MINERAL MACHINE MUSIC

An audio visual collaboration between
geologist Clement Fay BSc, PhD & media artist Mitch Goodwin BACA, PhD

Presented with the support of
The University of Melbourne
& James Cook University

Originally commissioned for the *Synthesis* exhibition
At Umbrella Studio, Townsville, QLD, Australia

PROJECT HISTORY

Mineral Machine Music was developed for an collaborative art/science exhibition, *Synthesis*, at Umbrella Studios in Townsville Australia.

Clement and myself were partnered together having no previous knowledge of our respective research interests.

The film project became an aesthetic and figurative study of two independently produced pre-existing visual image sets.

THE IMAGES

The work juxtaposes the man-made structural textures of the New York subterranean cityscape with the geological mineral deposits located in the South Australian outback that formed in the early Proterozoic period.

Originally conceived as a an interactive experience in which a viewer's physical proximity to the screen would determine the depth of the rock sample and the cityscape.

THE AUDIO

THE IMAGERY IS AUGMENTED WITH LAYERS OF SONIC NOISE:

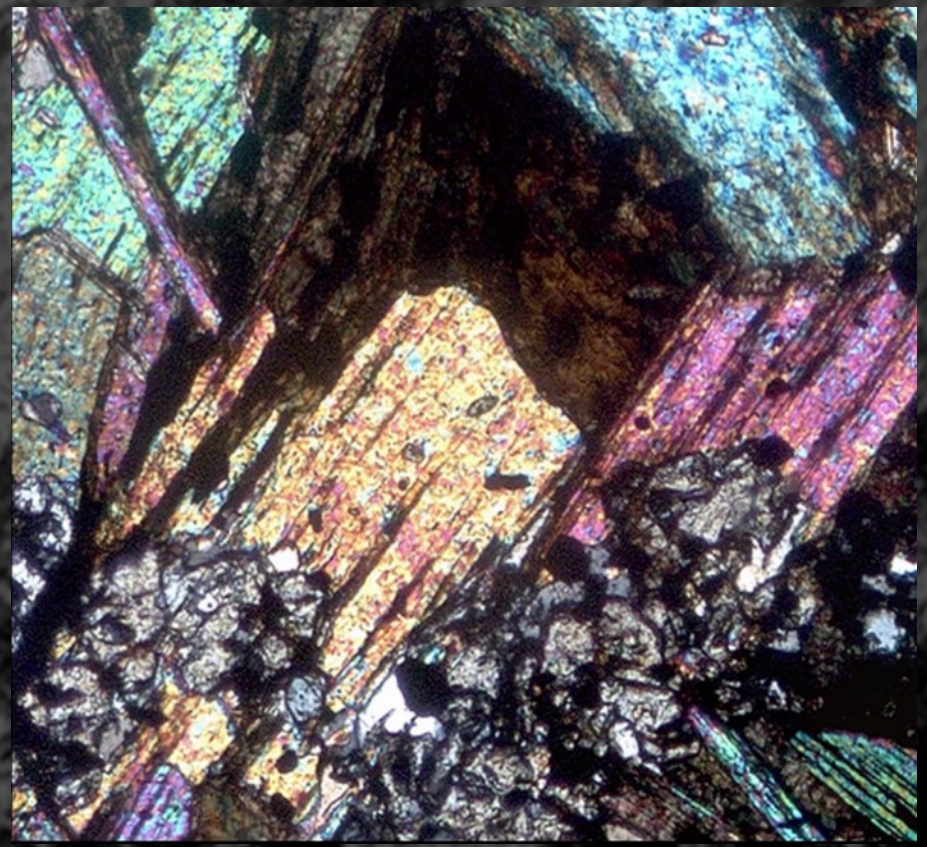
- MUSICAL REPRESENTATIONS OF SEISMIC ACTIVITY;
- ECHOES OF THE UNIVERSE FROM DEEP SPACE;
- SAMPLED GROANS OF TECTONIC ACTIVITY;
- THE INDUSTRIAL MACHINE AMBIANCE OF A NEW YORK CITY SUBWAY SYSTEM AND ITS INHABITANTS.

