

# The World of a GEOLOGIST



**Making our planet a better place for everyone today, and for way into the future**

**1964**



**2007**



My name is Geoff Derrick –  
I am a GEOLOGIST, and  
proud of that over a career  
of 46 years and counting

**Essentials –**

- Hammer
- Hand lens
- A cup of black tea



**2010**

A group of seven geologists are gathered in a field of tall, dry grass and scattered trees. One man on the left, wearing a white t-shirt and a light-colored hat, is pointing towards the ground. The other men are dressed in field gear, including hats, shirts, and pants, and are looking towards the ground or each other. The background shows a line of trees under a blue sky with some clouds.

Geologists often collect in small groups and argue about the rocks

*That is the way that science advances*

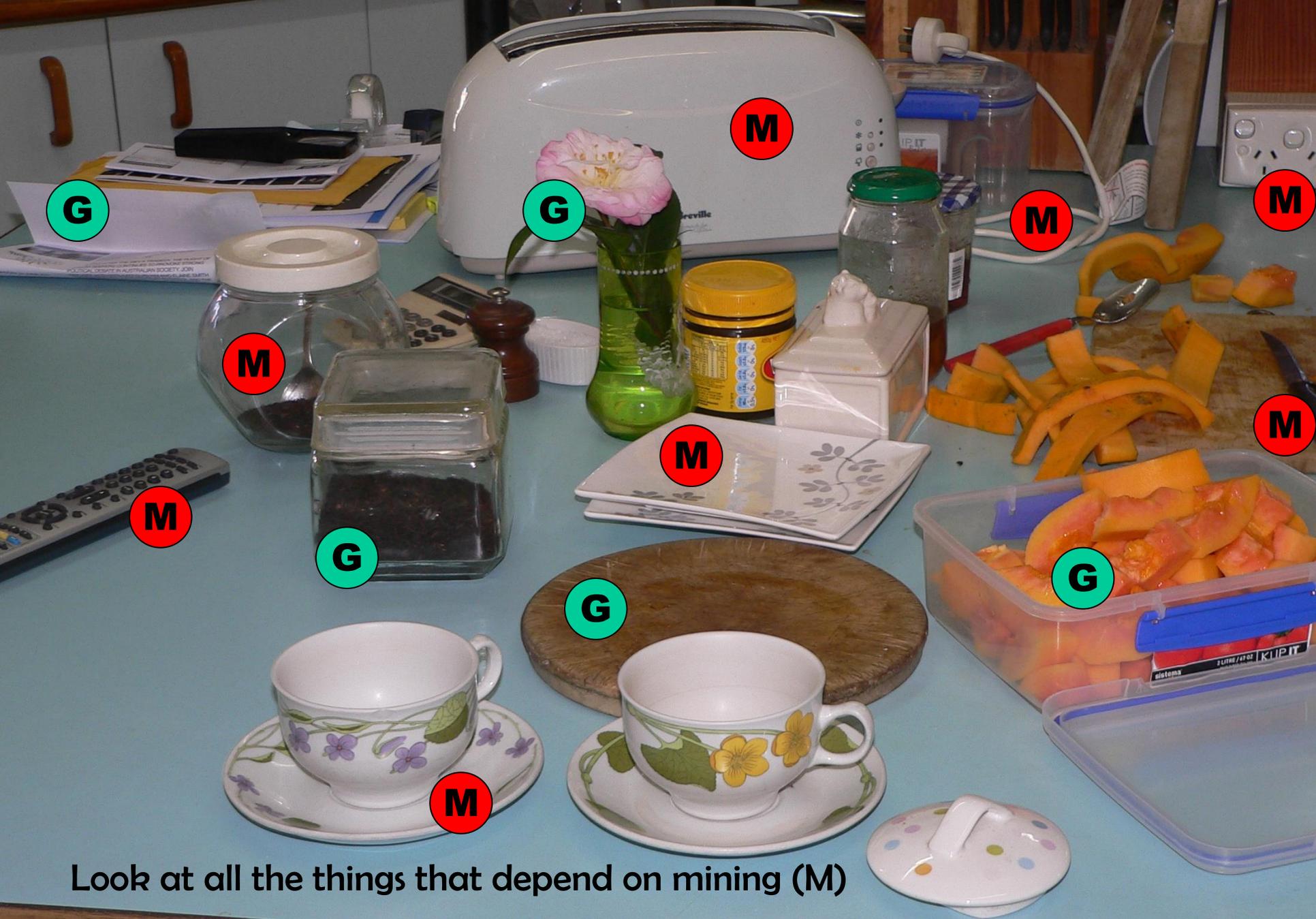
To survive in this  
world, we have to  
**GROW** things or  
**MINE** things



