

[22:06] <@Spauwe> Inclusions

[22:06] <@Spauwe> their genesis and significance

[22:07] <@Spauwe> actually it's their genesis and our understanding thereof that is the significance

[22:07] <@Spauwe> when we grasp what we see and how it got there we are able to tell our customers/students more about the stone

[22:07] <@Spauwe> where has it formed

[22:08] <@Spauwe> where has it been since it was formed

[22:08] <@Spauwe> with the last part being above ground as well as under it

[22:09] <@Spauwe> in the oncoming weeks we'll have a chat about what we can expect to see in gems and how to read what we see

[22:09] <@Spauwe> tonight an introduction

[22:09] <@Spauwe> called phase inclusions

[22:09] <@Spauwe> let's start quickly with single phase inclusions

[22:10] <@Spauwe> hereby I'm referring to three possibilities

[22:10] <@Spauwe> what are these three?

[22:10] <ravirus> mono, bi and tri-phase

[22:10] <doos\_> crystal, negative, gas

[22:10] <DragonStek> liquid , gas ,solid

[22:10] <@Spauwe> yes dragon

[22:10] <ravirus> oh, ic

[22:10] <@Spauwe> that was what I was fishing for

[22:11] <ravirus> ok

[22:11] <@Spauwe> can we get an example with each of these three

[22:11] <@Spauwe> gas first

[22:12] <doos\_> bubbles in verneuil

[22:12] <@Spauwe> what material has a typical single phase gas inclusion?

[22:12] <doos\_> glass

[22:12] <@Spauwe> verneuil sapphire yes

[22:12] <@Spauwe> and glass is a very good example as well

[22:12] <@Spauwe> <http://img98.imageshack.us/img98/6852/bubblexw5.jpg>

[22:13] <@Spauwe> doesn't get clearer then that

[22:13] <@Keirkof> interesting orient on that bubble ^^

[22:14] <@Spauwe> single phase solids

[22:14] <@Spauwe> example?

[22:14] <ravirus> crystals

[22:15] <ravirus> apatite

[22:15] <ravirus> in hessonite

[22:15] <ravirus> lol

[22:15] <@Spauwe> yep any crystal will work here

[22:15] <@Keirkof> chromite in peridot ^^

[22:15] <@Spauwe> and so on and so on

[22:15] <ravirus> metamict zircon in sapphire

[22:15] <@Spauwe> an interesting one in the following link

[22:15] <@Spauwe> used by the cutter to create a very special effect

[22:16] <@Spauwe> scroll down a bit to the clear quartz round cut stone

[22:16] <@Spauwe> <http://www.palagems.com/inclusions.htm>

[22:16] <@Spauwe> nice ey...?

[22:16] <doos\_> seen one of those, real pretty

[22:17] <ravirus> yeah tourmaline needles

[22:17] <doos\_> all by reflection

[22:17] <@Spauwe> yep

[22:17] <@Spauwe> very cool effect

[22:17] <DragonStek> oh i like

[22:17] <@Keirkof> idd

[22:17] <@Spauwe> and finally there is the last single phase possibility:

[22:17] <@Spauwe> liquid inclusions

[22:17] <ravirus> fluid veils

[22:18] <@Spauwe> a good example of those are trichites in Tourmalines

[22:18] <@Spauwe> it's the liquid inclusions I want to discuss today a bit more deeper

[22:18] <@Spauwe> we'll get to them in a bit

[22:19] <@Spauwe> first for the sake of completeness let's discuss two and tri phase inclusions

[22:19] <@Spauwe> for a 2 phase there's several possibilities as well

[22:19] <@Spauwe> combinations of all of the above in short

[22:20] <@Spauwe> liquid- gas

[22:20] <@Spauwe> liquid- solid

[22:20] <@Spauwe> anybody ever seen a solid- gas one?

[22:20] <ravirus> can't recall

[22:21] <@Keirkof> that would be a wee crystal inside a gas bubble

[22:21] <ravirus> umm...

[22:21] <@Spauwe> or the other way around bart

[22:21] <doos\_> or just a negative crystal

[22:21] <@Spauwe> a wee bubble in a crystal inclusion ☺

[22:21] <@Keirkof> one wouldn't call that a multi-phase inclusion now would they

[22:21] <ravirus> maybe there's liquid too

[22:22] <@Spauwe> I Think we found a point of discussion there

[22:22] <@Spauwe> why call a liquid with a gas in it a 2 phase and a crystal with a bubble in it different?