ROCK SAMPLING

The samples were photographed under a high resolution microscope at a thickness of 5 microns.

They are taken from marine sediments deposited in late-to-early Proterozoic period. These mineral deposits multiplied and transformed over 30 to 40 Million years.

These images are a snapshot of the long orogenic history (mountain building) of the Adelaide area.



ROCK SAMPLING

This Orogenic belt is part of a larger system that was created during the early Paleozoic formation of the Gondwana super-continent.

These rocks display what are called a typical type of metamorphism which occurs under medium pressure and a medium-to-high temperature range.

The tectonic forces that deformed these rocks are mostly collisional i.e. frontal collision between two plates.

CITY SAMPLING

The urban images featured in the film are from a collection of photographs taken during my second visit to New York City in April 2013.

They were collected on the NYC subway system, predominately between Brooklyn and Manhattan over a four day period.

CITY SAMPLING

These images compliment another series exploring artificial manifestations of line and form in the natural landscape of south west Victoria.

Like much of my photographic work the images represent my interest in the texture and the fabric of my environment. This inevitably lends itself to aesthetic comparisons between shape, contrast and colour.

THE SCIENCE

TODAY'S GEOLOGY LESSON

Plane polar photo-micrograph. Biotite (Iron Magnesium rich) blades and intergranular Quartz.

Note from Clem: “This slide has a dirty thin section where some of the metallic grit used to polish the rock to a thickness of 5 microns is still attached to the slide.”

High resolution scan of a non polished hand sized sample section. The large whitish minerals are to cm scale are a class of aluminum-silicate polymorphs.

These are important metamorphic minerals as they indicate a period of stability (in pressure and temperature) during which the crystals nucleated and grew.

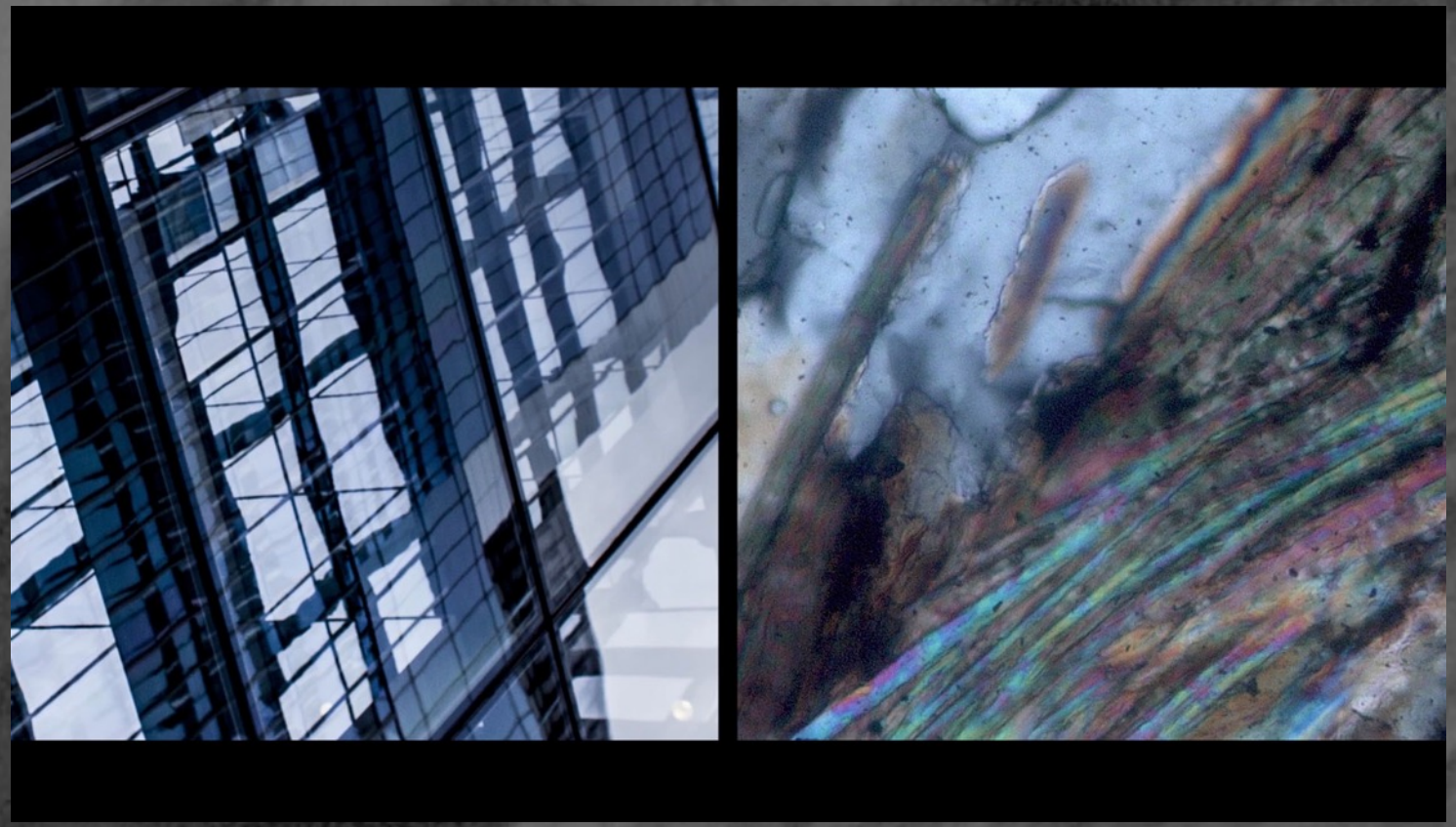
Porphyroblasts have a competency difference with the overall surrounding material and therefore display different behavior during deformation.