*Geologists help with this !!*



Farmers grow our food, but geologists can help make it happen – our farmers need machinery to work their land



Look at all the things that depend on mining (M)

HOW MANY MINERALS and METAL CAN YOU SEE HERE??





*If you live in a house, you should HUG a geologist*



Copper tubing  
carries our hot  
water

*And if you had a hot shower this morning, you should  
give a geologist ANOTHER HUG !!*

To find all the metal we need  
to build our towns and cities  
and farms and cars,  
**geologists** travel all over the  
world, and see amazing things  
along the way . . . .



*Helen Derrick, my life companion*



When we very young marrieds, our first house was a tent beside Hong Kong waterhole in the Kimberley, where we lived for 5 months April to October 1964 to make geological maps

This was a bush camp for 5 months under canvas; we had a family camp, and experiences have stayed in my memory for all of these 46 years.



*Wood stoves, bough sheds, Land Rovers and freshwater crocodiles.*



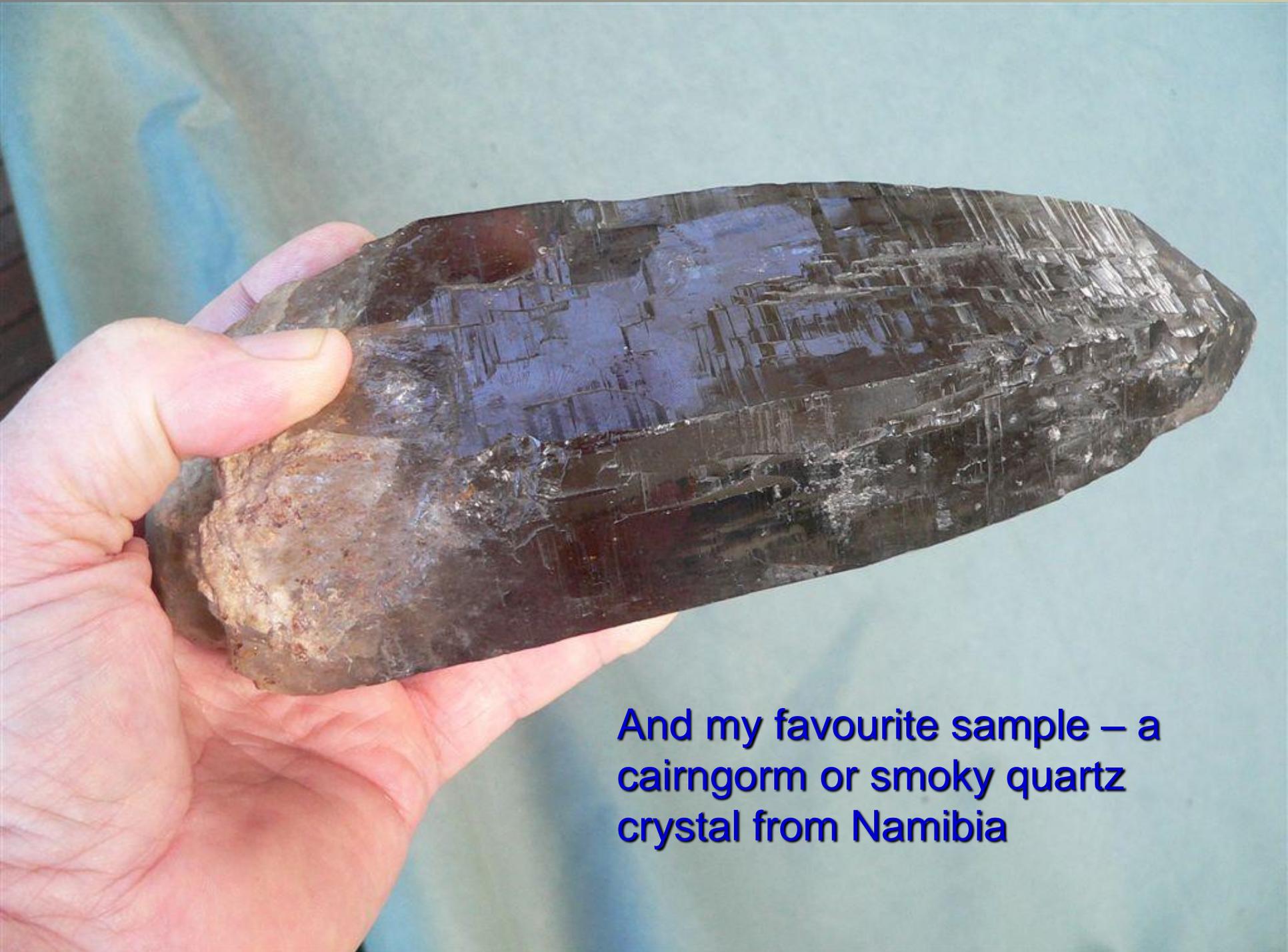
I went to the salt pans of the  
Atlantic coast of Namibia



