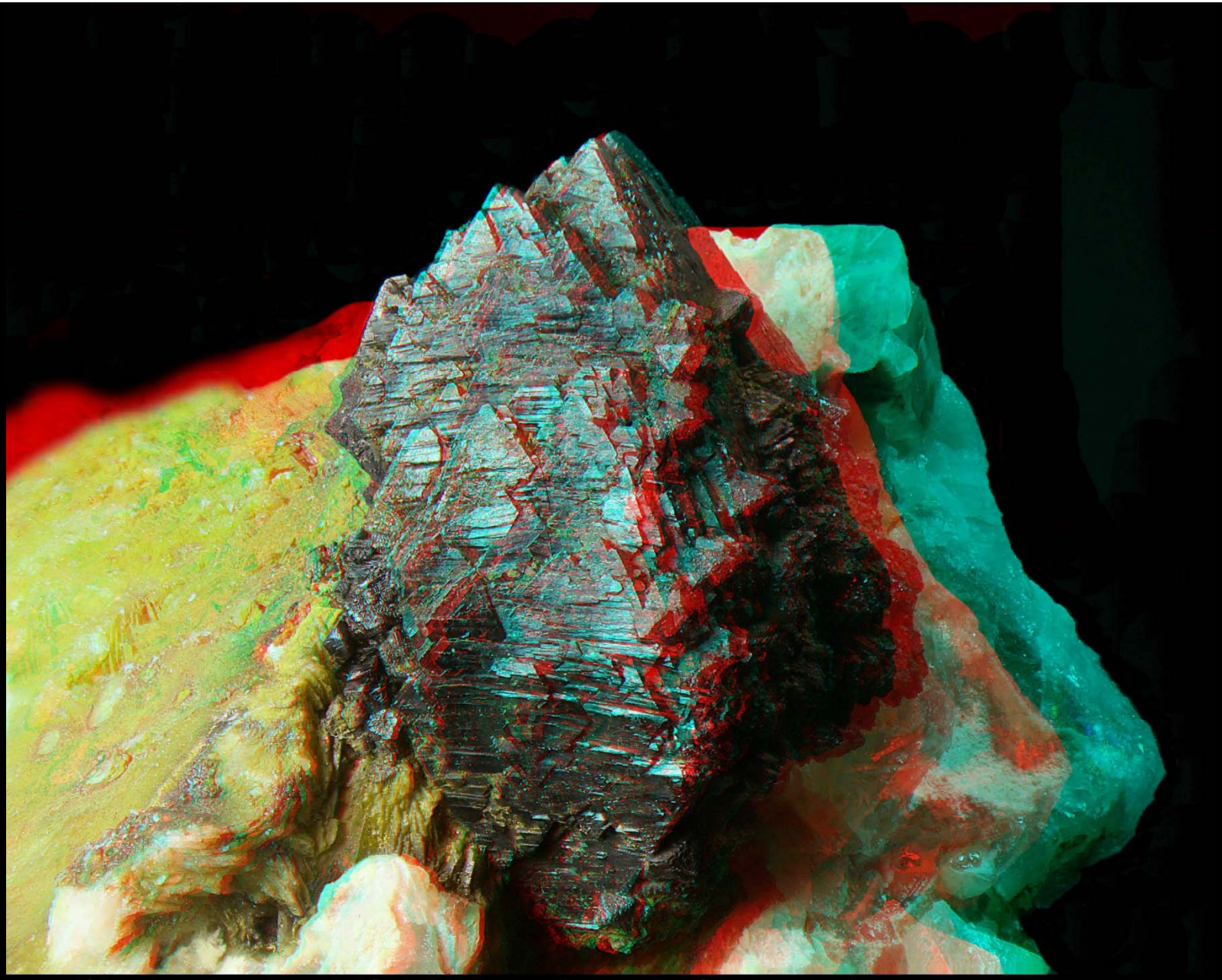
Goethite pseudomorph after marcasite

Field width 13.5 mm

with calcite dog-tooth crystals on a substrate of baryte and calcite. Tenter Hill Quarry, Bramham, West Yorshire, now buried beneath the M1/A1 motorway at north Leeds.

Specimen: found by George W. Fletcher on 16th Sept1991 and 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 2x zoom with Schott fibre optic lighting.



1 mm

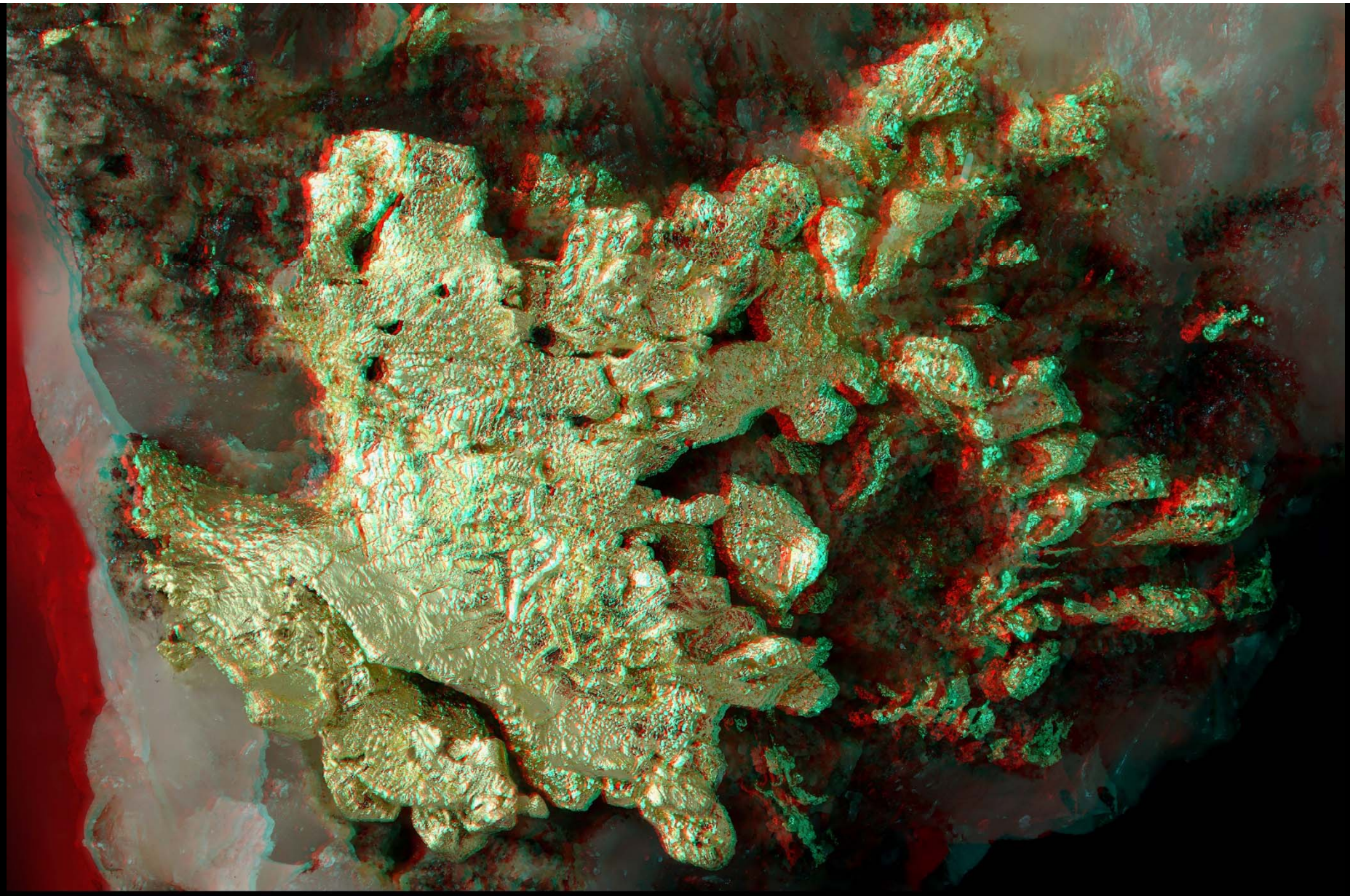
Goethite pseudomorph after marcasite

Field width 12.2 mm

with calcite dog-tooth crystals on a substrate of baryte and calcite. Tenter Hill Quarry, Bramham, West Yorshire, now buried beneath the M1/A1 motorway at north Leeds.

Specimen: found by George W. Fletcher on 16th Sept1991 and 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 1.6x zoom, with LED lamp illumination.



1 mm

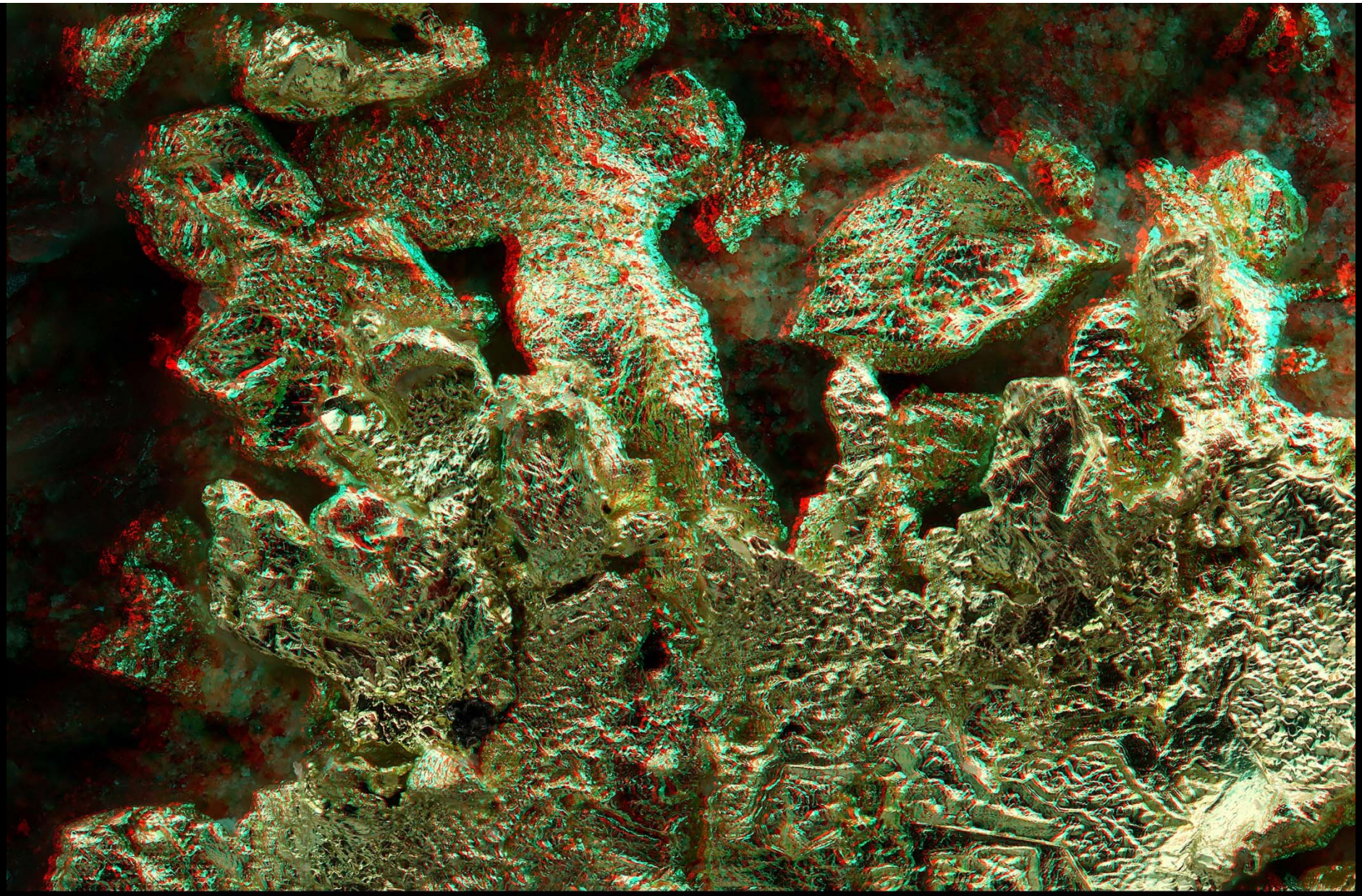
Gold Au

Hills east of Bridge of Orchy, Argyll.

Field width 8.0 mm

Specimen: Calum Anton 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.
Left + middle stacks of 117 and 101 35-micrometre steps at 4 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Gold Au

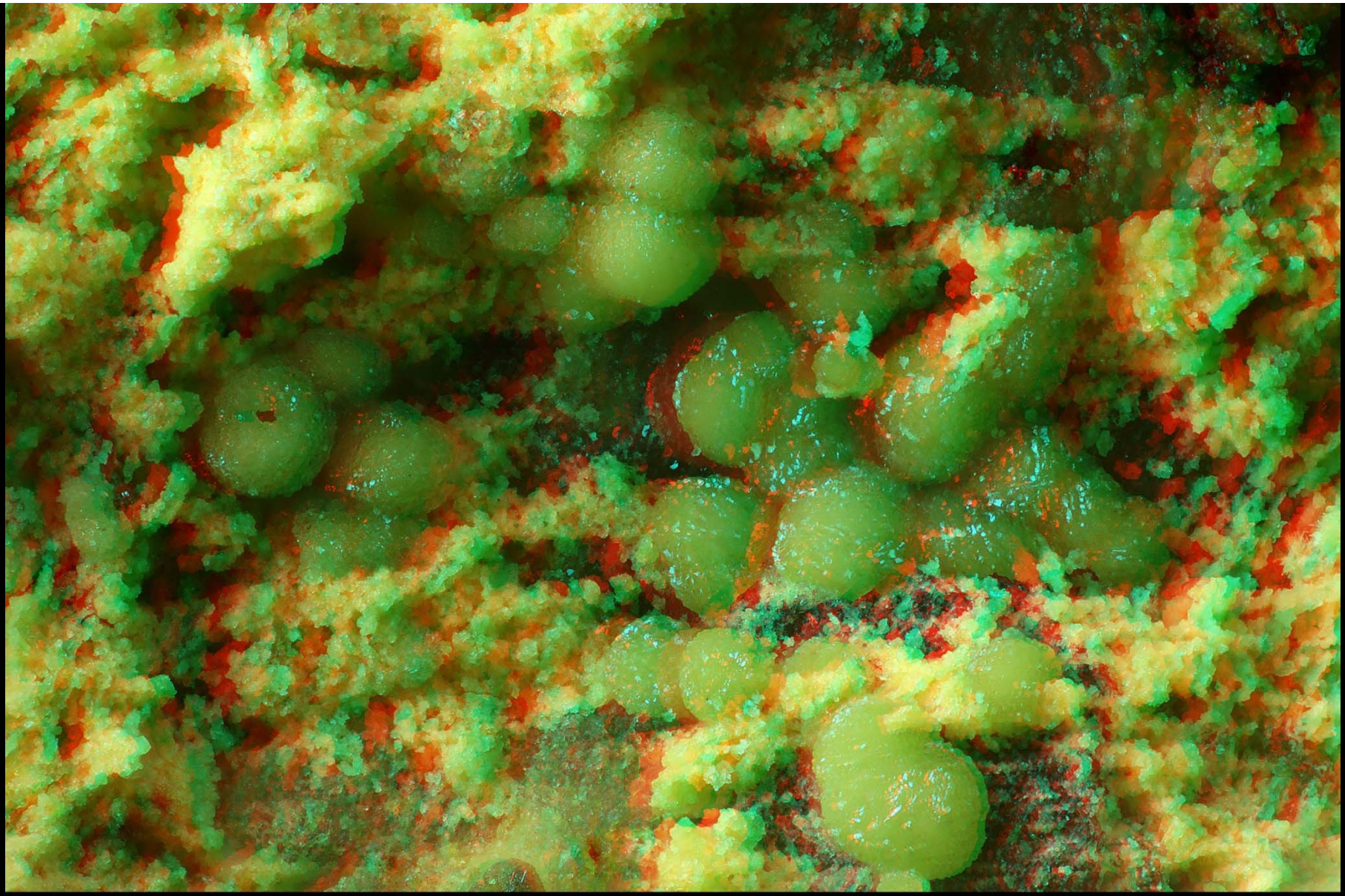
Field width 3.65 mm

Hills east of Bridge of Orchy, Argyll.

1 mm

Specimen: Calum Anton collection. 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 85 and 80 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm 1 mm **Goldhillite** $Cu_5Zn(AsO_4)_2(OH)_6 \cdot H_2O$, probably phosphate rich.

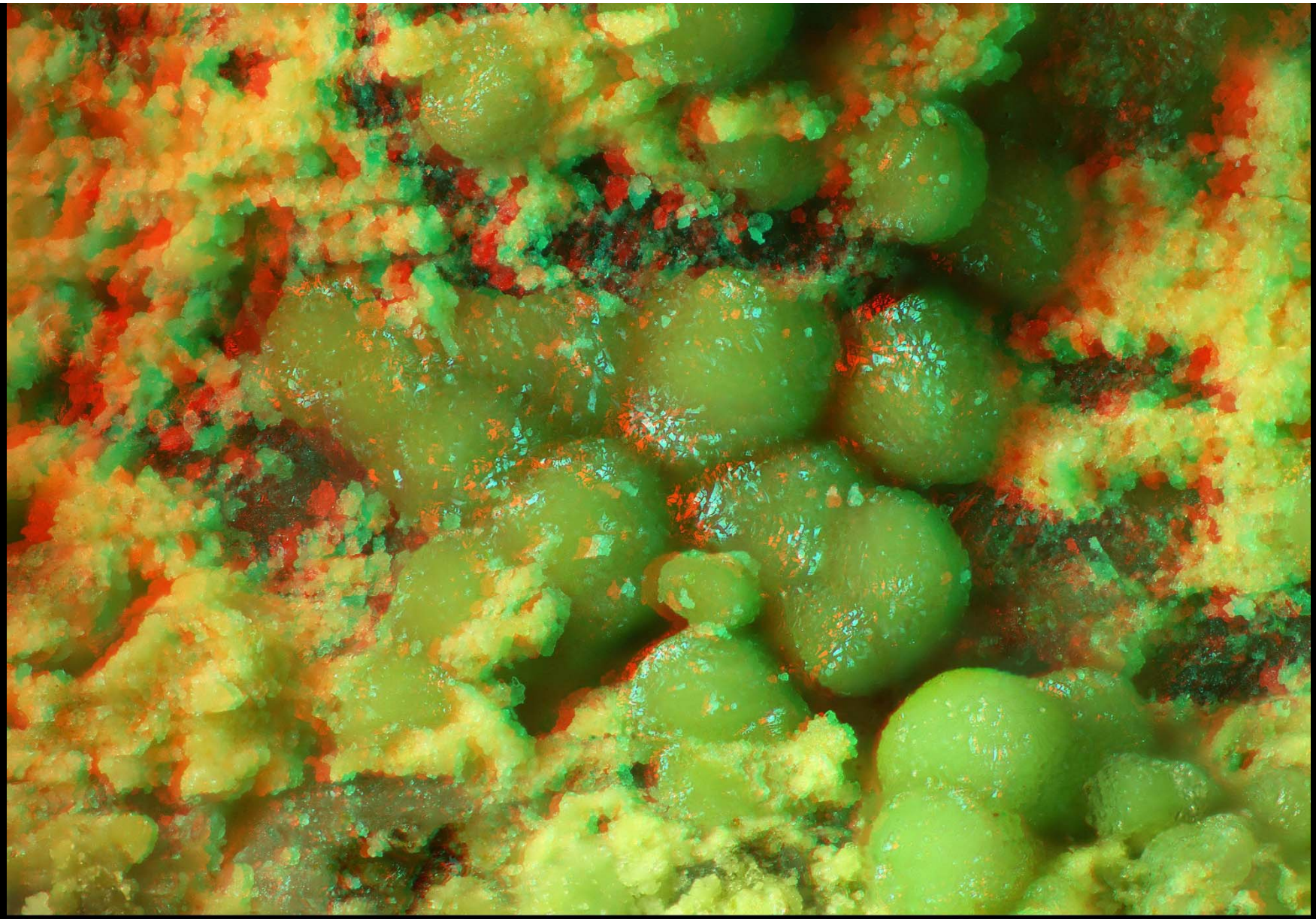
Pale apple green spherulites. Field width 1.80 mm.

Potts Gill Mine, Caldbeck Fells, Cumbria.

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

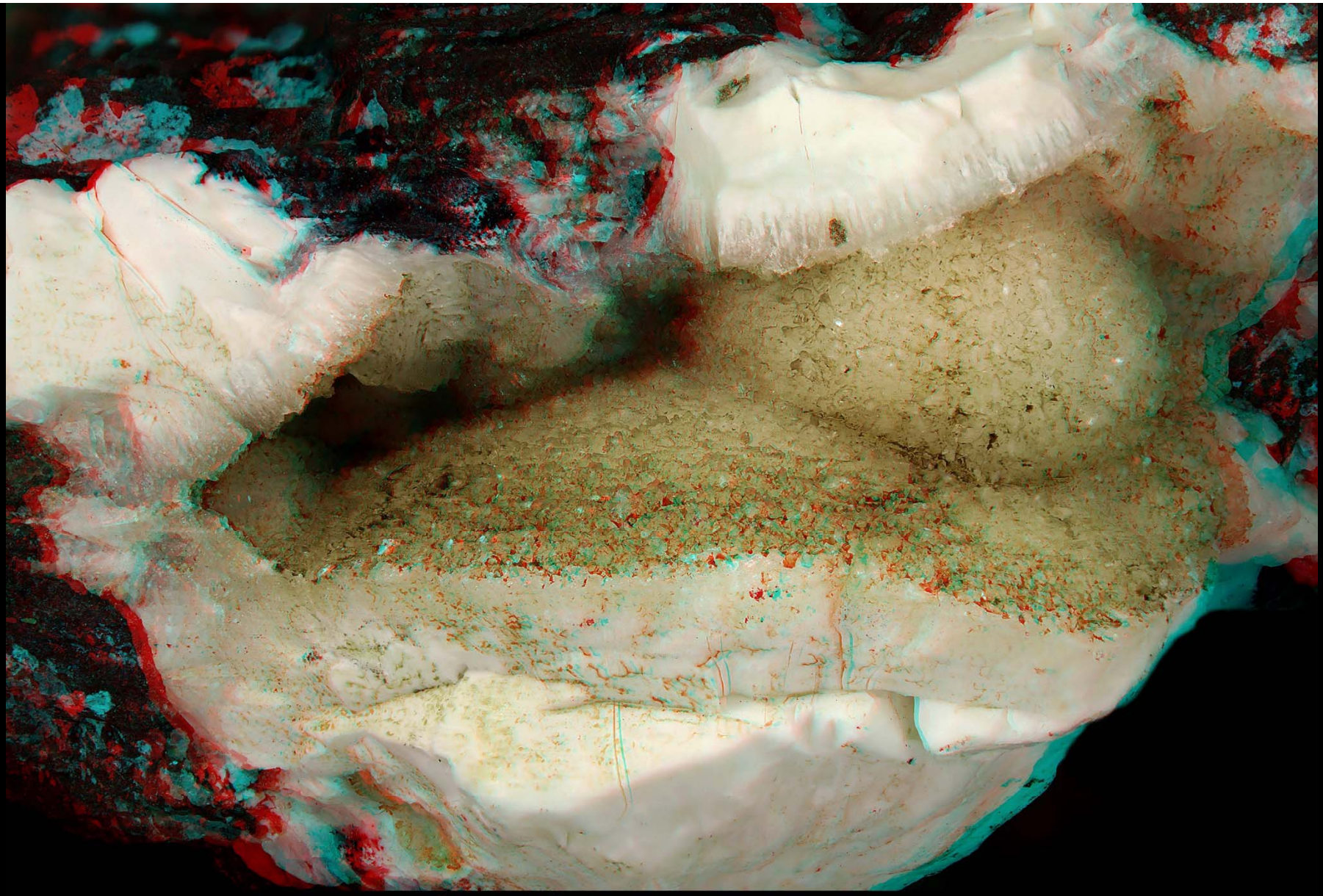
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 16 mm objective lens, with Schott fibre optic illumination.

Left + right stacks of 98 and 86 8-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Goldhillite $Cu_5Zn(AsO_4)_2(OH)_6 \cdot H_2O$, probably phosphate rich.
Pale apple green spherulites. Field width 1.17 mm.
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 134 and 145 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



10 mm

Gonnardite $(Na,Ca)_2(Si,Al)_5O_{10}\cdot 3H_2O$

Fine textured botryoidal.

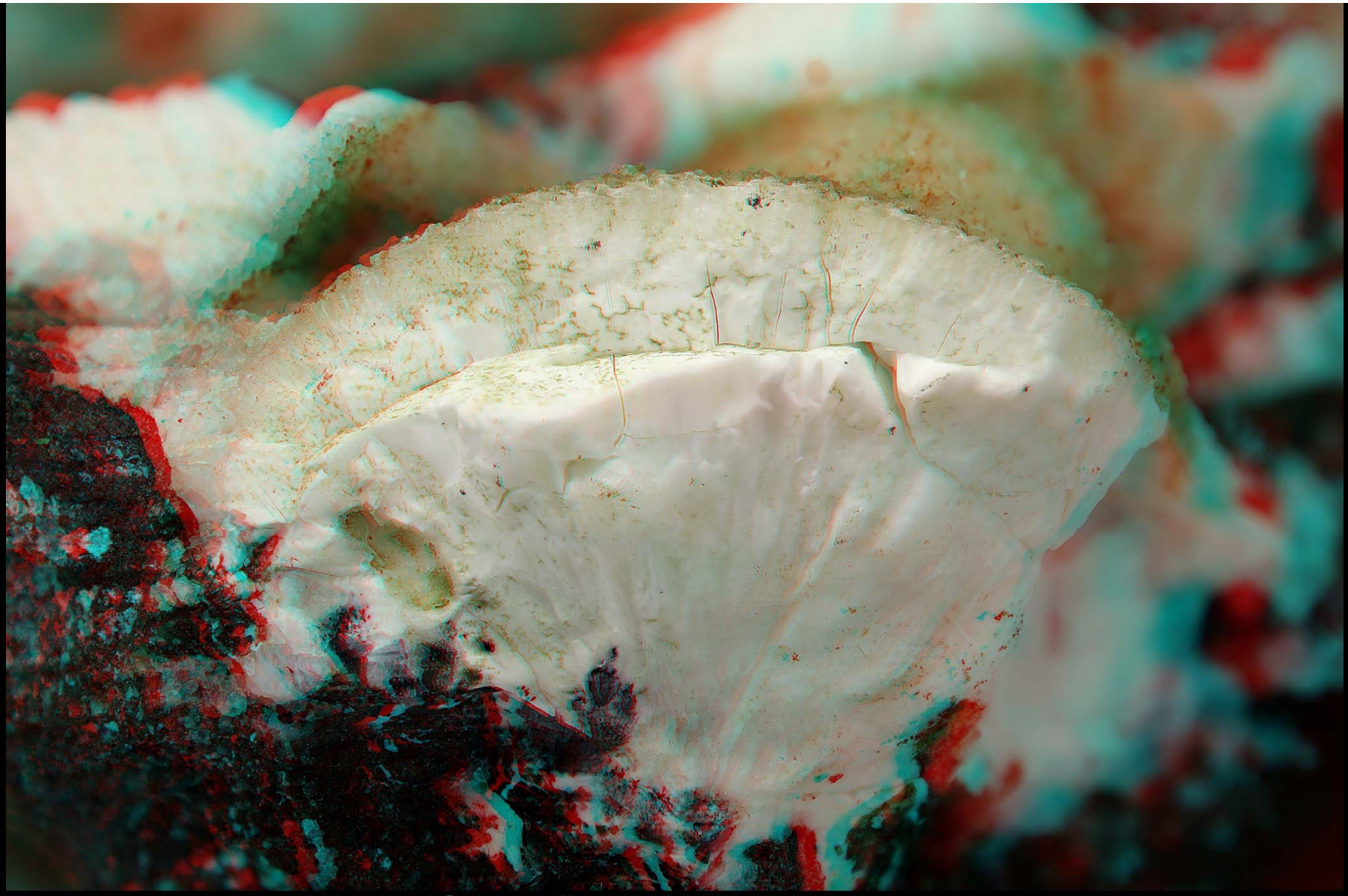
Field width 32.9 mm.

Gobbins, Island Magee, Co. Antrim, Northern Ireland.

Specimen: Norman Moles collection, formerly Harry Foy collection 2000. Photography: John Chapman 2023.

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 109 and 117 120-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 2, combined in CombineZM.



10 mm

Gonnardite $(Na,Ca)_2(Si,Al)_5O_{10}\cdot 3H_2O$

Fine textured botryoidal.

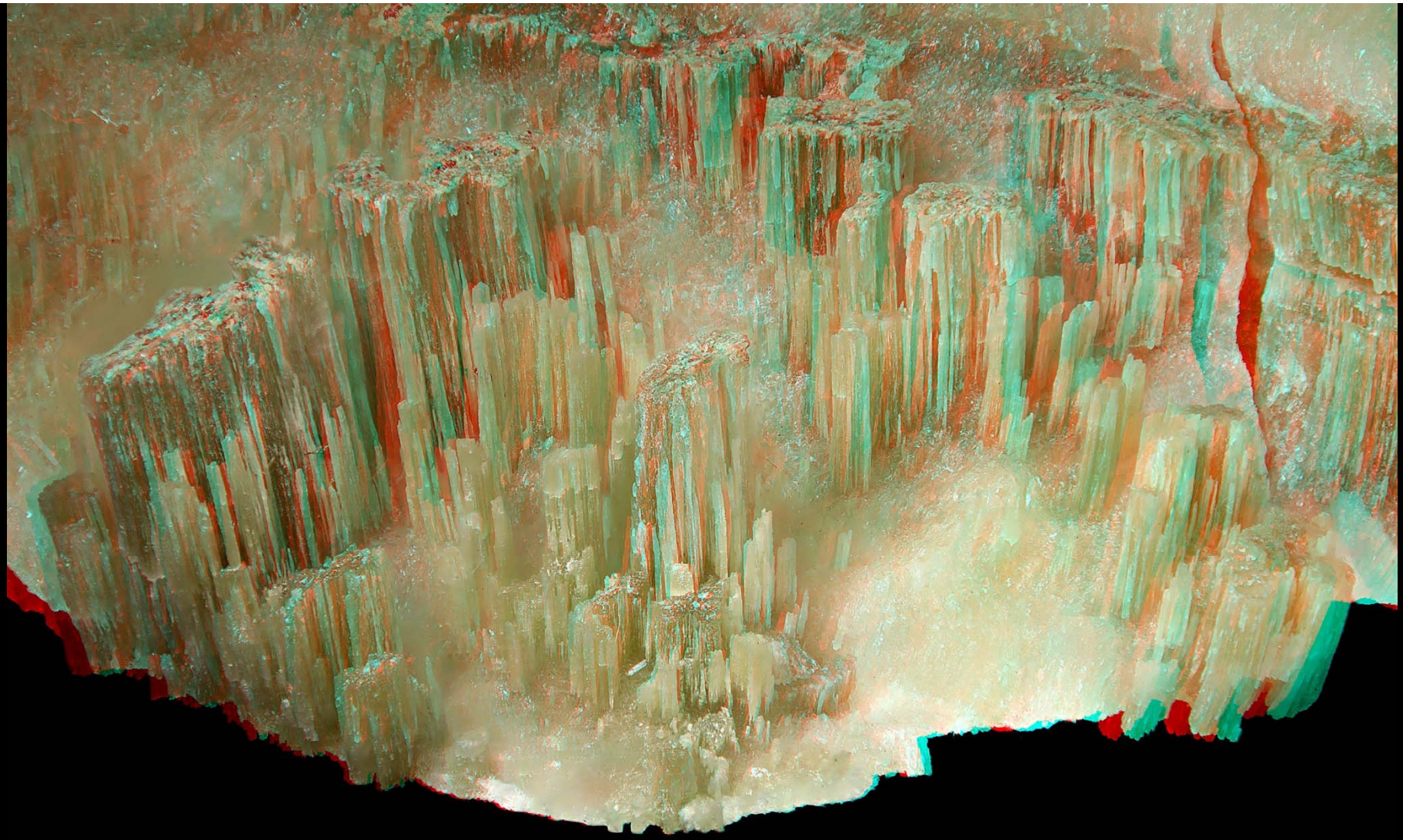
Field width 32.9 mm.

Gobbins, Island Magee, Co. Antrim, Northern Ireland.

Specimen: Norman Moles collection, formerly Harry Foy collection 2000. Photography: John Chapman 2023.

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 52 and 56 150-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 2, combined in CombineZM.



10 mm

Gypsum $CaSO_4$

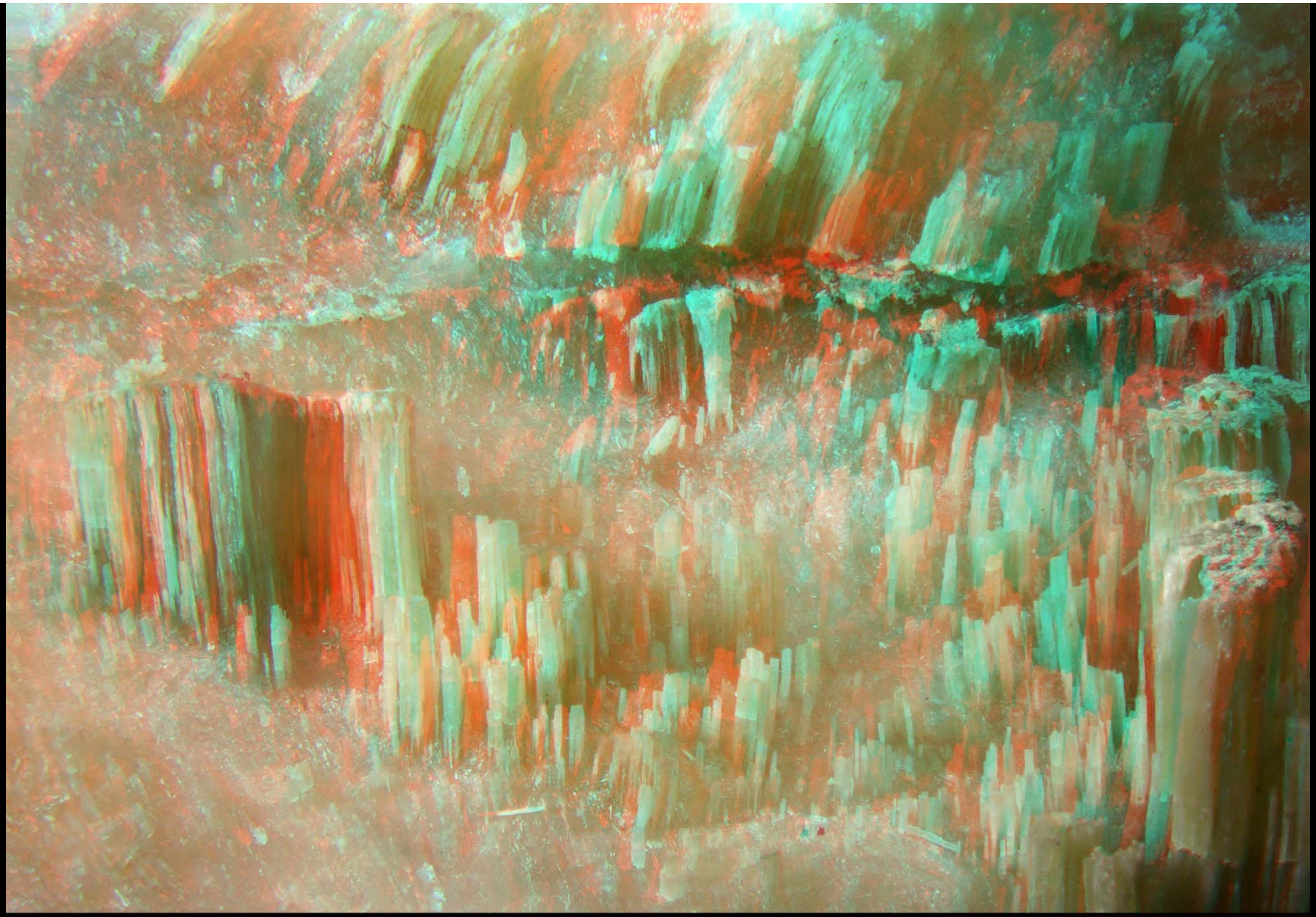
Field width 33.7 mm.

Part of a water-worn veinlet in a 10 metre cubic boulder of Triassic Tea Green Marl on the beach of Blue Anchor Bay, near Minehead, Somerset. Illustrated in Minerals of Britain and Ireland 2.

Specimen: found by John Chapman around 1963 and in John Chapman collection No. Ca18. Photography: John Chapman.

