

MICROSCOPICAL EXPLORATION SIX

A TENTATIVE MOVE FROM MEDICINE CABINET TO KITCHEN CUPBOARDS

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My Microscopical Explorations up until now, ME1- ME5 , have been concerned mainly with what I could find in the medicine cabinet. Unfortunately, for ME6, there's very little left in there that I haven't looked at already.

The same microscopes and waveplates as used in previous MEs were ready and waiting, so what to do next????

Time to venture, with caution, into the territory more usually patrolled by Attila the Housewife (so sorry, Good Lady Wife of nearly 44 years), the kitchen.

My aim was to see what suitable substance(s) might be raided from the cupboards in there, and it took but a moment to spot a potential candidate for further exploration in the 'baking cupboard': a little tub of Cream of Tartar. 'Permission to use' having been granted, I realised that I might have another problem; solubility!

Now, Cream of Tartar or, more correctly, potassium hydrogen tartrate is effectively insoluble in the solvents used in ME1-ME5 and only slightly soluble in water. But, in alkaline solution the stuff will dissolve more readily. This meant another foray into Attila's Lair and, sure enough, there it was in the 'cleaning cupboard' under the sink, Caustic Soda Drain Cleaner.

THE TEST SOLUTION

Caustic Soda/sodium hydroxide/Lye was dissolved in water at a concentration of four grams per litre yielding an alkaline solution at pH13. This was sufficiently alkaline to dissolve the potassium hydrogen tartrate and provide the test solution for ME6.

THE SPECIMEN SLIDE

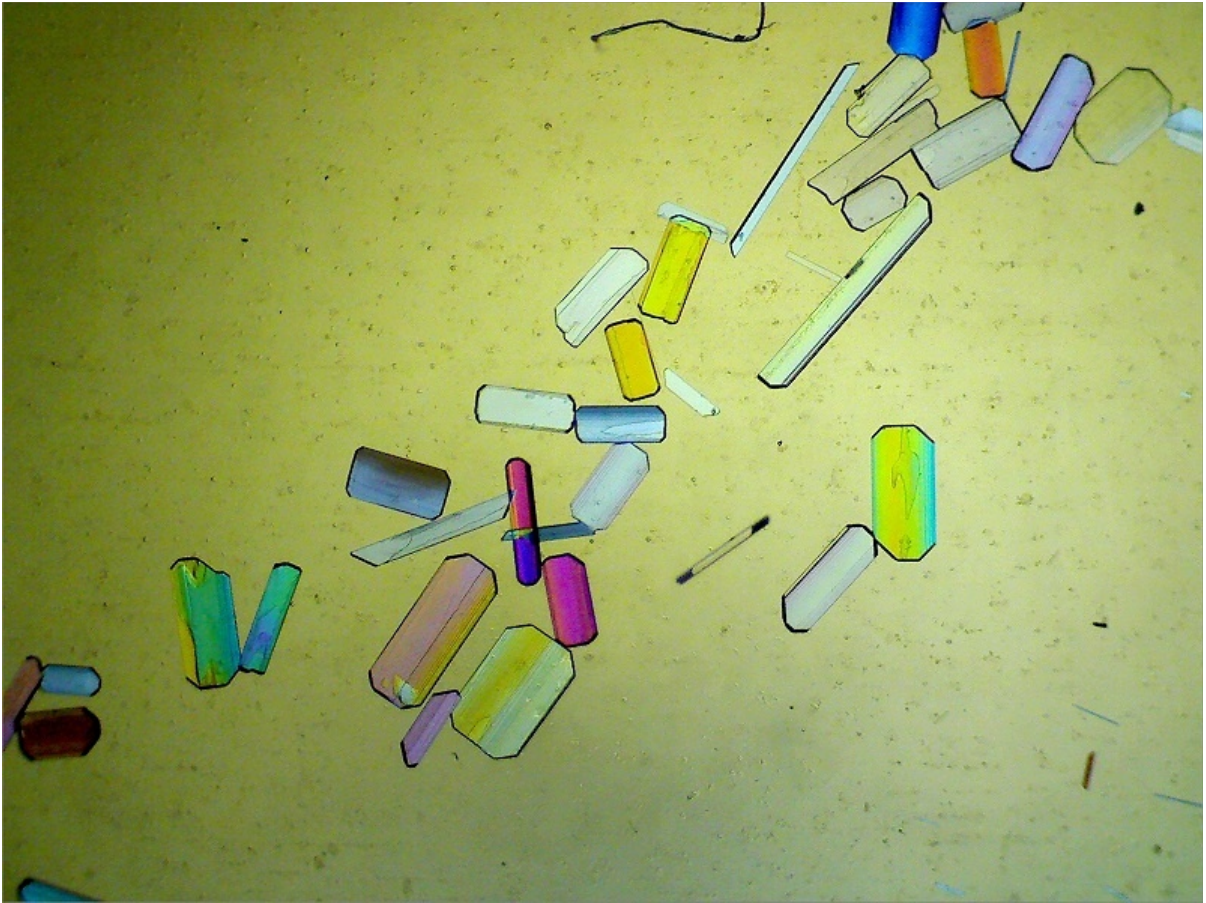
A specimen slide was prepared by applying 5 drops (approximately 0.25 millilitres) of the test solution to a clean glass microscope slide and allowing the water to evaporate at ambient room temperature.

The specimen slide was viewed by placing it transversely on top of the glass stage plate of my Vickers M10A with one or other, or none, of the wave-plates interposed in the light path at right angles to the slide beneath the stage plate (see photo).