[22:22] <@Spauwe> ghehe

[22:23] <@Spauwe> something to think about when you go to bed...

[22:23] <@Spauwe> from here it's an easy step to 3 phase inclusions

[22:23] <@Spauwe> same thing again

[22:23] <doos\_> probably because there is also a gas in the neg. crystal

[22:23] <@Spauwe> combinations of the above

[22:24] <@Spauwe> yeah but a negative crystal isn't a phase

[22:24] <@Spauwe> the gas or vacuum in it is

[22:24] <@Spauwe> although a vacuum isn't really a phase either

[22:24] <@Spauwe> it's nothing

[22:24] <@Spauwe> :)

[22:24] <@Spauwe> ghehehe

[22:24] <@Spauwe> brainbreakers

[22:25] <ravirus> complete vacuum it's impossible

[22:25] <ravirus> there have to be a gas

[22:25] <@Spauwe> 3 phase inclusions don't always have to display a liquid, a gas and a solid

[22:25] <@Spauwe> true Ravirus

[22:26] <@Spauwe> 3 phase inclusions can consist out of two liquids and a gas

[22:26] <@Spauwe> or one liquid and two gases

[22:26] <ravirus> we are talking of phase?

[22:27] <@Spauwe> nice examples are water-oil-co<sub>2</sub> inclusions

[22:27] <@Spauwe> yes Ravirus

[22:27] <ravirus> mmm.....

[22:27] <ravirus> three different material there

[22:27] <ravirus> but i c only 2 phase

[22:27] <@Spauwe> you are suggesting that would be a two phase one

[22:28] <@Spauwe> yep I see the point

[22:28] <ravirus> scientific speaking

[22:28] <ravirus> a gas is a gas

[22:28] <@Spauwe> I'm following Roedder here who speaks of different phases when different materials are present

[22:28] <ravirus> i can understand

[22:28] <@Spauwe> but I see your point (thought of that myself as well)

[22:29] <@Spauwe> when the two liquids are immiscible

[22:29] <ravirus> cut i don't stick to it

[22:29] <@Spauwe> I do think you can speak of different phases

[22:29] <ravirus> they have different characteristics

[22:29] <@Spauwe> yep

[22:29] <ravirus> but they're still liquids

[22:30] <@Spauwe> and you will see them as three phases as well (in some occasions)

[22:30] <ravirus> it's a borderline

[22:30] <ravirus> but i'll call it a biphasic

[22:31] <ravirus> with 2 immiscible liquids

[22:31] <@Spauwe> when looking at a negative crystal that contains some watery substance, a small bubble and a liquid oil you can make out that oil as a bubble as well

[22:31] <@Spauwe> so that's two bubbles floating in water

[22:32] <@Spauwe> one liquid bubble, one gas bubble

[22:32] <ravirus> i got it

[22:32] <ravirus> but respectfully disagree on terminology

[22:33] <@Spauwe> so... since science is what we make from it (while still discussing reality) we have the freedom to call that what we want ☺

[22:33] <ravirus> yup

[22:34] <@Spauwe> to please the lot we'll call 'm multi phase inclusions ☺

[22:35] <@Spauwe> with few exceptions multi phase inclusions originate from a single phase inclusion

[22:36] <@Spauwe> a liquid one

[22:37] <@Spauwe> how does a liquid end up in a crystal you may ask yourself...

[22:37] <@Spauwe> two ways:

[22:37] <@Spauwe> 1. during growth of the crystal some of the brine it was growing from and in got caught in it

[22:38] <@Spauwe> eg in a etch pit during a pause in the growing sequence

[22:38] <@Spauwe> can you see that happening?

[22:38] <DragonStek> yes

[22:39] <@Spauwe> that link to the tourmaline inclusion from above showed the one eyed snake as well

[22:40] <@Spauwe> that looks like it is a good example of this theory

[22:41] <@Spauwe> the quartz crystal didn't form perfectly at a certain stage and some brine was caught in it when it later closed over the pit containing the brine

[22:41] <@Spauwe> liquid inclusions that are formed during the original growth of the crystal is called:

[22:41] <@Spauwe> ?