Canon EOS 5D Mk II 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 133 and 133 150-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



10 mm

Gypsum $CaSO_4$

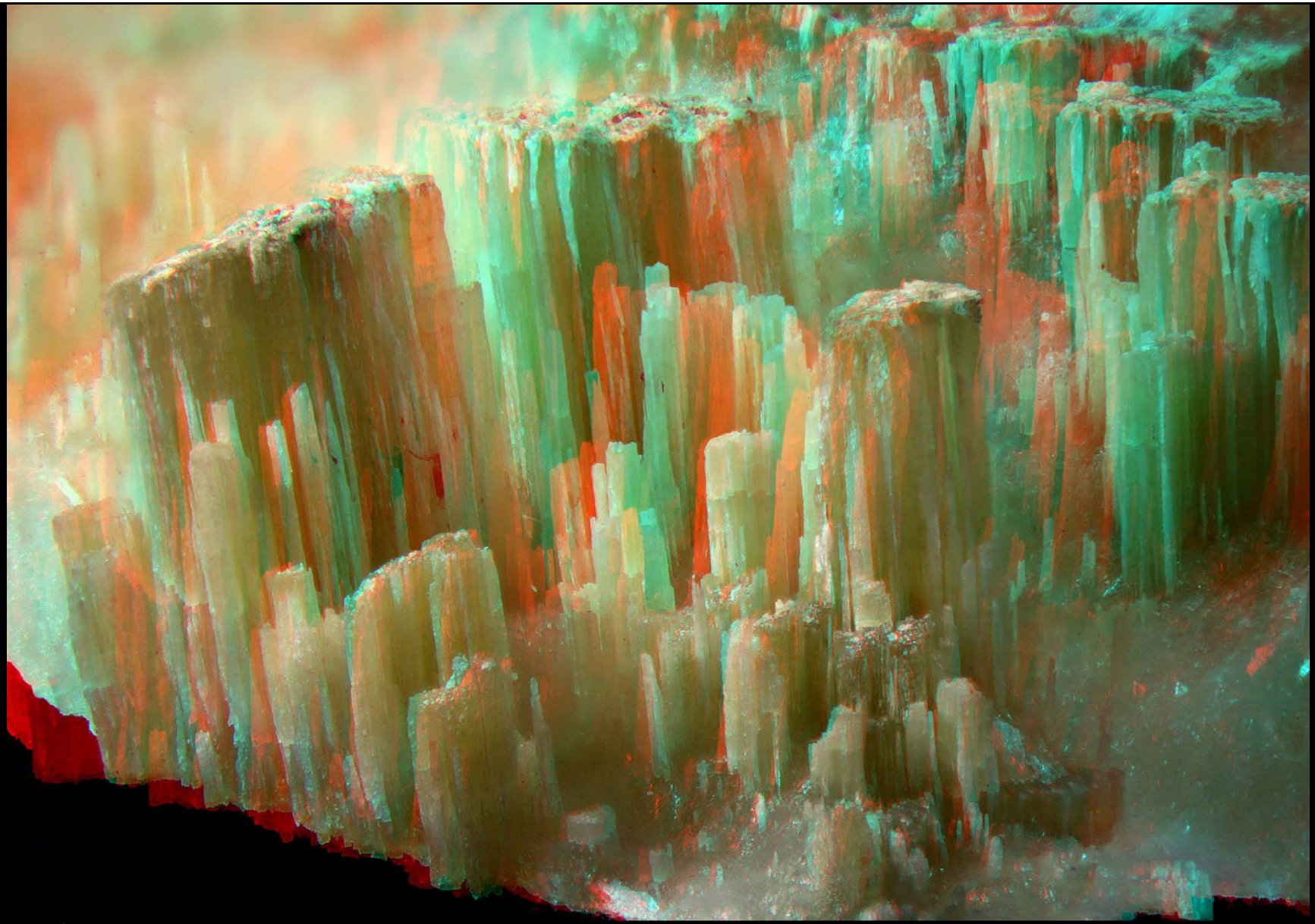
Field width 27.6 mm.

Part of a water-worn veinlet in a 10 metre cubic boulder of Triassic Tea Green Marl on the beach of Blue Anchor Bay, near Minehead, Somerset. Illustrated in Minerals of Britain and Ireland

Specimen: found by John Chapman around 1963 and in John Chapman collection No. Ca18. Photography: John Chapman.

Canon EOS 5DSr camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and at 1.0x zoom factor, with LED illumination.

Stack of 84 manual steps combined in CombineZM and processed in Photoshop CS5, March 2020.



1 mm

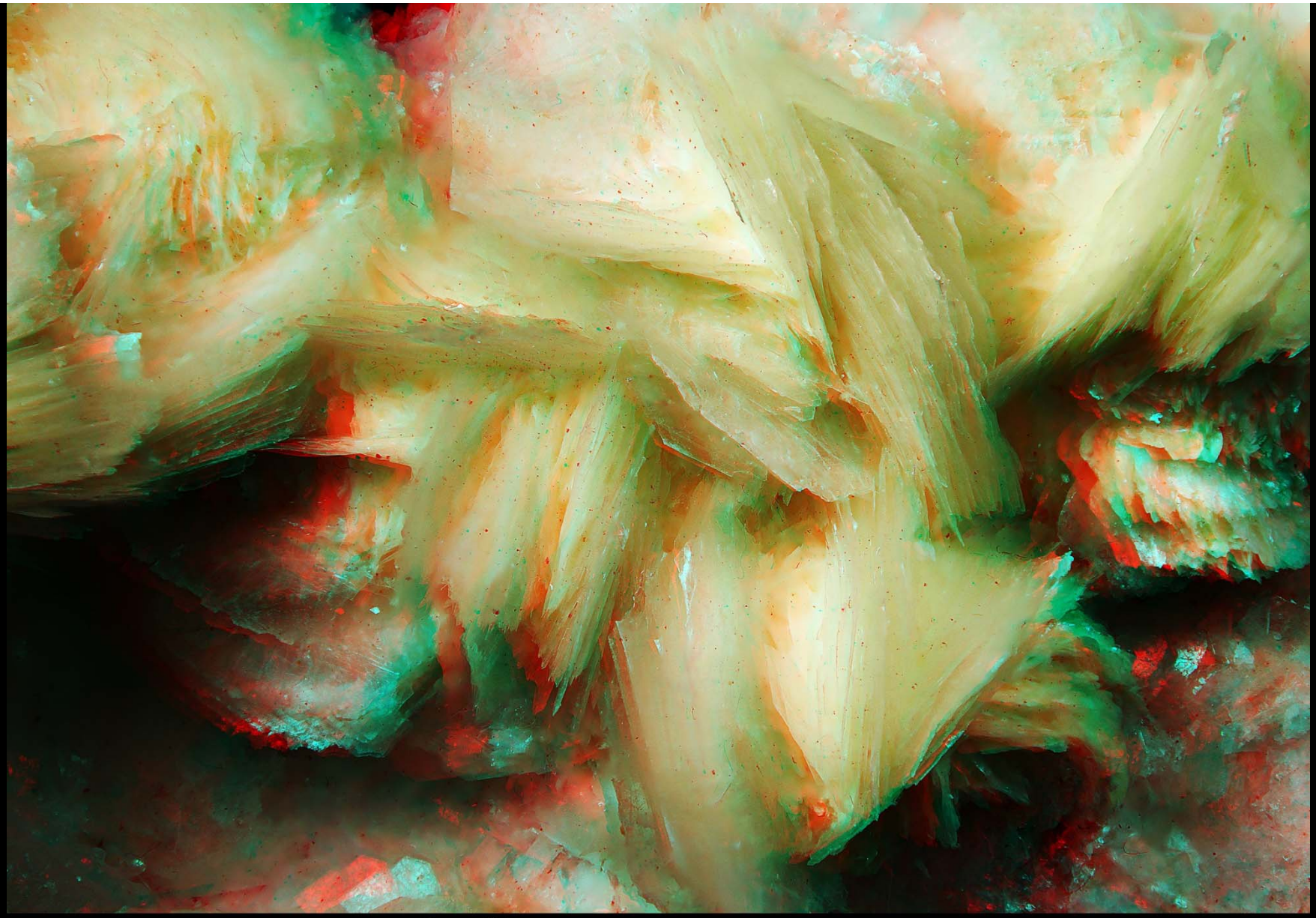
Gypsum $CaSO_4$

Field width 22.9 mm.

Part of a water-worn veinlet in a 10 metre cubic boulder of Triassic Tea Green Marl on the beach of Blue Anchor Bay, near Minehead, Somerset. Illustrated in Minerals of Britain and Ireland

Specimen: found by John Chapman around 1963 and in John Chapman collection No. Ca18. Photography: John Chapman.

Canon EOS 5DSr camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and at 1.2x zoom factor, with LED illumination.
Stack of 64 manual steps combined in CombineZM and processed in Photoshop CS5, March 2020.



10 mm

Gyrolite $NaCa_{16}(Si_{23}Al)O_{60}(OH)_8 \cdot 14H_2O$

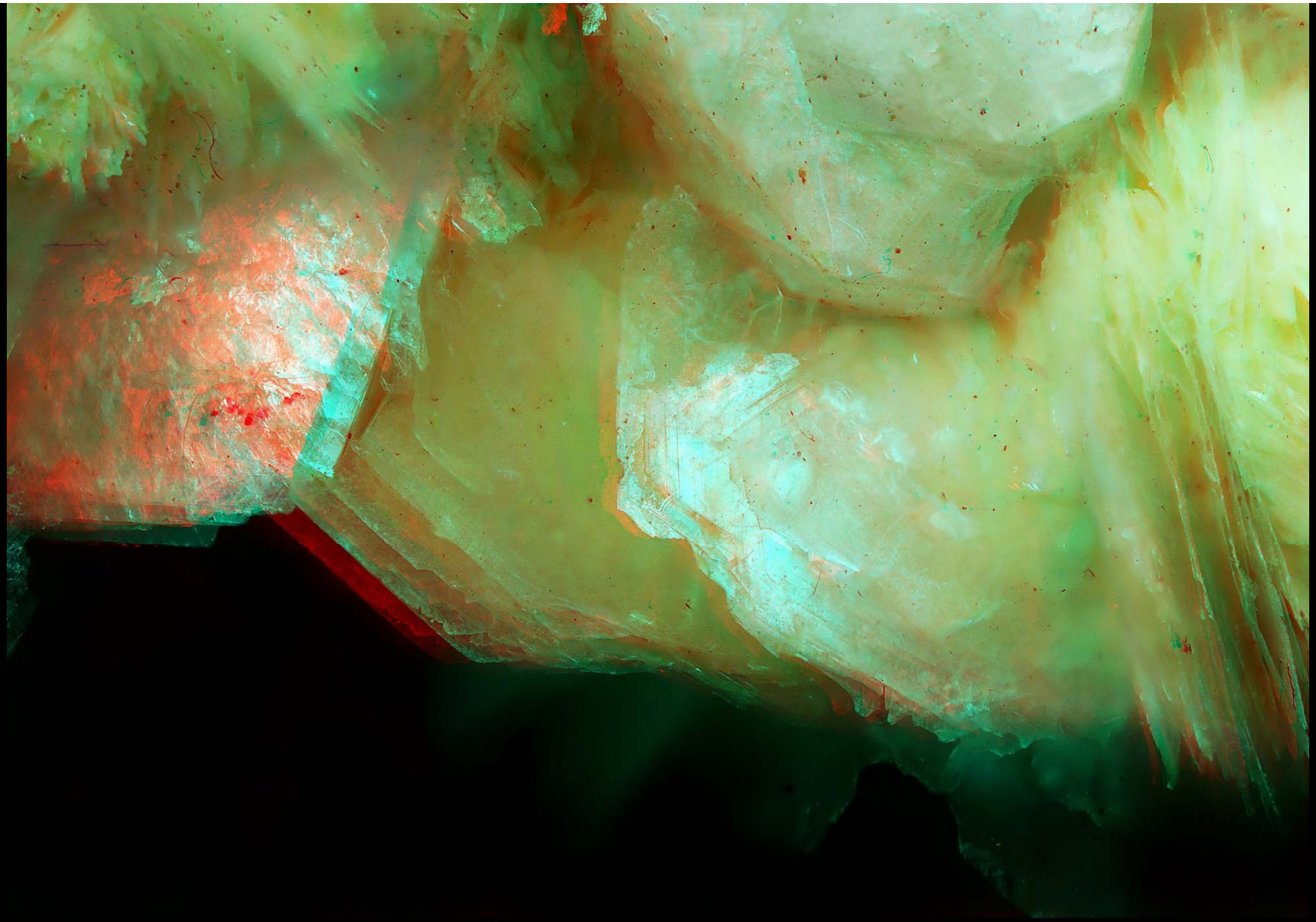
Field width 31.9 mm.

Large sheaves of lamellar crystals with apophyllite and analcime.

From the remote cliffs of Inbhir a Gharraidh NG 2410 3672, Duirinish, Isle of Skye.

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 40 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 90 and 92 200-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM.



1 mm

Gyrolite $NaCa_{16}(Si_{23}Al)O_{60}(OH)_8 \cdot 14H_2O$

Field width 1.59 mm.

Large sheaves of lamellar crystals with apophyllite and analcime.

From the remote cliffs of Inbhir a Gharraidh NG 2410 3672, Duirinish, Isle of Skye.

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 92 and 108 80-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.

Hemimorphite $Zn_4(Si_2O_7)(OH)_2 \cdot H_2O$

Glassy spherulites on strontianite.

Whitesmith Mine, Strontian, Highland.

Specimen: David McCallum collection.

Photography: John Chapman, November 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 135 and 125 30-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 9.12 mm.

No 3D available

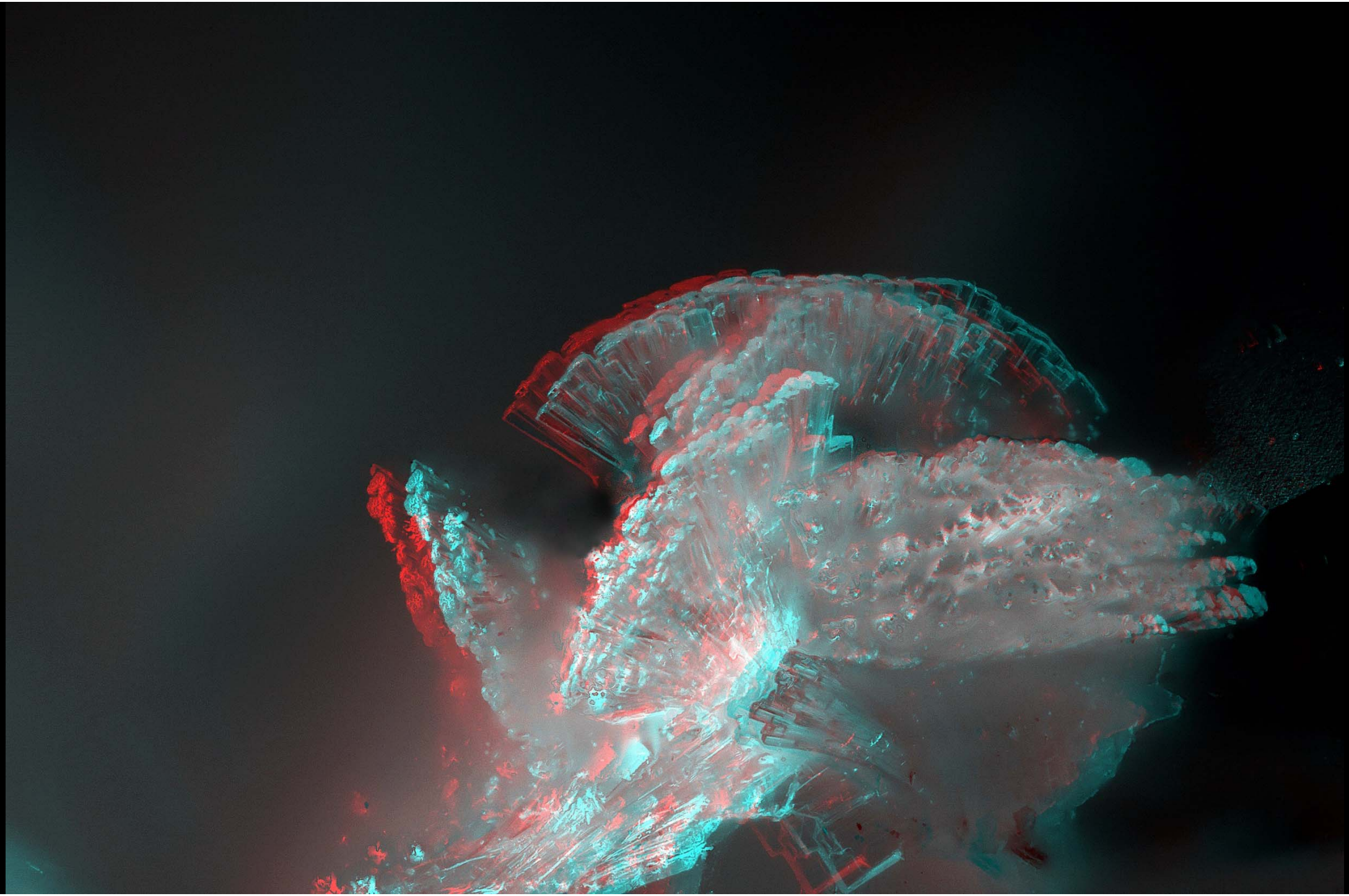
0.1 mm

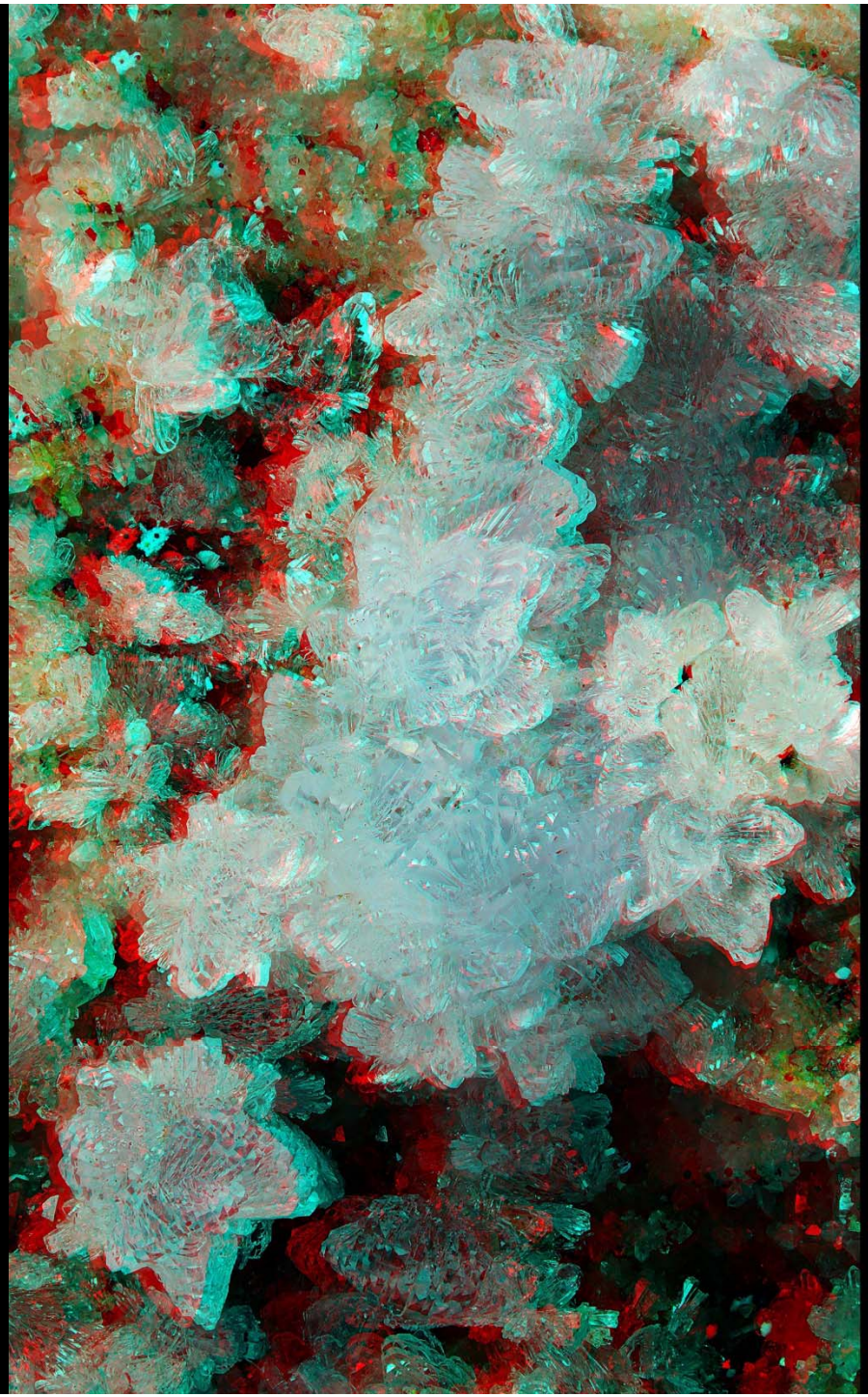
Hemimorphite $Zn_4(Si_2O_7)(OH)_2 \cdot H_2O$

Field width 2.45 mm.

Fan-like radiating clusters in cavity in quartz.
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.
Stack of 134 15-micrometre steps via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM and processed in Photoshop 2023.





Hemimorphite $Zn_4(Si_2O_7)(OH)_2 \cdot H_2O$

Pale blue crystal clusters on quartz
with minor rosasite.

Potts Gill Mine NY 3192 3657,
Caldbeck Fells, Cumbria.

Specimen: collected by David and Julie Green.

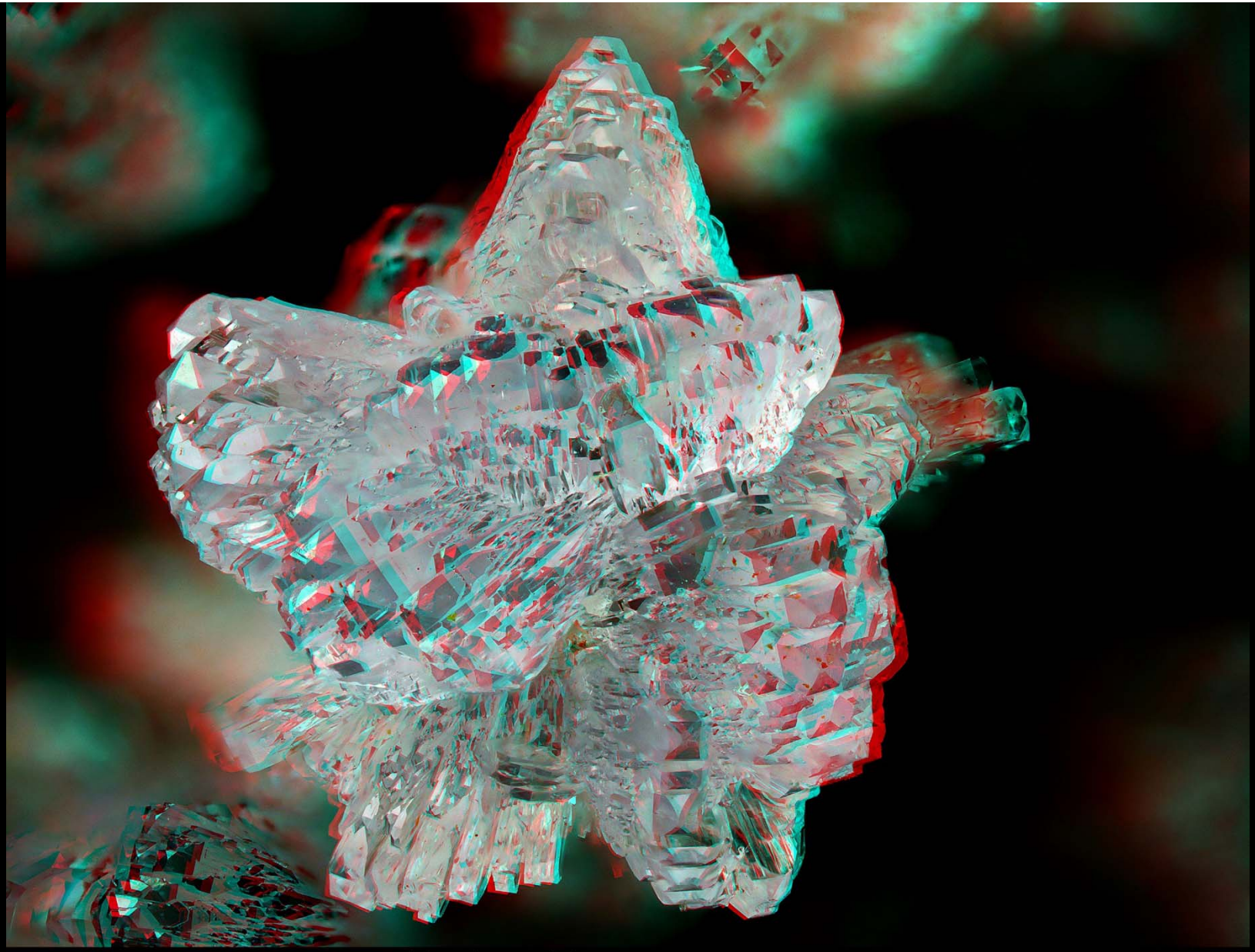
Photography: John Chapman, February 2024.

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 73 and 75 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 13.2 mm.



Hemimorphite $Zn_4(Si_2O_7)(OH)_2 \cdot H_2O$

1 mm

Pale blue crystal clusters on quartz with minor rosasite.

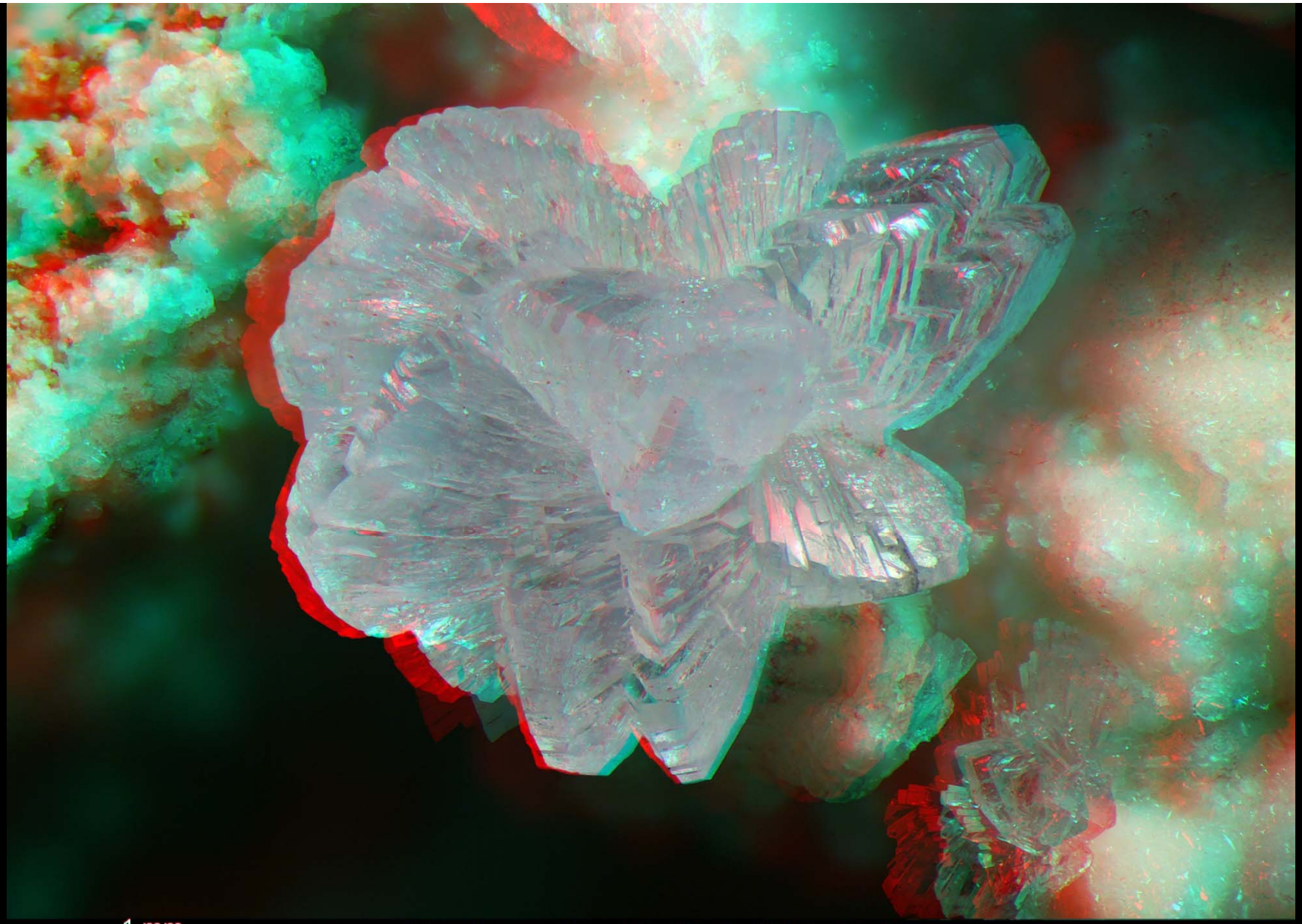
Field height 3.75 mm.

Potts Gill Mine NY 3192 3657, Caldbeck Fells, Cumbria.

Specimen: collected by David and Julie Green. 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 ilumination.

Left + right stacks of 67 and 71 steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

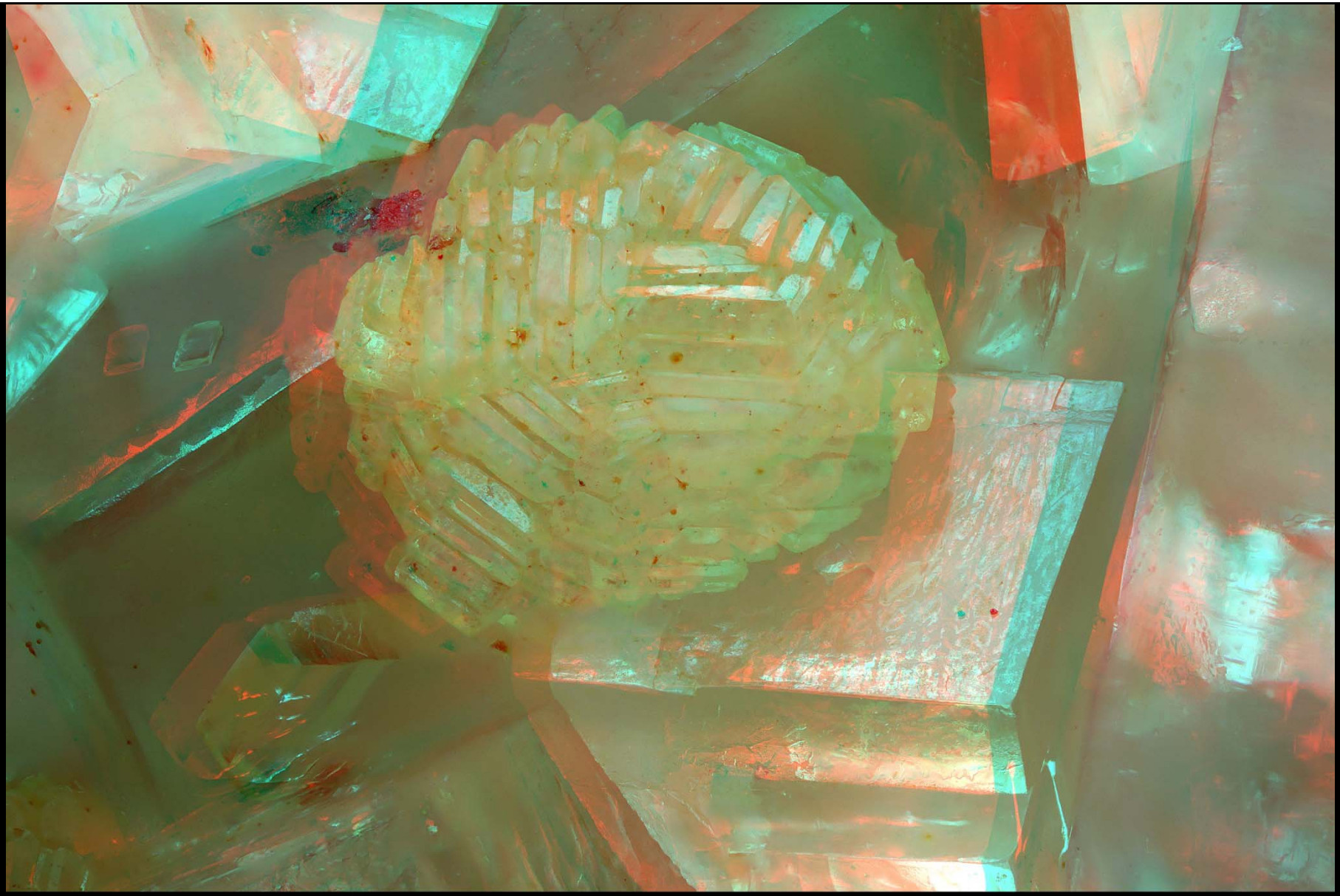


1 mm

Hemimorphite ($Zn_4Si_2O_7(OH)_2.H_2O$)

Field width 6.7 mm

Blue tabular crystalline group, the colour possibly due to copper atoms replacing zinc atoms.
Surrender Ground at east end of Friarfold (O.S. =Forefield) Rake, northern flank of Swaledale, North Yorkshire.
Specimen: David McCallum collection No. E348. Found by Mike Wood in May 2011 at NY 97088 02447. Photography: John Chapman.



1 mm

Hemimorphite $Zn_4(Si_2O_7)(OH)_2.H_2O$

Field width 3.53 mm.

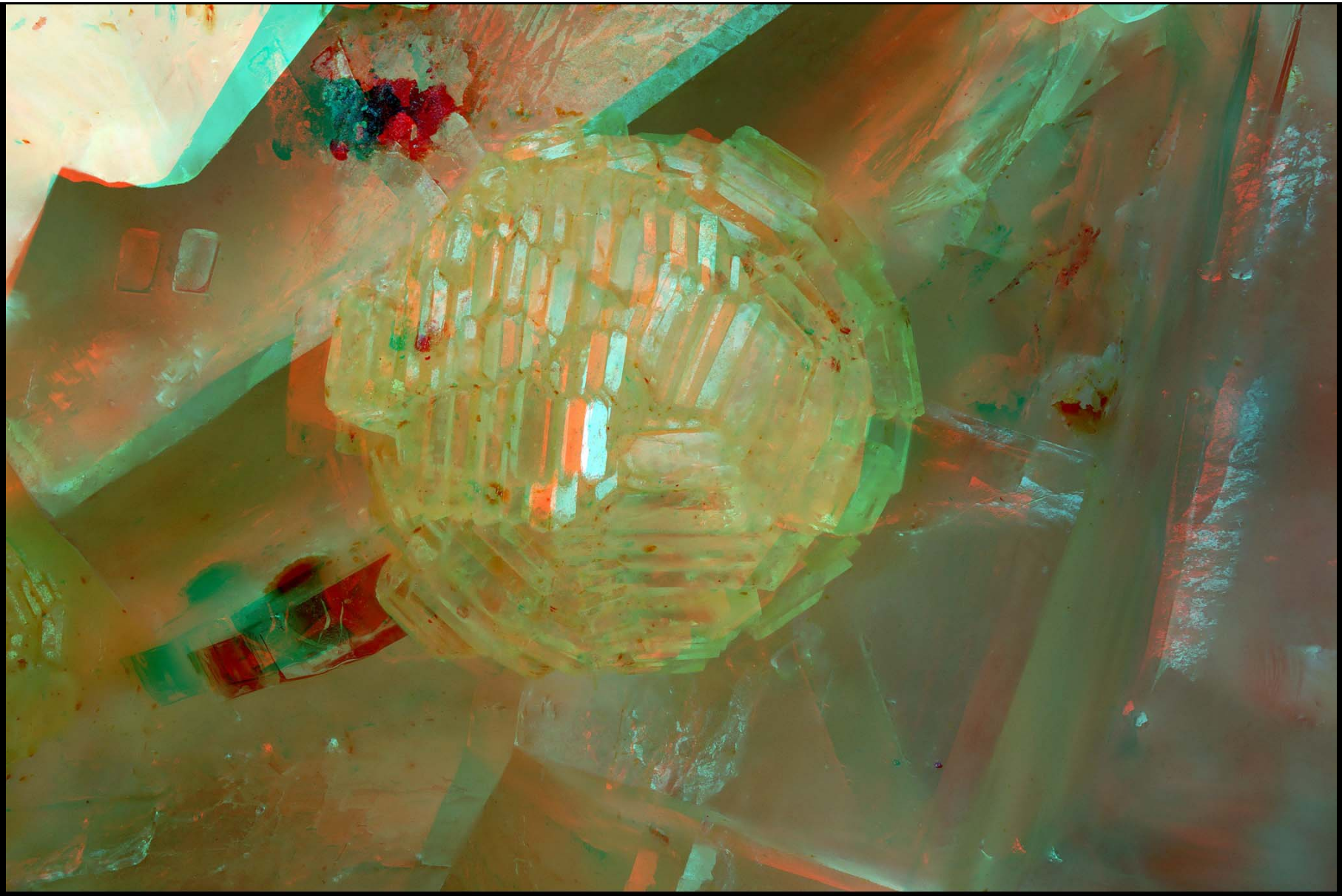
Pale tan spherulite of closely fitting crystals on cubic fluorite crystals.

Gill Heads Mine SE 0661 6204, Trollers Gill, North Yorkshire.

Specimen: found by John Chapman and in John Chapman collection, No. GH60. 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 139 20-micrometre steps at degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Hemimorphite $Zn_4(Si_2O_7)(OH)_2.H_2O$

Field width 3.61 mm.