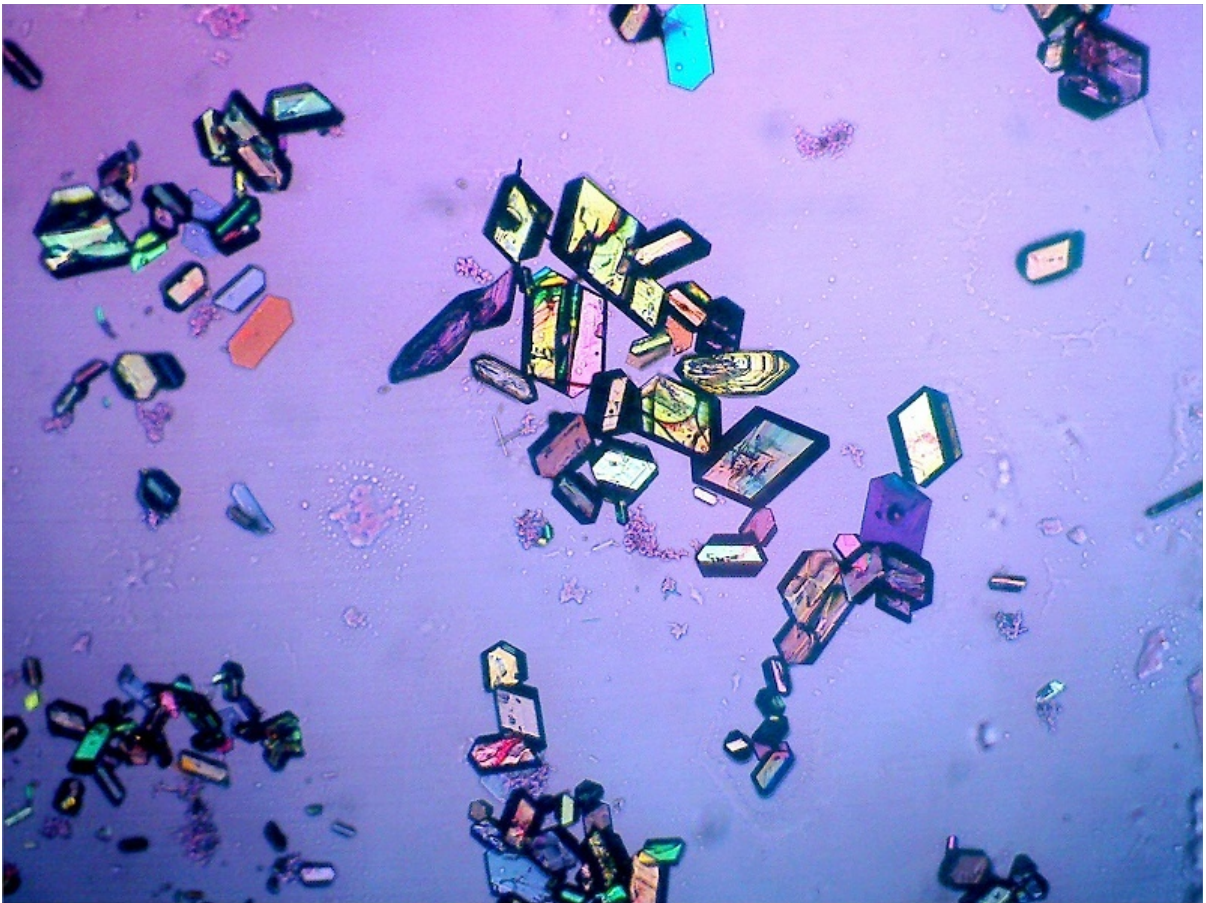


THE PICTURES

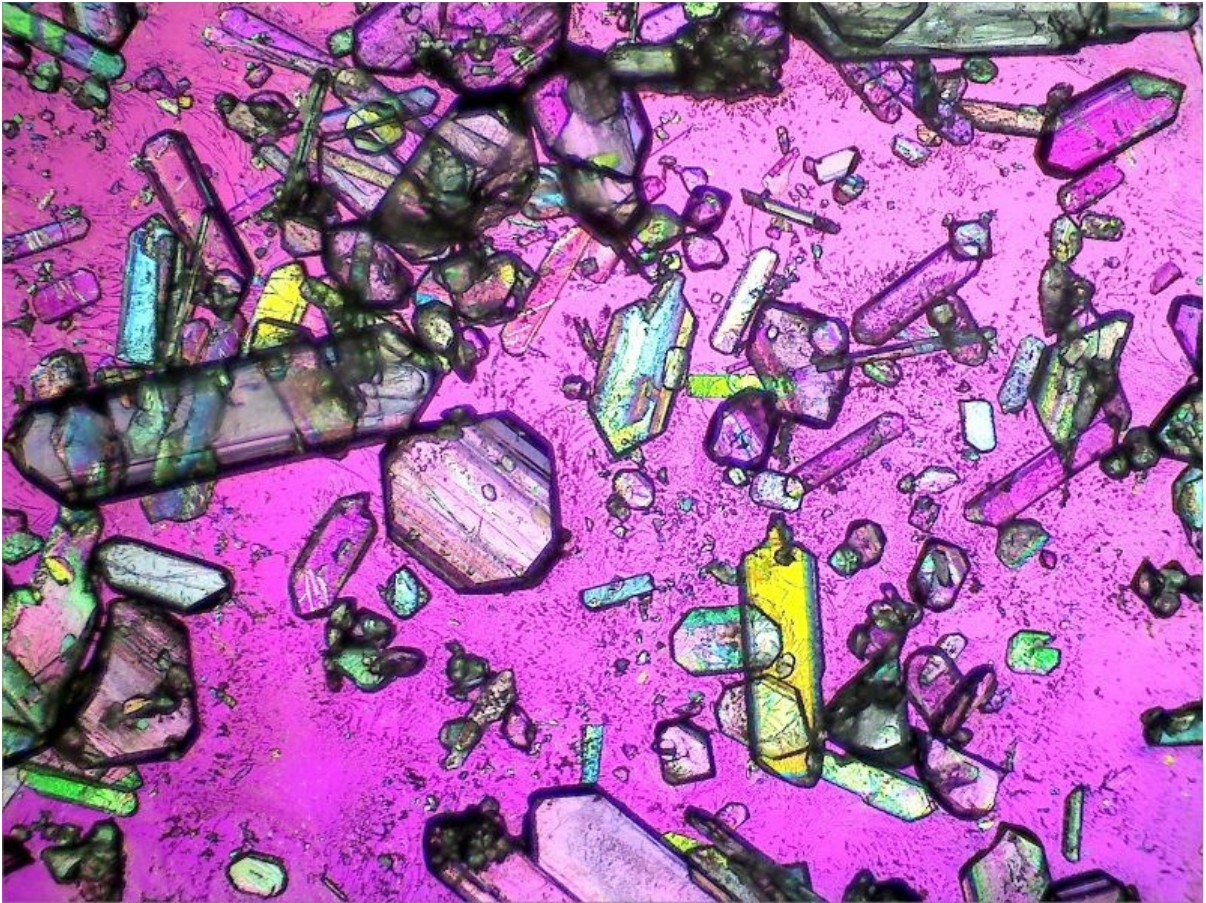
The following pictures were captured under polarised light illumination as in the previous explorations and using MycoCam 5.0 image capture software. Each is the result of the focus-stacking of multiple images. As can be seen in Pictures 1 & 2 the first application of the test solution produced discrete monoclinic crystals, which were photographed using the x4 objective, giving a higher magnification than the x2.7 lens used in the previous MEs. Interesting, but not quite what I was aiming for. A second application of 5 drops of test solution to the slide was allowed to evaporate and resulted in the more shambolic collection of discrete crystals evident in Picture 3, also viewed under the slightly higher magnification (x4).