[22:42] <ravirus> primary

[22:42] <@Spauwe> in general: inclusions that form with the host are.... inclusions

[22:42] <@Spauwe> yesh

[22:42] <@Keirkof> hmm never heard that before

[22:42] \* @Keirkof takes notes

[22:42] <@Spauwe> the second way a liquid can end up in a crystal is when it's a secondary inclusion

[22:43] <DragonStek> syngenetic? is that the same thing

[22:43] <@Spauwe> same thing

[22:43] <DragonStek> ok

[22:43] <@Spauwe> pregenetic = before

[22:43] <@Spauwe> syn = together

[22:43] <@Spauwe> post= after

[22:43] <ravirus> protogenetic

[22:43] <@Spauwe> proto indeed

[22:44] <@Spauwe> don't mess with the latin skills of the romans 😊

[22:44] <ravirus> i haven't any latin skills sorry

[22:44] <@Spauwe> none?

[22:44] <@Spauwe> hard to believe

[22:44] <ravirus> NONE

[22:44] <ravirus> technical studies

[22:44] <ravirus> aeronautics

[22:44] <@Spauwe> aaahhh

[22:44] <ravirus> no latin there

[22:45] <@Spauwe> just the name is as latin as can be but okay....

[22:45] <@Spauwe> back to the secondary fluid inclusions

[22:45] <@Spauwe> once upon a time there was this crystal

[22:46] <@Spauwe> and at a certain stage, it cracked

[22:46] <@Spauwe> along came the fluid

[22:46] <@Spauwe> and it entered the crack

[22:46] <@Spauwe> the crystal was upset

[22:47] <@Spauwe> it wanted to become whole again

[22:47] <@Spauwe> the fluid was nice and hot

[22:47] <@Spauwe> and under a lot of pressure

[22:48] <@Spauwe> so the crystal was able to release some of it's atoms into the liquid

[22:48] <@Spauwe> and those atoms redeposited elsewhere

[22:48] <@Spauwe> in some cases the fluid actually was carrying just those atoms that the crystal needed to become whole again

[22:49] <@Spauwe> the crystal was in those cases still growing on the outside as well

[22:49] <@Spauwe> and in it's quest to become whole again...

[22:49] <@Spauwe> it finally sealed off the fracture

[22:50] <@Spauwe> and it lived happily ever after

[22:50] <@Spauwe> all this happened at great depth

[22:50] <@Spauwe> Ravirus you are a diver

[22:50] <ravirus> yup

[22:50] <ravirus> but not so deep

[22:51] <@Spauwe> with how many atm does pressure increase every ten meters under water?

[22:51] <ravirus> 1

[22:51] <@Spauwe> yups

[22:51] <@Spauwe> 1 bar or atm per 10 meters of water

[22:51] <ravirus> at 40 meters'

[22:51] <@Spauwe> we all know that the sg of water is 1

[22:51] <ravirus> ?

[22:51] <ravirus> how many atm?

[22:51] <@Spauwe> 5 bar

[22:52] <ravirus> good

[22:52] <@Spauwe> there's 15 km of air on top of me as well

[22:52] <@Spauwe> 15 km of air = 1 bar

[22:52] <@Spauwe> 10 meters of water = 1 bar as well

[22:52] <@Spauwe> 10 meters of rock....

[22:53] <@Spauwe> with a sg of let's say an average of 2 (?)

[22:53] <@Spauwe> will be getting some pressure going fast

[22:53] <@Spauwe> 500 meters would be getting towards 100 bar then

[22:54] <@Spauwe> add to that heat

[22:54] <@Spauwe> anybody knows how temp increases with depth?

[22:54] <doos\_> no

[22:54] <ravirus> i know haw decrease with height

[22:55] <ravirus> how

[22:55] <@Spauwe> a quick google brought me to an average of 75 degrees Fahrenheit per mile

[22:55] <doos\_> so about a 100+ per km

[22:55] <@Spauwe> I suck in math so calculating what that would be in celcius per kilometer isn't my idea of a whole lot of fun

[22:55] <doos\_> 100+ Celsius

[22:56] <doos\_> times 9/5 + 32

[22:56] <doos\_> times -32 \* 5/9

[22:56] <doos\_> now I confuse myself

[22:56] <ravirus> elaborate

[22:57] <@Spauwe> anyways, at a few kilometer we're dealing with A LOT OF PRESSURE AND A FAIR BIT OF HEAT

[22:57] <ravirus> yep, lol

[22:57] <doos\_> that will be about 16 Celsius/km

[22:57] <@Spauwe> water is heated beyond it's boiling point down there and stuff that is otherwise insoluble

[22:58] <@Spauwe> will be dissolved in water there

[22:58] <@Spauwe> 16 per km...