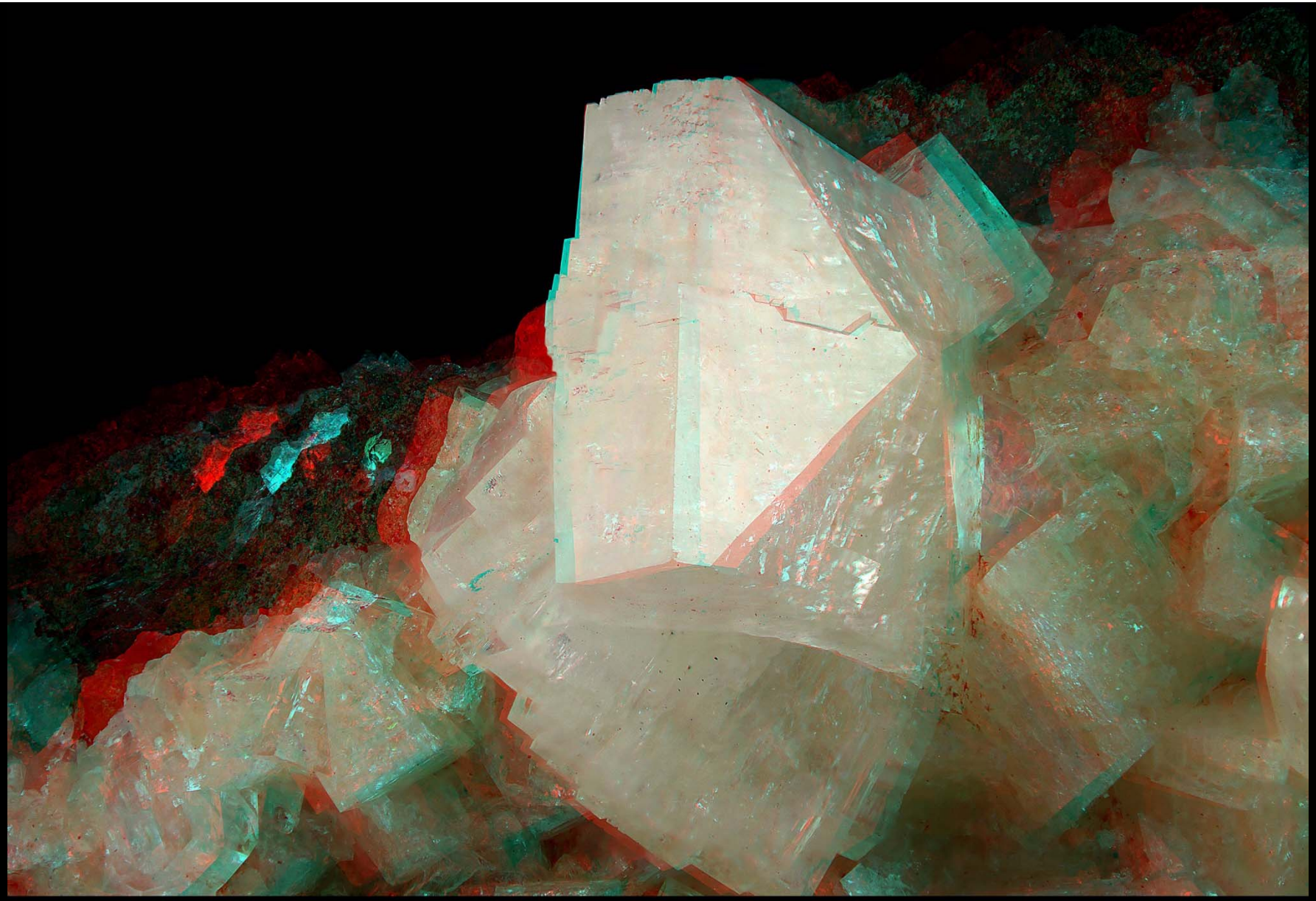
Pale tan spherulite of closely fitting crystals on cubic fluorite crystals.

Gill Heads Mine SE 0661 6204, Trollers Gill, North Yorkshire.

Specimen: found by John Chapman and in John Chapman collection, No. GH60. 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 138 and 131 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



5 mm

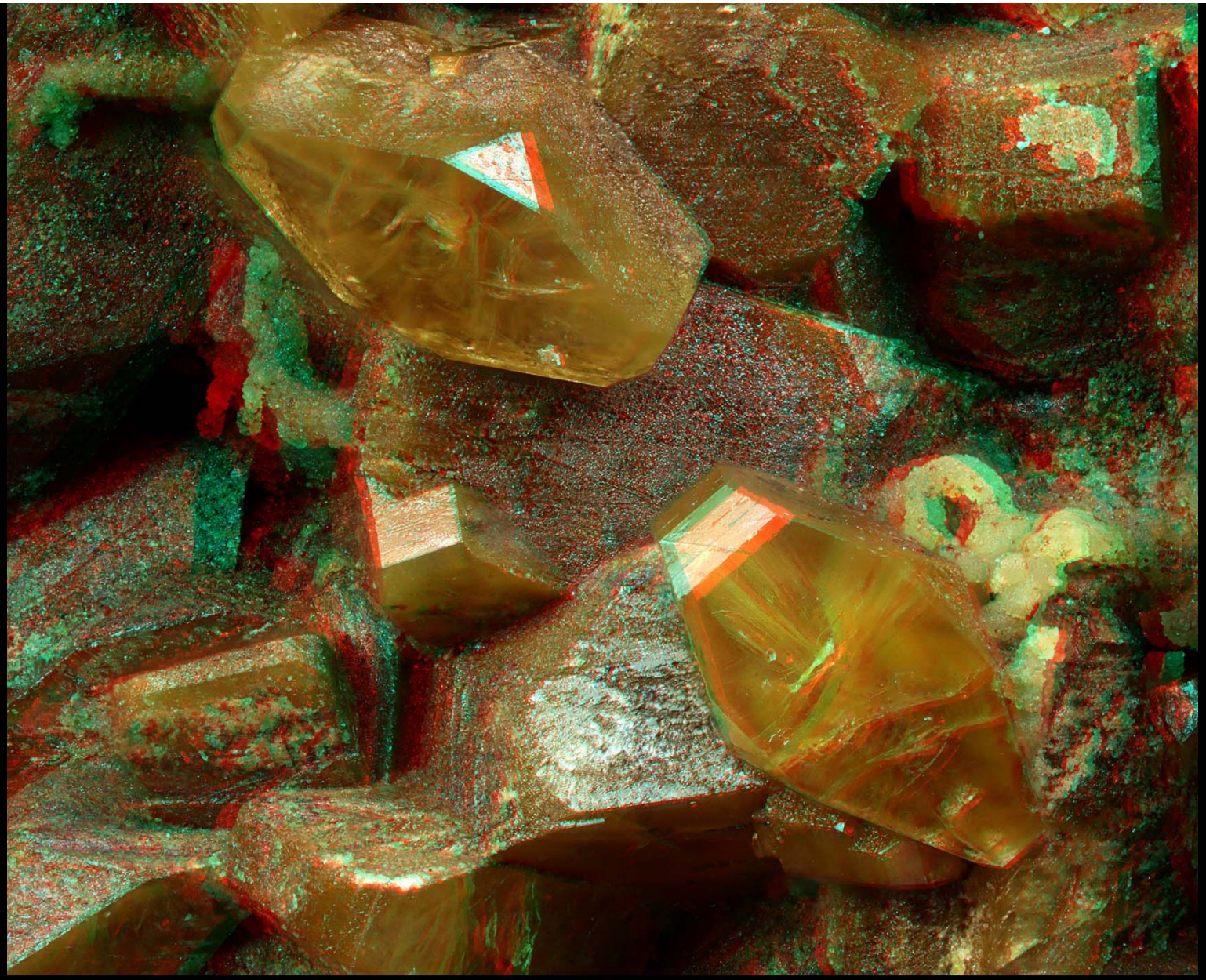
Heulandite-Ca $(Ca,Na,K)_5(Si_{27}Al_9)O_{72}\cdot 26H_2O$

Field width 26.0 mm.

Well formed crystal group with stilbite clusters (mostly out of photographed field) on orange-pink chabazite.
Moonen Bay NG 1527 4639, Duirinish, Isle of Skye.

Specimen: formerly 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 60 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 127 and 128 150-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM



1 mm

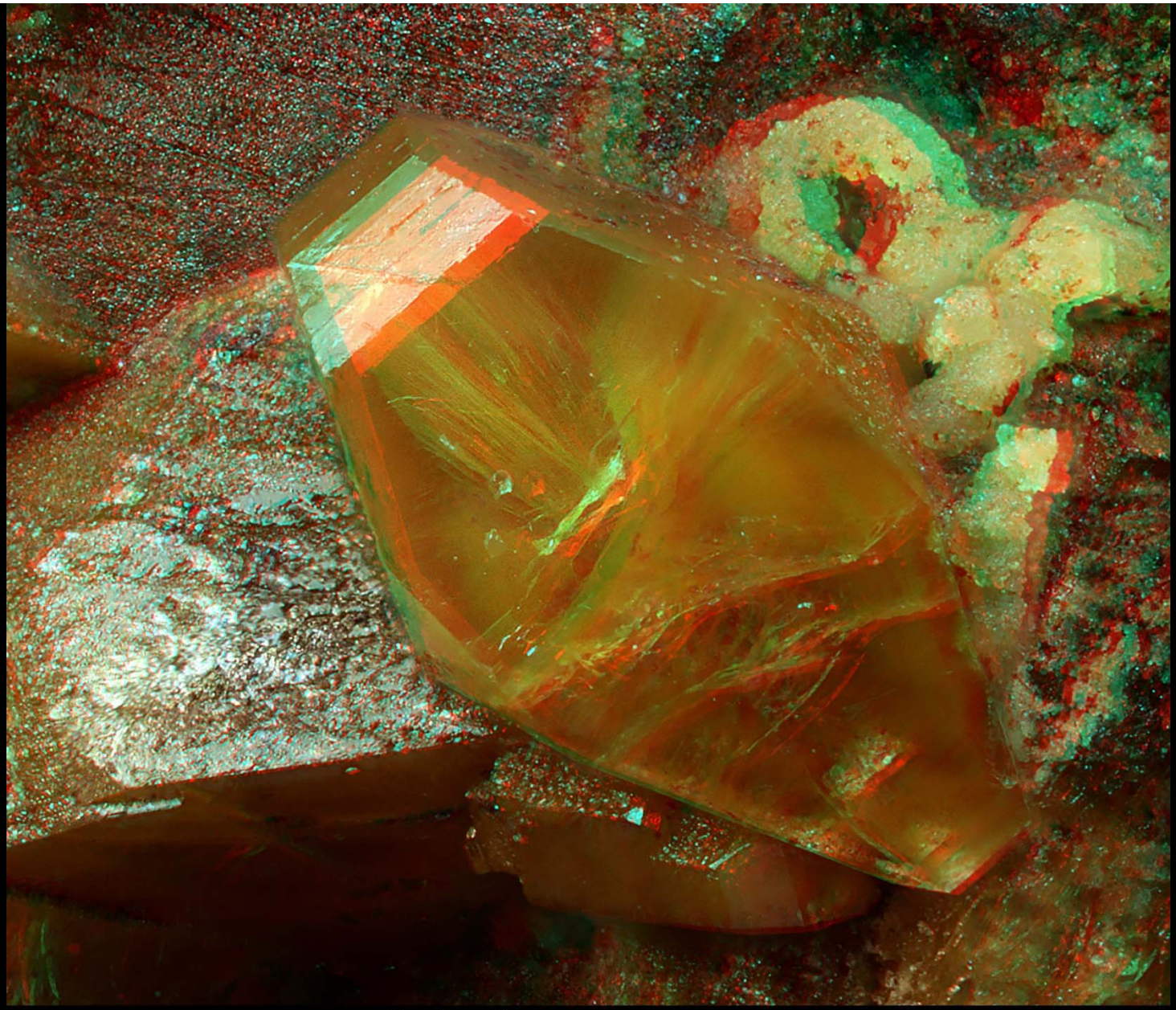
Heulandite $(Ca,Na,K)_5(Si_{27}Al_9)O_{72}\cdot 26H_2O$ Field width 2.63 mm.

Prismatic hematite-stained crystals, some transparent/translucent.

Lang Craigs, nr. Overtoun House, Kilpatrick Hills, Dunbartonshire.

Specimen: Calum Anton 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 114 and 126 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

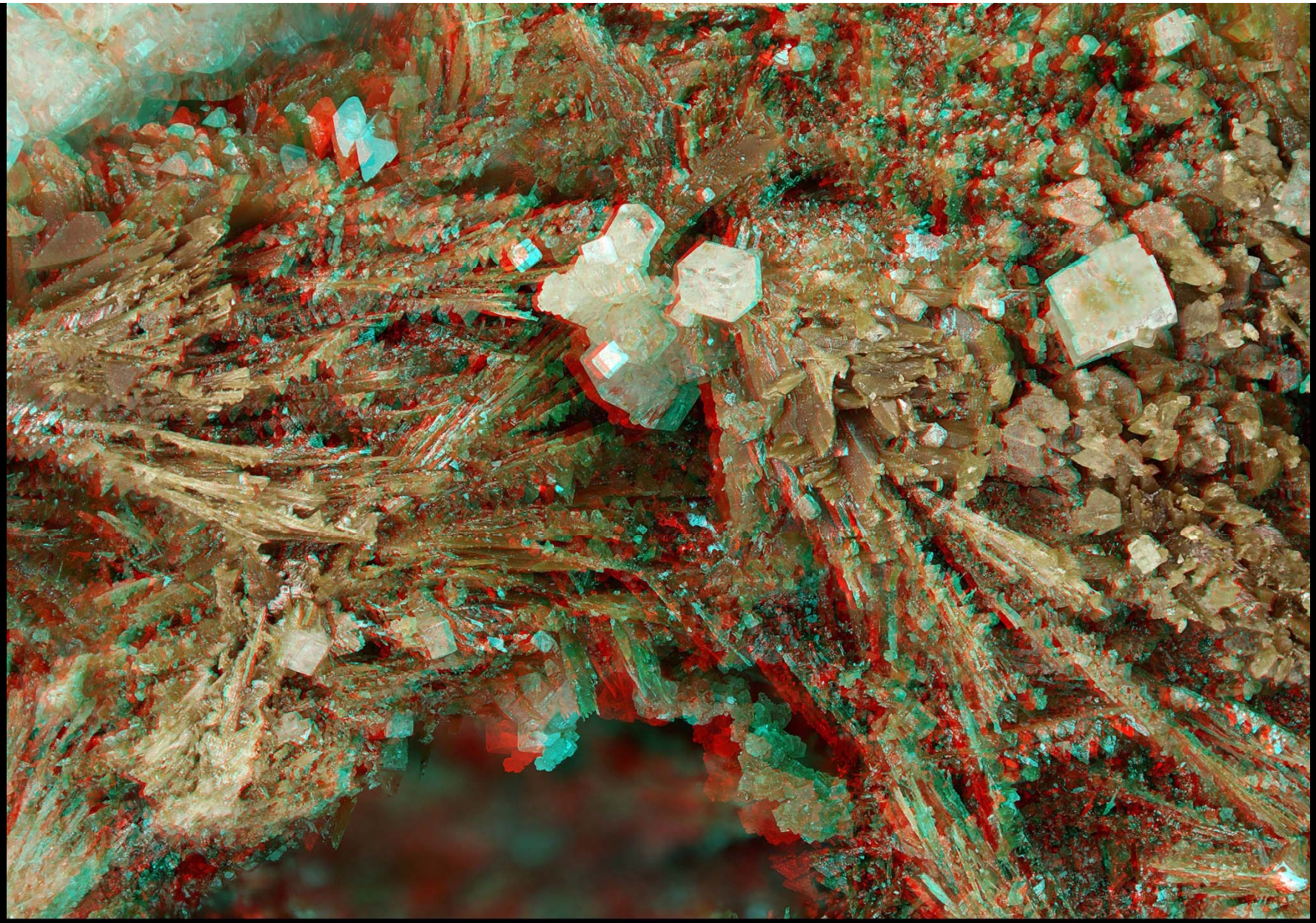
Heulandite $(Ca,Na,K)_5(Si_{27}Al_9)O_{72}\cdot 26H_2O$ Field width 1.33 mm.

Prismatic hematite-stained crystals, some transparent/translucent.

Lang Craigs, nr. Overtoun House, Kilpatrick Hills, Dunbartonshire.

Specimen: Calum Anton 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 114 and 126 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Hilgardite $Ca_2B_5O_9Cl \cdot H_2O$

Field width 11.8 mm.

Crystal sprays, hematite stained, with colourless boracite. 280 Panel, Boulby Mine, Loftus, Cleveland.

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

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 150 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 73 and 87 60-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.3, combined in CombineZM.

Hilgardite $Ca_2B_5O_9Cl \cdot H_2O$

Dendritic crystal spray, hematite stained, with boracite.

280 Panel, Boulby Mine, Loftus, Cleveland.

Specimen: David Green collection.

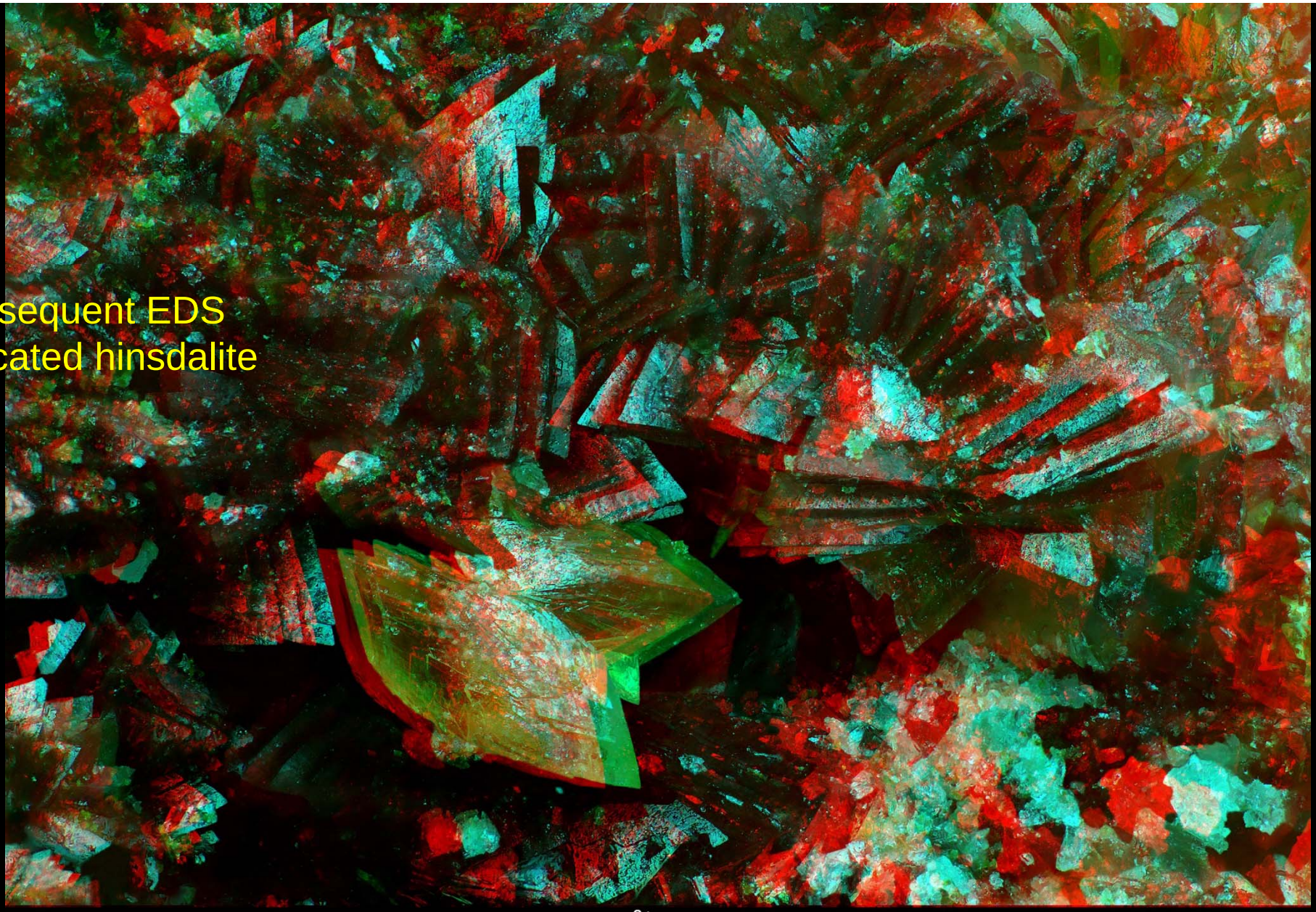
Photography: John Chapman, August 2023.

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

Left + right stacks of 110 and 102 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 4.09 mm.



0.1 mm

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

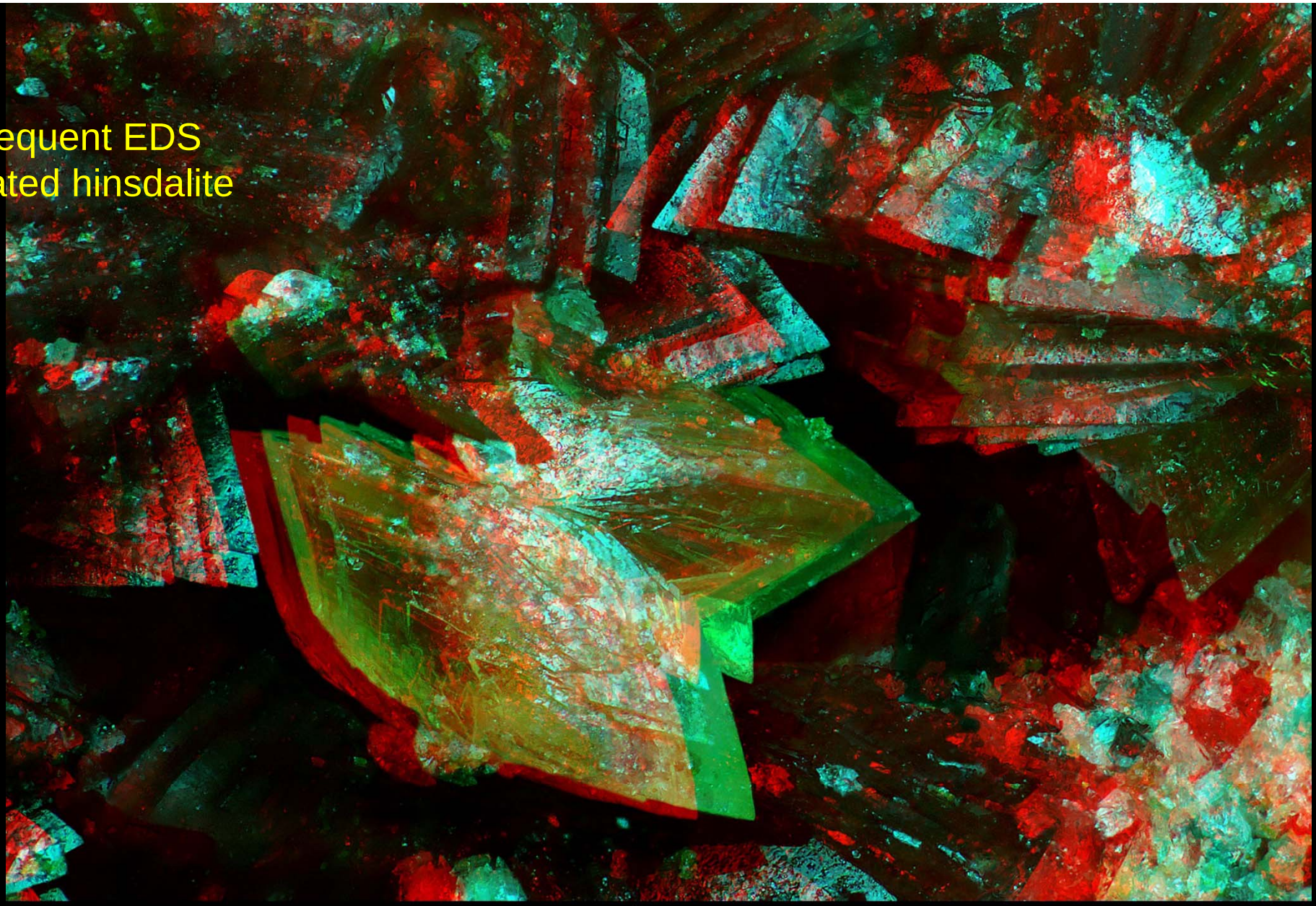
Yellow and brown transparent rhombohedral crystals. Saddleback Old Mine, Mungrisdale, Cumbria.

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.

Subsequent EDS indicated hinsdalite



0.1 mm

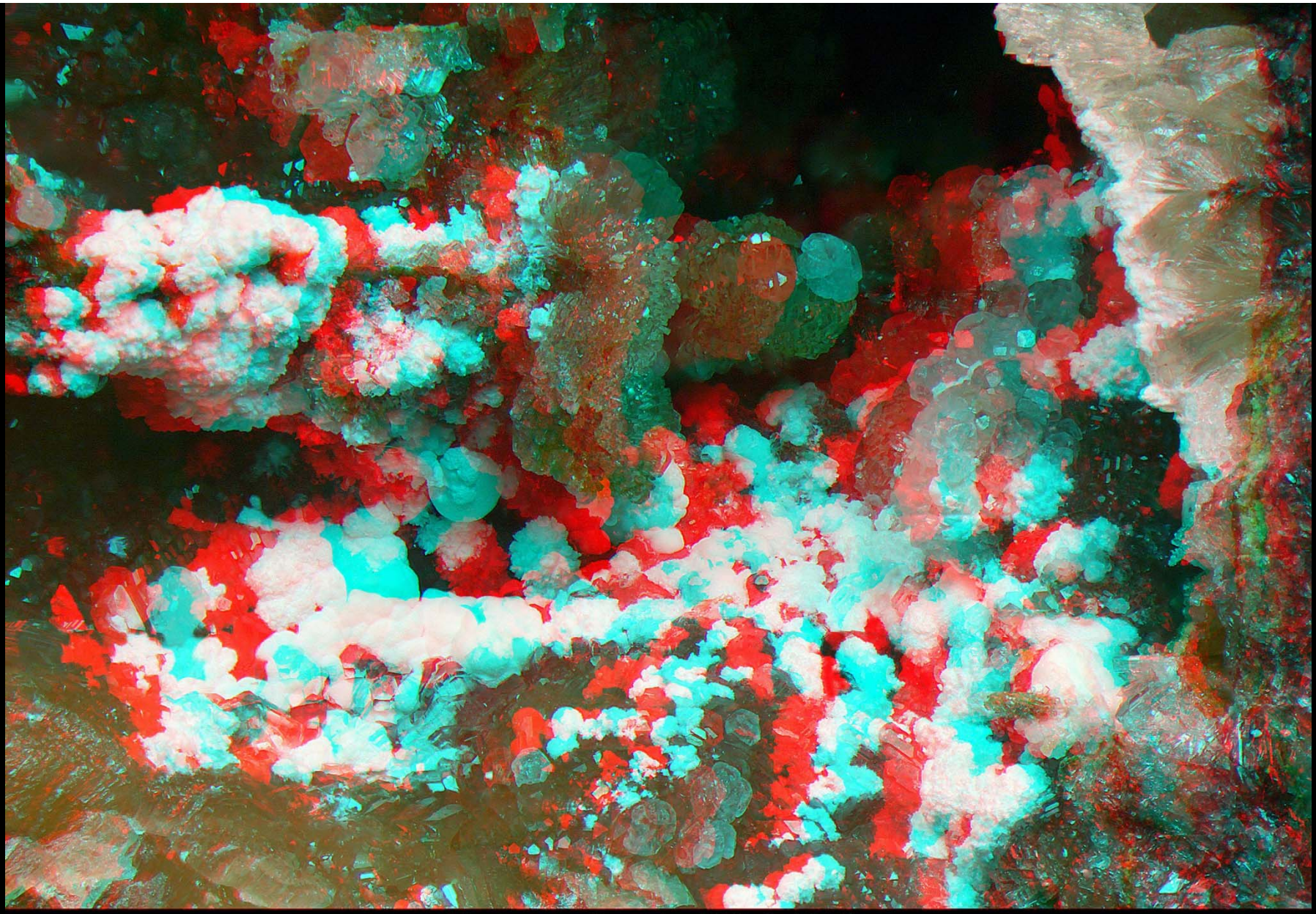
Corkite $PbFe^{3+}_3(SO_4)(PO_4)(OH)_6$ Field width 0.728 mm.

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.



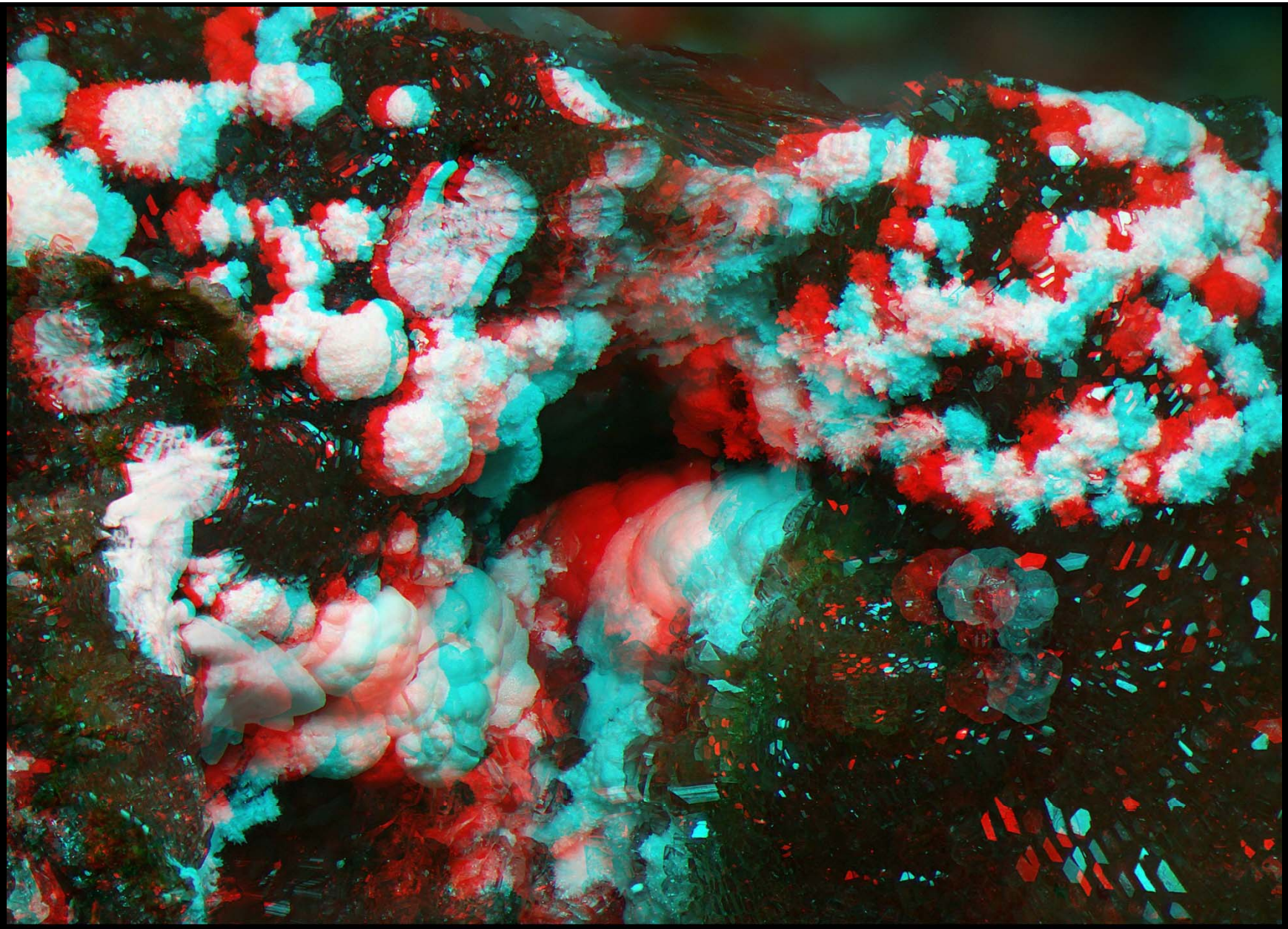
1 mm

Hydrozincite $Zn_5(CO_3)_2(OH)_6$

Field width 13.5 mm

Opaque white spherulitic - botryoidal groups on hemimorphite with either calcite or smithsonite clusters.
Grove Beck Mine, Swaledale, North Yorkshire.

Specimen: found by Dave McCallum and in Dave McCallum collection No. E333. 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.



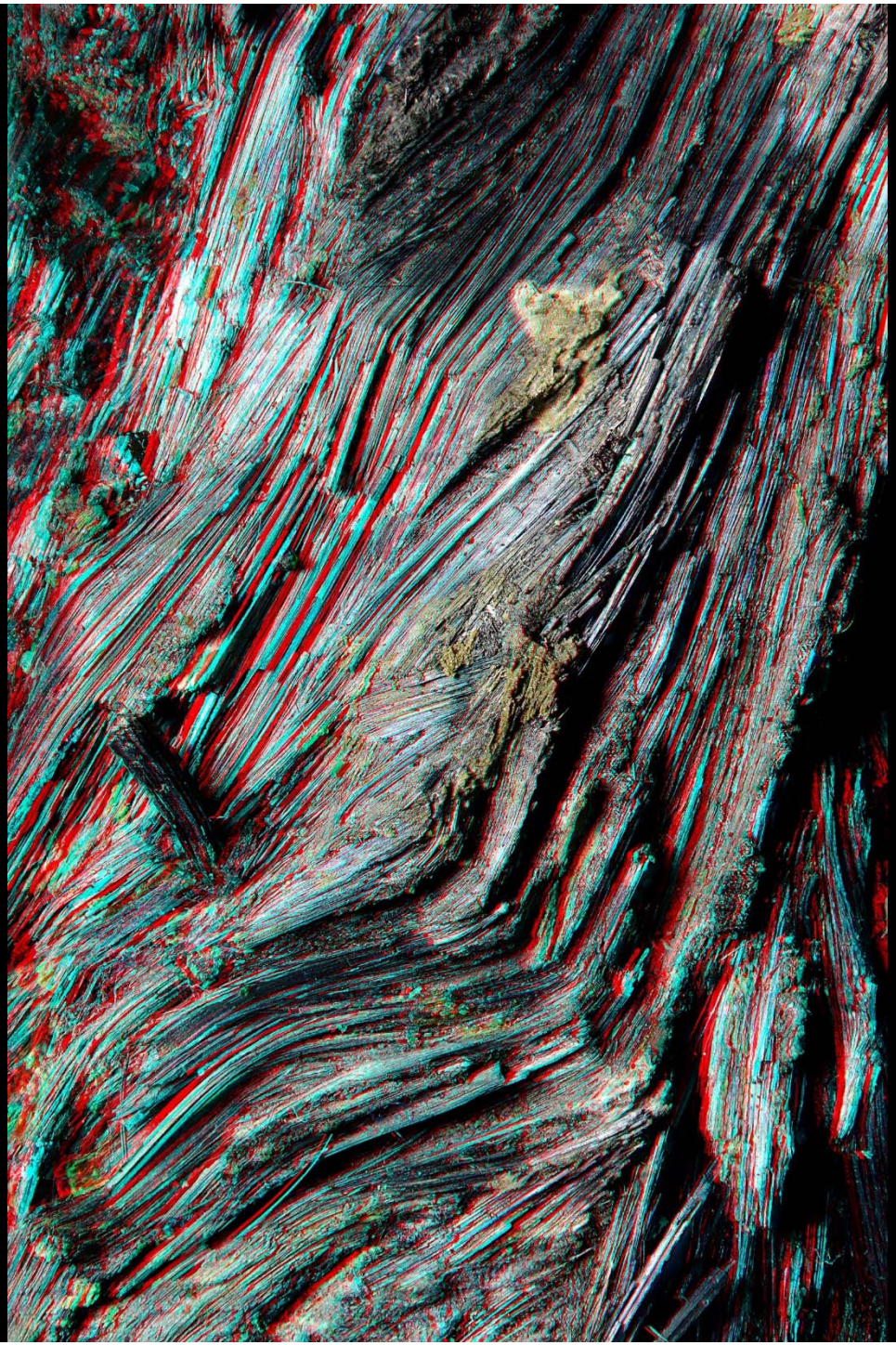
1 mm

Hydrozincite $Zn_5(CO_3)_2(OH)_6$

Field width 10.6 mm

Opaque white spherulitic - botryoidal groups on hemimorphite with either calcite or smithsonite clusters.
Grove Beck Mine, Swaledale, North Yorkshire.

Specimen: found by Dave McCallum and in Dave McCallum collection No. E333. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f = 125 mm objective lens and 2.5x zoom, with Schott fibre optic lighting.



Jamesonite $Pb_4FeSb_6S_{14}$

Rich curved fibrous aggregates with pyrite and arsenopyrite in quartz-killas matrix, with supergene nadorite and possible mopungite.