*Where the flamingoes wade through the ocean waters*



I saw a rhinoceros carved from malachite, a copper mineral mined in Zambia



**And my favourite sample – a  
cairngorm or smoky quartz  
crystal from Namibia**

Then a few weeks in  
western Pakistan. . .



*Where geology can help raise the living  
standards of these village people.*

*Well north of the Arctic Circle*

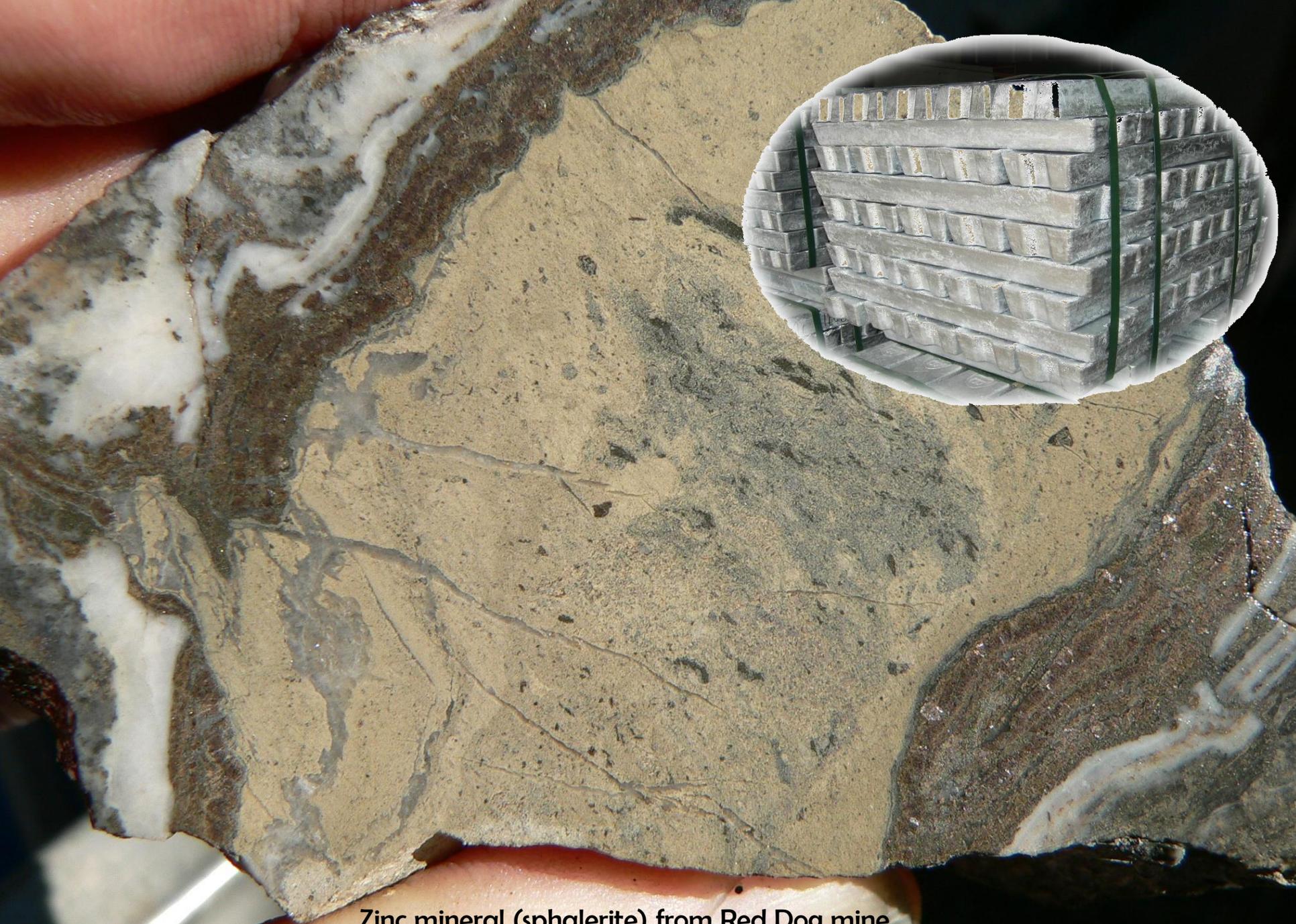


Then to the world's largest Zn mine in Alaska, 1995. . .