High magnification polarized photo-micrograph in plane.

Features poikiloblastic inclusions (fine grains of one mineral embedded in the metacrystal of another).

Staurolite composition (which often has twinned cross-like optical properties).

These inclusions (in this case, Quartz) are a relic of a previous metamorphic fabric (deformation driven mineral alignment).



A very high resolution photo-micrograph in cross polarized light.

Muscovite (Pink & Blue) and Biotite.

Difference in color is due to what is called pleiochroism. This is an optical phenomenon in which the color of the mineral changes depending on the angle of view (the incidence of the light and crystallographic axis).

Mosaic of dirty Quartz, this happens when the rocks are not grinded to a 5 micron thickness.

This particular slide is actually the artisanal proxy used to verify that your thin section is thin enough.

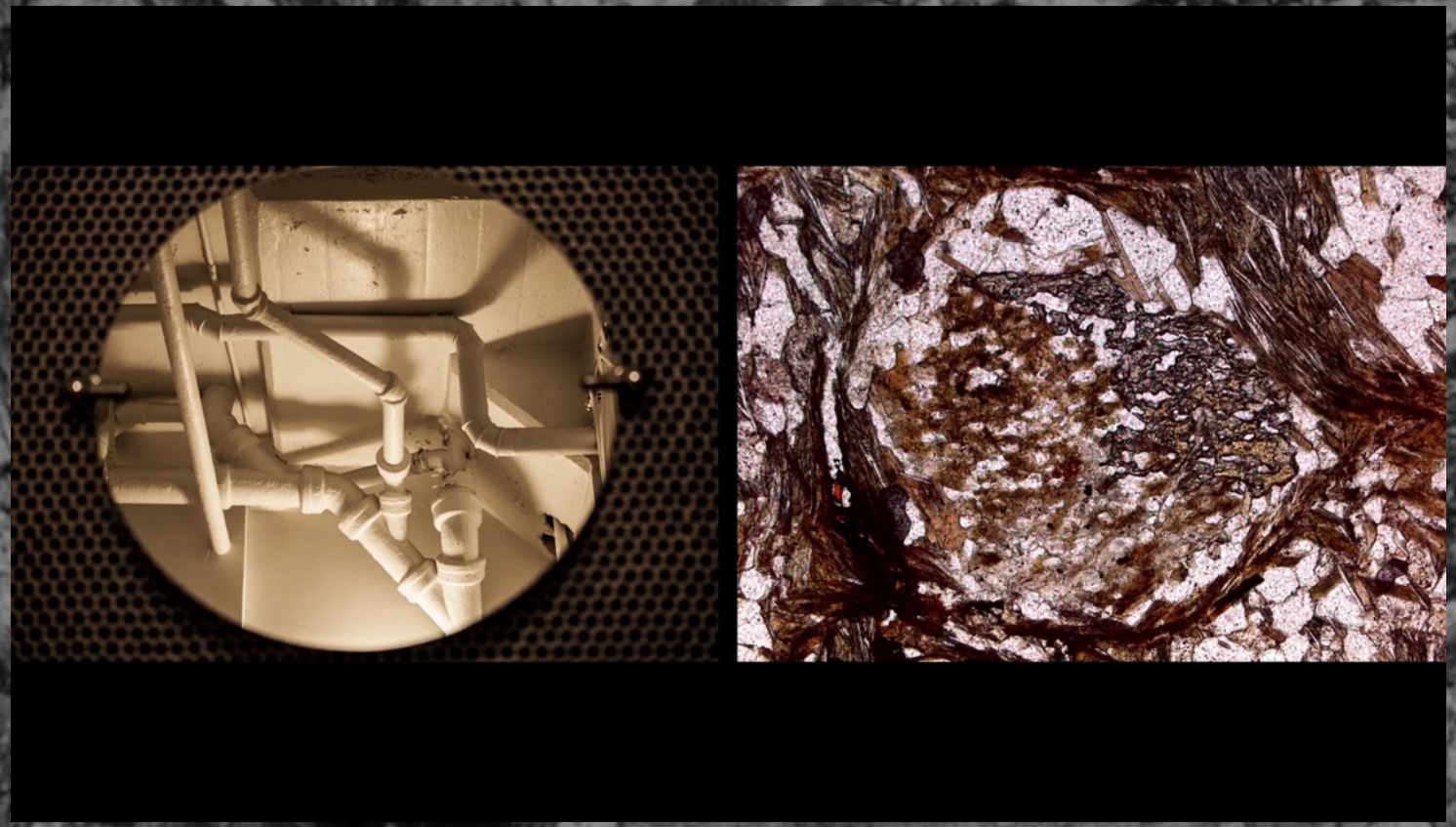
Note from Clem: “It would have been from one of the first batch of thin sections I made, still imperfect.”

Cross polarized image of two biotite foliations across two domains:

M Domain (Mica): Central oblique elongated biotite

Q Domain (Quartz): The right and left sides of the Mica domain consist of quartz deposits.