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

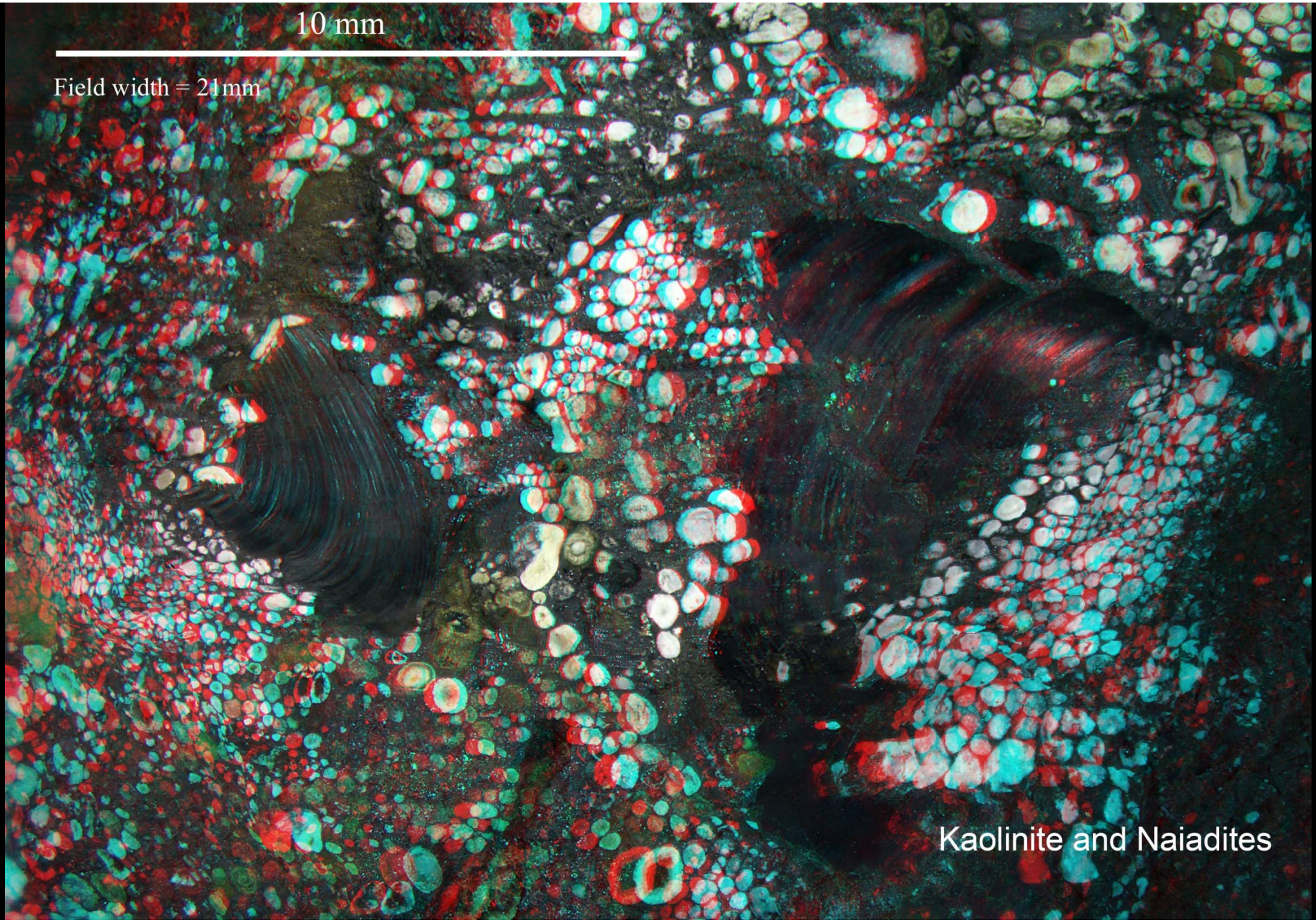
Specimen: David and Julie Green collection.

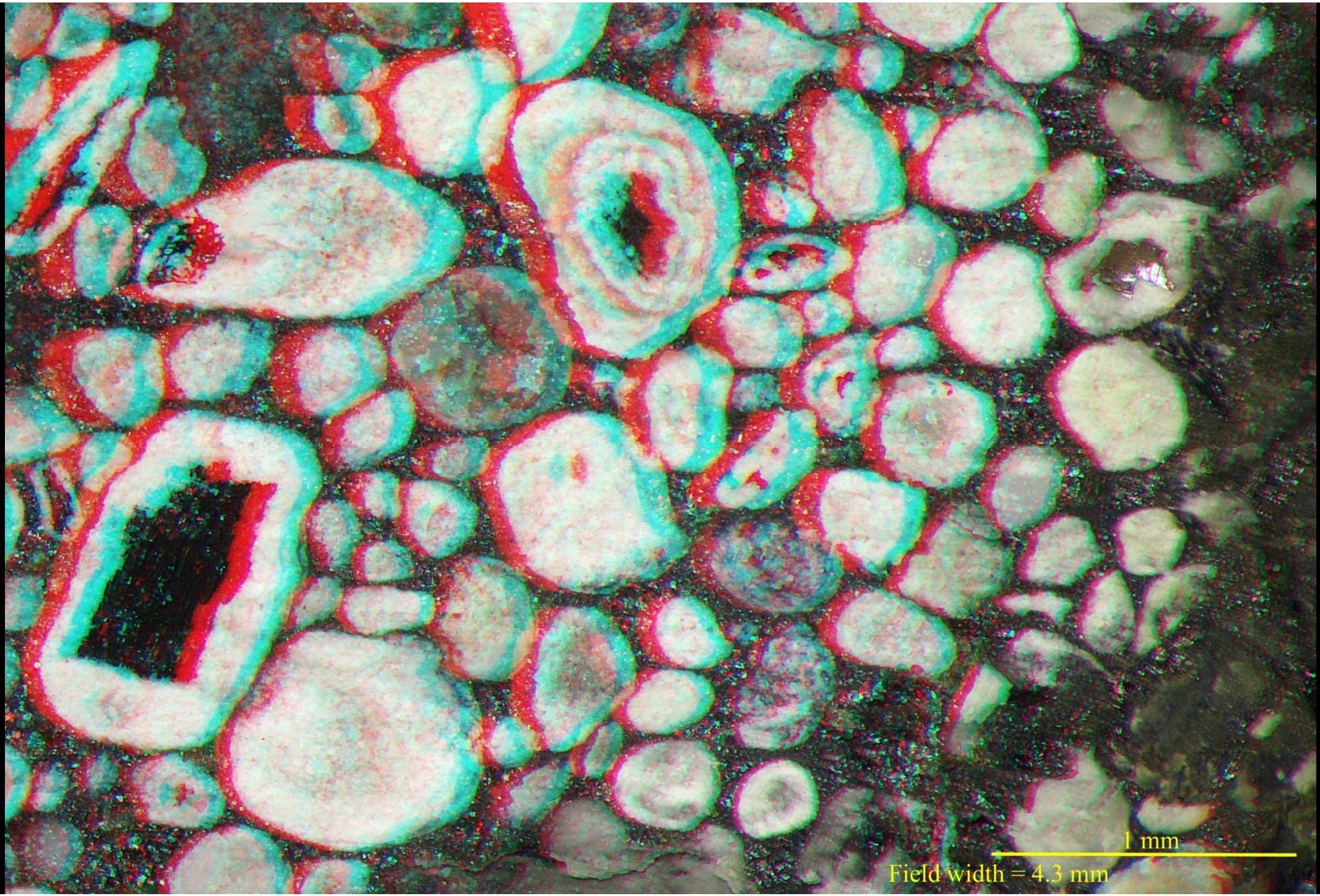
Photography: John Chapman, January 2024.

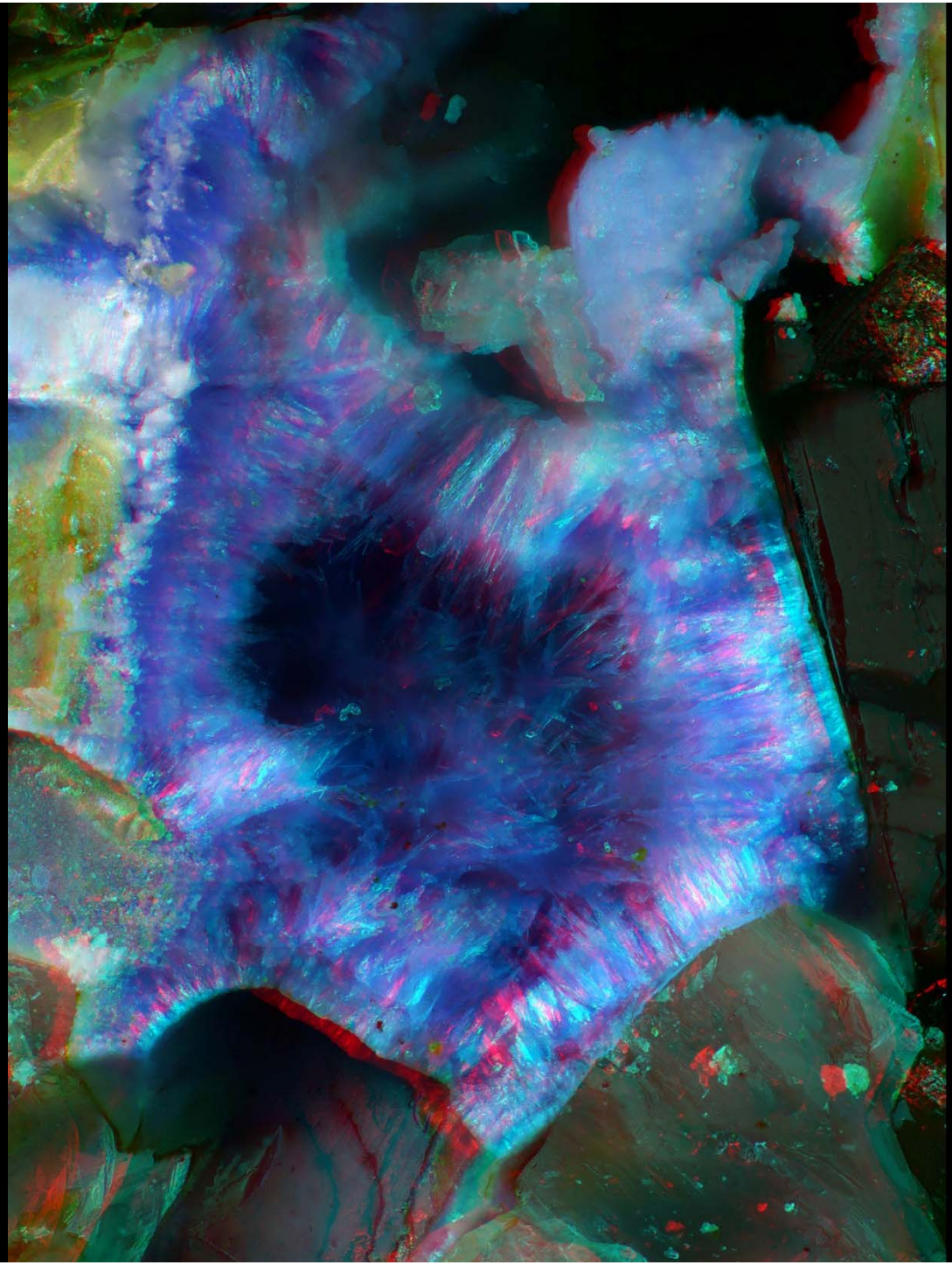
Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63 mm objective lens on 80 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 54 and 67 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.5, combined in CombineZM and rendered in Stereophotomaker.

10 mm Field height 20.8 mm.


10 mm
Field width = 21mm
Kaolinite and Naiadites


1 mm
Field width = 4.3 mm



Khaidarkanite $Cu_4Al_3(OH)_{14}F_3 \cdot 2H_2O$

Sky blue fibrous and botryoidal habit, individual thin bladed crystals with straight terminations.

Keldside Veins, Great Sleddale, North Yorkshire.

Specimen: David Green collection.

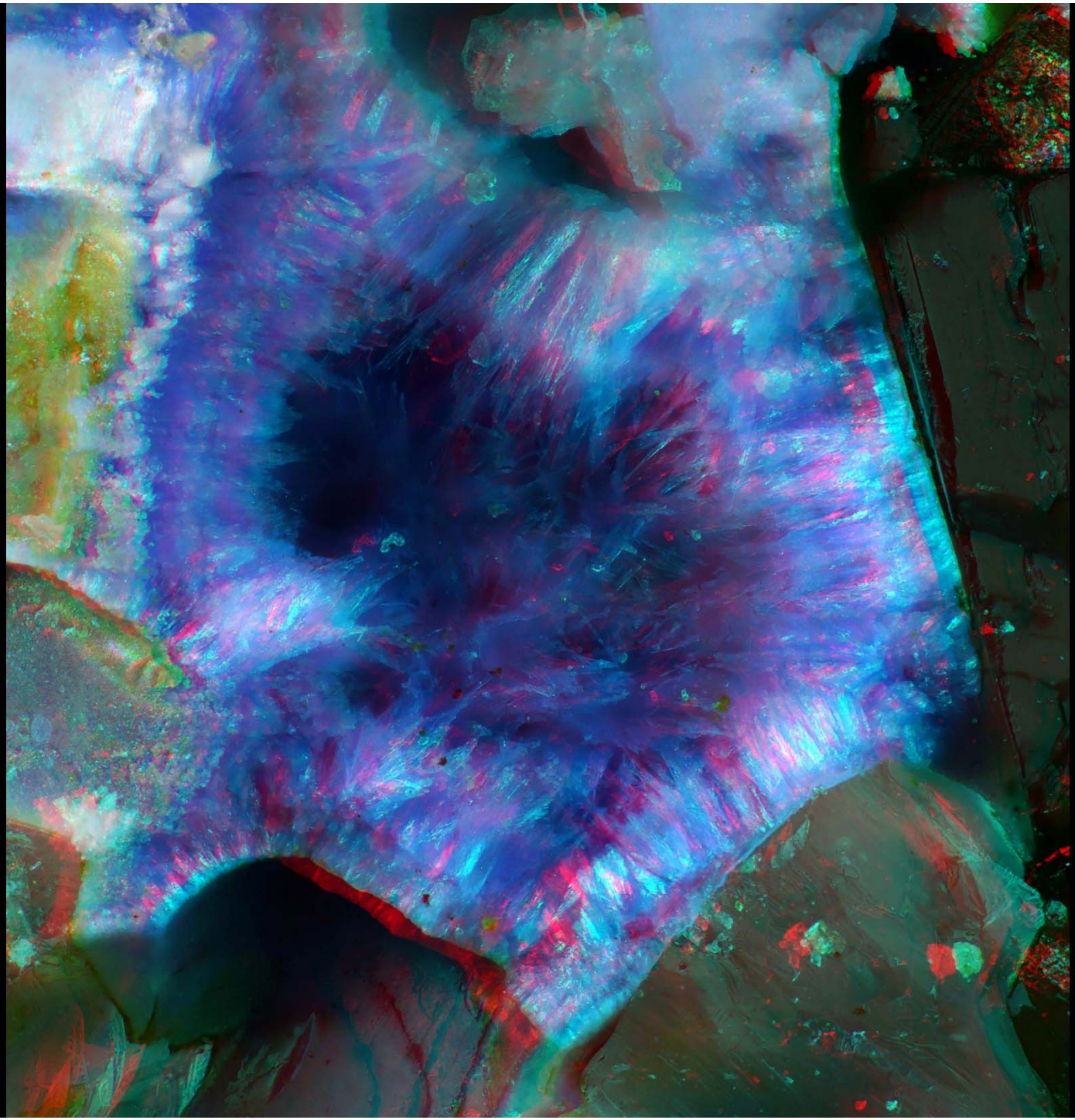
Photography: John Chapman, September 2024.

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

Left + right stacks of 142 and 138 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 1.10 mm.



Khaidarkanite $Cu_4Al_3(OH)_{14}F_3 \cdot 2H_2O$

Sky blue fibrous and botryoidal habit, individual thin bladed crystals with straight terminations.

Keldside Veins, Great Sleddale, North Yorkshire.

Specimen: David Green collection.

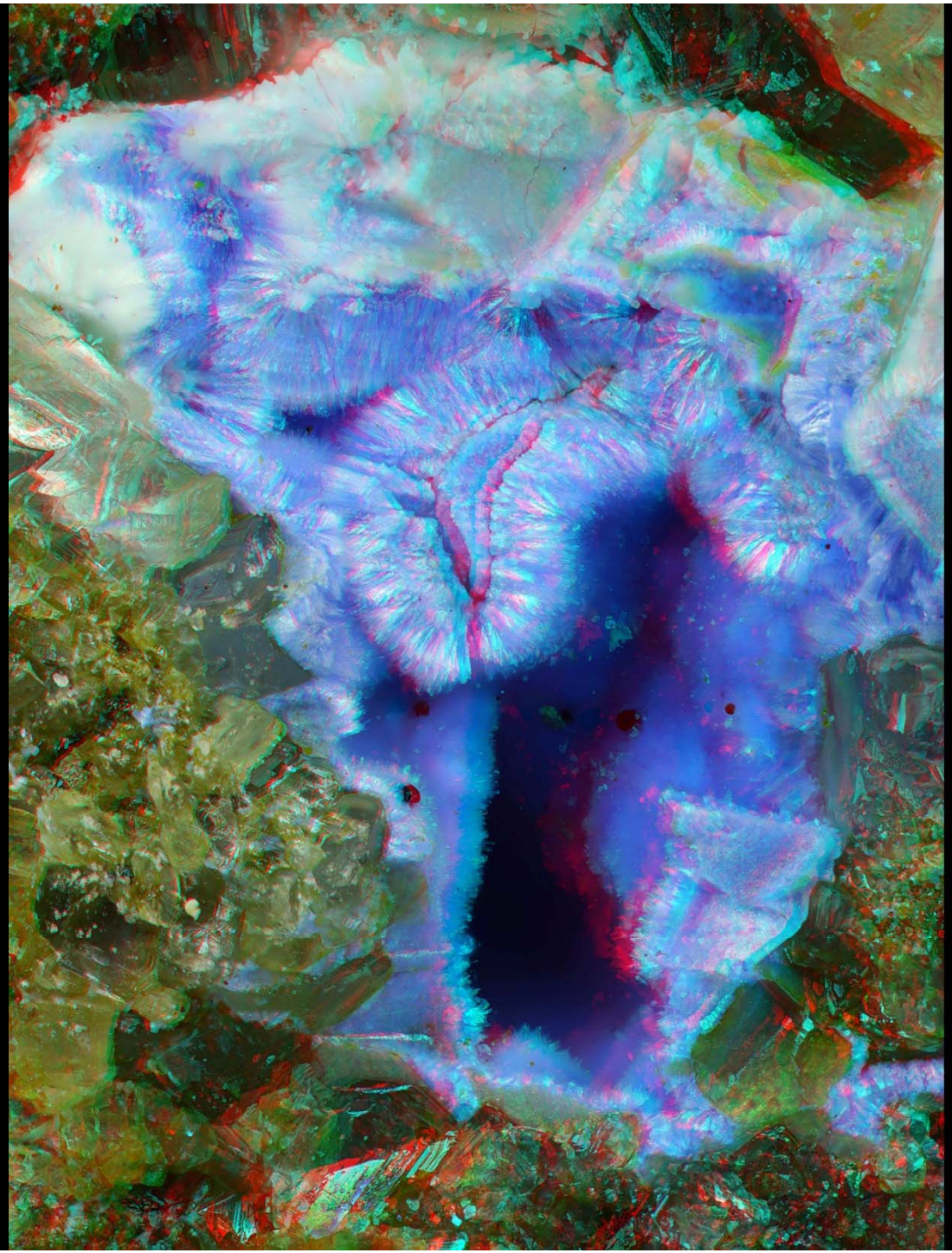
Photography: John Chapman, September 2024.

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

Left + right stacks of 142 and 138 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 0.860 mm.



Khaidarkanite $Cu_4Al_3(OH)_{14}F_3 \cdot 2H_2O$

Sky blue fibrous and botryoidal habit, individual thin bladed crystals with straight terminations.

Keldside Veins, Great Sleddale, North Yorkshire.

Specimen: David Green collection.

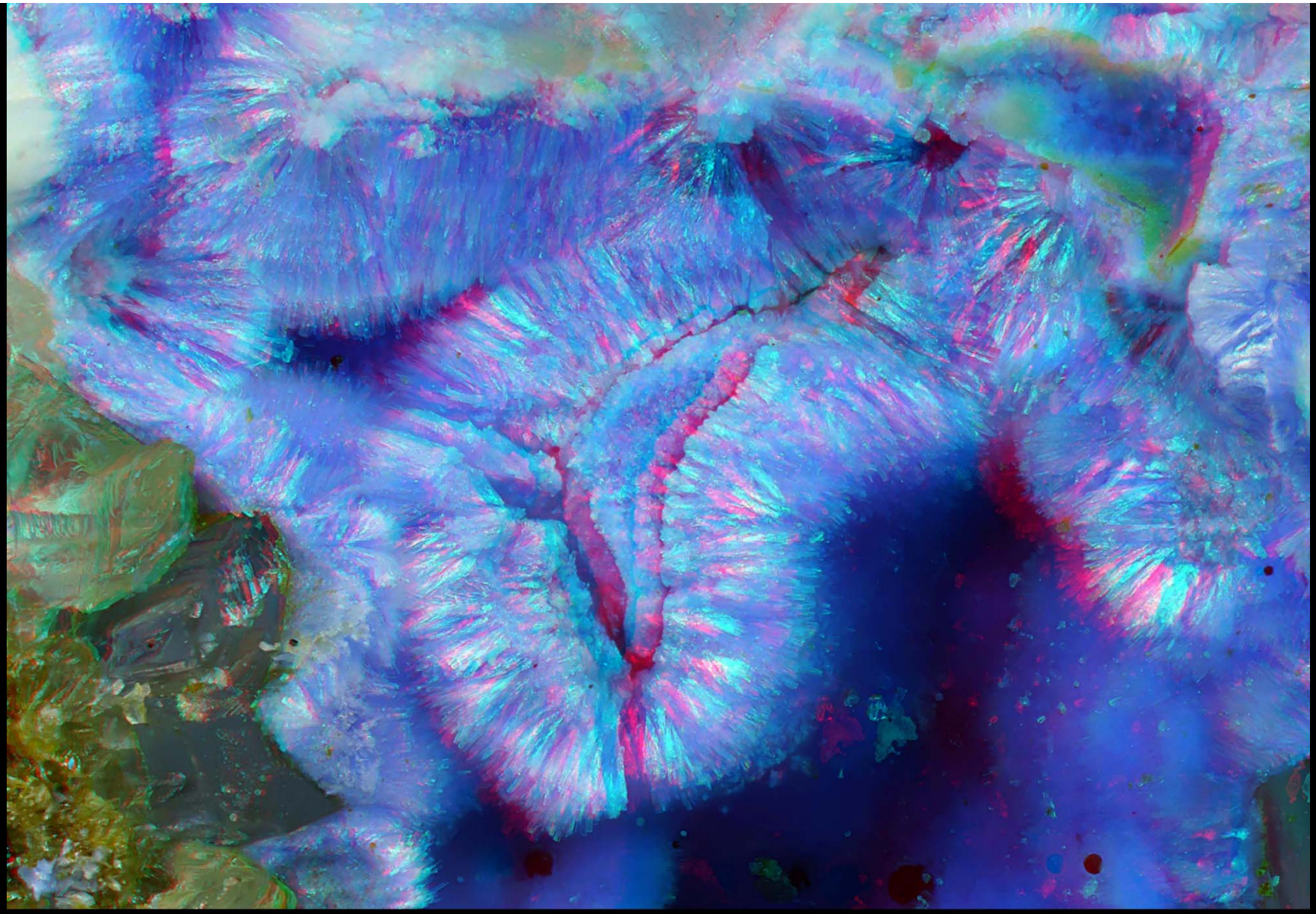
Photography: John Chapman, September 2024.

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 102 and 110 8-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

1 mm

Field height 2.39 mm.



0.1 mm

Khaidarkanite $Cu_4Al_3(OH)_{14}F_3 \cdot 2H_2O$

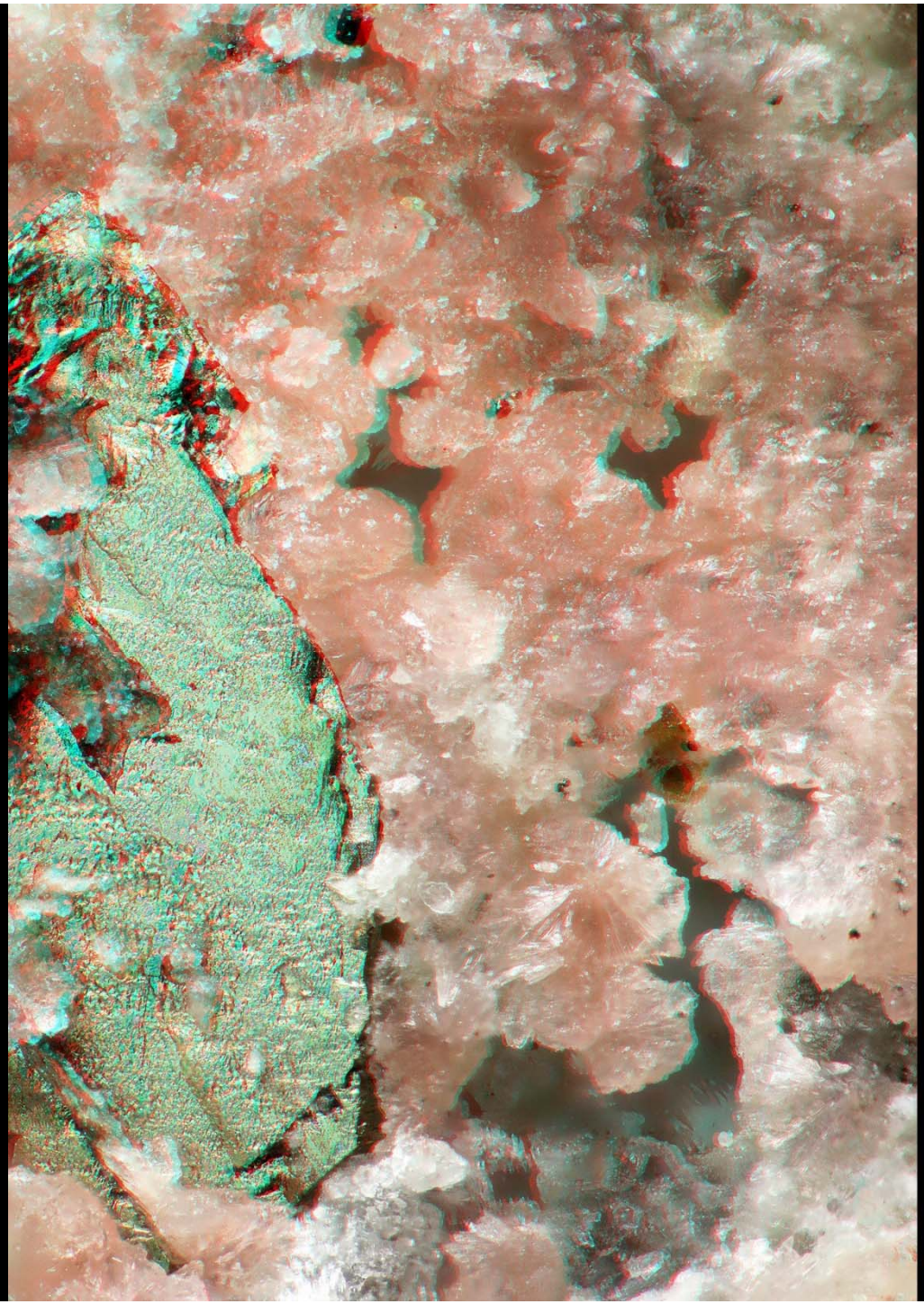
Field width 1.38 mm.

Sky blue fibrous and botryoidal habit, individual thin bladed crystals with straight terminations.

Keldside Veins, Great Sleddale, North Yorkshire.

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 102 and 110 8-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



Köttigite $Zn_3(AsO_4)_2.8H_2O$

Pink drusy surrounding slightly oxidised subhedral pyrite in a thin fracture in pale yellow-green metabasite with calcite and sphalerite.

Strontian Mine (Bellsgrove), Strontian. Argyll.

Specimen: found by David McCallum May 2022, now in John Chapman collection.

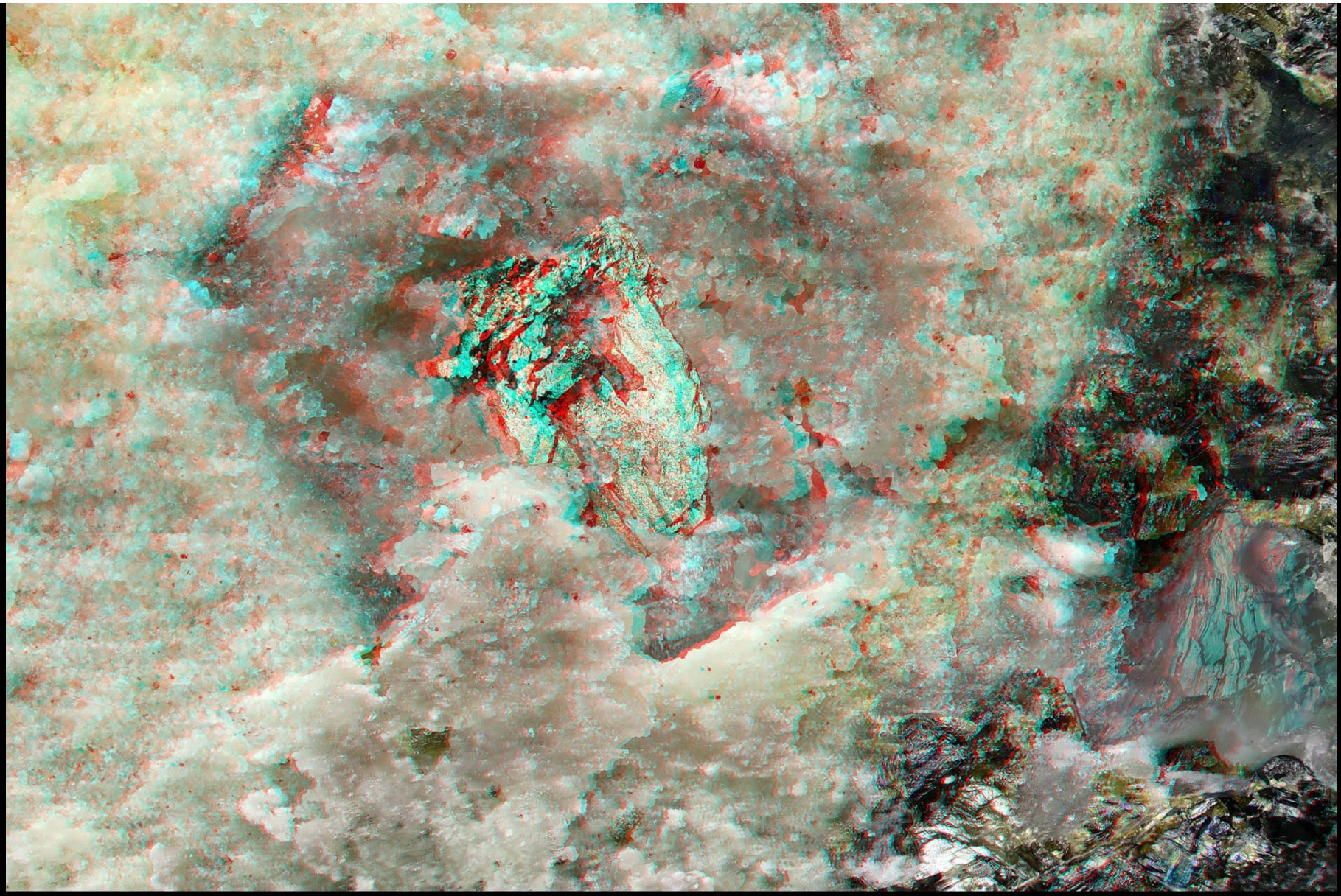
Photography: John Chapman.

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

0.1 mm

Field height 1.12 mm.



1 mm

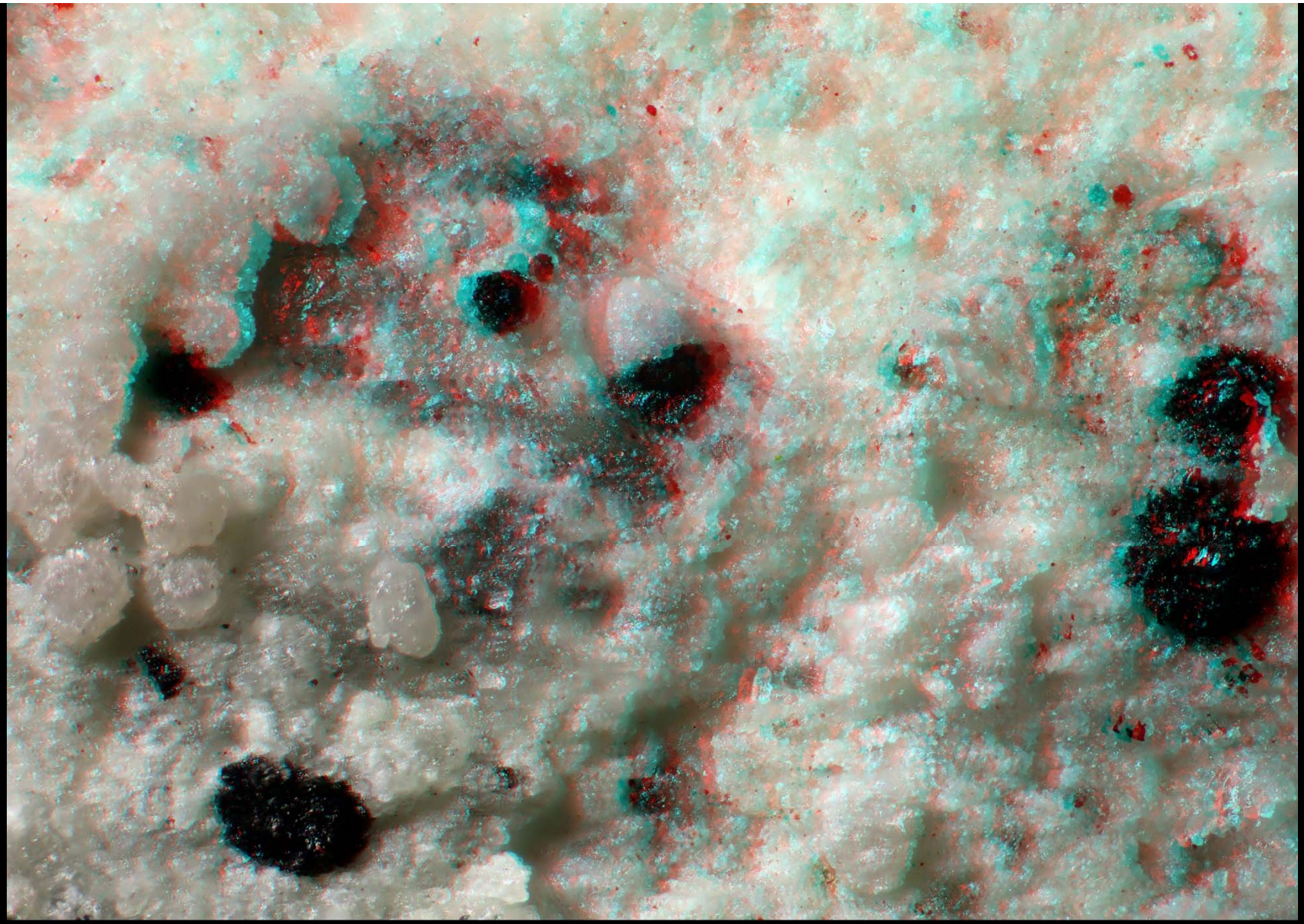
Köttigite $Zn_3(AsO_4)_2.8H_2O$

Field width 3.52 mm.

Pink drusy surrounding slightly oxidised subhedral pyrite in a thin fracture in pale yellow-green metabasite with calcite and sphalerite. Strontian Mine (Bellsgrove), Strontian, Argyll.