Picture 1



Picture 2

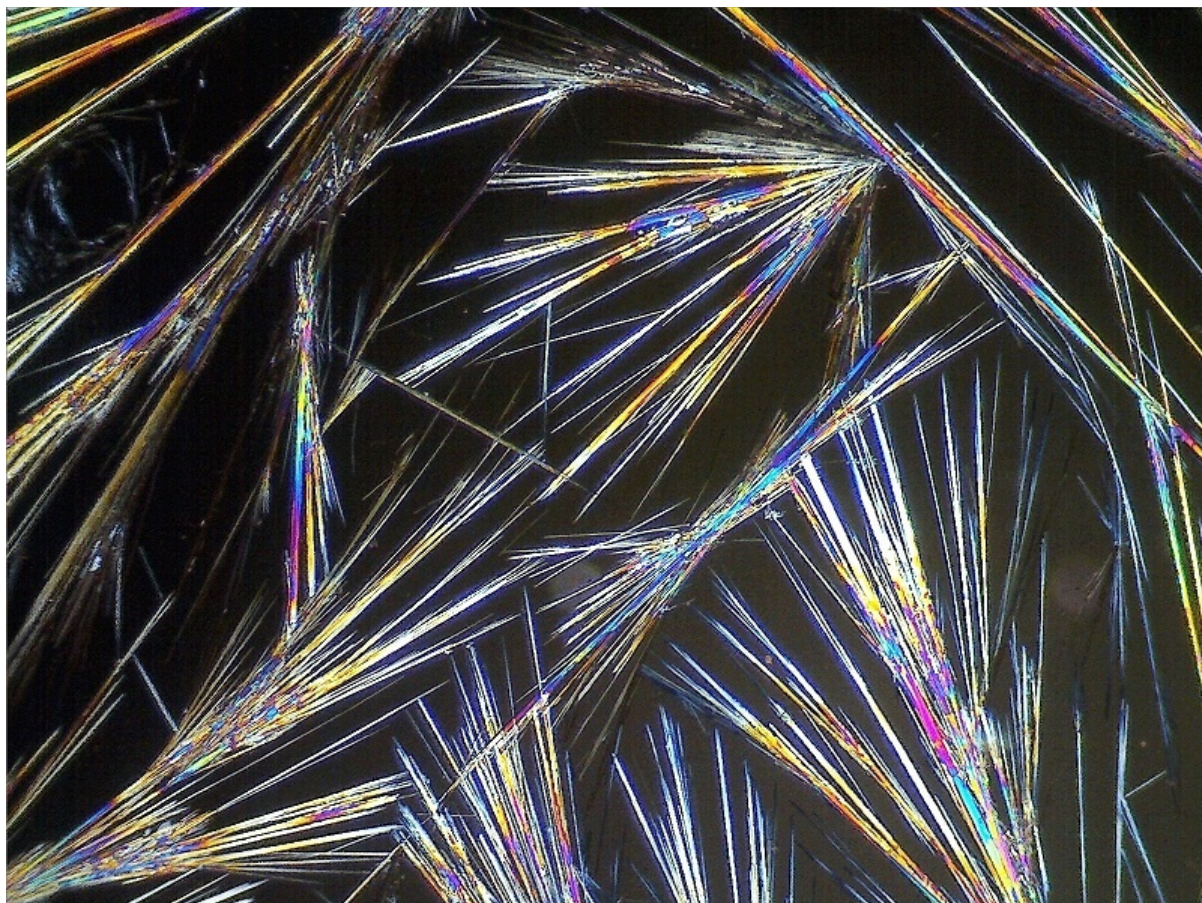


Picture 3

A further aliquot of test solution was then added to the specimen slide and, when dry, resulted in the needles evident in pictures 4 & 5. (NB. All subsequent pictures captured using the x2.7 objective.)