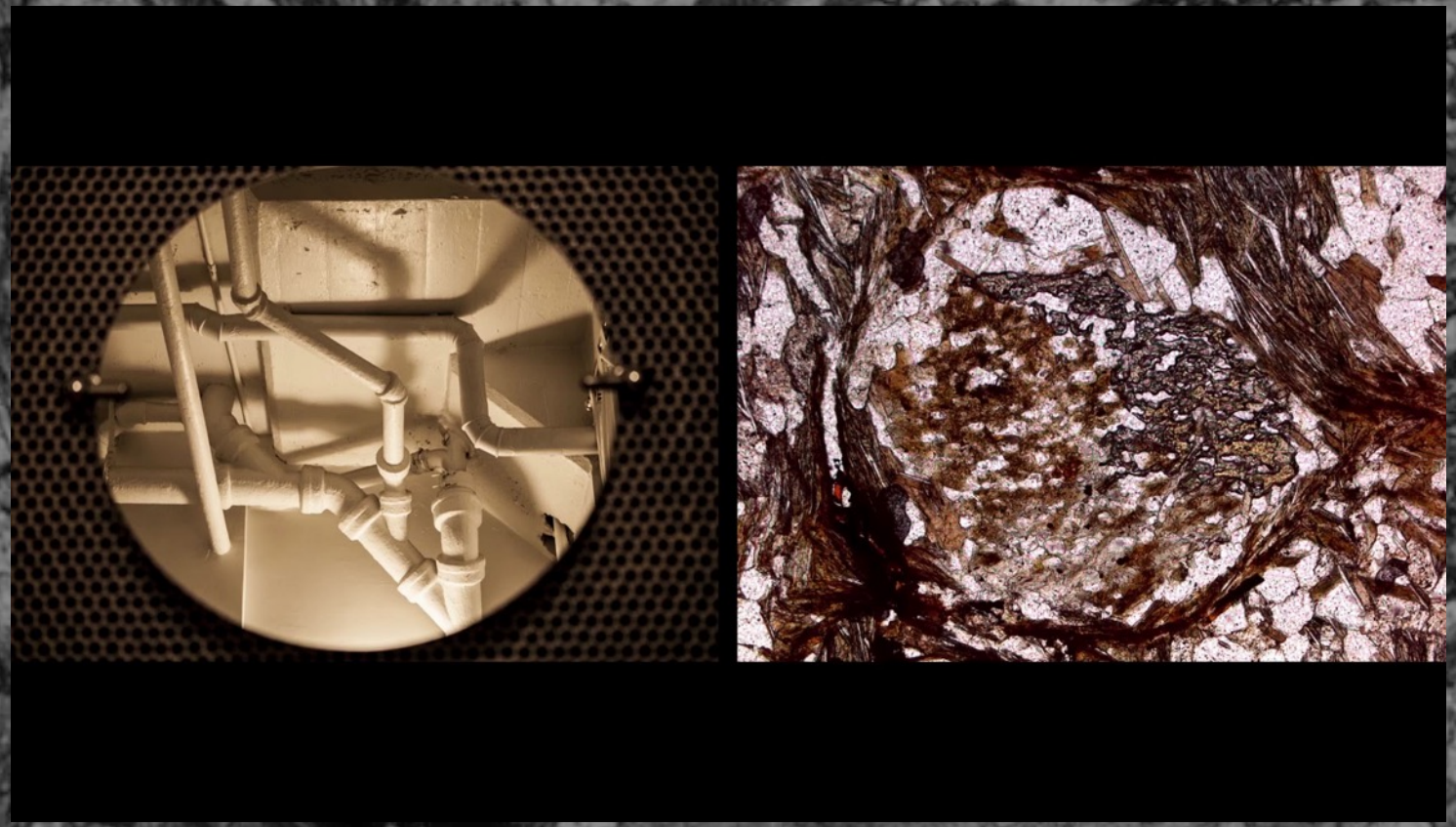
The central foliation is the youngest. From the M to the Q domain you can see opposite deflection of the micas that illustrate shearing along the central cleavage of the sample.



In the middle you have two porphyroblasts, one staurolite (right) and one andalusite (left).

The continuity of the quartz inclusion trails from one to the other indicates that these two crystals grew in a co-stable manner.

However, the andalusite is now totally reacted-out to fine grain mica (pinnite). This happens when the rock moves outside of the stability field for the mineral due to a change in conditions (i.e. heating, cooling or tectonic displacement).



Furthermore we can see that the original crystal shape is still preserved in the rock.

This reaction, where a mineral is replaced but it's original shape and inclusion remains, is called pseudomorphism.

This is at the heart of the aesthetic and functional duality of the two image sets.

CONTACT

mitchgoodwin.com

fb.me/mitchgoodwin.artist

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