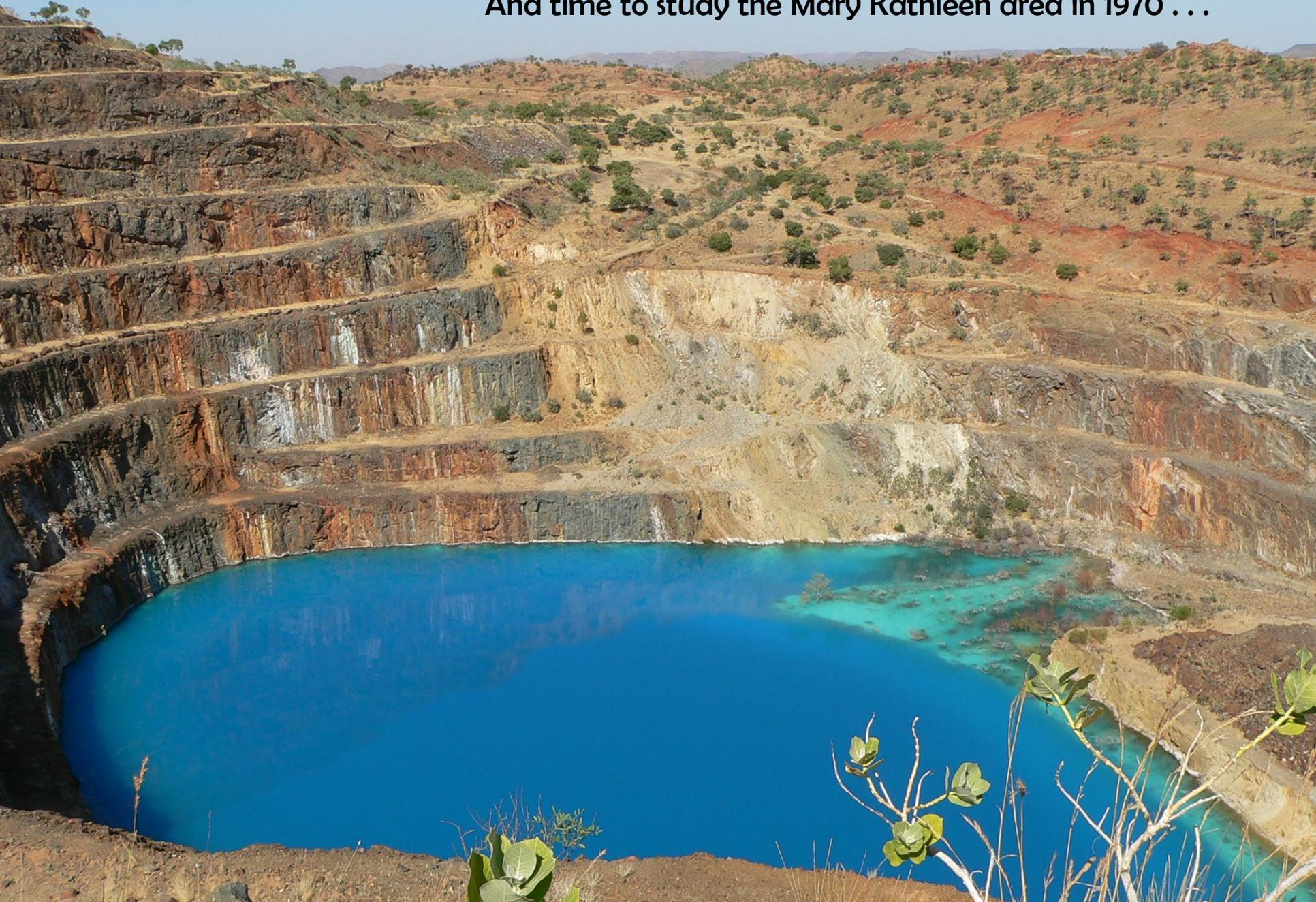
**RED  
DOG  
MINE**





Zinc mineral (sphalerite) from Red Dog mine

And time to study the Mary Kathleen area in 1970 . . .