Specimen: found by David McCallum May 2022, now in John Chapman collection. 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 58 and 77 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



0.1 mm

Köttigite $Zn_3(AsO_4)_2.8H_2O$

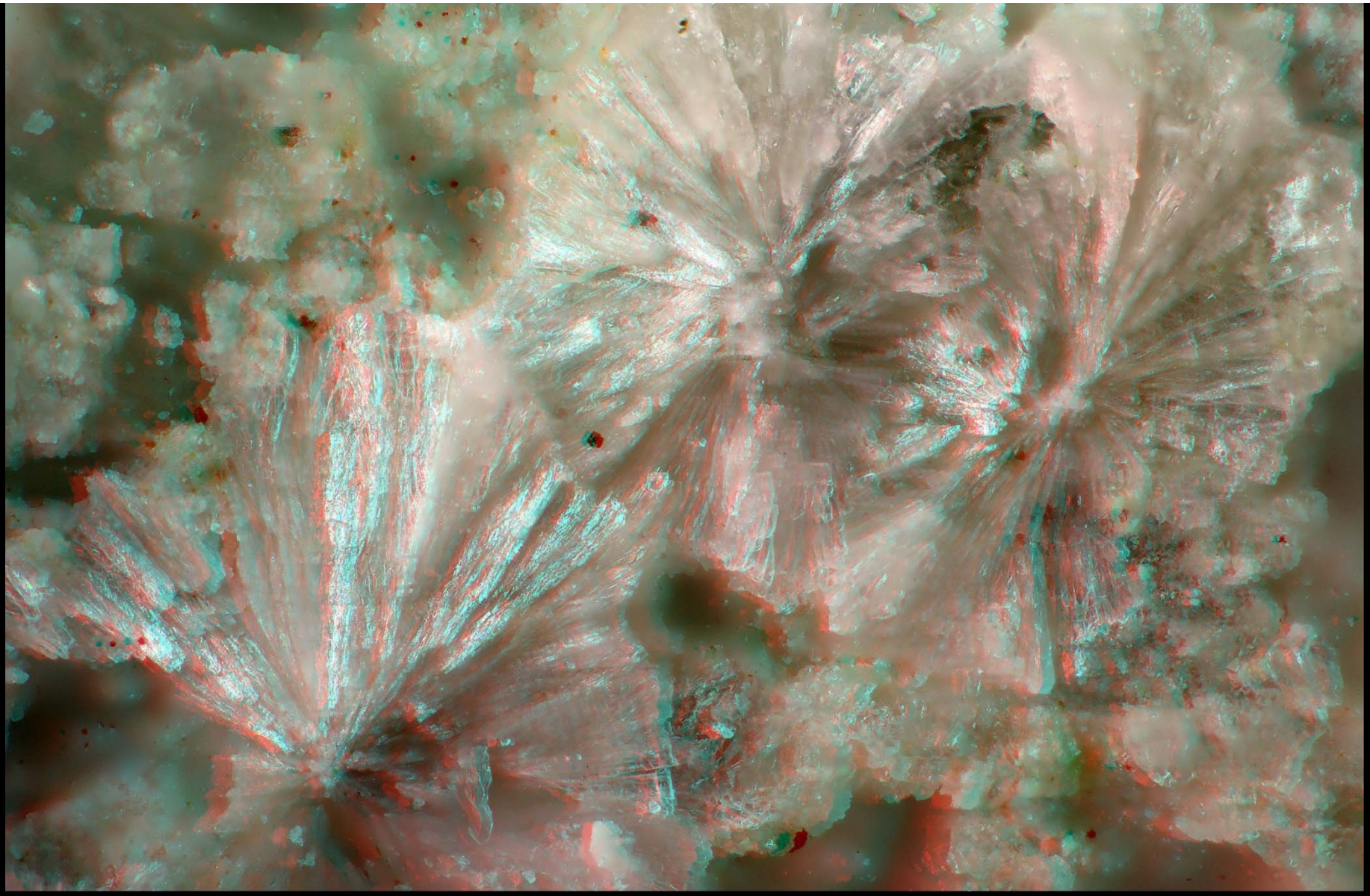
Field width 1.16 mm.

Pale pink spherulites with an undentified black manganese oxide in a fracture in pale grey-green metabasite.
Strontian Mine (Bellsgrove), Strontian, Argyll.

Specimen: found by David McCallum May 2022, now in John Chapman 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 123 and 124 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.

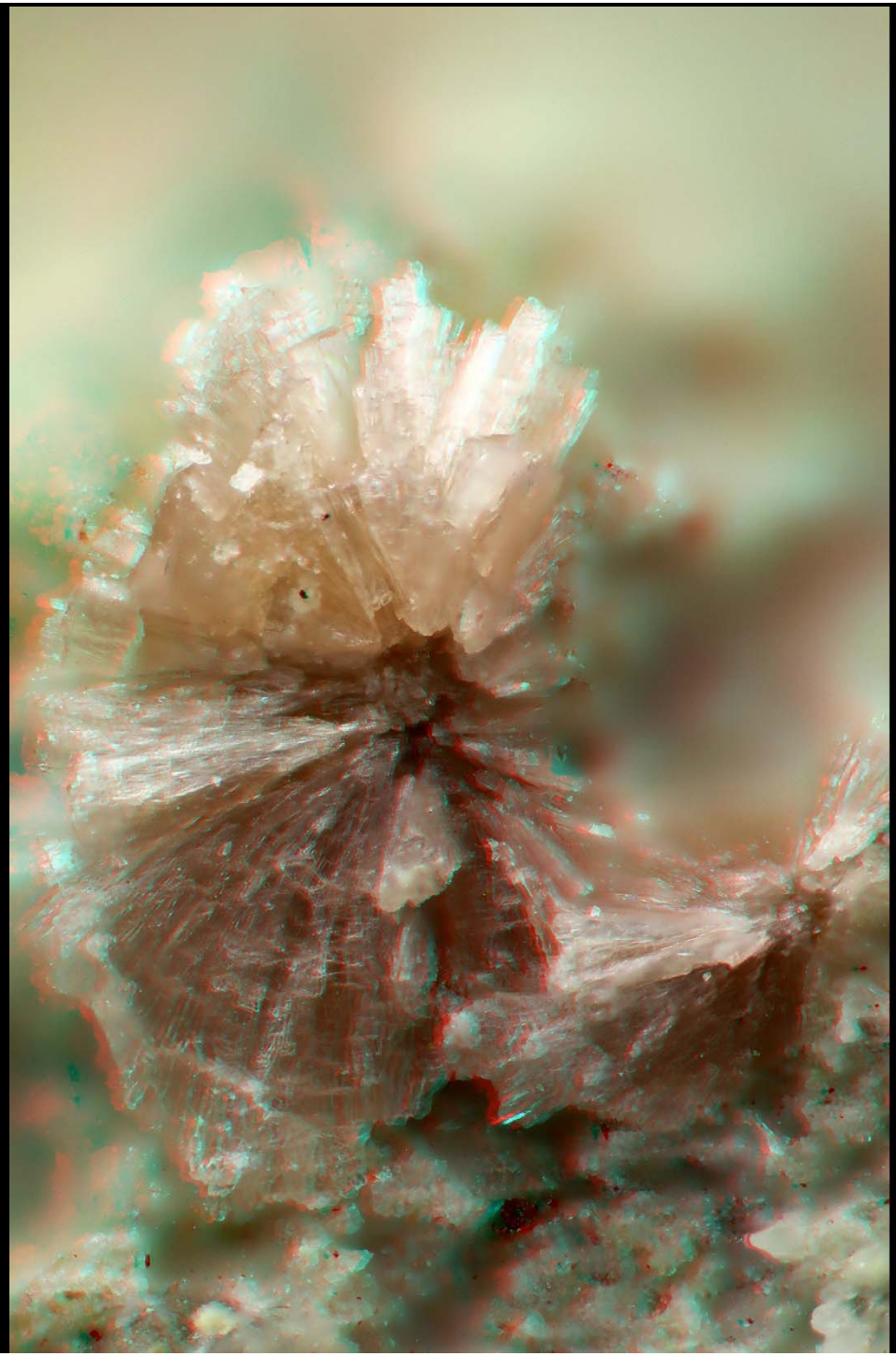


0.1 mm

Köttigite $Zn_3(AsO_4)_2.8H_2O$

Field height 1.25 mm

Pink radiating lath-like crystals in pale green metabasite.
Strontian Barytes Mine, Strontian, Fort William and Ardnamurchan, Highland.
Specimen: David Green collection, No. STR01. 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 78 and 61 5-micrometre steps at 6 degrees via Stackshot rail combined in CombineZM and rendered in Stereophotomaker.



Köttigite $Zn_3(AsO_4)_2.8H_2O$

Pink radiating lath-like crystals in pale green metabasite.

Strontian Barytes Mine, Strontian,
Fort William and Ardnamurchan, Highland.

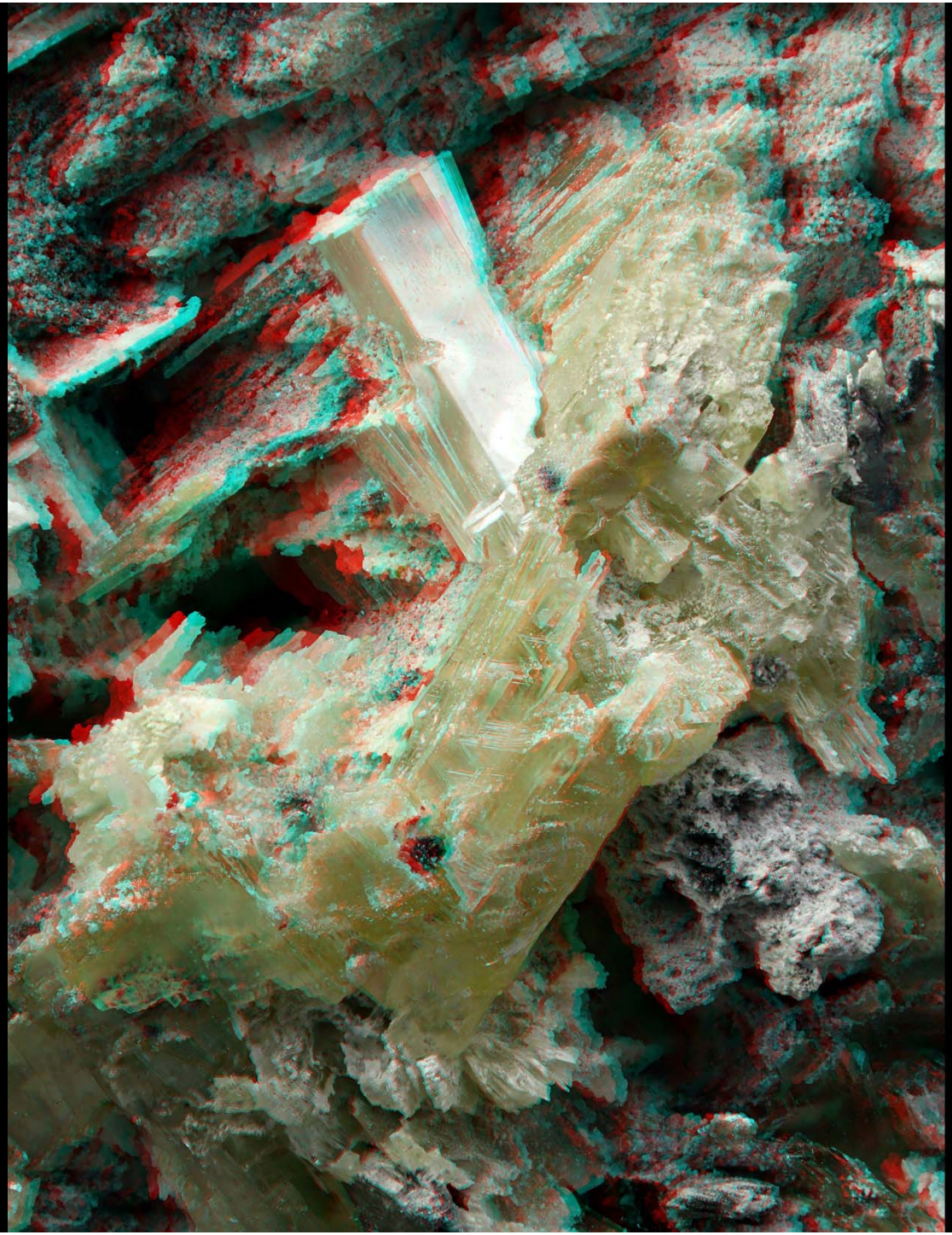
Specimen: David Green collection, No. STR01.

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 41 and 37 5-micrometre steps at 6 degrees via Stackshot rail combined in CombineZM and rendered in Stereophotomaker.

0.1 mm

Field height 1.25 mm



Lanarkite $Pb_2O(SO_4)$

Uncommonly large pale yellow crystals of monoclinic system showing perfect cleavage on {-201} and splintery fracture.

Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

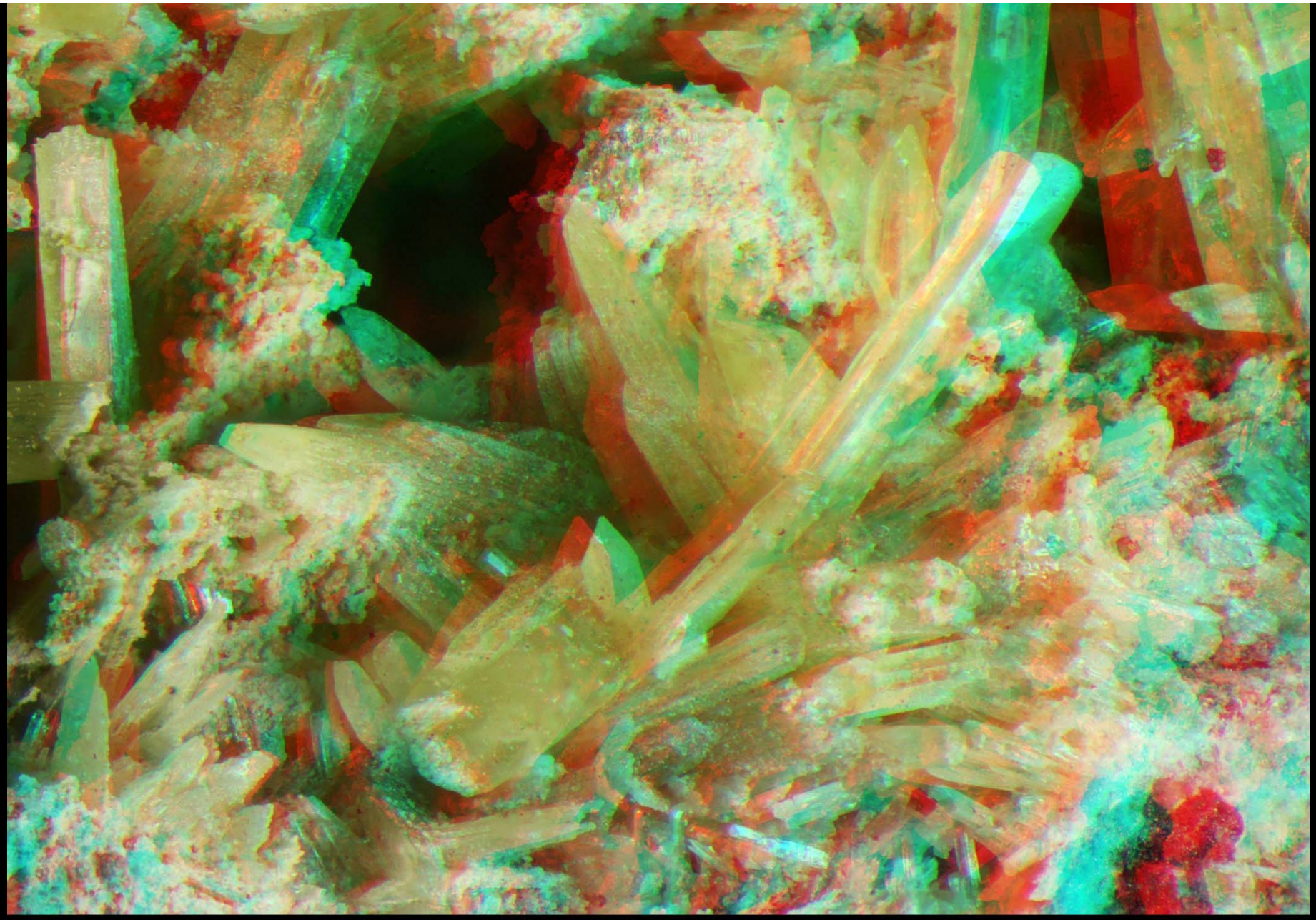
Specimen: found by David McCallum, No. E105, and now in David Green collection.

Photography: John Chapman.

Canon EOS 5DSr camera with Carl Zeiss Luminar 63 mm objective lens on 140 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 85 and 83 70-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 11.3 mm

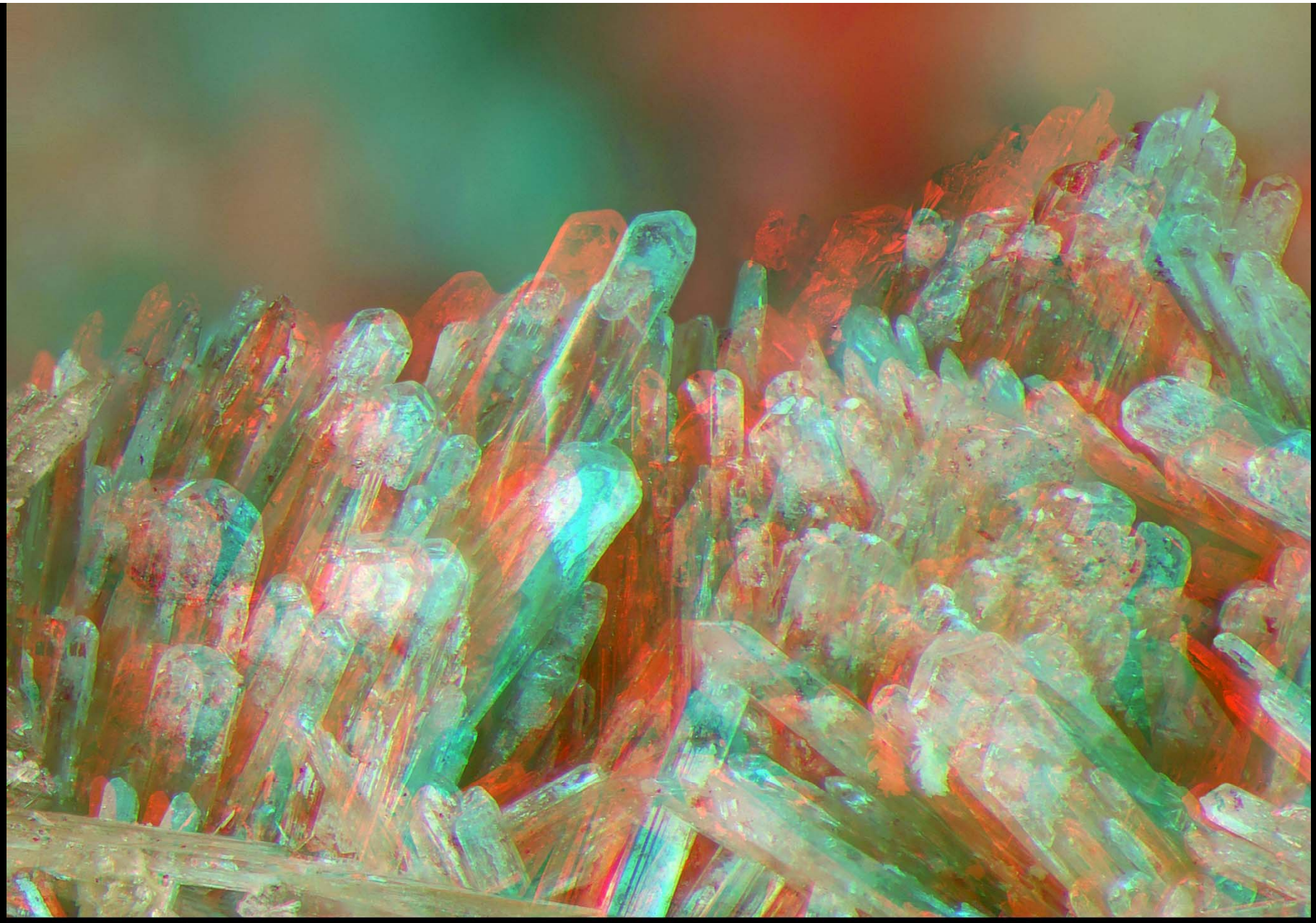


1 mm

Lanarkite $Pb_2(SO_4)O$

Field width 4.3 mm

Pale yellow thin prismatic monoclinic crystals with sharp terminations. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.
Specimen: found by David McCallum, E107, 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 and 6.4x zoom, with LED lamp illumination.



1 mm

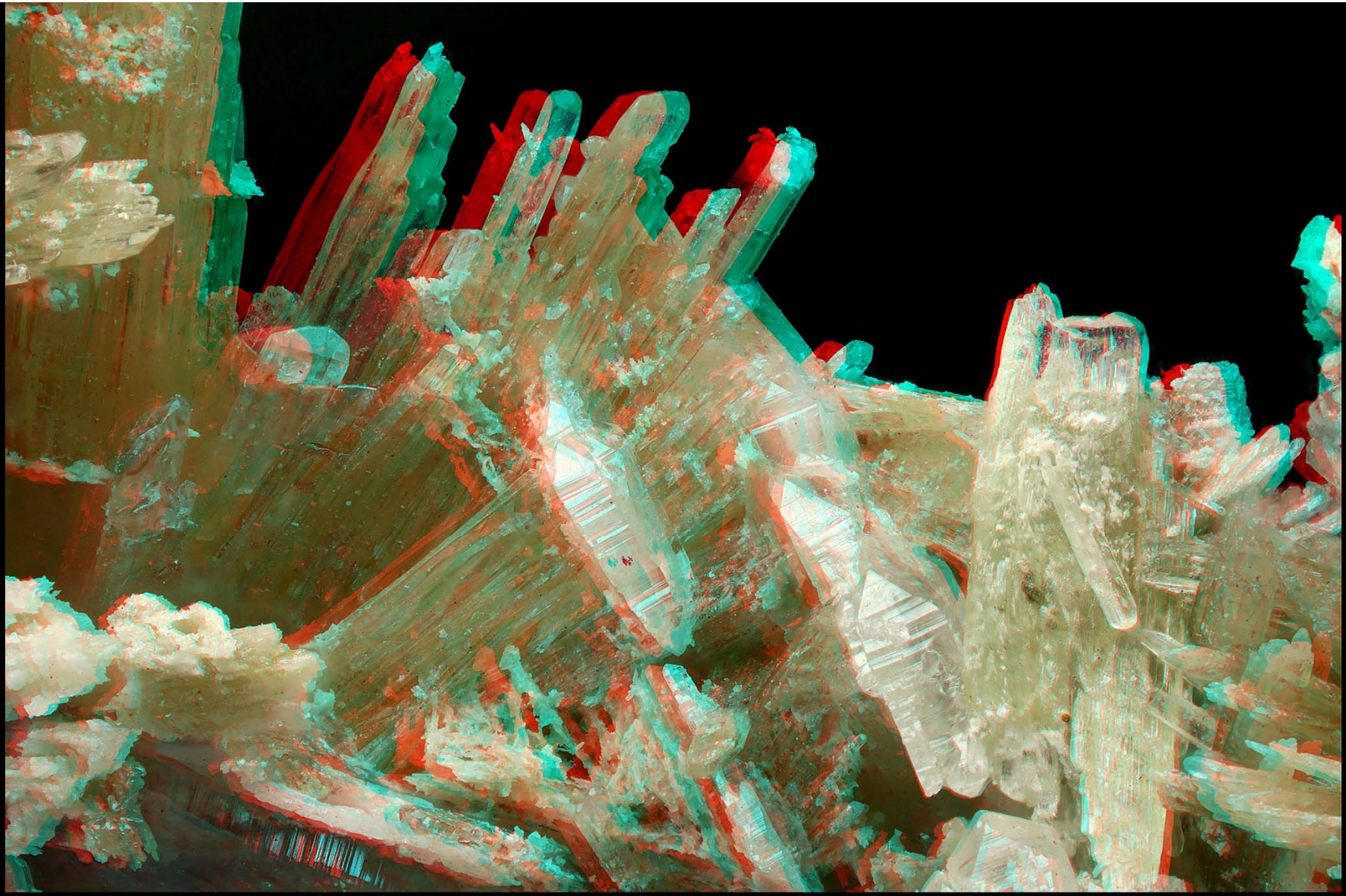
Lanarkite $Pb_2(SO_4)O$

Field width 4.3 mm

Transparent pale brown bladed monoclinic crystals with pyramids. Whitwell Quarry SK 530 753, Whitwell, Derbs.

Specimen: found by David McCallum, No. E145, 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.



1 mm

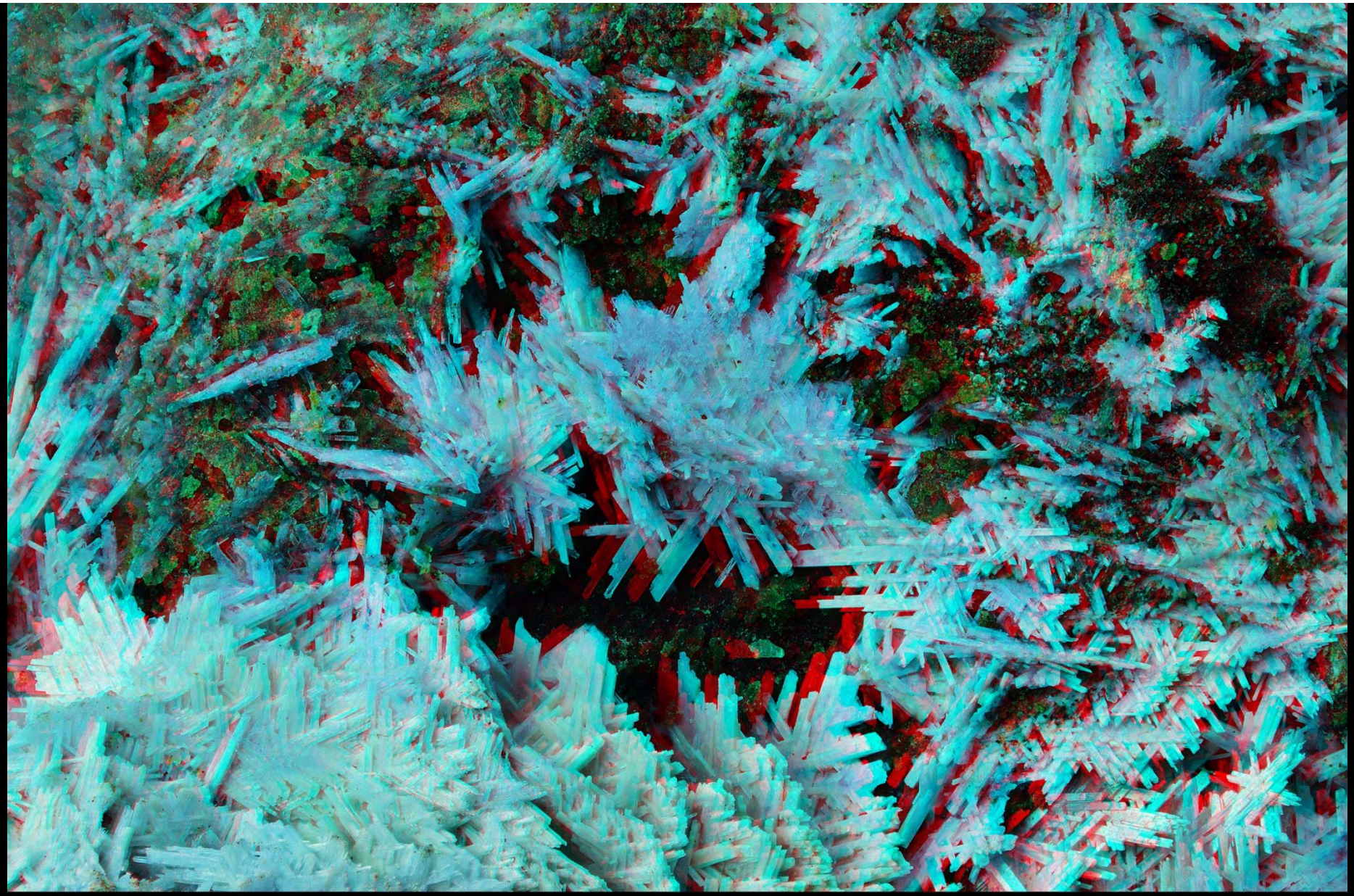
Lanarkite $Pb_2O(SO_4)$

Field width 6.7 mm

In addition to the yellow and grey lanarkite crystals there are several colourless transparent anglesite crystals with a striated ridge morphology. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: Peter Briscoe 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 82 and 124 40 and 30-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

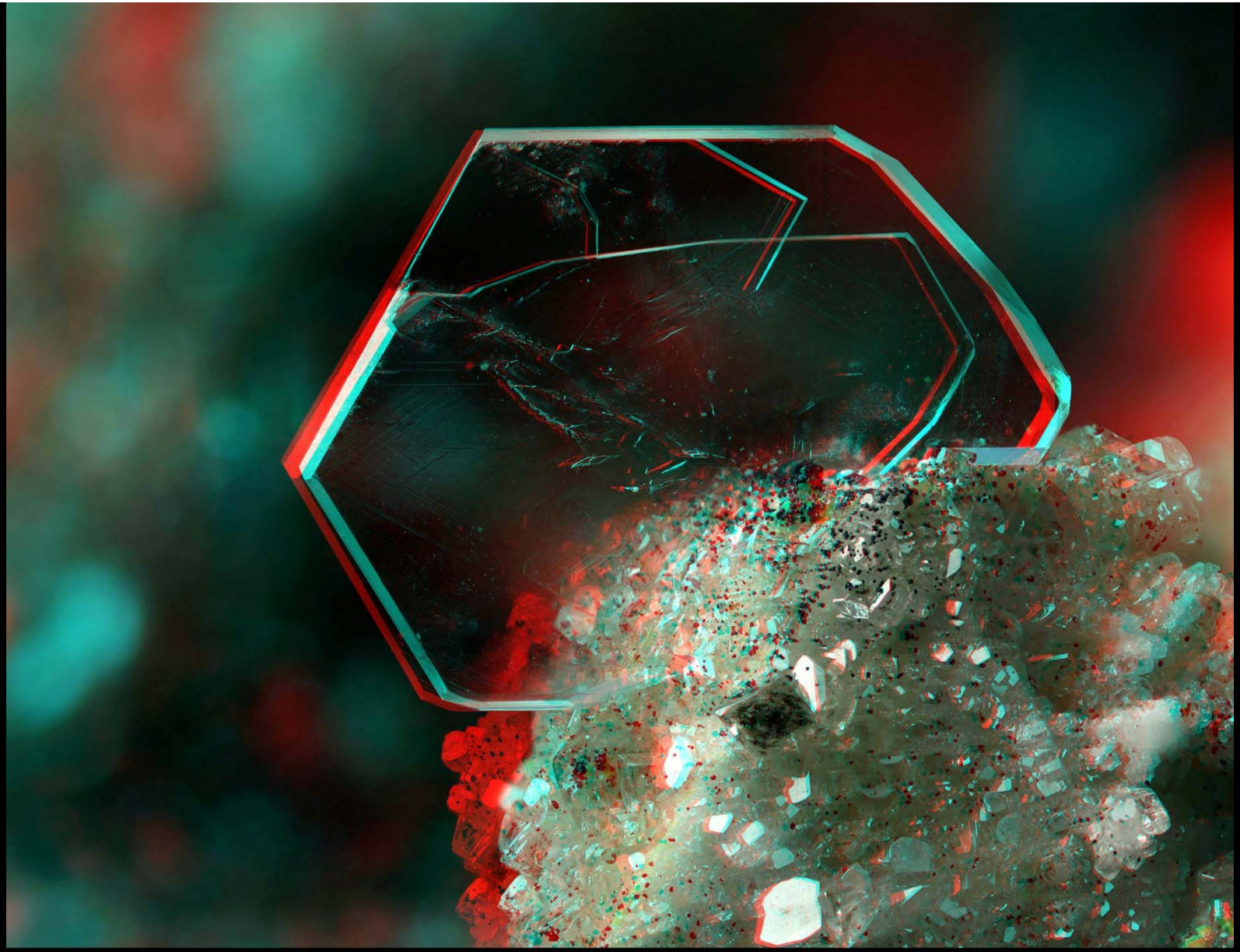


1 mm

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

Field width 6.7 mm.

Dendritic groups of turquoise-coloured pseudohexagonal bladed crystals in flat fans. Pave York Mine, Coniston, Cumbria.
Specimen: formerly in Norman Thomson collection, now in David Green collection. Photography: John Chapman, February 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 67 and 76 35-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Leadhillite $Pb_4(SO_4)(CO_3)_2(OH)_2$

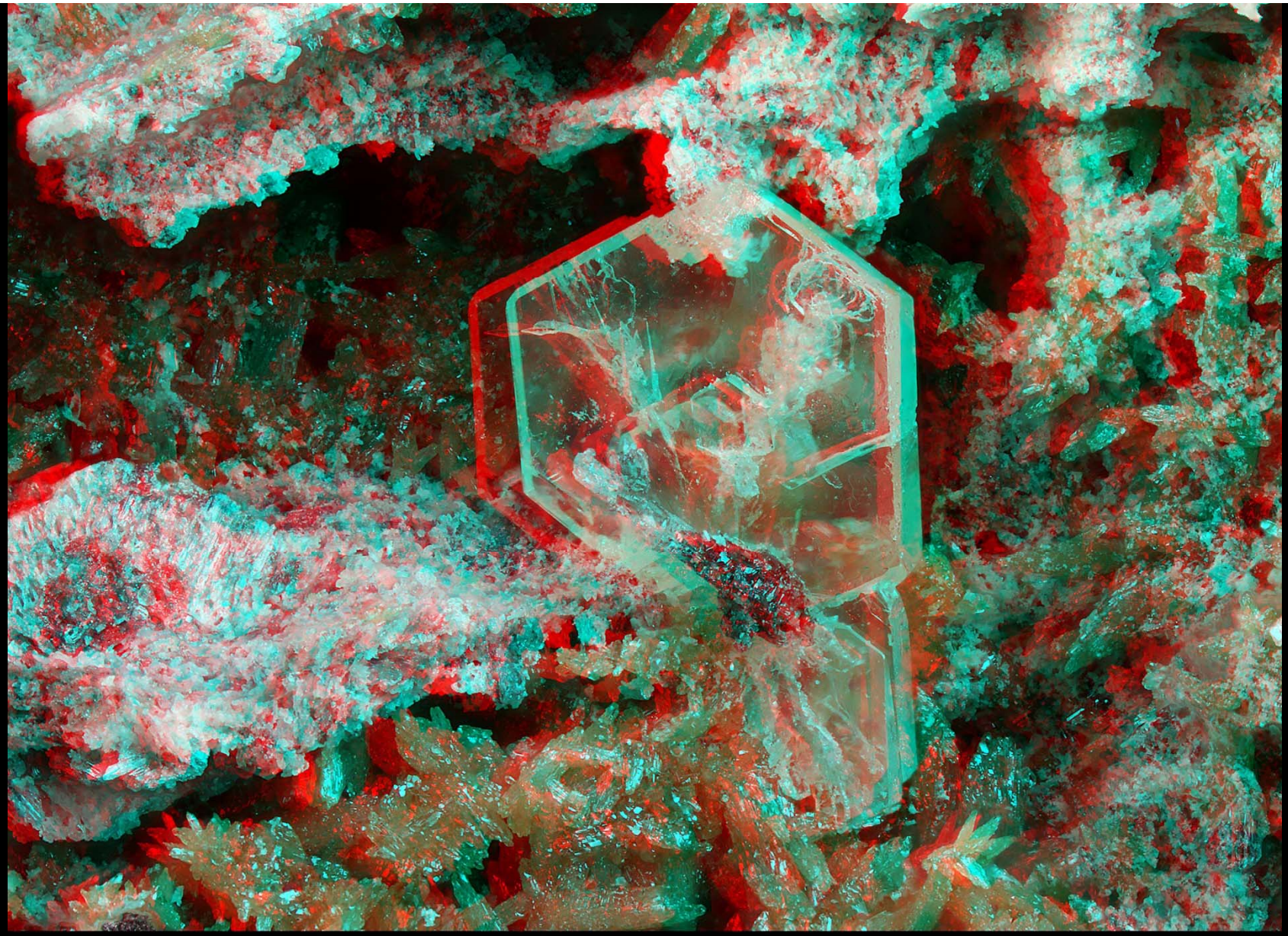
Field width 3.15 mm

Colourless thin tabular pseudo-hexagonal crystal on a rather crude pseudomorph of anglesite after either leadhillite or susannite in a cavity lined by drusy blocky anglesite. The anglesite has tiny iridescent inclusions, possibly of silver.