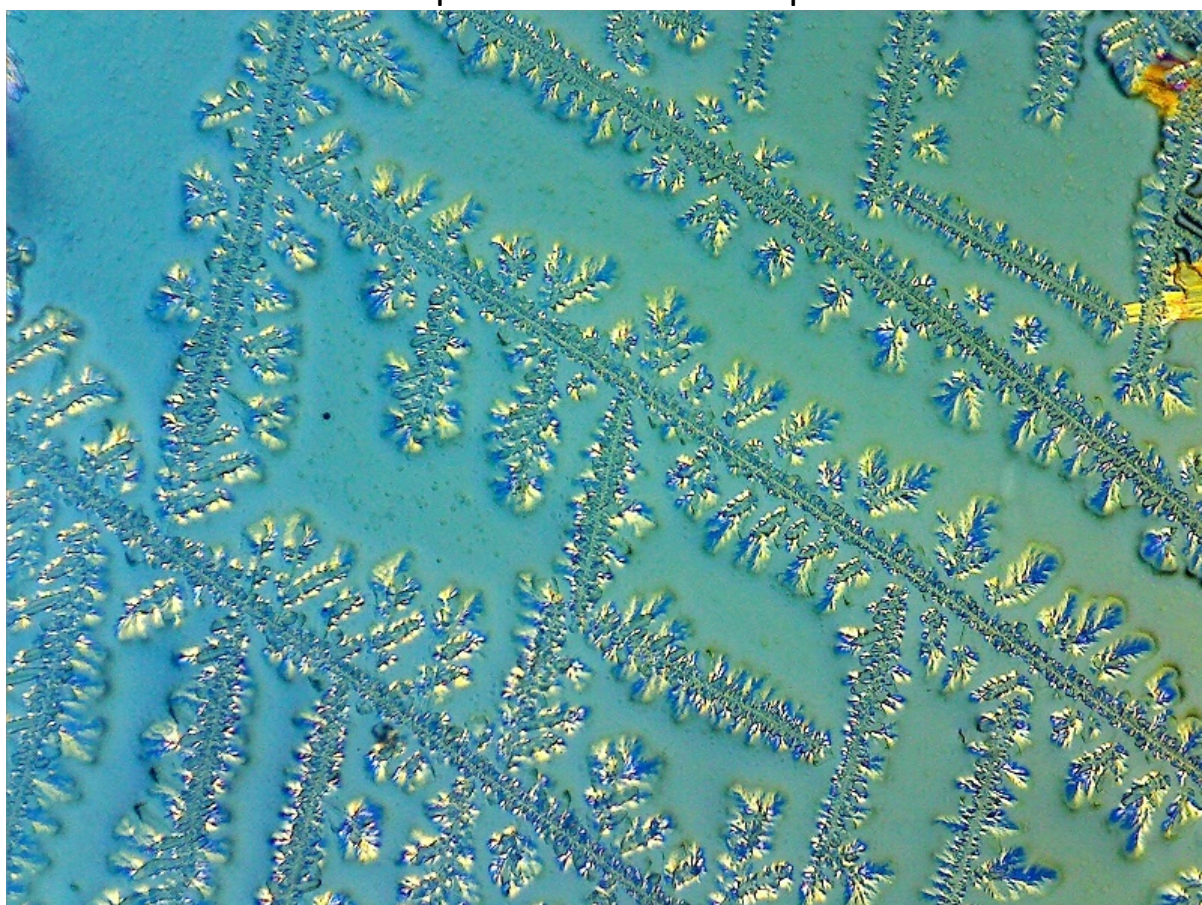


Picture 4

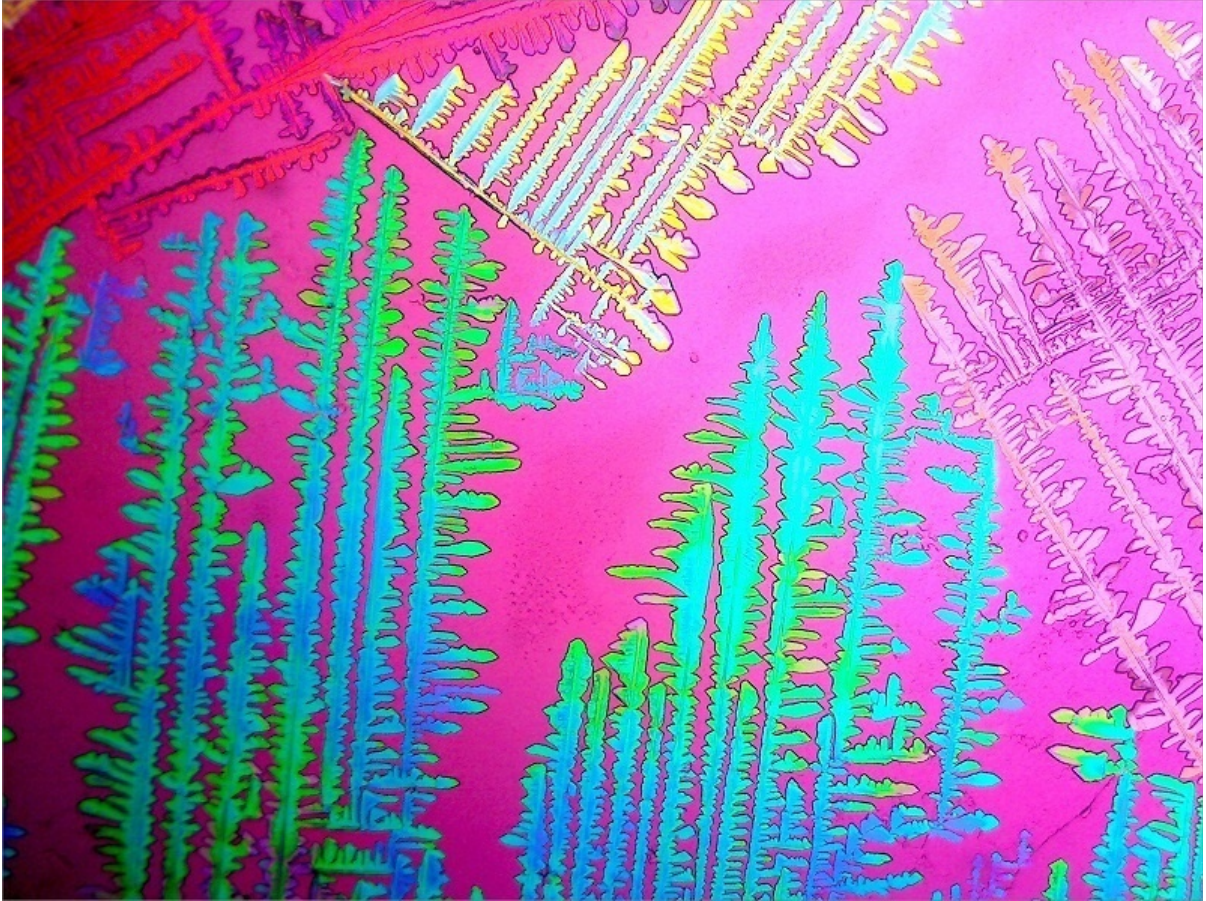


Picture 5

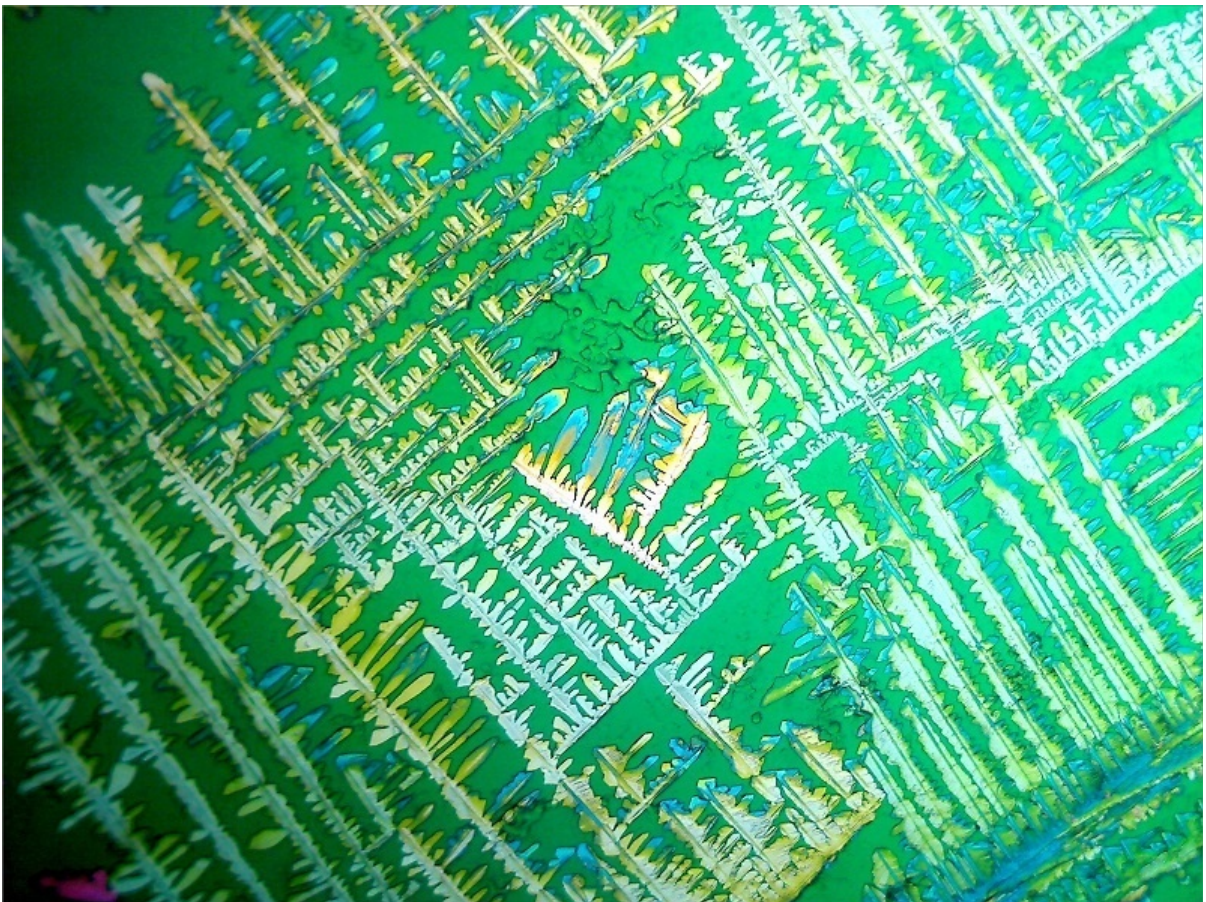
Time for the addition of another 10 drop aliquot of test solution, and the crystal formations on the slide develop an even more complex structure.