And to see waterholes  
near Lawn Hill

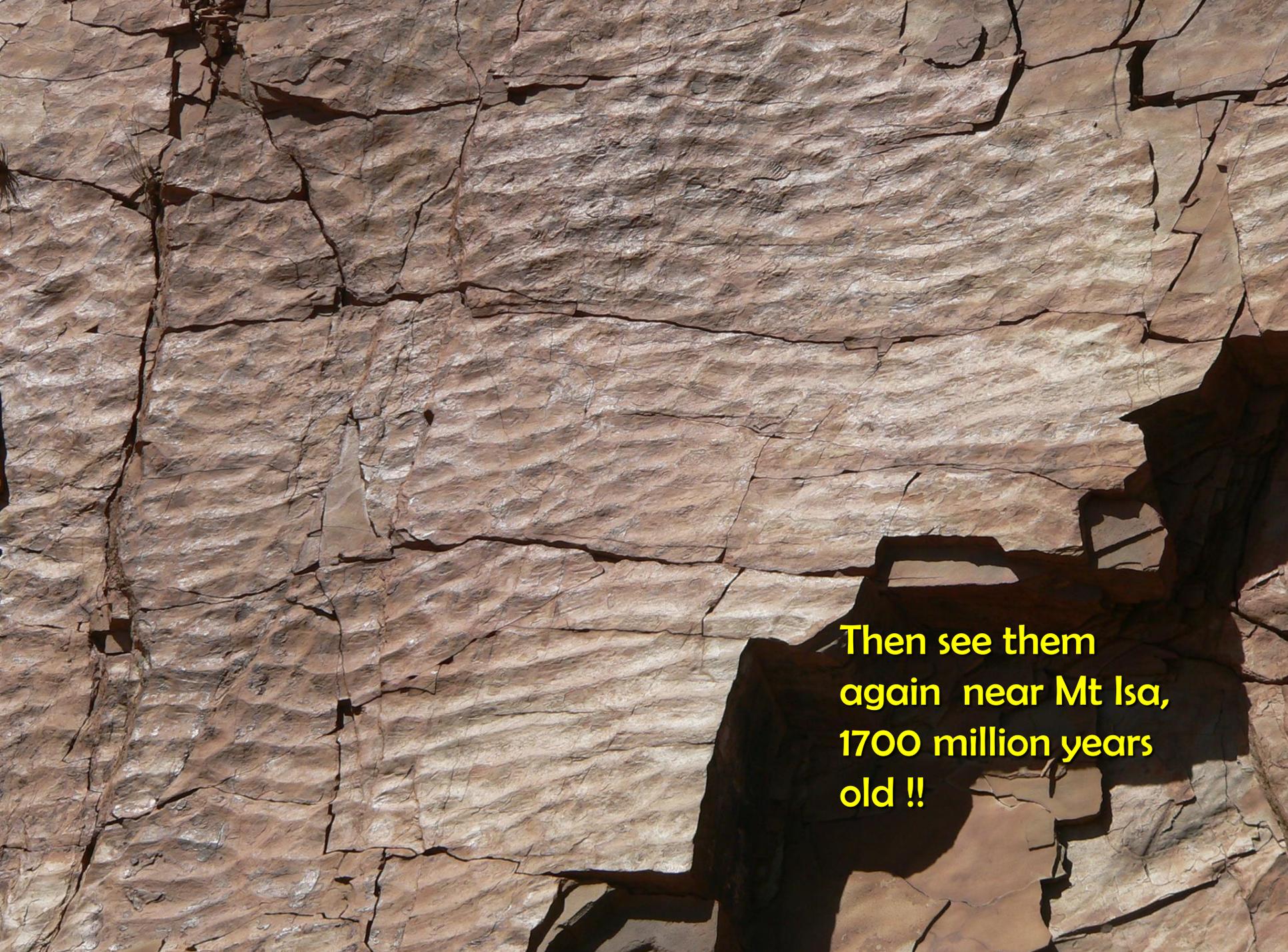




But geologists  
are also  
**TIME** travellers,  
working to  
understand the  
age of the earth  
and the earth's  
long history.  
Sometimes what  
is seen today is  
the key to the  
past

See these ripple marks at Iluka, NSW . . . .





**Then see them  
again near Mt Isa,  
1700 million years  
old !!**

Or take modern stromatolites at Shark Bay in WA. – algal mounds growing like mushrooms in warm shallow marine waters



SECTION

...bedded dolomite, irregular dolomite, stromatolite  
...some cauliflower-chert structures

...Dyke Band - often partly silicified  
...and silicified  
...the dome-shaped stromatolitic biostratigraphy  
...and structure  
...the chert - dome-shaped biostratigraphy - columnar  
...dolomite containing bulbous and nodular  
...bands, grassstone bands, cauliflower-chert  
...structures