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

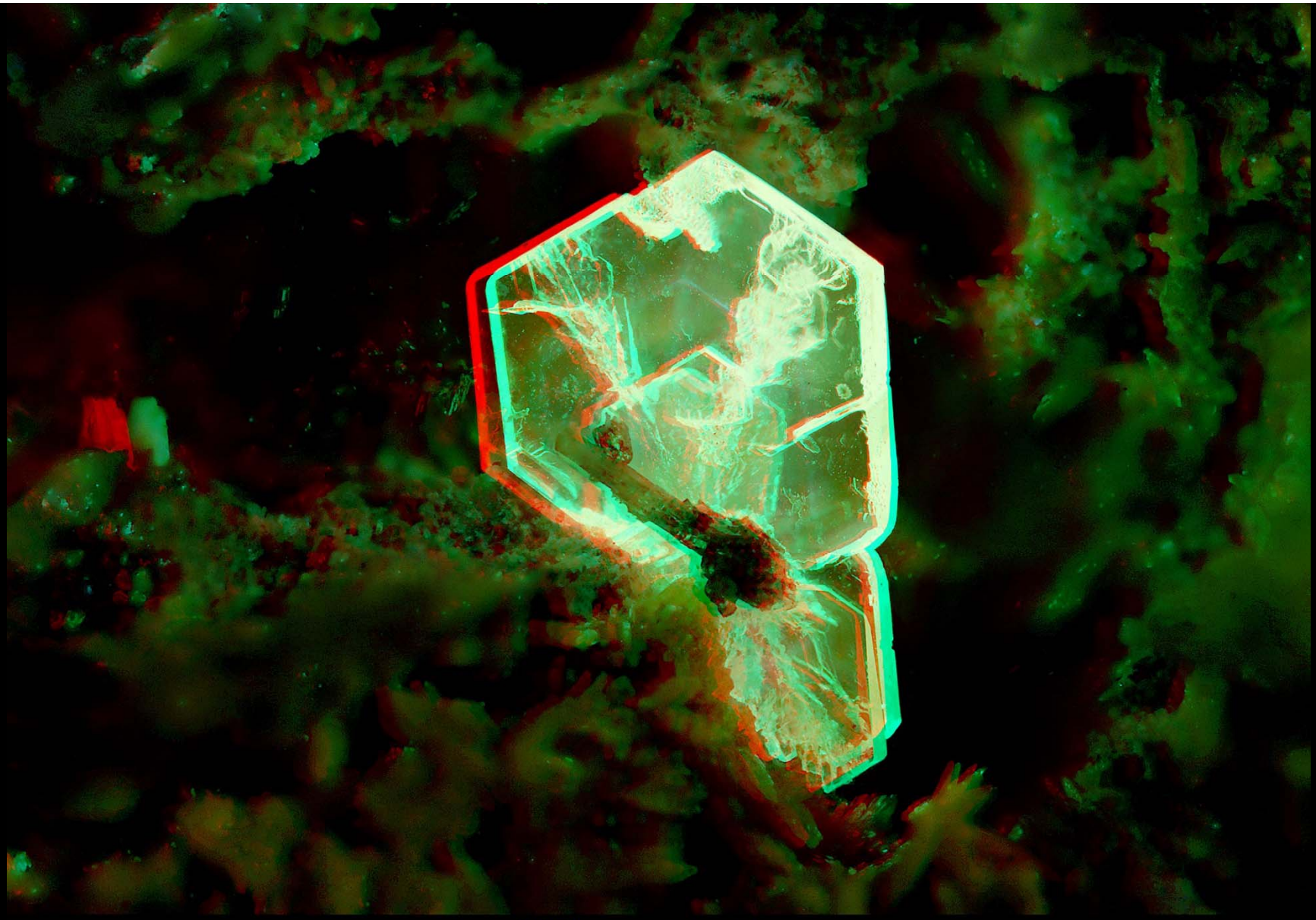
Specimen: David Green collection. Photography: John Chapman

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 48 and 50 20-micrometre steps at 8 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM



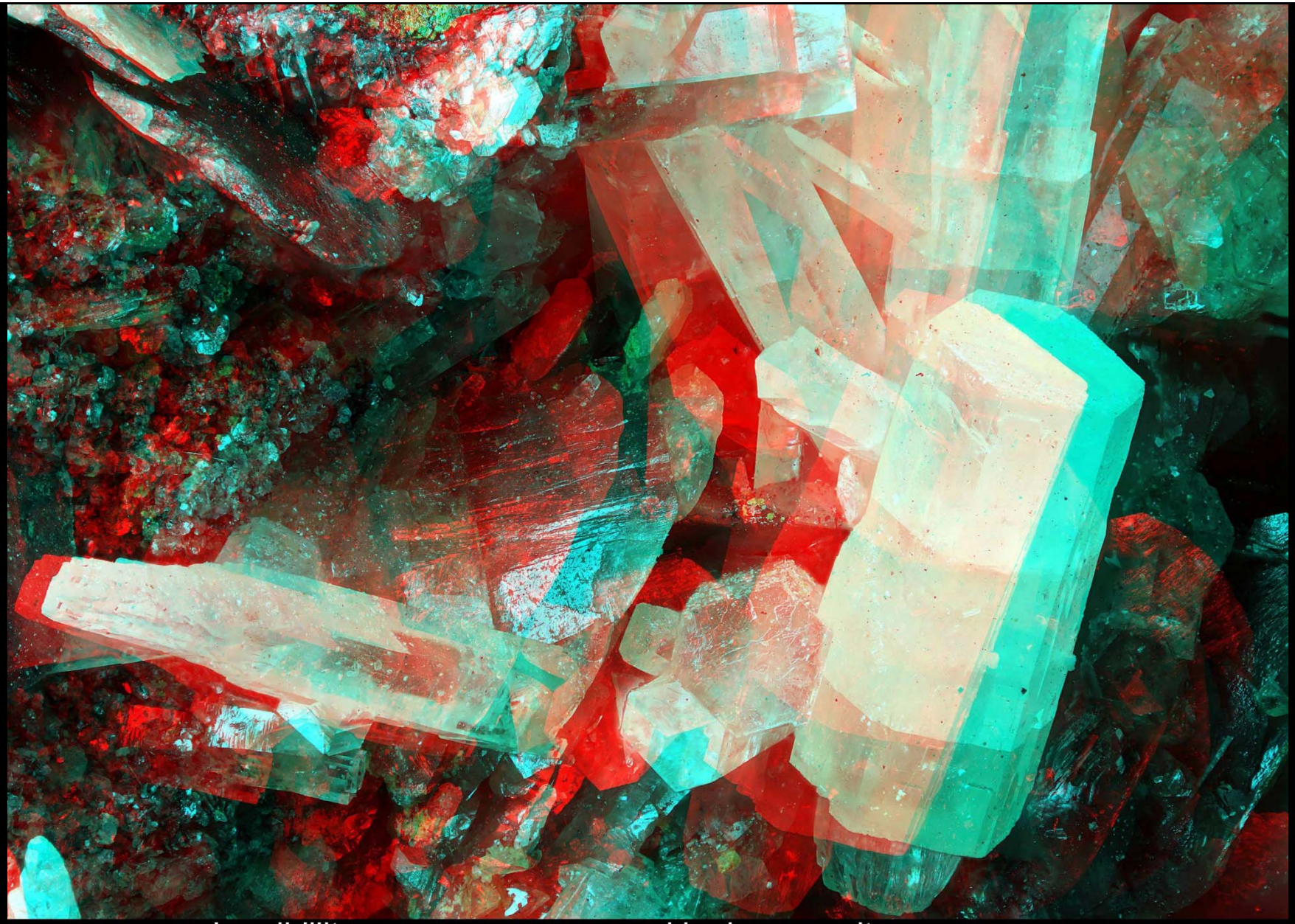
1 mm **Leadhillite** $Pb_4(SO_4)(CO_3)_2(OH)_2$ Field width 2.32 mm

Transparent pseudohexagonal platy crystals with brown scotlandite and other 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 illumination.
Left + right stacks of 96 and 99 15-micrometre steps at degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm **Leadhillite** $Pb_4(SO_4)(CO_3)_2(OH)_2$ Field width 2.45 mm

Platy colourless pseudohexagonal crystals with brown scotlandite photographed in ultraviolet light.
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 Luminar 25 mm objective lens on 175 mm bellows extension. Convoy S2+ UV torch with UG1 excitation filter and LP 397 interference emission filter. Left + right stacks of 82 and 85 15-micrometre steps at 6 degrees combined in CombineZM.



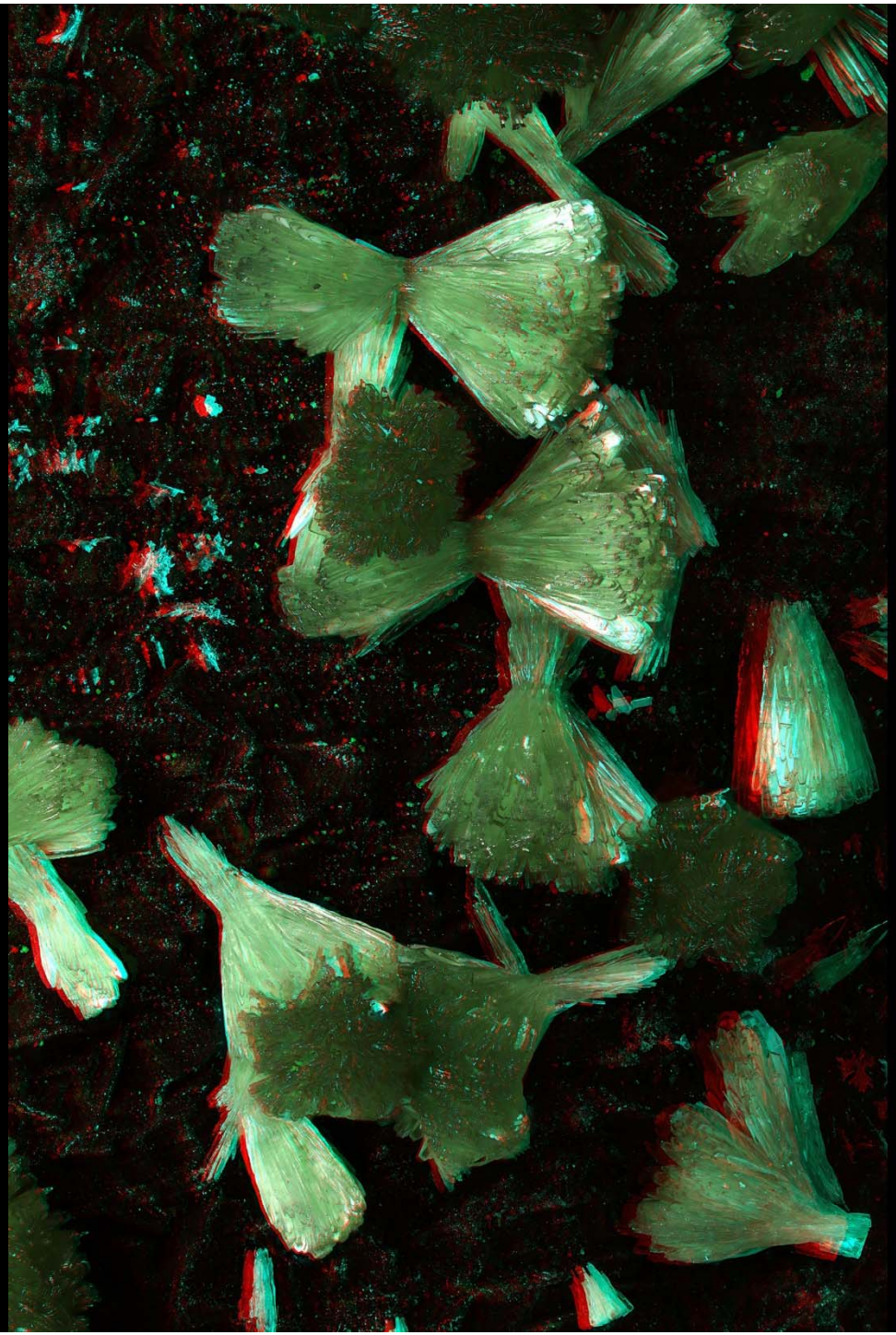
1 mm Leadhillite $Pb_4(SO_4)(CO_3)_2(OH)_2$ and hydrocerussite $Pb_3(CO_3)_2(OH)_2$ Field width 6.38 mm

Prismatic off-white translucent to transparent prismatic hexagonal leadhillite and discoidal trigonal translucent hydrocerussite in cavity in galena. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: found by David McCallum, No. 146, and now in David Green collection. Photography: John Chapman.

Canon EOS 5DSR camera with Carl Zeiss (West Germany) 40 mm Luminar objective lens on 160 mm bellows extension, with Schott fibre optic illumination.

L+R stacks of 144 and 119 steps via Stackshot rail at 10 degrees, with Luminar at fully open aperture, combined in CombineZM



Malachite $Cu_2(CO_3)(OH)_2$

Green wheatsheaf aggregates on goethite-chalcopyrite.

Cloud Hill Quarry Ca. SK 410 211, Breedon, Leics.

Specimen: David Green collection 28th July 2018.

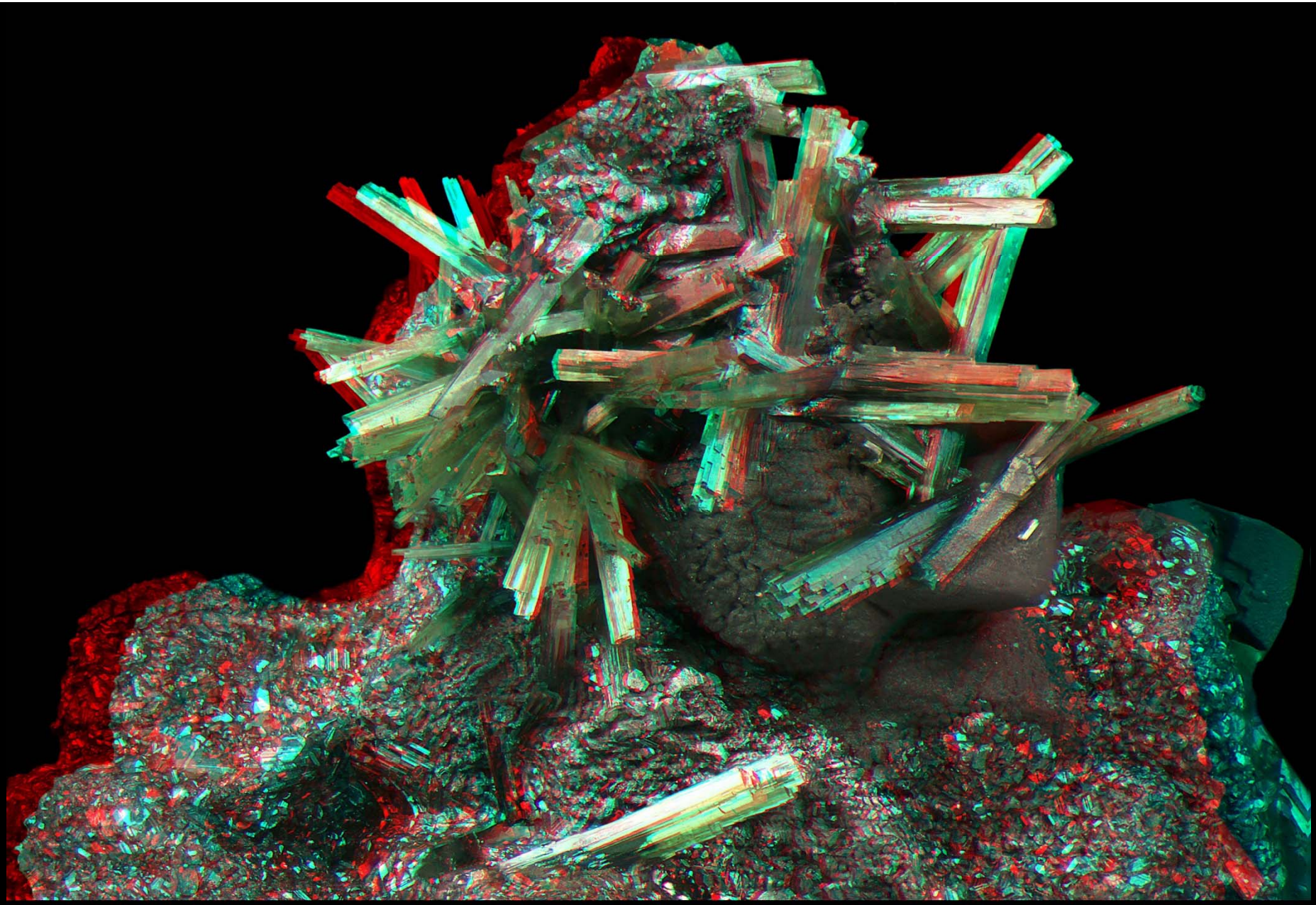
Photography: John Chapman, December 2023.

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 120 and 99 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.

1 mm

Field height 3.67 mm.



1 mm

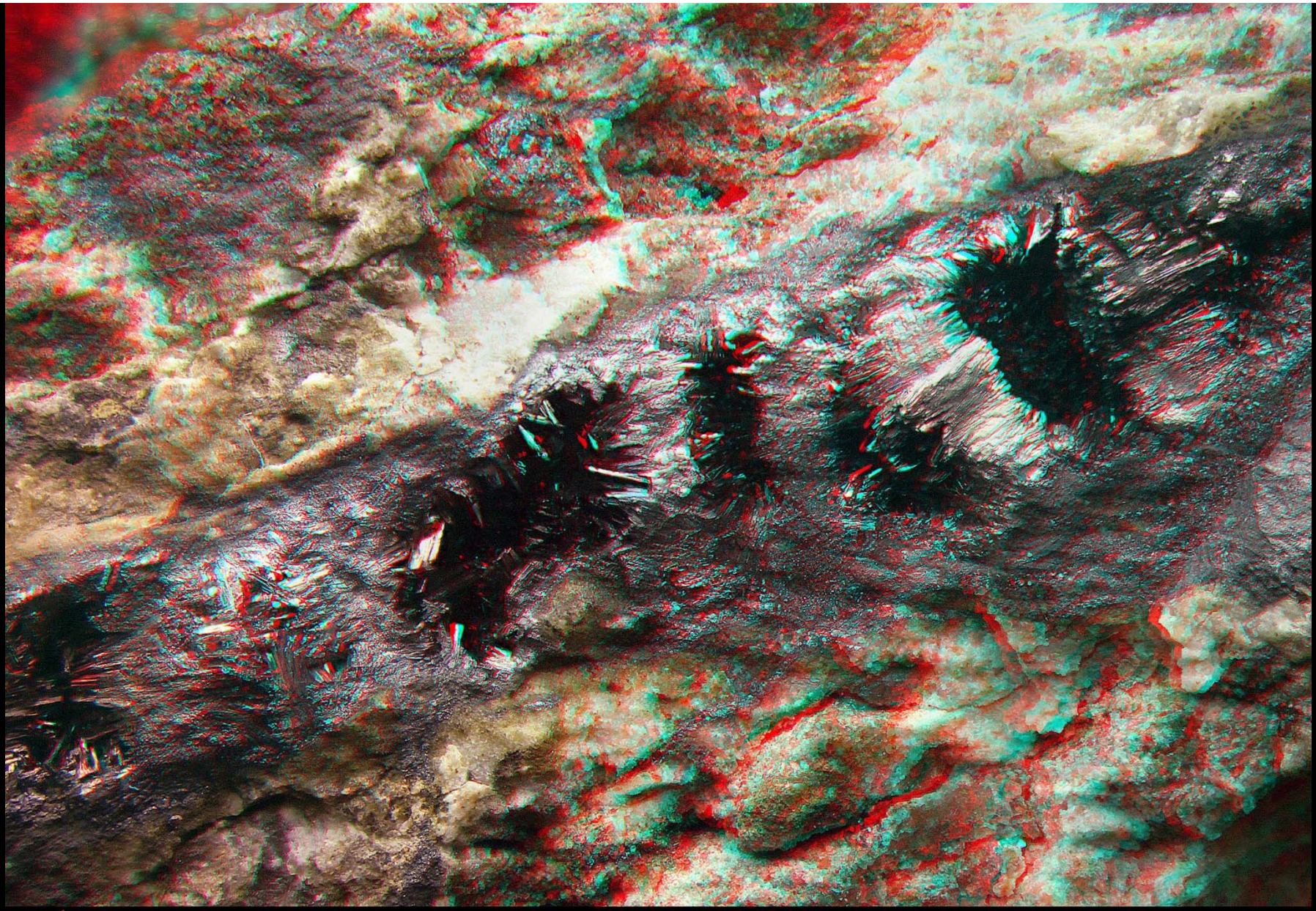
Malachite $Cu_2(CO_3)(OH)_2$,

Field width 5.3 mm

rare, prismatic crystals with parallel growth on goethite replacing dolomite. Murton Mine, Scordale, Cumbria.

Specimen: found underground and now in David Green collection no. MT070. 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.

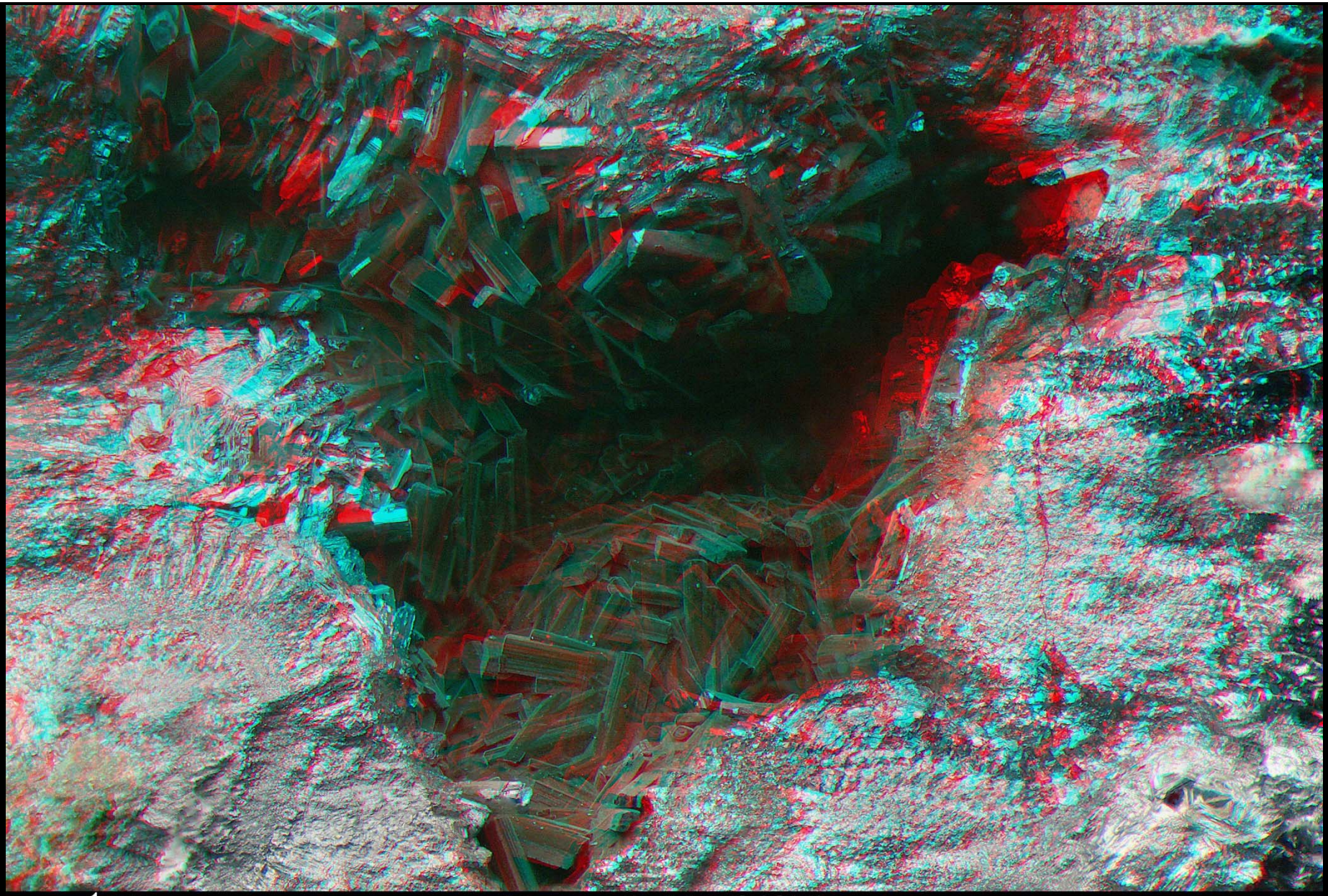


1 mm

Manganite $Mn^{3+}O(OH)$.

Field width 22 mm

Vein of massive manganite containing cavities of highly lustrous crystals in a quartz and mica pegmatite.
Laverock Braes, Grandhome Estate, Grandhome, Aberdeen, Scotland.
Specimen: found by Michael McMullen and in Michael McMullen collection. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f = 125 mm objective lens and 1.2x zoom, with Schott fibre optic lighting.



1 mm

Manganite $Mn^{3+}O(OH)$

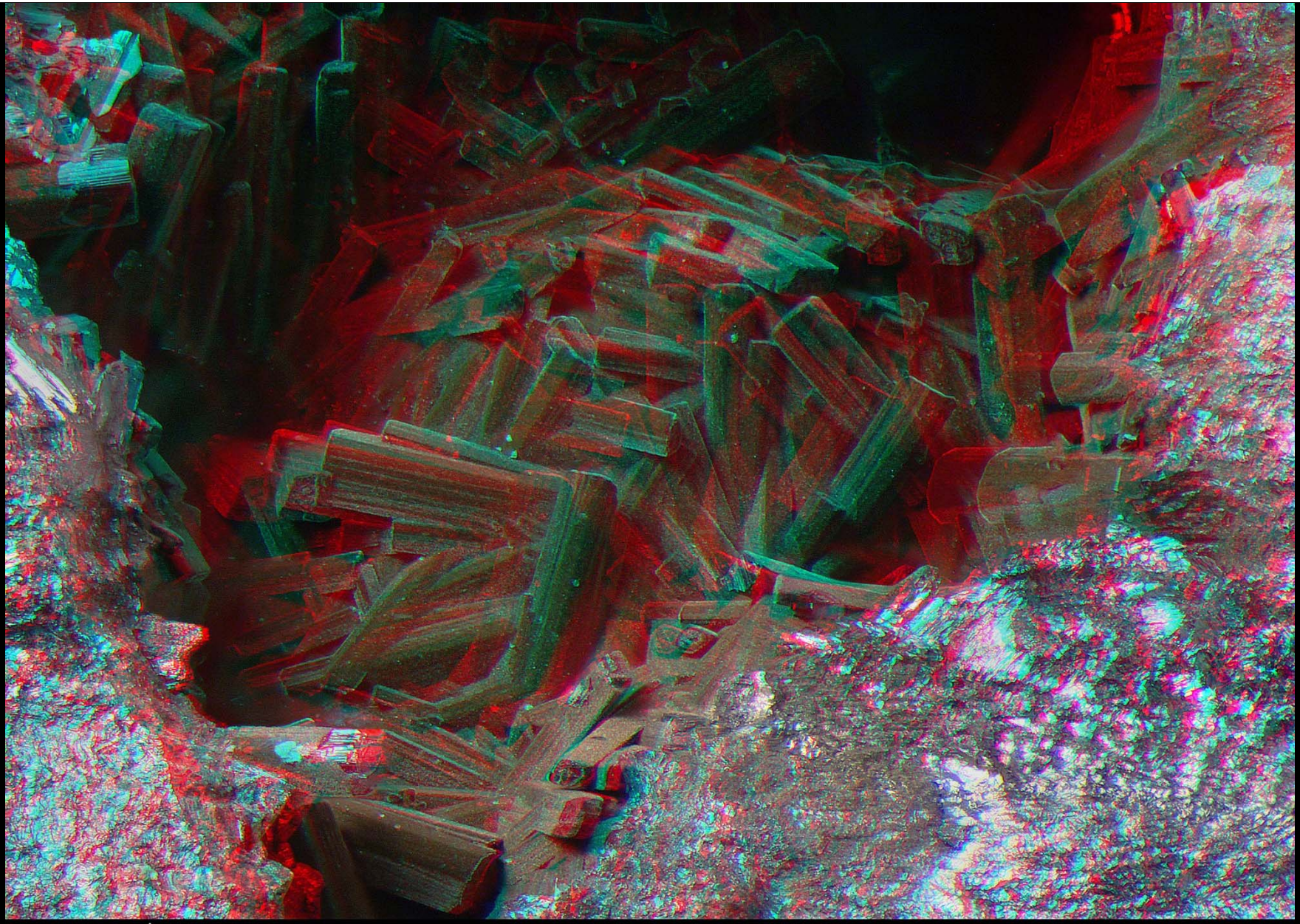
Field width 10.6 mm

Monoclinic system prismatic crystals coated with a brown mineral, possibly todorokite.

Laverock Braes, Grandhome Estate, Grandhome, Aberdeen, Scotland.

Specimen: found by Michael McMullen and in Michael McMullen collection. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 2.5x zoom, with Schott fibre optic lighting.

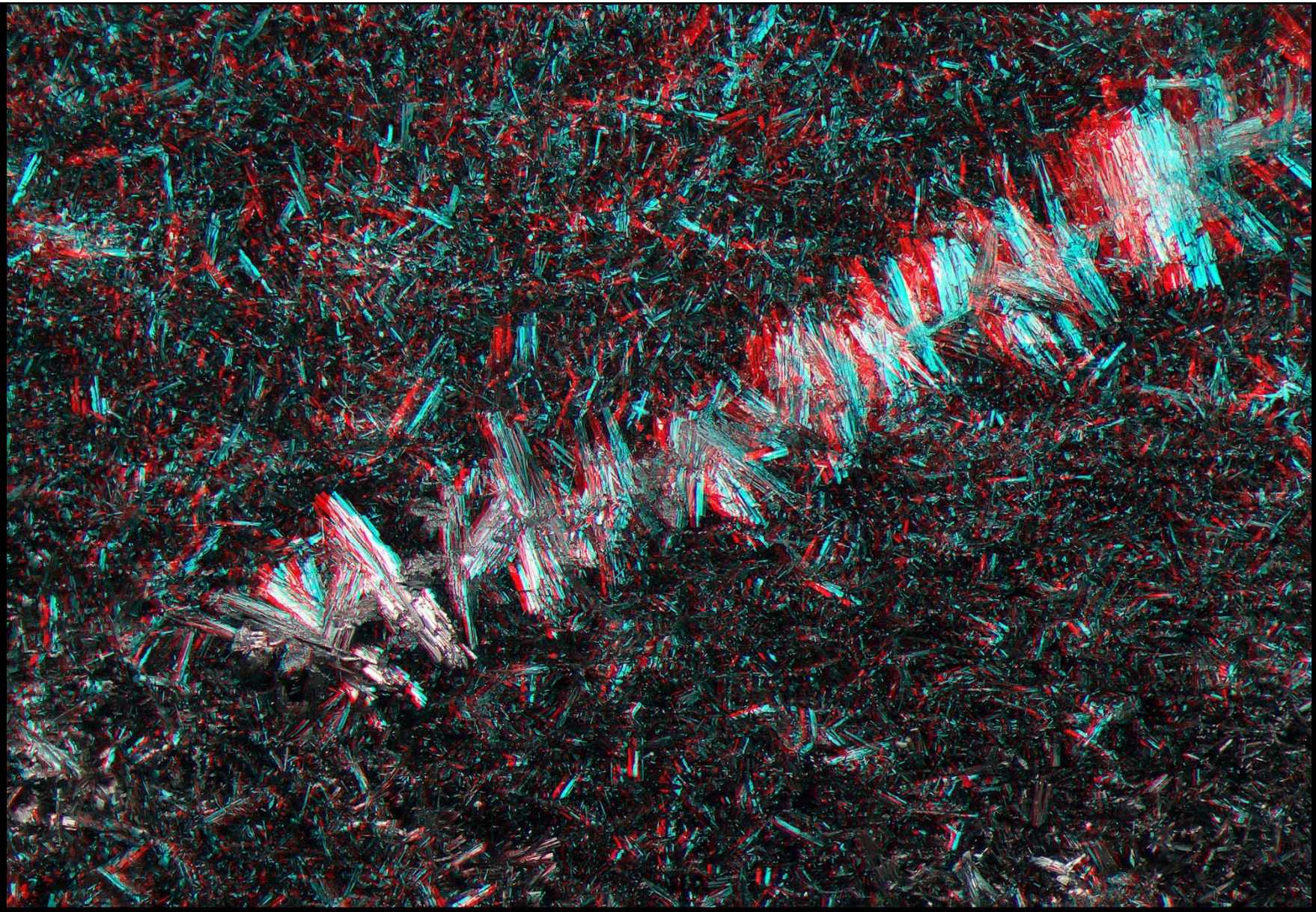


1 mm

Manganite $Mn^{3+}O(OH)$

Field width 5.2 mm

Monoclinic system prismatic crystals coated with a brown mineral, possibly todorokite.
Laverock Braes, Grandhome Estate, Grandhome, Aberdeen, Scotland.
Specimen: found by Michael McMullen and in Michael McMullen collection. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 5.0x zoom, with Schott fibre optic lighting.



1 mm

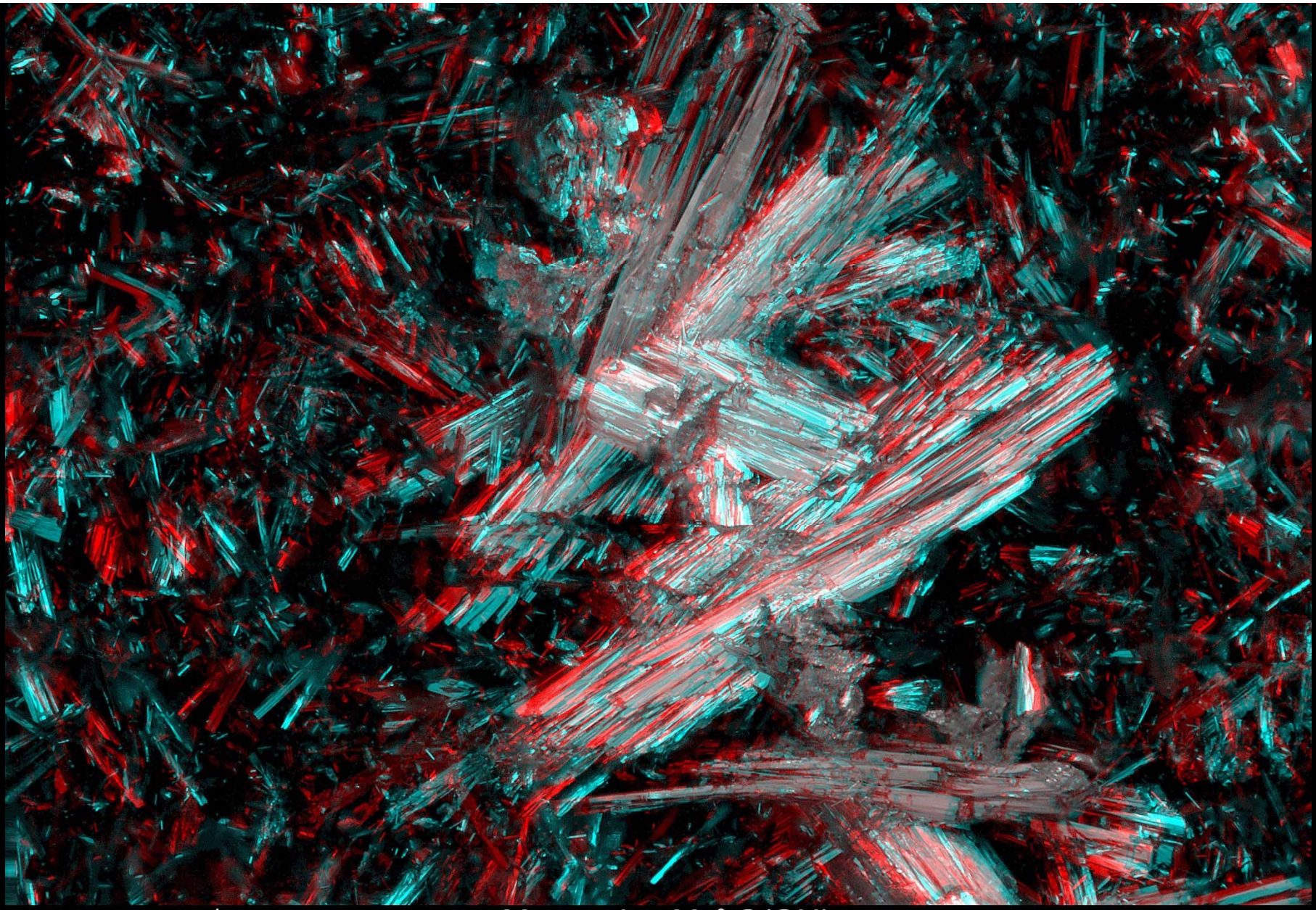
Manganite $Mn^{3+}O(OH)$.

Field width 10.6 mm.

Vein of massive manganite containing cavities of highly lustrous crystals in a quartz and mica pegmatite.
Laverock Braes, Grandhome Estate, Grandhome, Aberdeen, Scotland.

Specimen: found by Michael McMullen and in Michael McMullen collection. Photography: John Chapman.

Canon EOS 5D Mk II on Carl Zeiss (West Germany) Stereomicroscope SV8 with f = 125 mm objective lens and at 2.5x zoom.
LED light panel illumination to north. Manual stack combined in CombineZM, processed in PhotoShop Elenents.