[22:58] <@Spauwe> hmmm

[22:58] <ravirus> maybe too much

[22:59] <ravirus> and maybe it isn't a constant gradient

[22:59] <@Spauwe> should be a bit more, it'll be a exponentially increasing thing anyway

[22:59] <@Spauwe> google sucks

[22:59] <ravirus> like in the troposphere

[23:00] <@Spauwe> if you say so, yep like in the troposphere... :)

[23:00] <@Spauwe> to get to my point

[23:00] <ravirus> i was meaning the contrary

[23:00] <ravirus> ok

[23:00] <@Spauwe> we have this liquid inclusion that is sealed off by a very sturdy container: a crystal

[23:01] <@Spauwe> down there the fluid is caught under pressure and heat

[23:01] <@Spauwe> when it comes up to the surface the heat will get lost

[23:01] <@Spauwe> the whole thing cools down

[23:02] <@Spauwe> when the fluid cools what happens to it?

[23:02] <ravirus> decrease volume

[23:02] <@Spauwe> pressure wise?

[23:02] <@Spauwe> yes the fluid shrinks

[23:02] <@Spauwe> the pressure in that little chamber will drop

[23:03] <ravirus> the stone collapse into the inclusion

[23:03] <ravirus> :)

[23:03] <@Spauwe> very possible

[23:03] <ravirus> it depends on the inclusions width

[23:04] <@Spauwe> it would happen here and there with big inclusions just under the surface

[23:04] <@Spauwe> the 'container' ( the crystal) was a solid at great depth already and will only get 'tighter' upon cooling down

[23:05] <@Spauwe> it will not be able to shrink that much

[23:05] <@Spauwe> it's atoms were already densely packed

[23:05] <@Spauwe> the fluid on the contrary has some space in between it's atoms

[23:06] <@Spauwe> and will decrease in volume

[23:06] <@Spauwe> this is where bubbles can start occurring

[23:06] <@Spauwe> a few possibilities

[23:06] <@Spauwe> the fluid was a homogeneous liquid (unseparatable)

[23:07] <@Spauwe> and a vacuum/vapour bubble may occur

[23:07] <@Spauwe> can we all see this happening?

[23:07] <ravirus> mmm.....

[23:07] <doos\_> yes

[23:08] <@Spauwe> the fluid will shrink that much that there's going to be excess space in the little chamber

[23:08] <ravirus> almost vacuum

[23:09] <ravirus> ok

[23:09] <@Spauwe> the fluid will draw a vacuum (and like you pointed out it's nearly impossible to get a full vacuum so we'll call it a vapour bubble)

[23:09] <ravirus> k

[23:10] <@Spauwe> a second possibility is that the liquid was a heterogeneous substance ( two or more substances in there)

[23:10] <@Spauwe> that where miscible at great depth and pressure

[23:11] <@Spauwe> but upon cooling down experience a decline in pressure and separate

[23:11] <@Spauwe> some in two liquids

[23:11] <@Spauwe> some in a liquid and a gas

[23:11] <ravirus> maybe at high temp

[23:12] <@Spauwe> there's a water co2 combination that gets described by Roedder in gubelin and koivula's first atlas

[23:12] <@Spauwe> upon cooling down they separate

[23:13] <@Spauwe> all this brings us to the third possibility

[23:13] <@Spauwe> the liquid may be a solution with all kinds of elements in 'm

[23:14] <@Spauwe> over time a crystal may form from this solution

[23:14] <@Spauwe> one of the best known is NaCl aka Halite aka salt

[23:15] <@Spauwe> [http://www.ruby-sapphire.com/images/photo\\_cd\\_images/1681-21.jpg](http://www.ruby-sapphire.com/images/photo_cd_images/1681-21.jpg)

[23:15] <@Spauwe> check out the nice little cube

[23:15] <ravirus> salt

[23:15] <@Spauwe> yesh

[23:15] <ravirus> salgamma

[23:16] <ravirus> in a triphase

[23:16] <@Spauwe> so

[23:16] <@Spauwe> we've seen how a single phase inclusion stands at the start of a multi phase inclusion