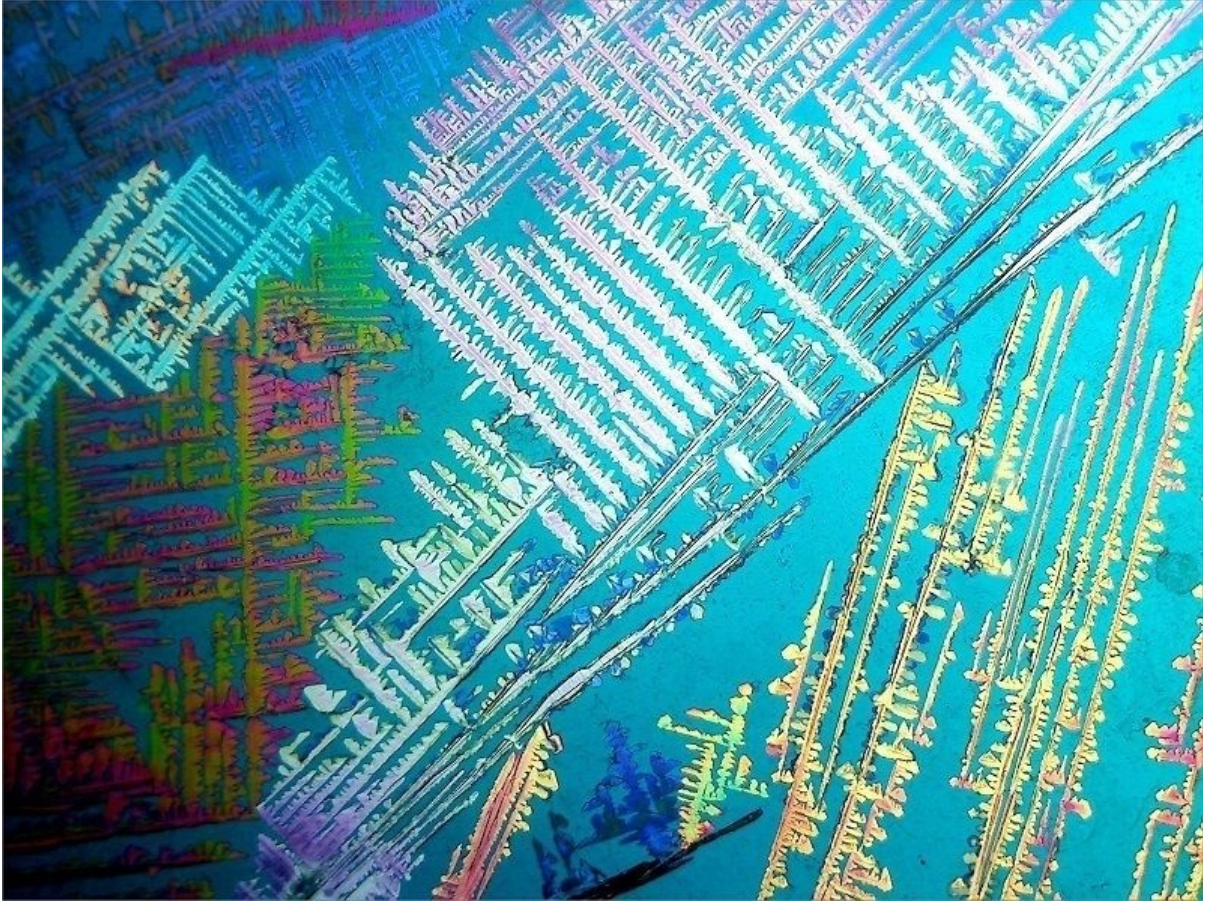
Picture 6



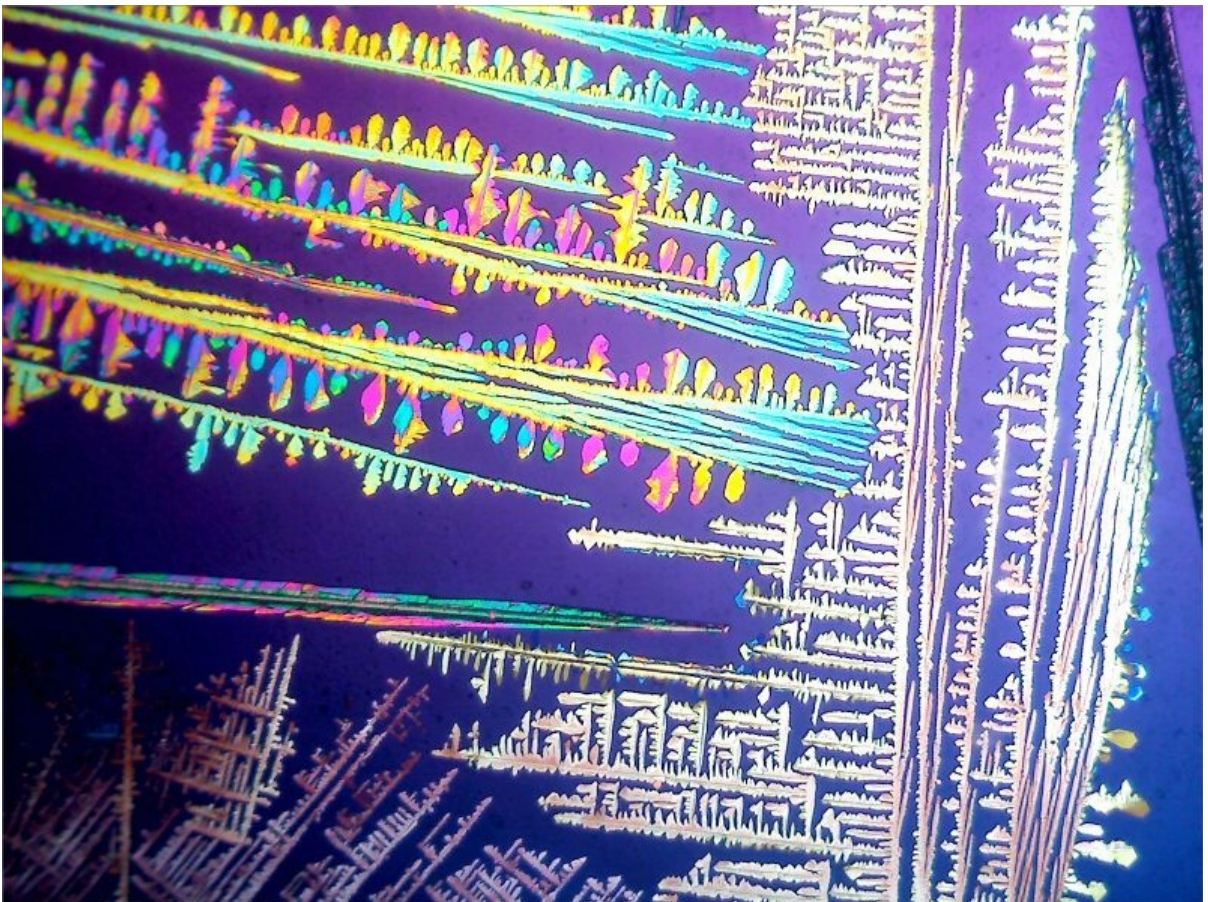
Picture 7



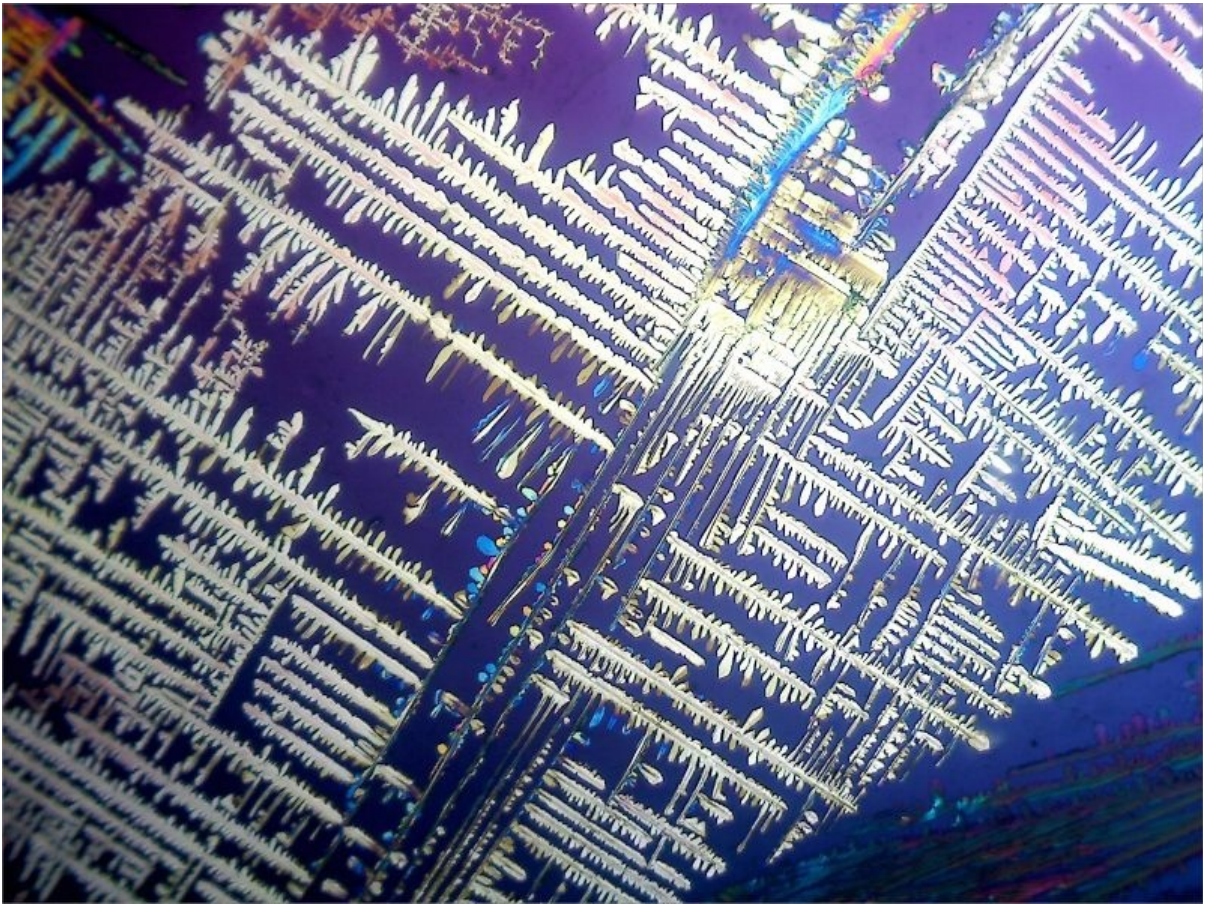
Picture 8



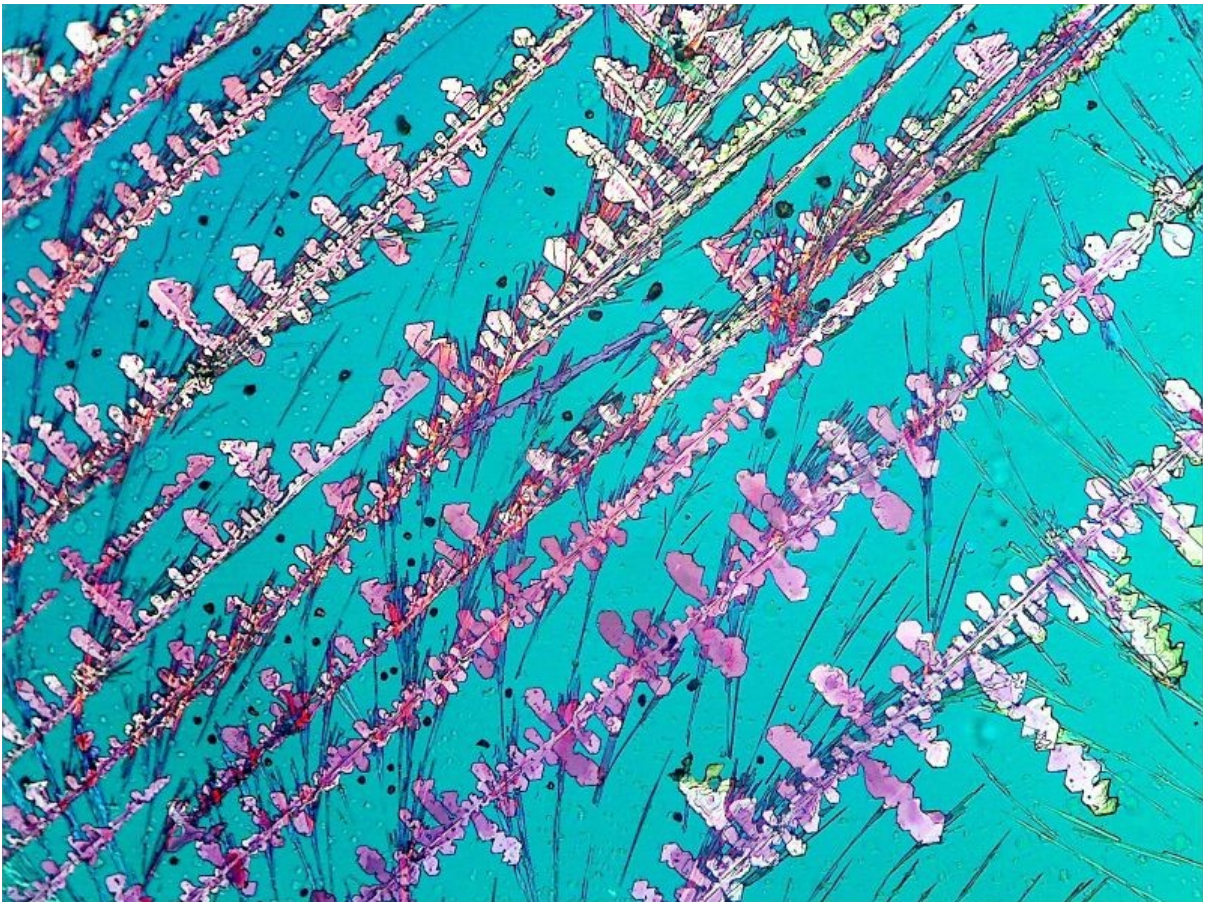
Picture 9



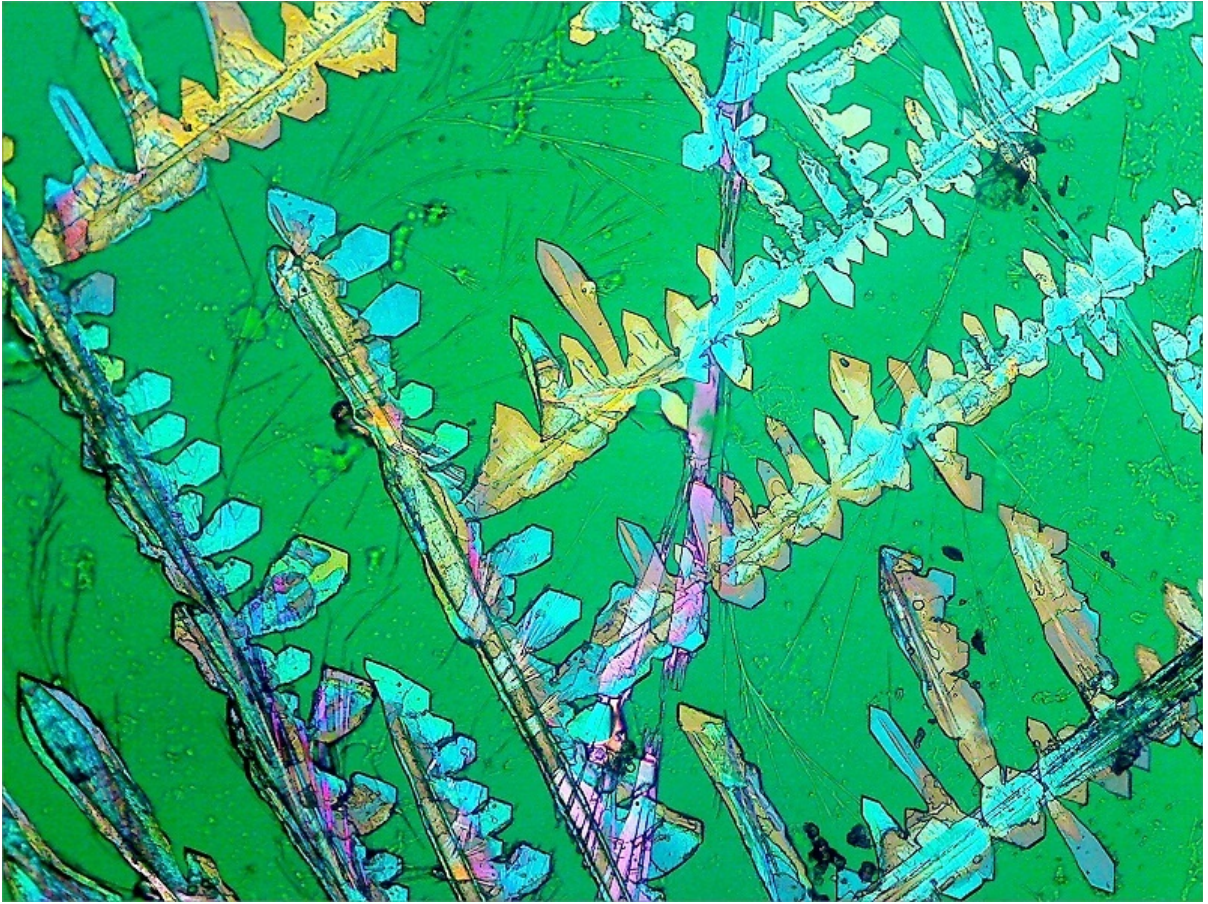
Picture 10



Picture 11

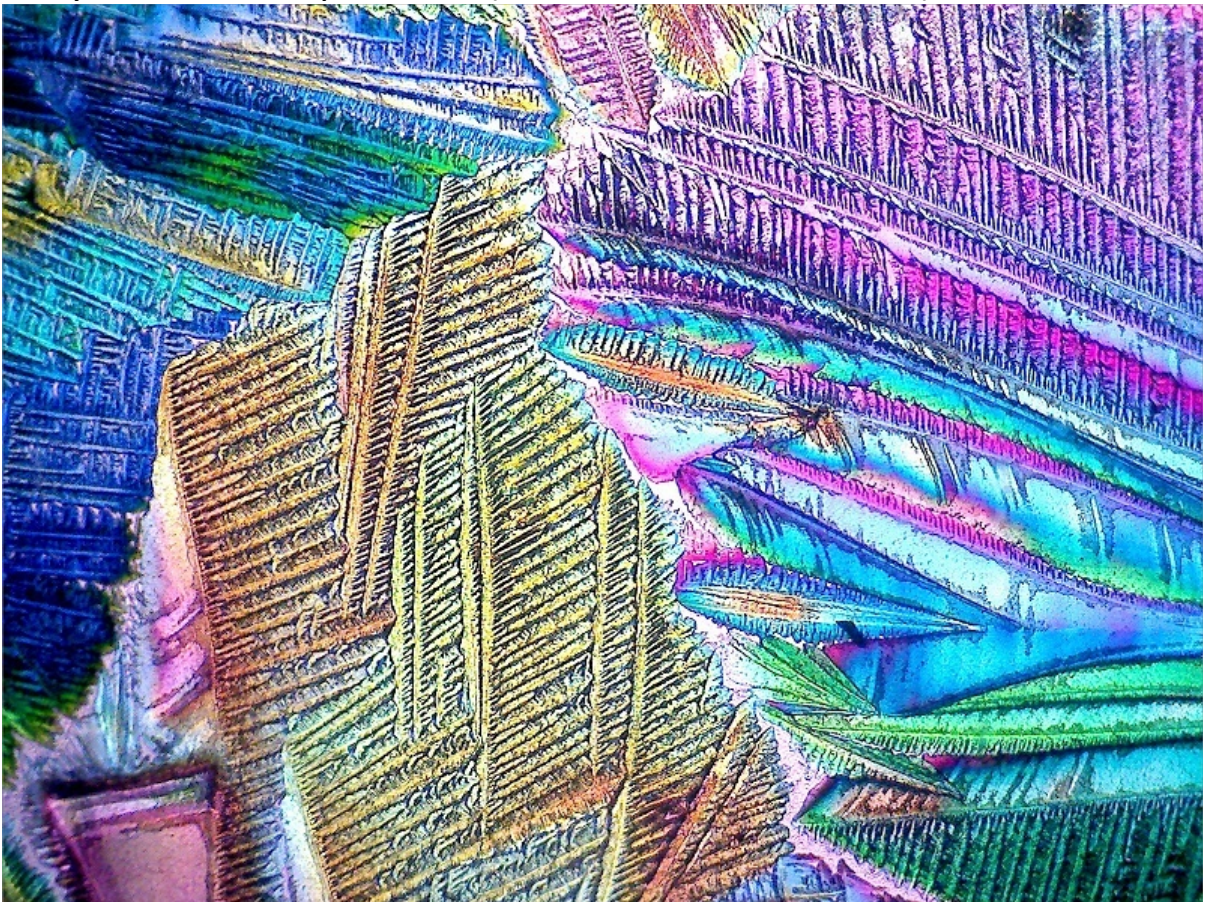