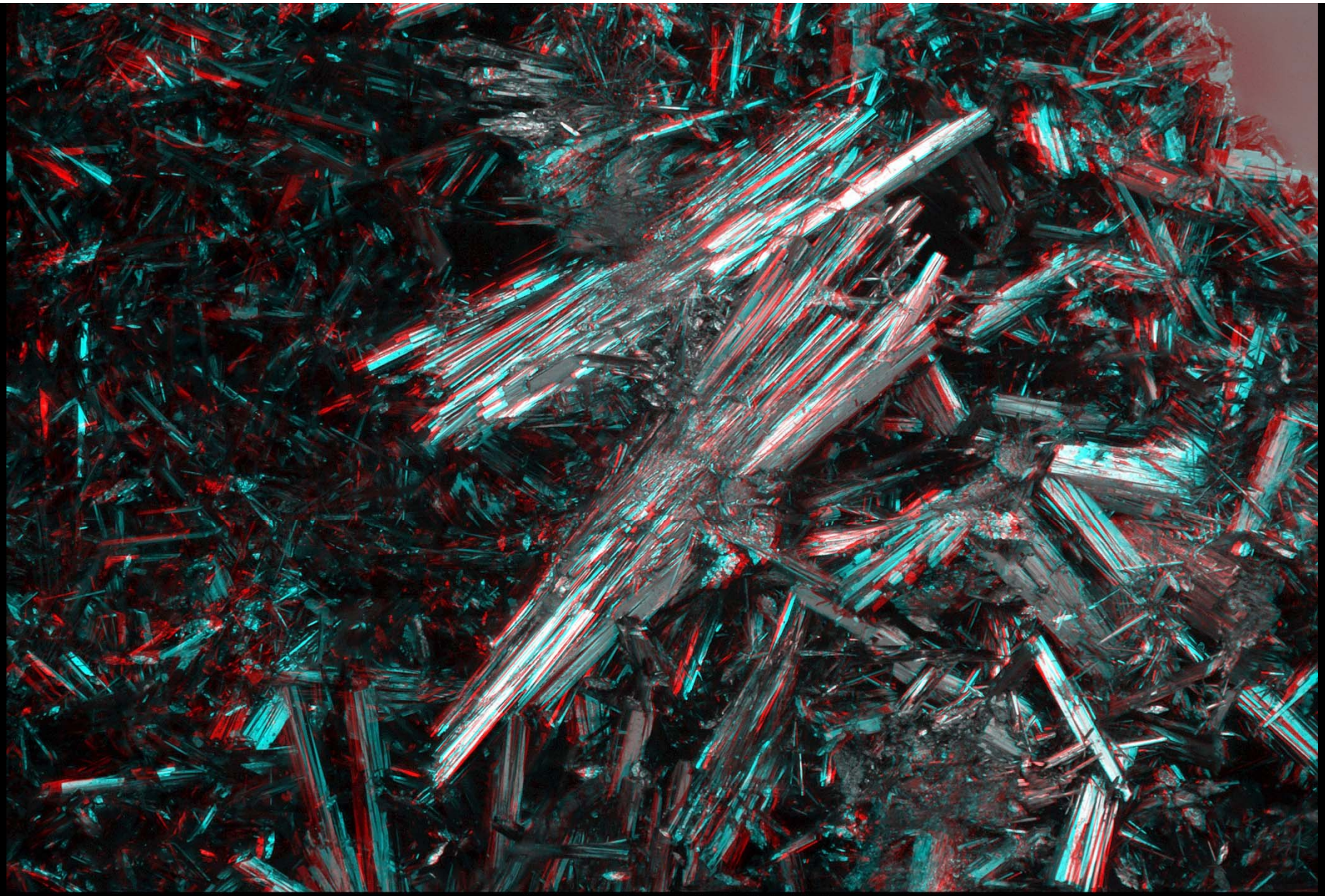


1 mm

Manganite $Mn^{3+}O(OH)$

Field width 3.3 mm

Sheaf-like groups of slightly spindle-shaped highly lustrous crystals.
Laverock Braes, Grandhome Estate, Grandhome, Aberdeen, Scotland.
Specimen: found by Michael McMullen and in Michael McMullen collection. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f = 100 mm objective and at 6.4x zoom, with Schott fibre optic lighting.

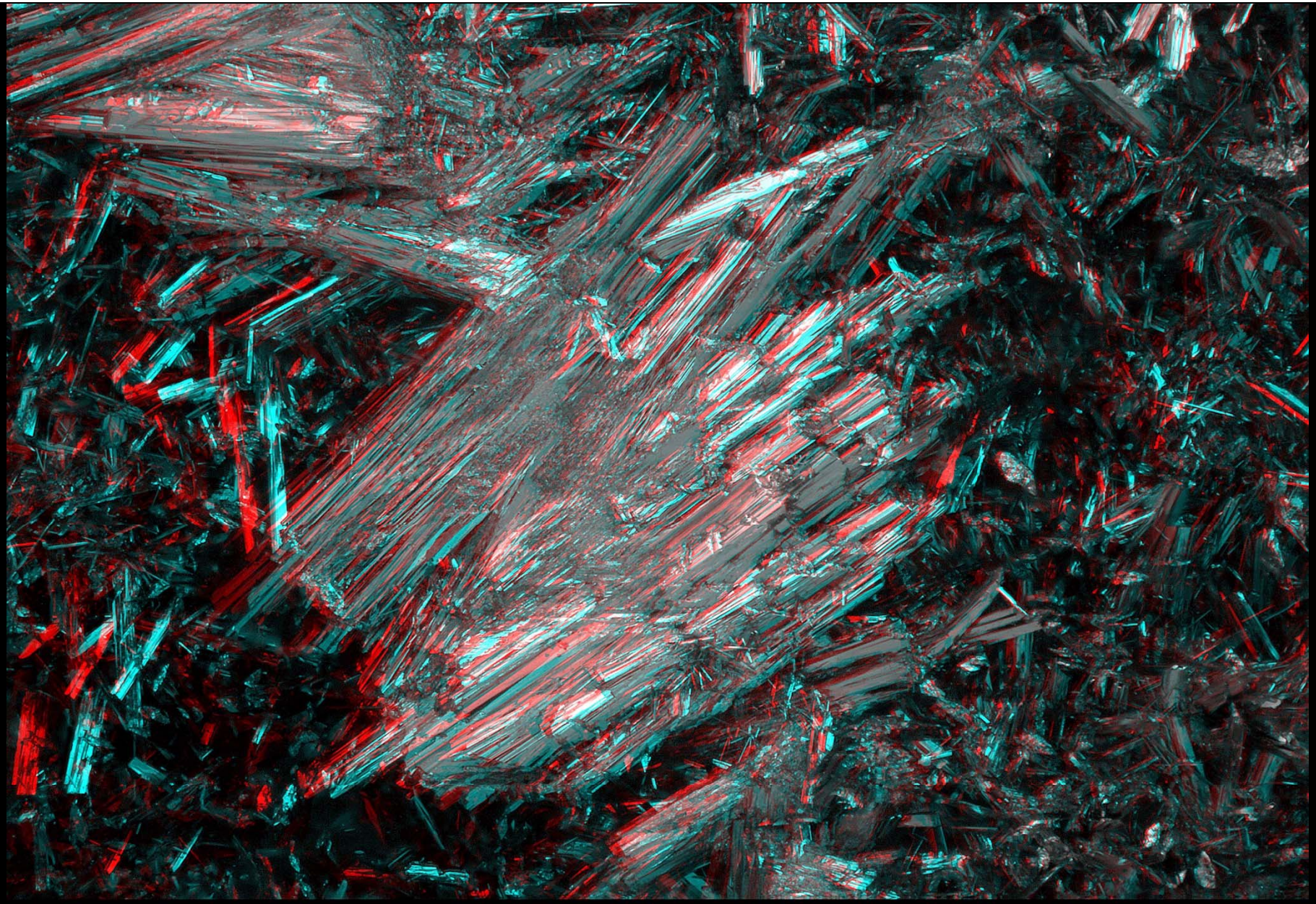


1 mm

Manganite $Mn^{3+}O(OH)$

Field width 3.3 mm

Sheaf-like groups of slightly spindle-shaped highly lustrous crystals.
Laverock Braes, Grandhome Estate, Grandhome, Aberdeen, Scotland.
Specimen: found by Michael McMullen and in Michael McMullen collection. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f = 100 mm objective and at 6.4x zoom, with Schott fibre optic lighting.

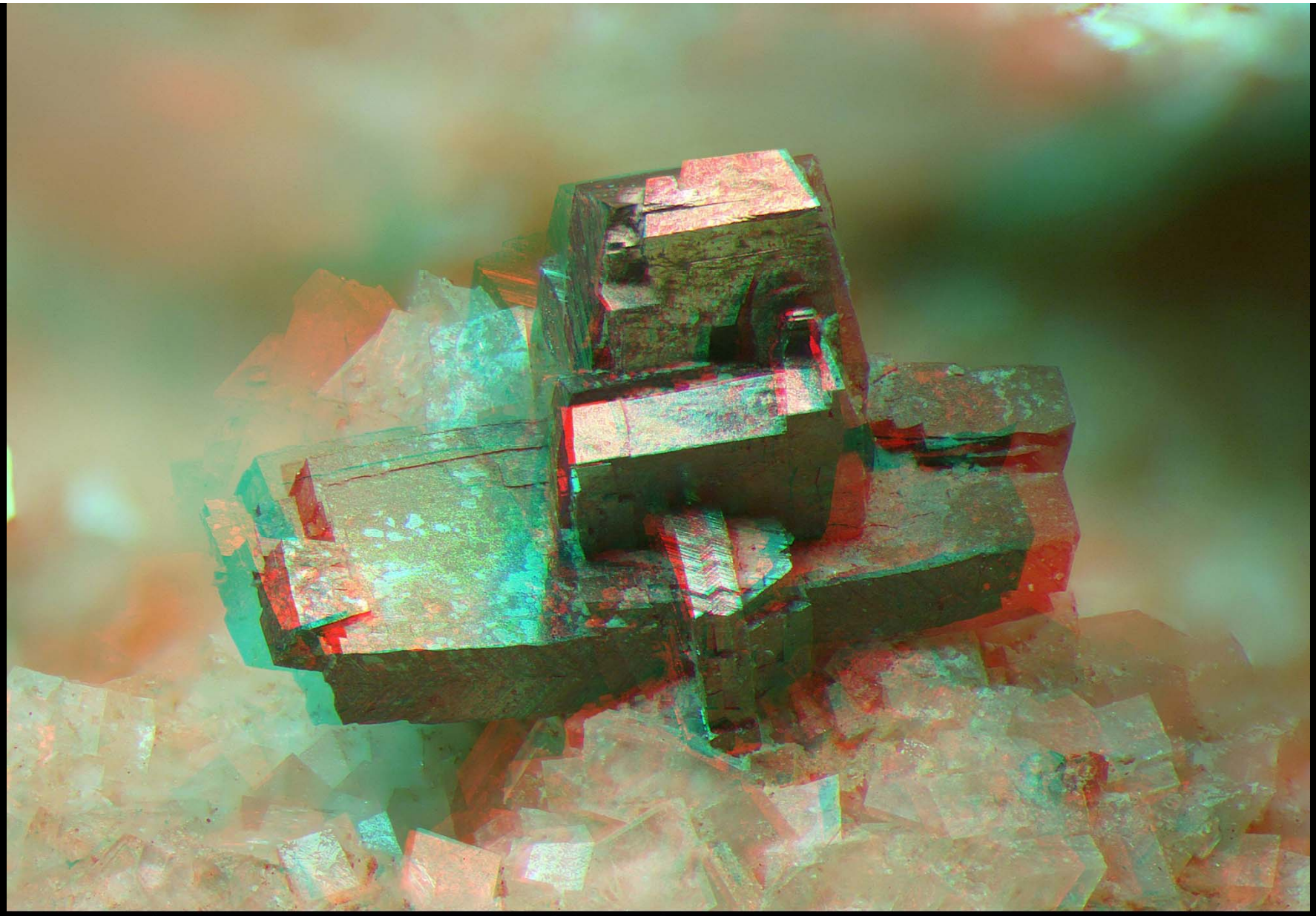


1 mm

Manganite $Mn^{3+}O(OH)$

Field width 3.3 mm

Sheaf-like groups of slightly spindle-shaped highly lustrous crystals.
Laverock Braes, Grandhome Estate, Grandhome, Aberdeen, Scotland.
Specimen: found by Michael McMullen and in Michael McMullen collection. Photography: John Chapman.
Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f = 100 mm objective and at 6.4x zoom, with Schott fibre optic lighting.



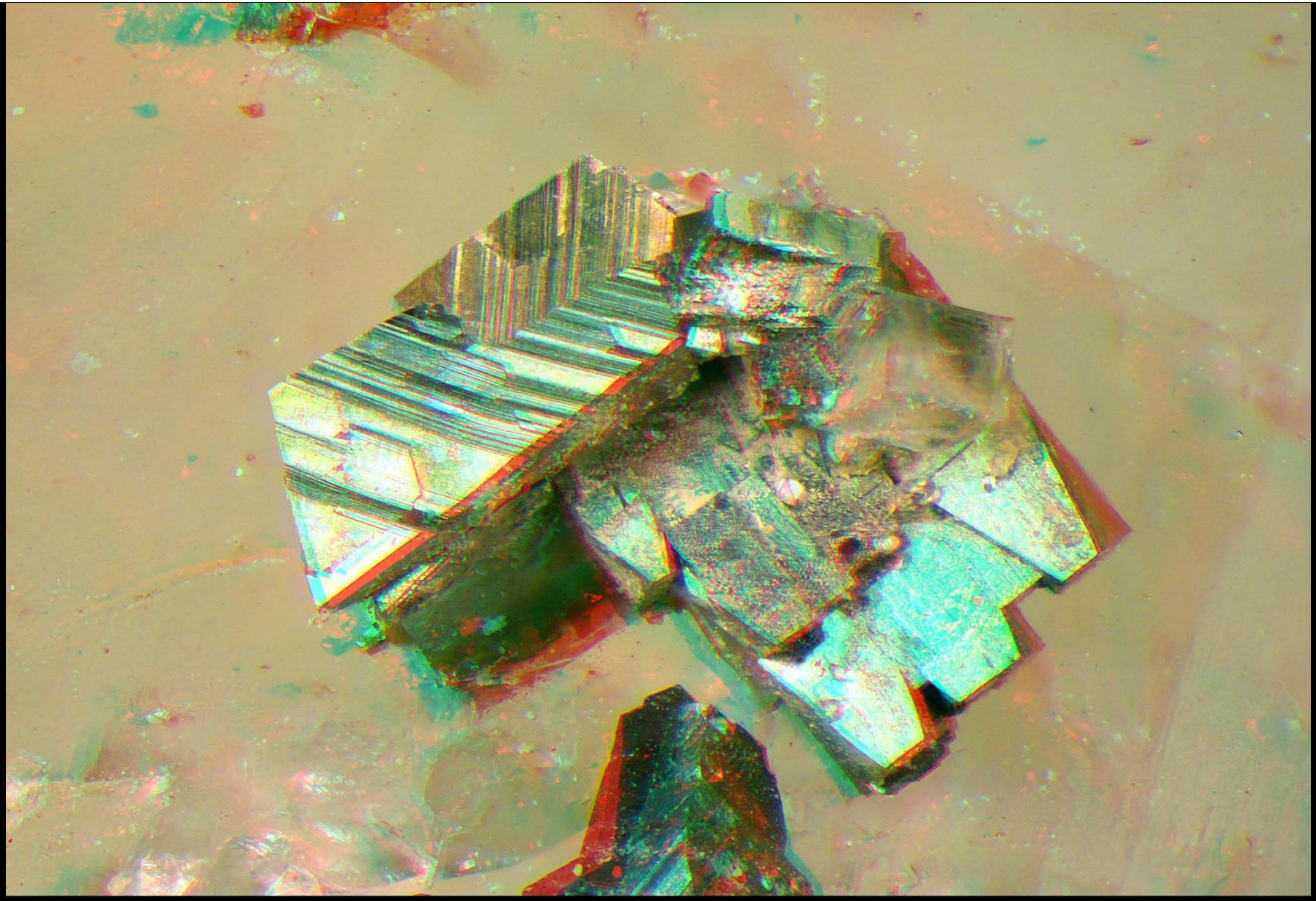
1 mm

Marcasite FeS_2

Field width 5.3 mm

Curved lustrous crystals overgrowing pink dolomite, together with pale yellow-brown calcite crystals with slightlycurved rhombohedral faces. Wistow Shaft borehole, Wistow, Selby, North Yorkshire. The strata containing this vugh was at a depth of 257 metres and identified as the Cadeby Formation (Lower Magnesian Limestone) of the Permian System, just above the Carboniferous System Coal Measures.

Specimen: Steve Uttley (NCB geologist) collection no. 208 and Peter Briscoe collection No. 209, 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 5.0x zoom, with LED lamp illumination.



1 mm

Marcasite FeS_2

Field width 4.3 mm

Curved lustrous crystals overgrowing pink dolomite, together with pale yellow-brown calcite crystals with slightlycurved rhombohedral faces. Wistow Shaft borehole, Wistow, Selby, North Yorkshire. The strata containing this vugh was at a depth of 257 metres and identified as the Cadeby Formation (Lower Magnesian Limestone) of the Permian System, just above the Carboniferous System Coal Measures.

Specimen: Steve Uttley (NCB geologist) collection no. 208 and Peter Briscoe collection No. 209, 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 6.4x zoom, with LED lamp illumination.

Marcasite FeS_2

Radiating cockscomb crystal groups.

Temple Mead Opencast colliery, Temple Newsam,
Leeds, West Yorkshire.

Specimen: originally Floyd collection, No. F736, now in
Peter Briscoe collection.

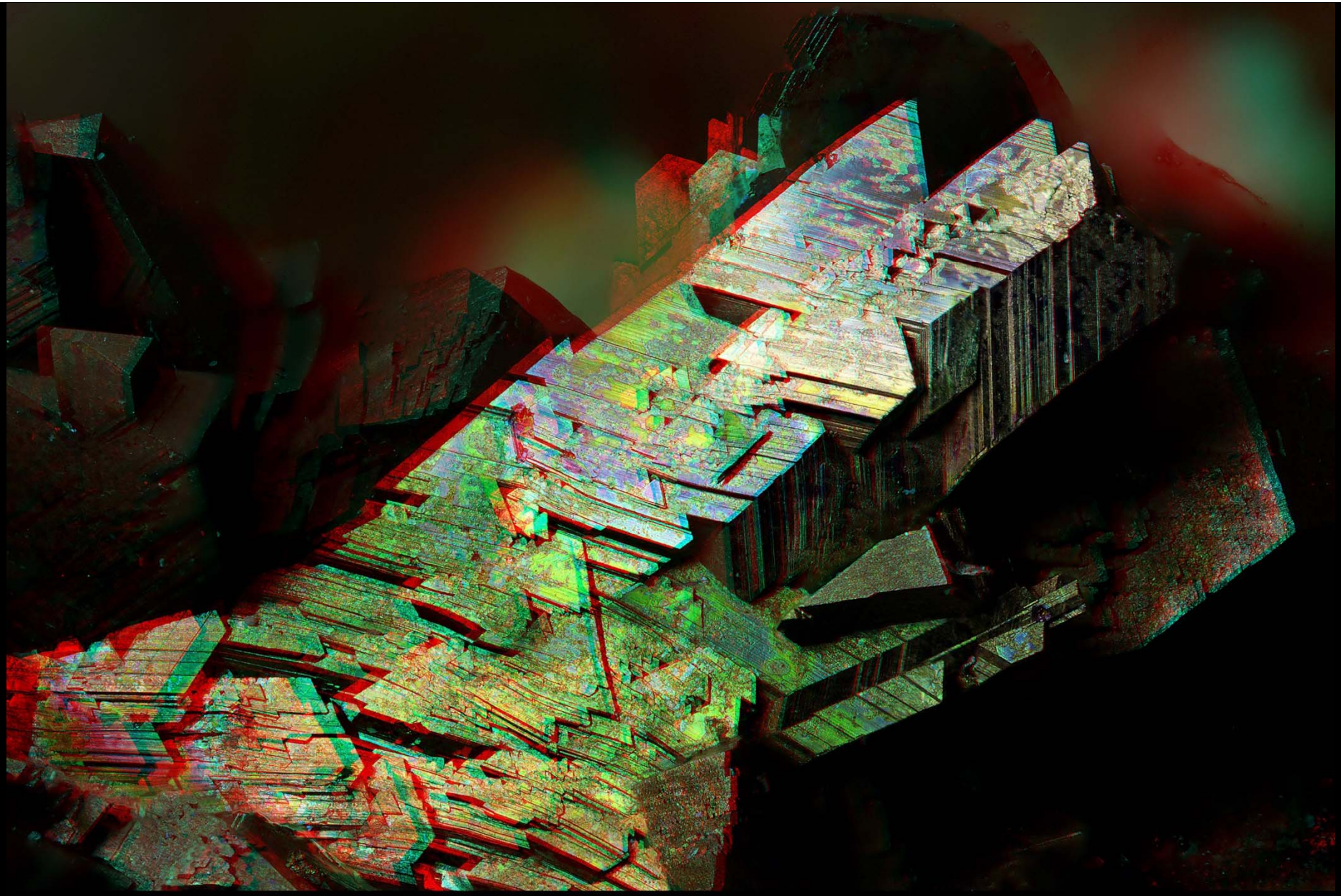
Photography: John Chapman.

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 84 and 83 100-micrometre steps at 6 degrees via Stackshot rail, with Luminar at aperture 1.75, combined in CombineZM and rendered in Stereophotomaker.

1 mm

Field height 10.92 mm.



1 mm

Marcasite FeS_2

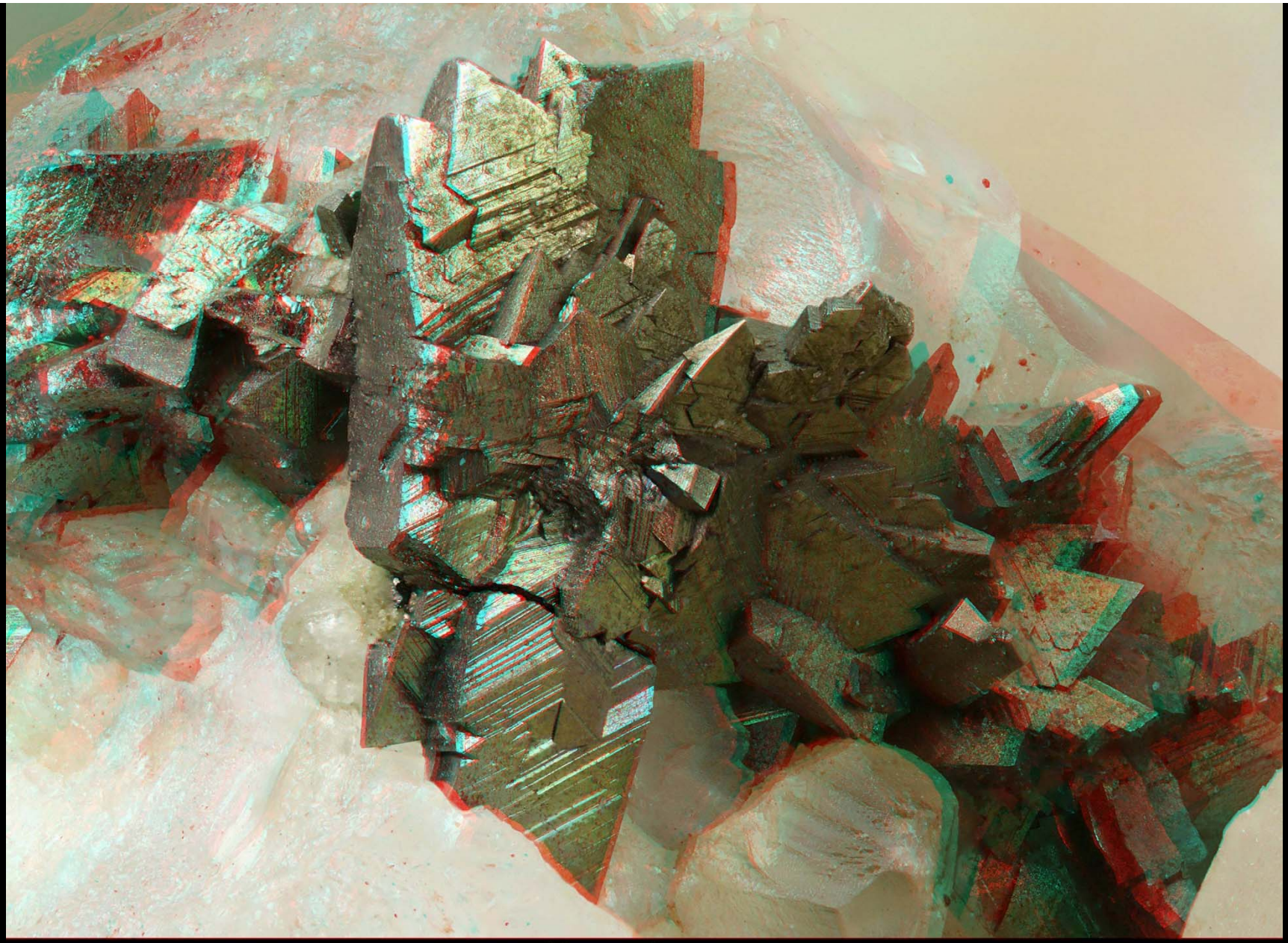
Field width 3.71 mm.

Radiating cockscomb crystal groups. Temple Mead Opencast, Temple Newsam, Leeds, West Yorkshire.

Specimen: originally Floyd collection No. F736, now in Peter Briscoe collection. 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 81 and 88 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

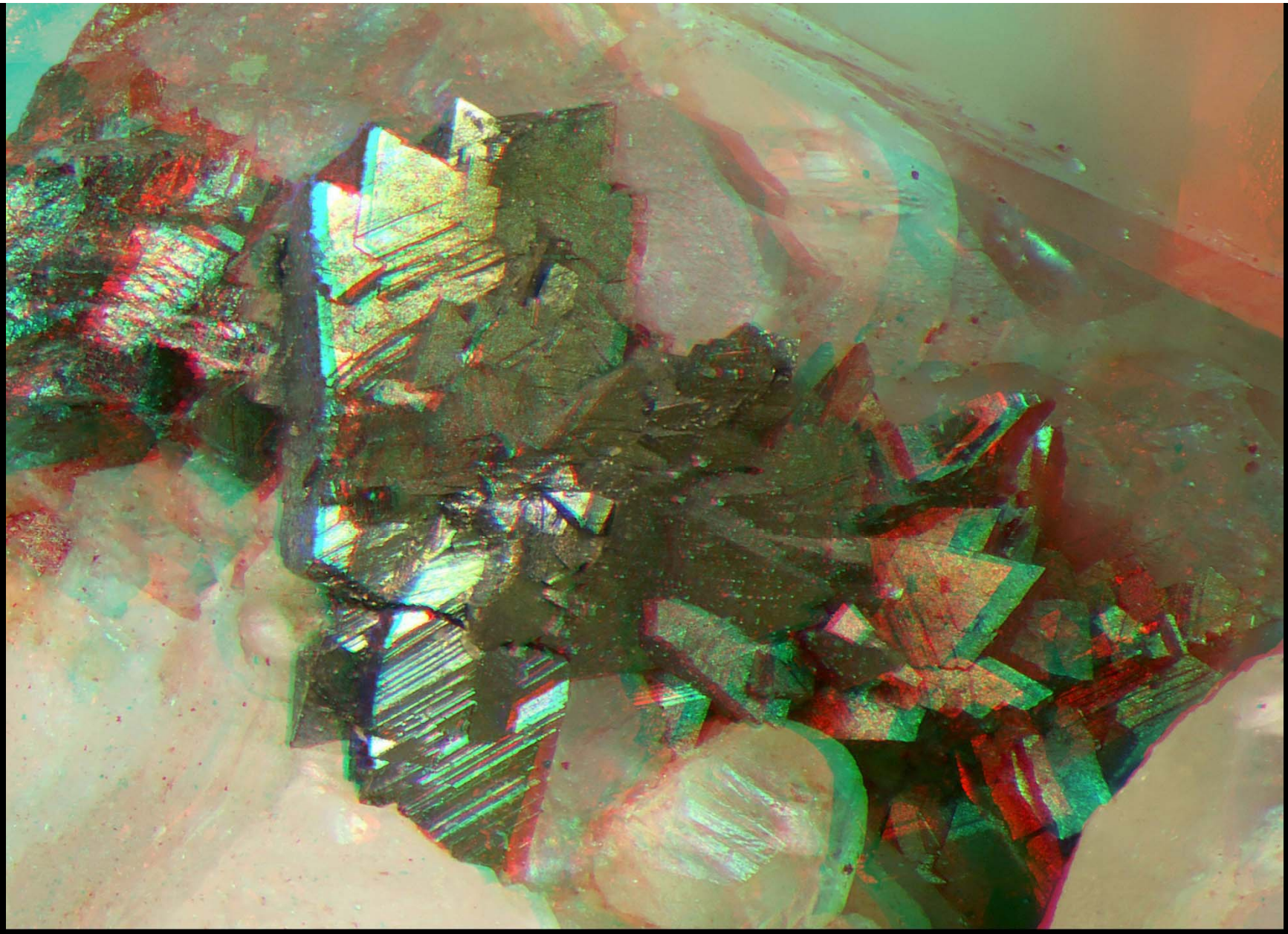
Marcasite FeS_2

Field width 2.92 mm

Cockscomb aggregate on calcite. Corrantee Mine, Strontian, Argyll.

Specimen: Calum Anton collection. 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 130 and 112 20-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



1 mm

Marcasite FeS_2

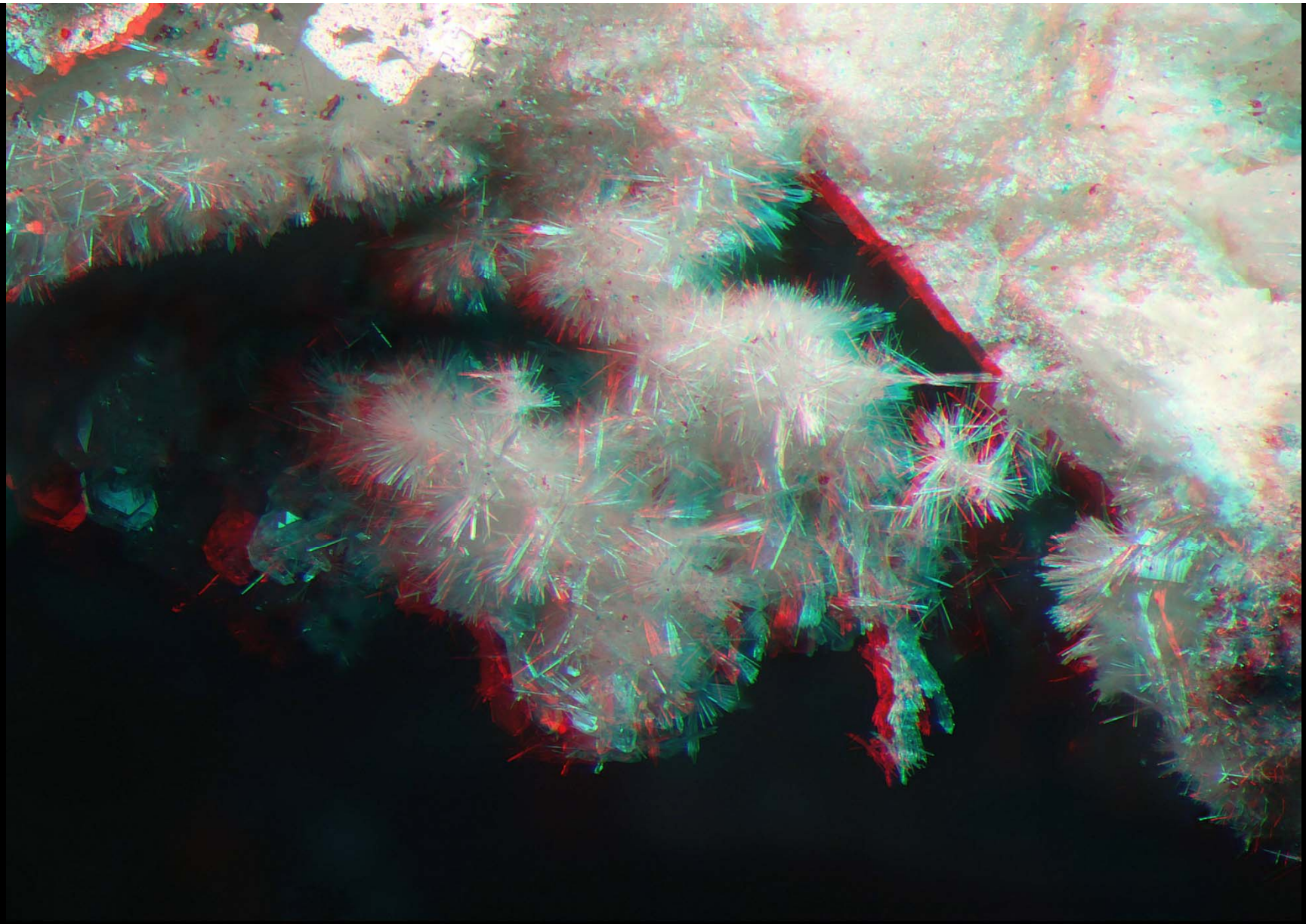
Field width 3.35 mm

Cockscomb aggregate on calcite. Corrantee Mine, Strontian, Argyll.

Specimen: Calum Anton collection. Photography: John Chapman.

3D image for viewing on computer screen

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



Mattheddleite $Pb_5(SiO_4)_{1.5}(SO_4)_{1.5}(Cl,OH)$, leadhillite $Pb_4(CO_3)_2(SO_4)(OH)_2$ and anglesite $PbSO_4$

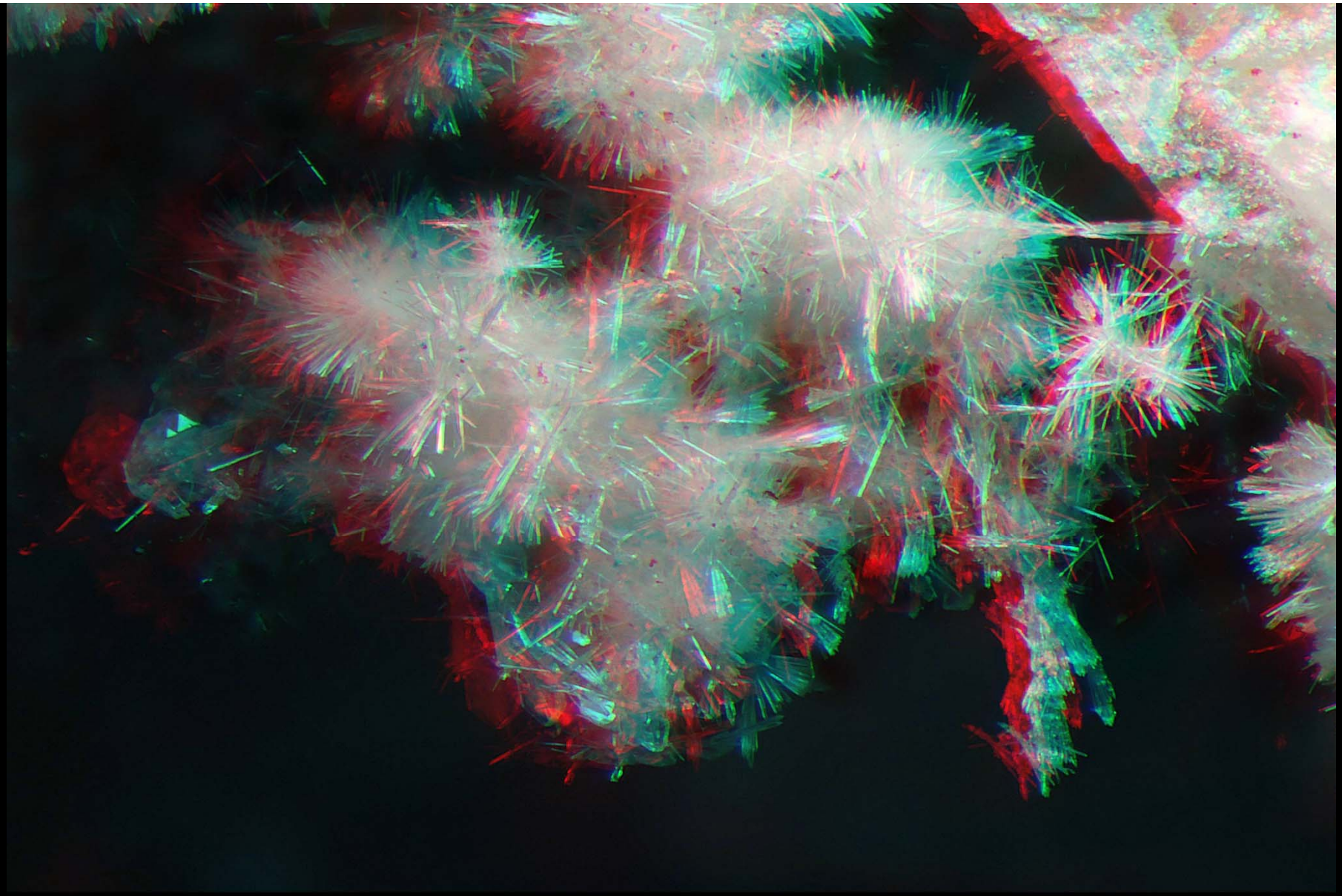
Acicular Mattheddleite with sharp pencil-point terminations intergrown with tabular pseudo-hexagonal leadhillite, overgrowing prismatic anglesite. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: found by David McCallum, No. E120, 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 6.4x zoom, with LED lamp illumination.