[23:17] <@Spauwe> let's have a 2 minute break before we get into the significance of it all

[23:17] <doos\_> ok

[23:17] <@Spauwe> brb

[23:18] <DragonStek> what's a negative crystal

[23:19] <DragonStek> is it a liquid of the same as its host

[23:19] <@Spauwe> In short:

[23:19] <@Spauwe> imagine a single phase liquid inclusion

[23:20] <@Spauwe> derived after a small crack filled up with a liquid

[23:20] <@Spauwe> so all the walls are irregular

[23:20] <@Spauwe> over time the crystal will start fixing its structure

[23:21] <@Spauwe> elements will use the liquid as a medium to travel through

[23:21] <@Spauwe> the liquid acts as a flux

[23:21] <@Spauwe> still with me?

[23:21] <DragonStek> yup

[23:22] <@Spauwe> well the crystal will continue to repair itself until all the walls of the crack are nice and regular again

[23:22] <@Spauwe> all the vacancies in the crystal structure will be repaired by 'excess' atoms from across the 'room'

[23:23] <@Spauwe> this will result in the crystal faces being displayed 'in reverse' as a negative crystal

[23:23] <@Spauwe> when you look at it you think you see a small crystal within the crystal but in fact you are looking at a void filled with a fluid

[23:23] <@Spauwe> does this make sense?

[23:24] <DragonStek> yes thanks

[23:25] <@Spauwe> a negative crystal can be the 'room' in which a multi phase inclusion lives

[23:26] <@Spauwe> I think I have a nice picture of one ready

[23:26] <@Spauwe> <http://www.gemresearch.ch/inclusions/images/spinel02.jpg>

[23:26] <ravirus> dr Peretti

[23:26] <@Spauwe> see the shape of the 'room' in which all that other stuff is living?

[23:27] <DragonStek> the dark and the lighter

[23:27] <@Spauwe> it's a octagon spinel shape

[23:27] <@Spauwe> the outline

[23:27] <@Spauwe> not the bubbles

[23:28] <DragonStek> ok

[23:28] <@Spauwe> here's another one: <http://www.burmarubies.com/MacleC.JPG>

[23:29] <@Spauwe> see the regular shape of the 'room'?

[23:29] <DragonStek> ok yes i see

[23:29] <@Spauwe> that's a negative crystal

[23:29] <DragonStek> ok ,

[23:29] <@Spauwe> in this case filled with a liquid and a gas

[23:29] <DragonStek> thanks

[23:30] <@Spauwe> that 'room' may have been a round irregular one once

[23:30] <@Spauwe> but was repaired by the crystal itself

[23:30] <@Spauwe> good

[23:30] <@Spauwe> everybody back from smokes and wee's?

[23:30] <DragonStek> yup got it now

[23:31] <@Spauwe> significance

[23:32] <@Spauwe> of multi phase inclusions

[23:33] <@Spauwe> multi phase inclusions can tell us a fair bit about origin of the gemstones

[23:33] <@Spauwe> remember a few weeks ago when talking about emeralds we discussed three phase inclusions in Colombian emeralds?

[23:33] <DragonStek> yes

[23:34] <@Spauwe> and that Colombian emeralds thank their quality to a special origin?

[23:34] <@Spauwe> opposed to most other emerald localities

[23:34] <DragonStek> hydrothermal

[23:34] <@Spauwe> yesh

[23:34] <@Spauwe> exactly

[23:34] <@Spauwe> one needs fluid in order to get a fluid inclusion

[23:35] <@Spauwe> gemstones that are of metamorphic origin have far less liquid inclusions than those of hydrothermal origin

[23:35] <@Spauwe> but

[23:36] <@Spauwe> one has to keep in mind that gemstones can always crack at a later date in a later environment that is favorable to healing conditions

[23:36] <@Spauwe> and thus form a liquid inclusion as a secondary inclusion

[23:37] <@Spauwe> is there any way we can tell these primary ones apart from the secondary ones?