Picture 12



Picture 13

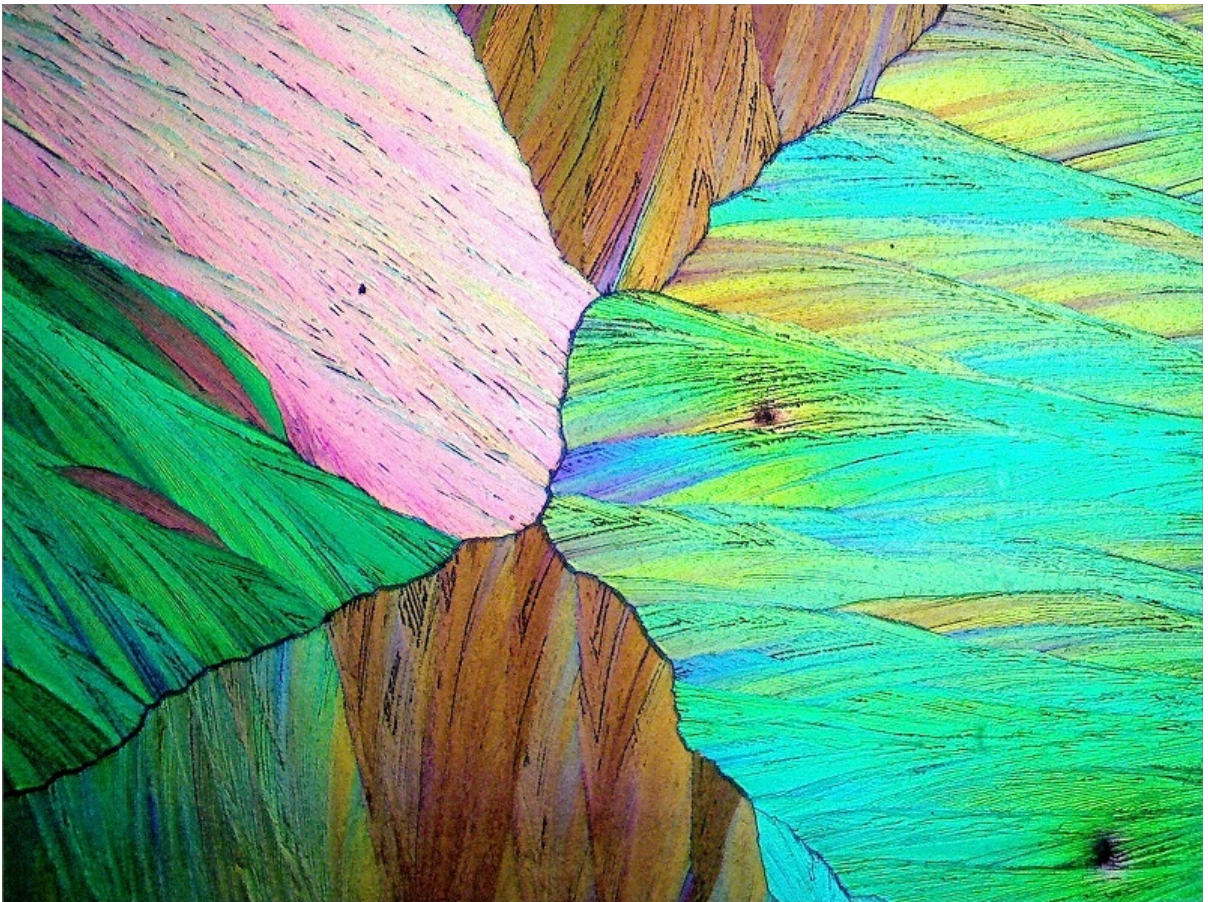
And finally, 10 more drops added (I think I'll make that do!).



Picture 14



Picture 15



Picture 16

IN CONCLUSION

The limited solubility of potassium hydrogen tartrate (cream of tartar) determines that the aqueous test solution used in this Microscopical Exploration was of fairly low concentration. This, in turn, required multiple additions of the solution to the specimen slide in order to build up the patterns and to generate the pleasing colours seen in the pictures above. Due to the moderate volatility of water, the process of crystal formation on the specimen slide took considerably longer than in MEs 1-5, but the results, I feel, justify the wait.

As before, interpret these abstract pictures as you will, but as we say here in Cumbria:

‘Ave a go yersel’!

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