1 mm

Field width 4.3 mm



Mattheddleite $Pb_5(SiO_4)_{1.5}(SO_4)_{1.5}(Cl,OH)$, leadhillite $Pb_4(CO_3)_2(SO_4)(OH)_2$ and anglesite $PbSO_4$

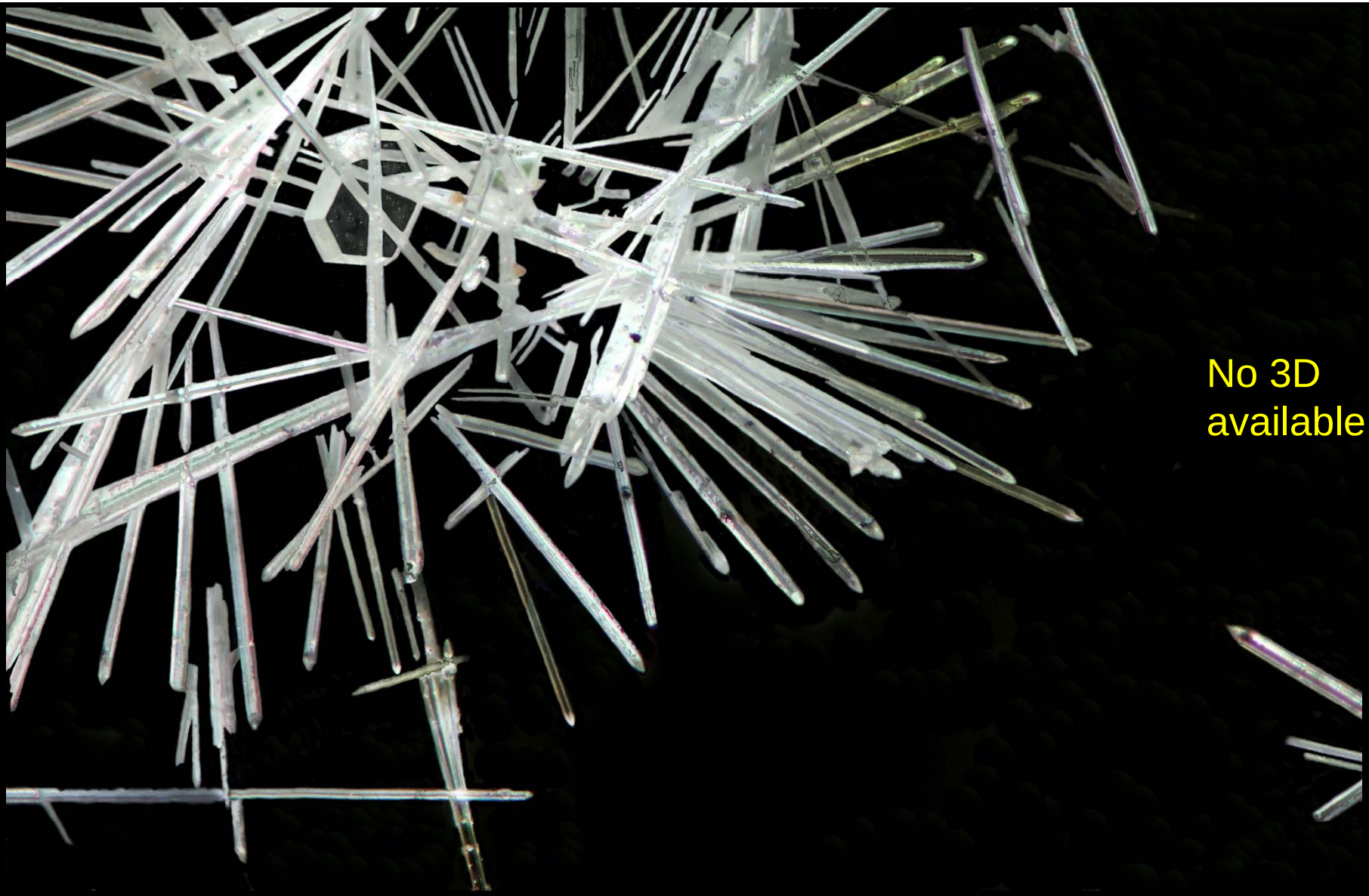
Acicular Mattheddleite with sharp pencil-point terminations intergrown with tabular pseudo-hexagonal leadhillite, overgrowing prismatic anglesite. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

Specimen: found by David McCallum, No. E120, 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 6.4x zoom, with LED lamp illumination.

1 mm

Field width 3.14 mm



No 3D available

Mattheddleite $Pb_5(SiO_4)_{1.5}(SO_4)_{1.5}(Cl,OH)$, leadhillite $Pb_4(CO_3)_2(SO_4)(OH)_2$ and anglesite $PbSO_4$

Acicular Mattheddleite with sharp pencil-point terminations intergrown with tabular pseudo-hexagonal leadhillite, overgrowing prismatic anglesite. Whitwell Quarry SK 530 753, Whitwell, Derbyshire.

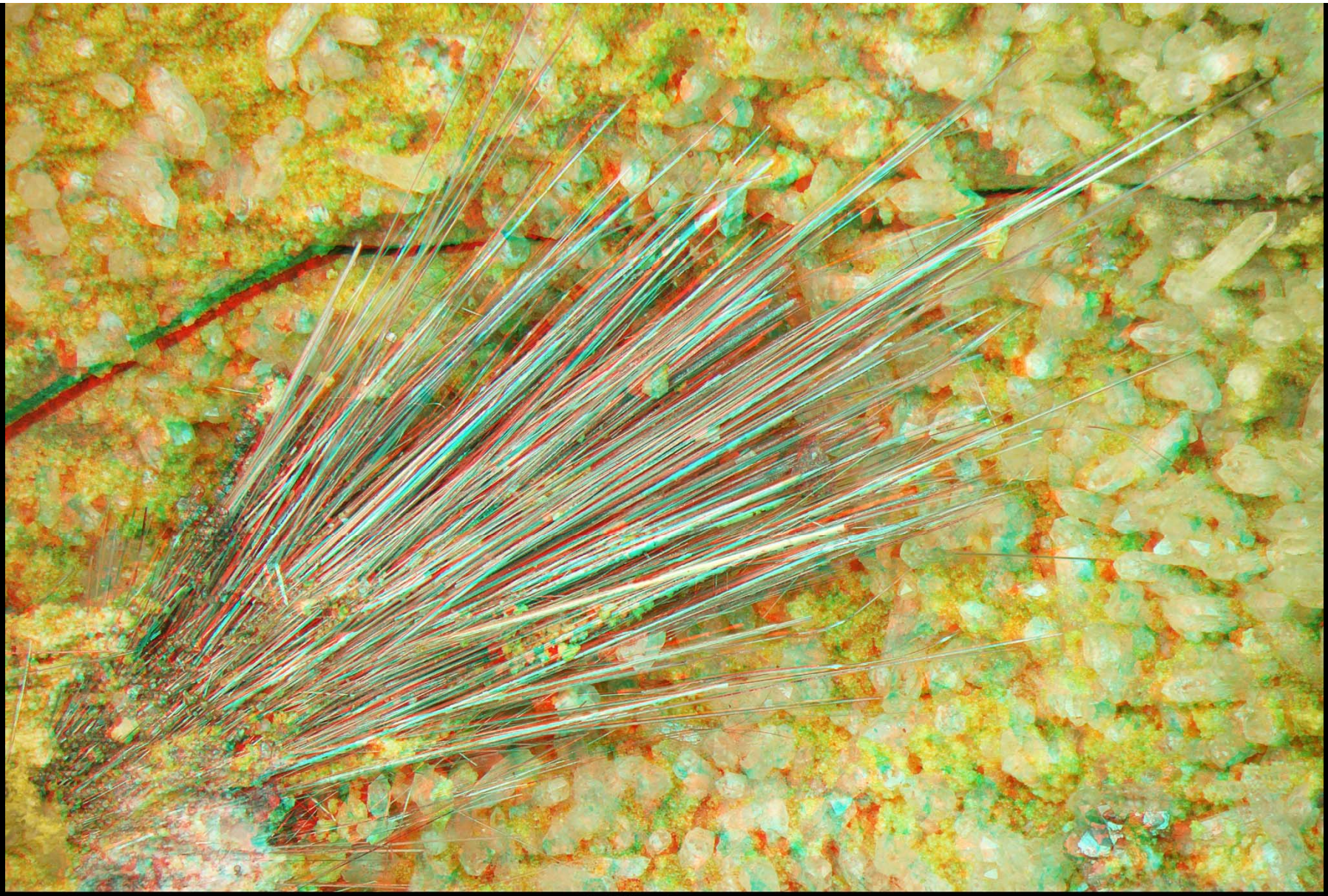
Specimen: found by David McCallum, No. E120, and now in David Green collection. Photography: John Chapman.

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

Stack of 118 2-micrometre steps via Stackshot rail combined in CombineZM and processed in PhotoShop CS5.

0.1 mm

Field width 0.50 mm



1 mm

Millerite NiS

Field width 17.0 mm

Acicular metallic pale brassy yellow crystals to 25 mm in length in shallow dish-shaped cavity with quartz, ochre, slightly iridescent sphenoidal chalcopyrite (bottom right) and pyrite around base of millerite crystals.
Coldberry Gutter, Teesdale.

Specimen: found by David Green and 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 1,6x zoom, with Schott fibre optic lighting.

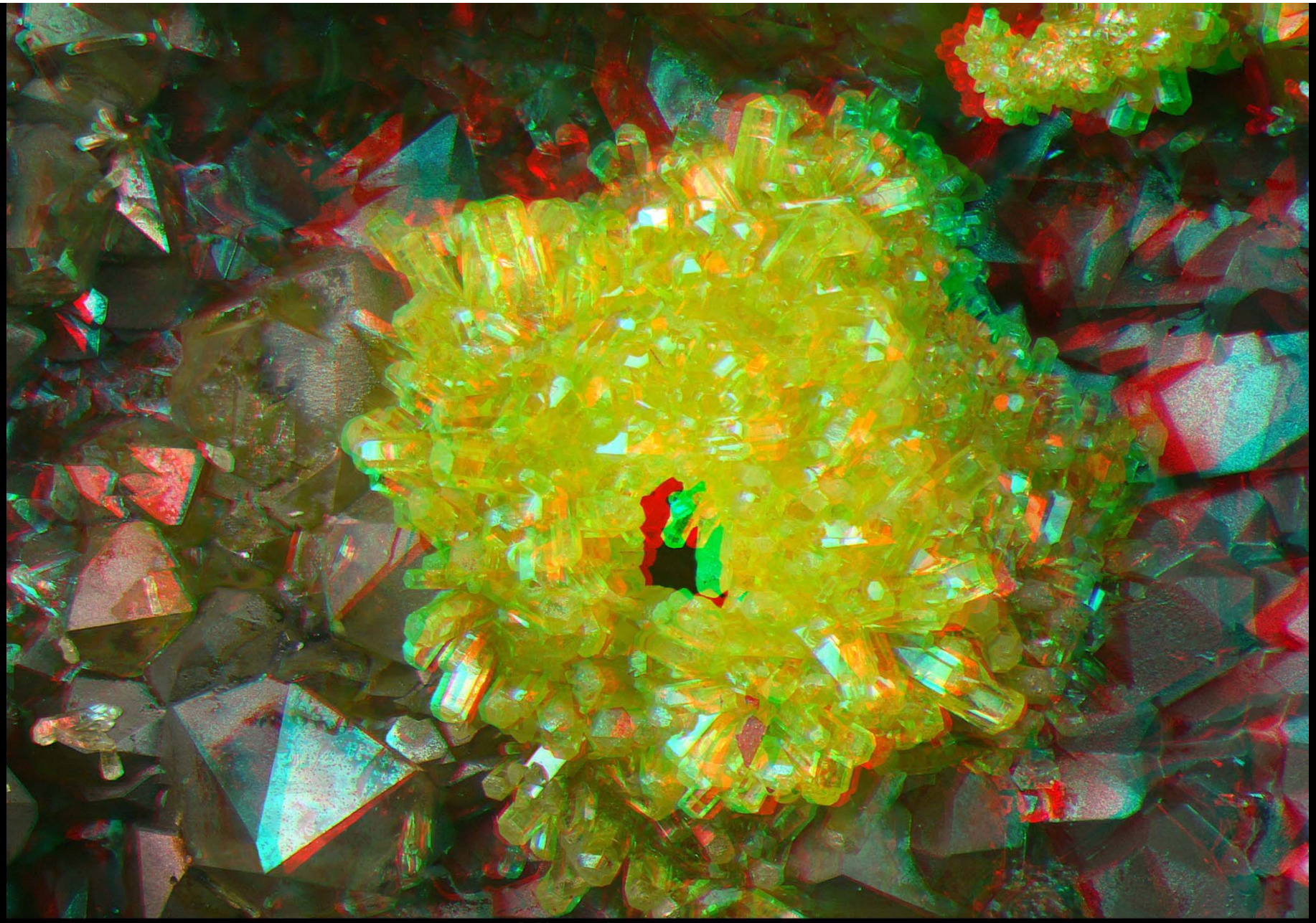
Millerite NiS

1 mm

Coldberry Gutter, near Middleton-in-Teesdale. Field width 13.5 mm

Specimen: found by David Green and 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 2x zoom, with LED illumination.



1 mm

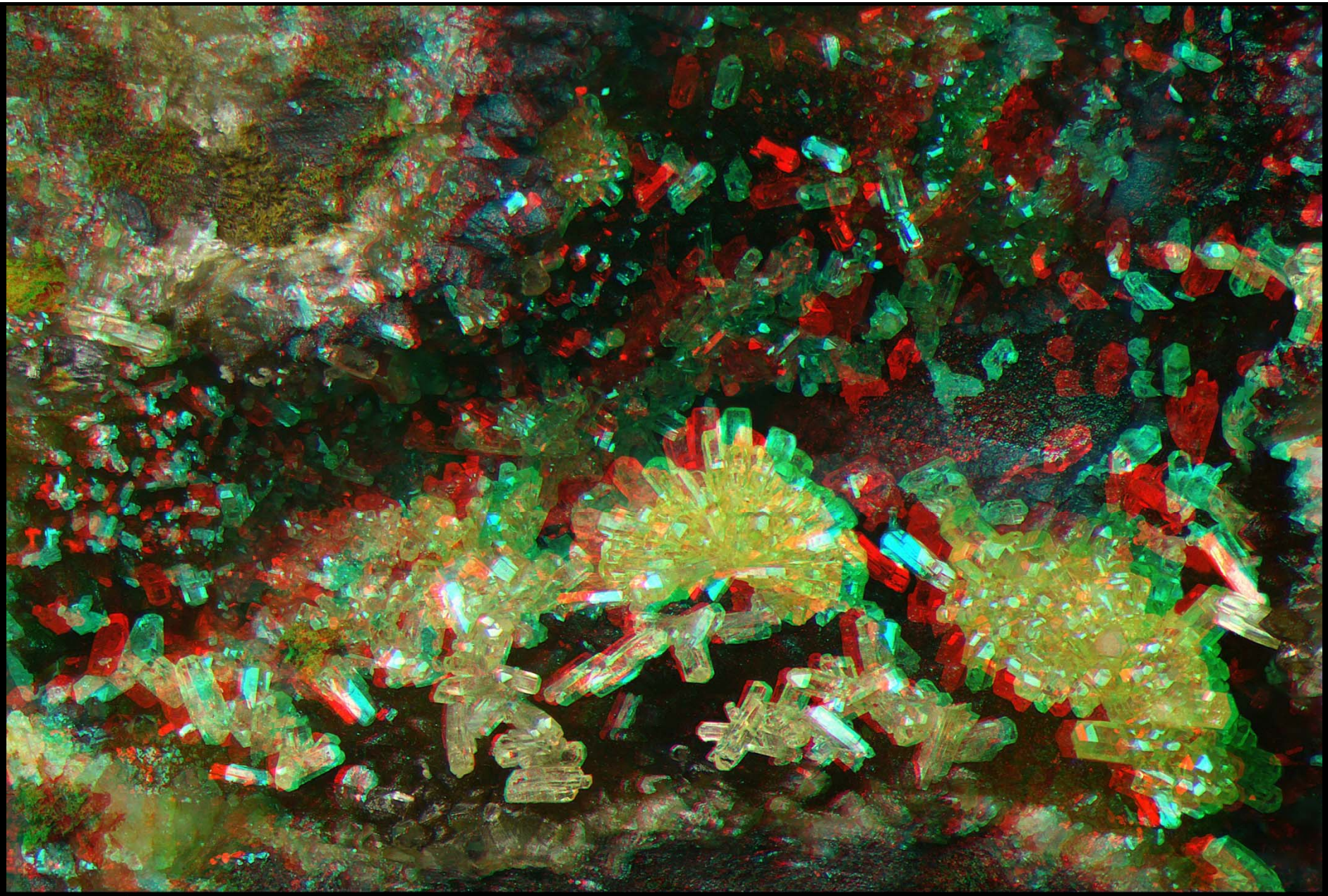
Mimetite $Pb_5(AsO_4)_3Cl$

Field width 5.3 mm

Crystalline crust around degraded galena crystal on goethite-coated quartz. Murton Mine, Scordale, Cumbria.

Specimen: found underground and now in David Green collection No. MT032. 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 LED illumination.



1 mm

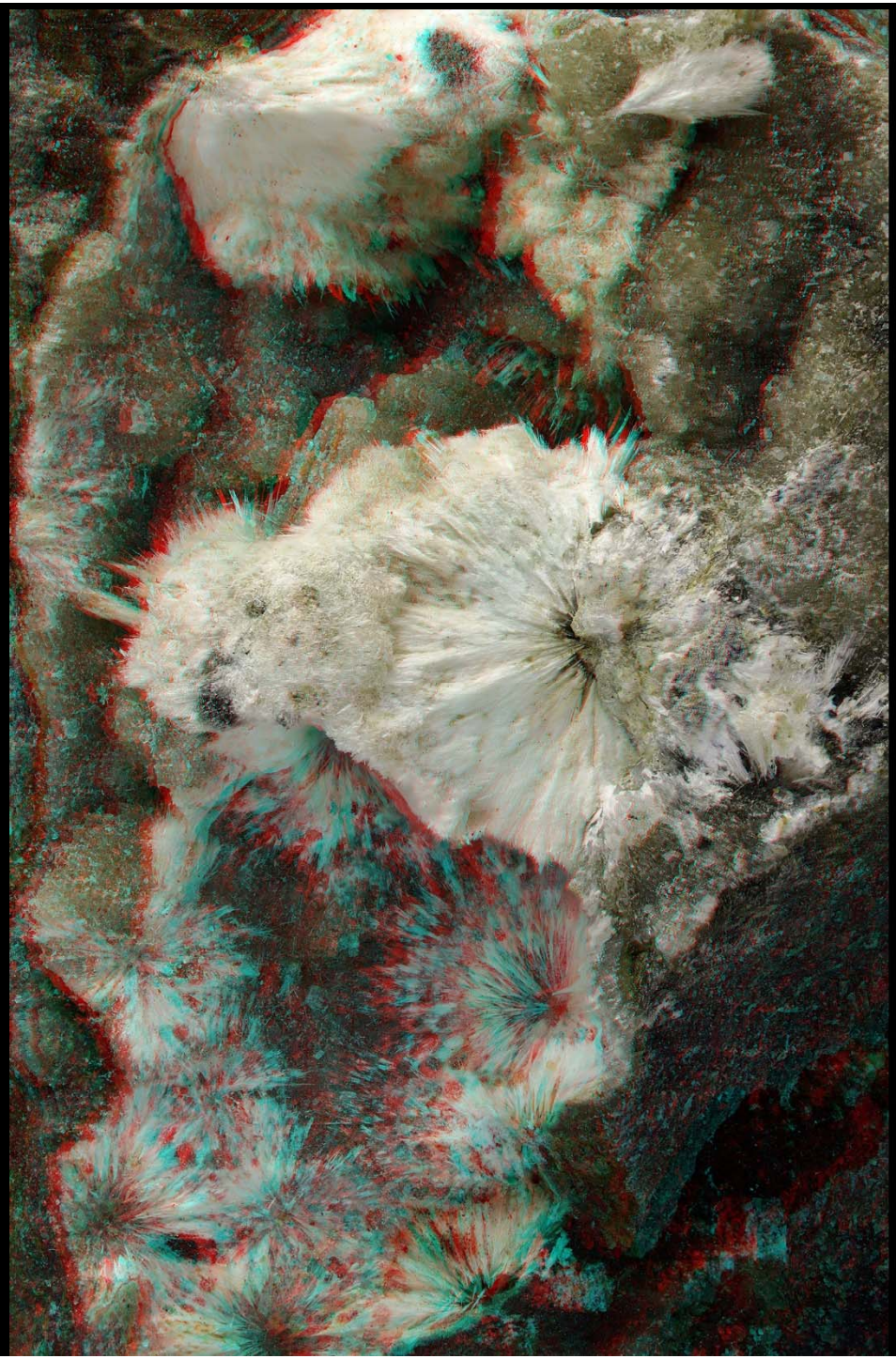
Mimetite $Pb_5(AsO_4)_3Cl$

Field width 6.7 mm

Radiating spray of blocky prismatic crystals to about 0.5 mm. Murton Mine, Scordale, near Appleby, Cumbria.

Specimen: found underground and now in David Green collection no. MT038. Photography: John Chapman.

Canon EOS 5D Mk II camera on Carl Zeiss (West Germany) Stereomicroscope SV8 with f=125 mm objective lens and 4x zoom, with Schott fibre optic lighting.



Mordenite $(Na_2,Ca,K_2)_4(Al_8Si_40)O_{96}\cdot_{28}H_2O$

and

dachiardite $Ca_2(Si_20Al_4)O_{48}\cdot_{13}H_2O$,

with

drusy chabazite $(Ca_2/Mg_2/Na_2/Sr)[Al_4Si_8O_{24}]\cdot 13H_2O$.

Boghill Quarry, Glengormley, Co. Antrim,
Northern Ireland.

Specimen: Norman Moles collection, formerly
Harry Foy collection, No. 2H08.

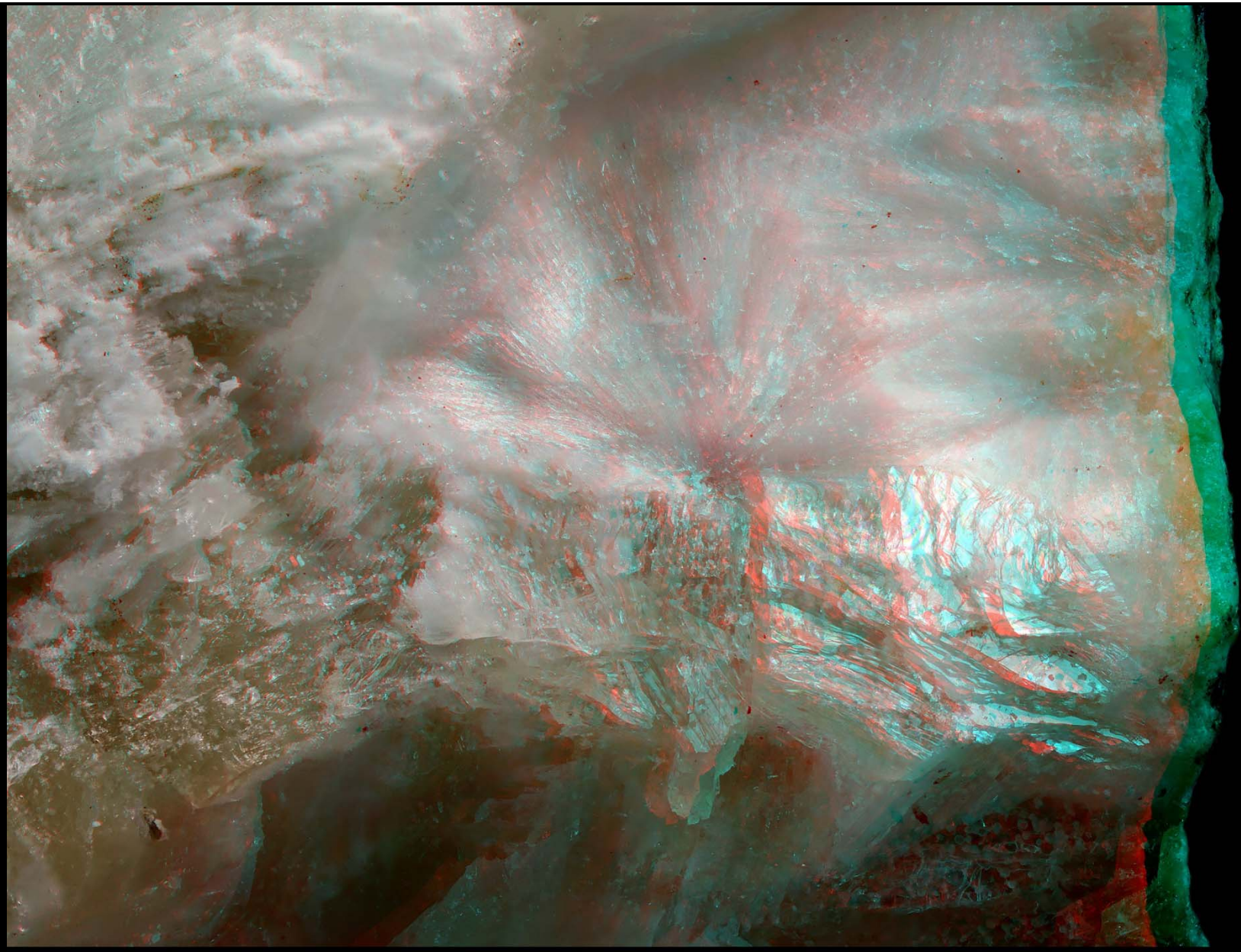
Photography: John Chapman 2023.

Canon EOS 5DSr camera with Carl Zeiss (West Germany) Luminar 63mm objective lens on 130 mm bellows extension, with Schott fibre optic illumination.

Left + right stacks of 96 and 93 50-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 14.4 mm.



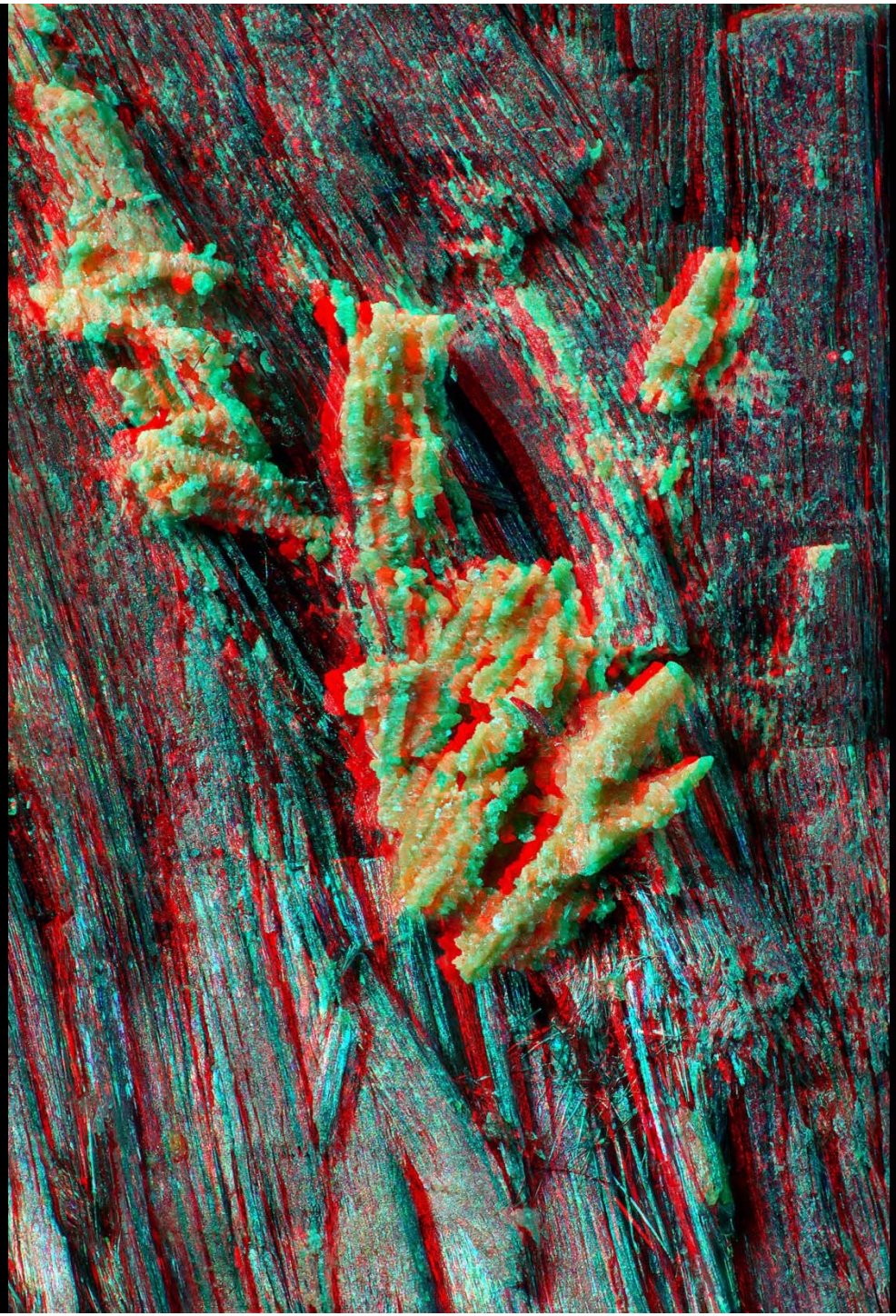
Mordenite $(Na_2,Ca,K_2)_4(Al_8Si_{40})O_{96}\cdot 28H_2O$ (acicular) and dachiardite-Na $Na_4(Si_{20}Al_4)O_{48}\cdot 13H_2O$

1 mm Boghill Quarry, Glengormley, Co. Antrim, Northern Ireland. Field width 3.68 mm.

Specimen: Harry Foy collection, now in Norman Moles collection, No. 2H07. Photography: John Chapman, July 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 109 and 99 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.



Nadorite $PbSb^{3+}O_2Cl$

Pale orange-brown crystal aggregates
on fibrous Jamesonite.

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

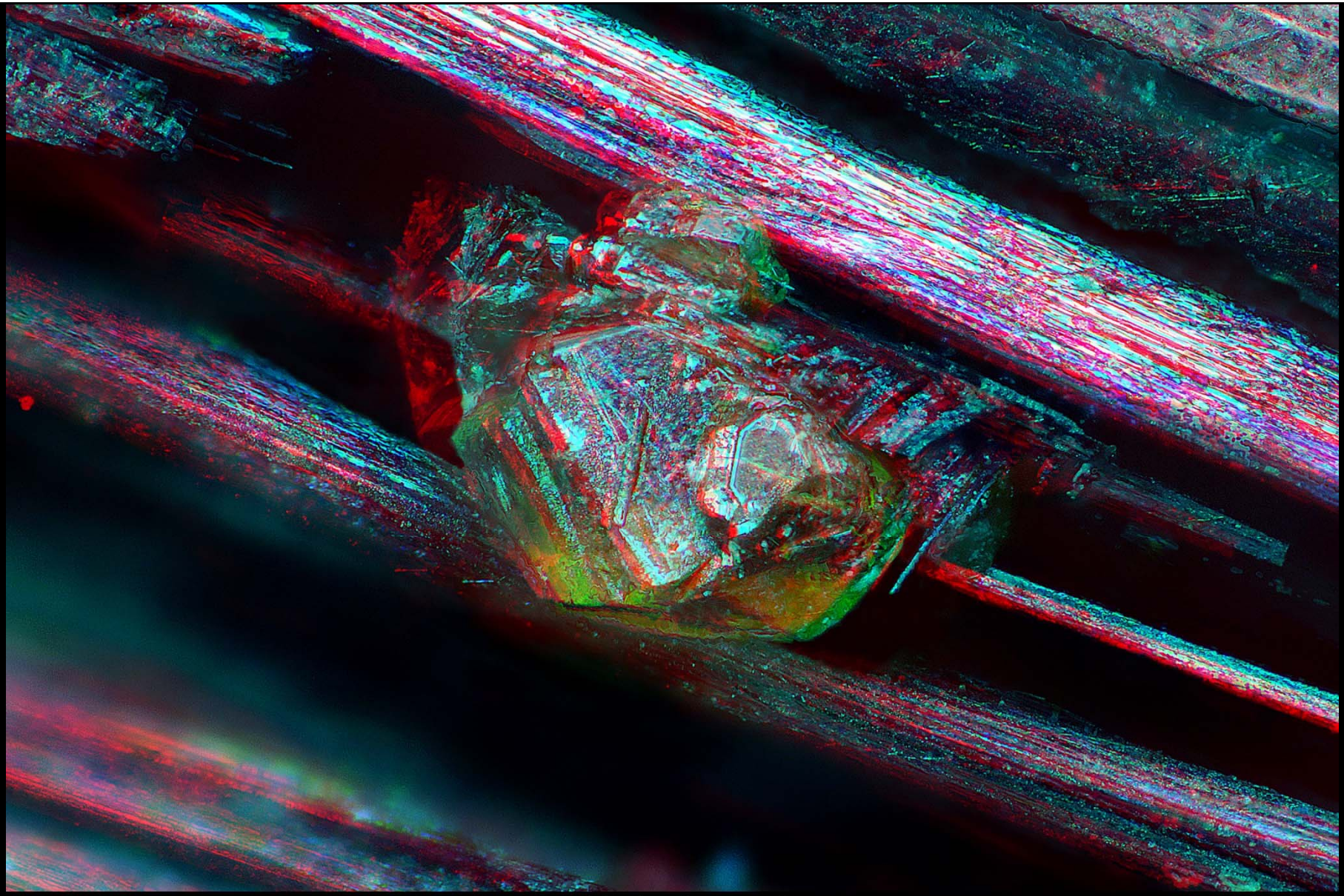
Specimen: David and Julie Green collection.

Photography: John Chapman, January 2024.

Canon 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 69 and 62 8-micrometre steps at 6 degrees via Stackshot rail,
with Luminar at fully open aperture, combined in CombineZM.

0.1 mm 1 mm Field height 2.09 mm.



0.1 mm

Nadorite $PbSb^{3+}O_2Cl$ or Sphalerite?

Amber coloured crystal in fibrous Jamesonite.

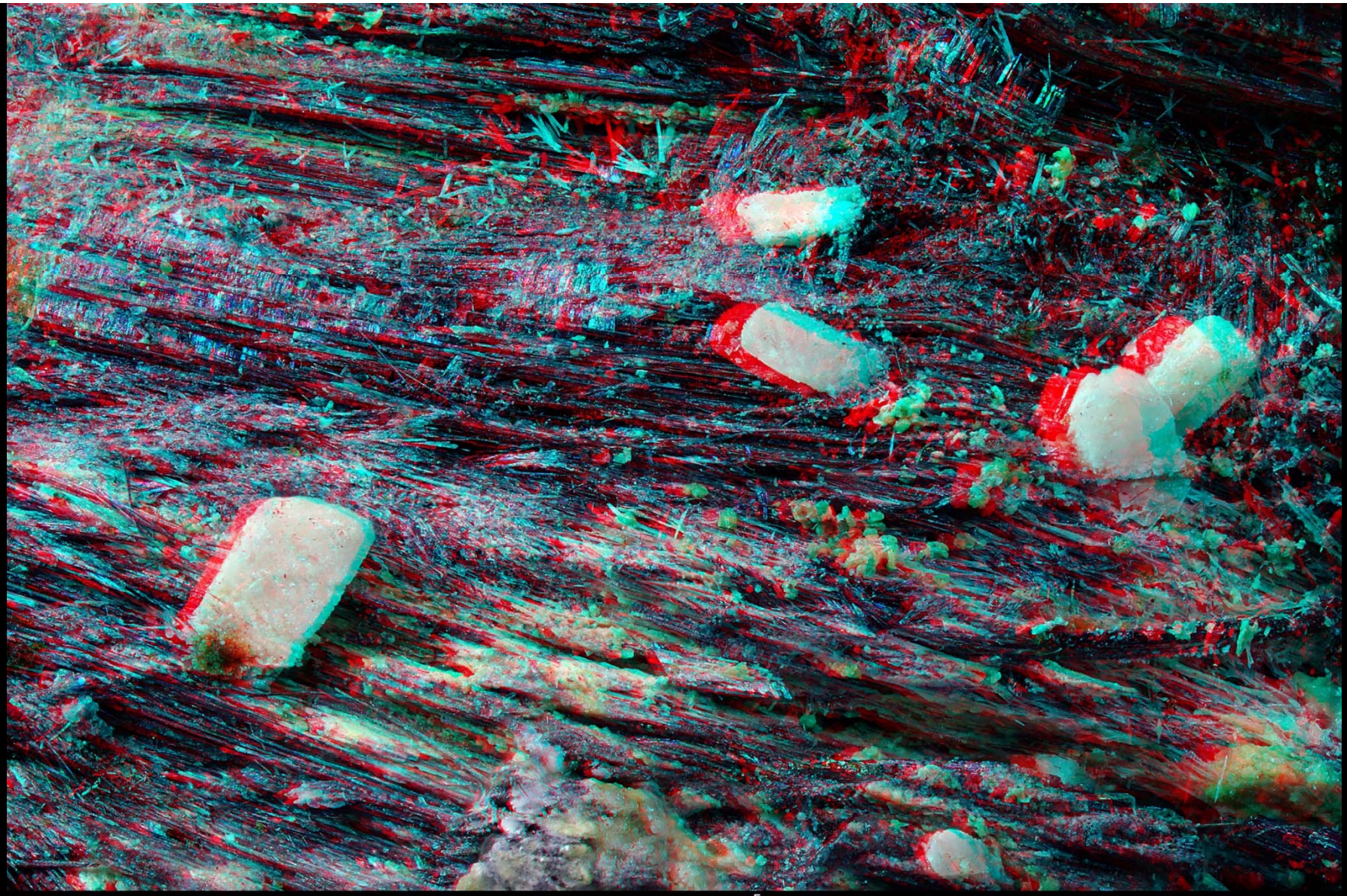
Field width 0.785 mm.

Russel'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 83 and 84 4-micrometre steps at 6 degrees via Stackshot rail, combined in CombineZM and rendered in Stereophotomaker.



0.1 mm 1 mm **Mopungite** $NaSb^{5+}(OH)_6$ Field width 2.71 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 Carl Zeiss (West Germany) Luminar 25 mm objective lens on 175 mm bellows extension, with Schott fibre optic illumination.
Left + right stacks of 97 and 88 15-micrometre steps at 6 degrees via Stackshot rail, with Luminar at fully open aperture, combined in CombineZM.