[23:38] <@Spauwe> imagine a conchoidal crack

[23:38] <@Spauwe> when it heals there is likely to be more than one spot where fluid remained

[23:38] <@Spauwe> more than one spot where the crack didn't heal fully

[23:39] <@Spauwe> in the case of a conchoidal crack the shape of the fingerprint we'll then see will be a curved shape

[23:39] <@Spauwe> in the case of a cleavage crack that healed it will be a straight fingerprint

[23:40] <@Spauwe> but it'll usually be a plane or curved plane of inclusions

[23:40] <@Spauwe> not a nice isolated one like in that spinel I just showed you drags

[23:40] <DragonStek> ok

[23:40] <ravirus> healing fractures?

[23:40] <@Spauwe> yep

[23:41] <ravirus> fingerprints

[23:41] <@Spauwe> the point I'm trying to make is that in general three phase inclusions indicate a hydrothermal origin

[23:41] <@Spauwe> unless they are part of a healed fissure

[23:41] <@Spauwe> in that case it doesn't prove it

[23:42] <@Spauwe> it may as well be a metamorphic or igneous material that cracked and healed at a later date at a different location

[23:42] <@Spauwe> a perfect illustration was given by Hughes

[23:43] <@Spauwe> a slightly different topic but the same principle

[23:43] <@Spauwe> [http://www.ruby-sapphire.com/flux\\_healing\\_mong\\_hsu\\_ruby.htm](http://www.ruby-sapphire.com/flux_healing_mong_hsu_ruby.htm)

[23:43] <ravirus> there's a nice drawing in the ruby&sapphire site

[23:44] <ravirus> you!

[23:44] <ravirus> ....

[23:44] <@Spauwe> ?

[23:44] <@Spauwe> que?

[23:45] <DragonStek> oh ok good picture

[23:45] <@Spauwe> those little crystal are all negative crystals drags

[23:46] <DragonStek> ok

[23:46] <@Spauwe> and the same story may apply here:

[23:46] <@Spauwe> the whole thing heals at great depth

[23:46] <@Spauwe> rises

[23:46] <@Spauwe> cools down

[23:47] <@Spauwe> and bubbles and crystals may start occurring inside the liquid 'chambers'

[23:47] <ravirus> so you have a nice fingerprint formed by many little bi-phase inclusions

[23:47] <@Spauwe> giving you multi-phase inclusions

[23:47] <@Spauwe> yeps

[23:47] <@Spauwe> so

[23:47] <@Spauwe> about origin:

[23:48] <@Spauwe> isolated multiphase inclusions are likely to tell you that the gem material in question was formed hydrothermally

[23:48] <@Spauwe> and are syngenetic/primary

[23:49] <@Spauwe> multi-phase inclusions as part of fingerprints can occur in every gemstone form any origin

[23:49] <@Spauwe> and are postgenetic/secondary

[23:50] <@Spauwe> well that is the end of my notes here

[23:50] <@Spauwe> check

[23:50] <@Spauwe> nope nothing on that other side no more

[23:50] <@Spauwe> questions/remarks/abuse?

[23:51] <ravirus> protogenetic

[23:51] <ravirus> :)

[23:51] <DragonStek> twinning and colorbanding is part of the syngenetic

[23:51] <@Spauwe> proto instead of post?

[23:51] <ravirus> yes

[23:51] <@Spauwe> ow

[23:51] <@Spauwe> ghhehe

[23:51] <@Spauwe> I thought instead of pre

[23:52] <@Spauwe> proto is before no?

[23:52] <@Spauwe> like prototype?

[23:52] <@Spauwe> twinning and colourbanding is syn yes

[23:52] <ravirus> you're right

[23:52] <DragonStek> ok thanks

[23:53] <DragonStek> very informative chat thanks

[23:53] <ravirus> i confused myself as usual

[23:53] <@Spauwe> just call it pre syn and post

[23:53] <@Spauwe> can't go wrong that way

[23:54] <ravirus> protogenetic = pre = before

[23:54] <ravirus> syngenetic = same time

[23:54] <@Spauwe> primary and secondary works as well

[23:54] <ravirus> epigenetic = post = after

[23:54] <@Spauwe> but I wouldn't know how to call a pre-existing crystal then

[23:55] <@Spauwe> ah there we go

[23:55] <DragonStek> cool all this is coming together

[23:55] <@Spauwe> proto syn and epi

[23:55] <@Spauwe> I'll try to remember

[23:55] <ravirus> yep

[23:55] <@Spauwe> well next week solids