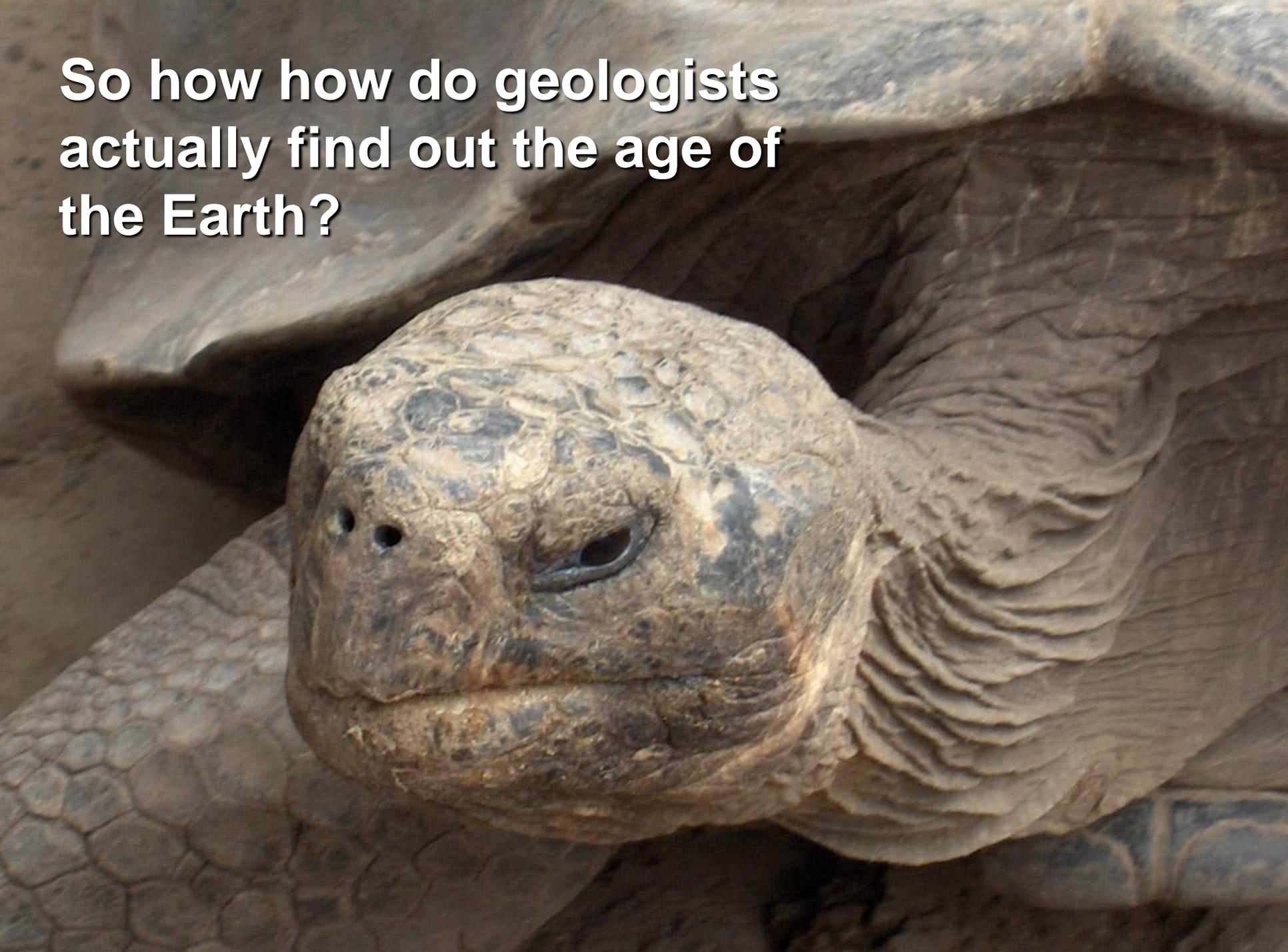
STROMATOLITE MEMBER  
...chert - domes containing radial columnar  
...containing columnar layered  
...bands, fine-grained pinkish

...sequence of chert, tuff  
...chert, tuff  
...features

...RT  
...lithology  
...lithology  
...lithology

Then see a fossilised stromatolite near Mt Isa, 1650 million years old !!

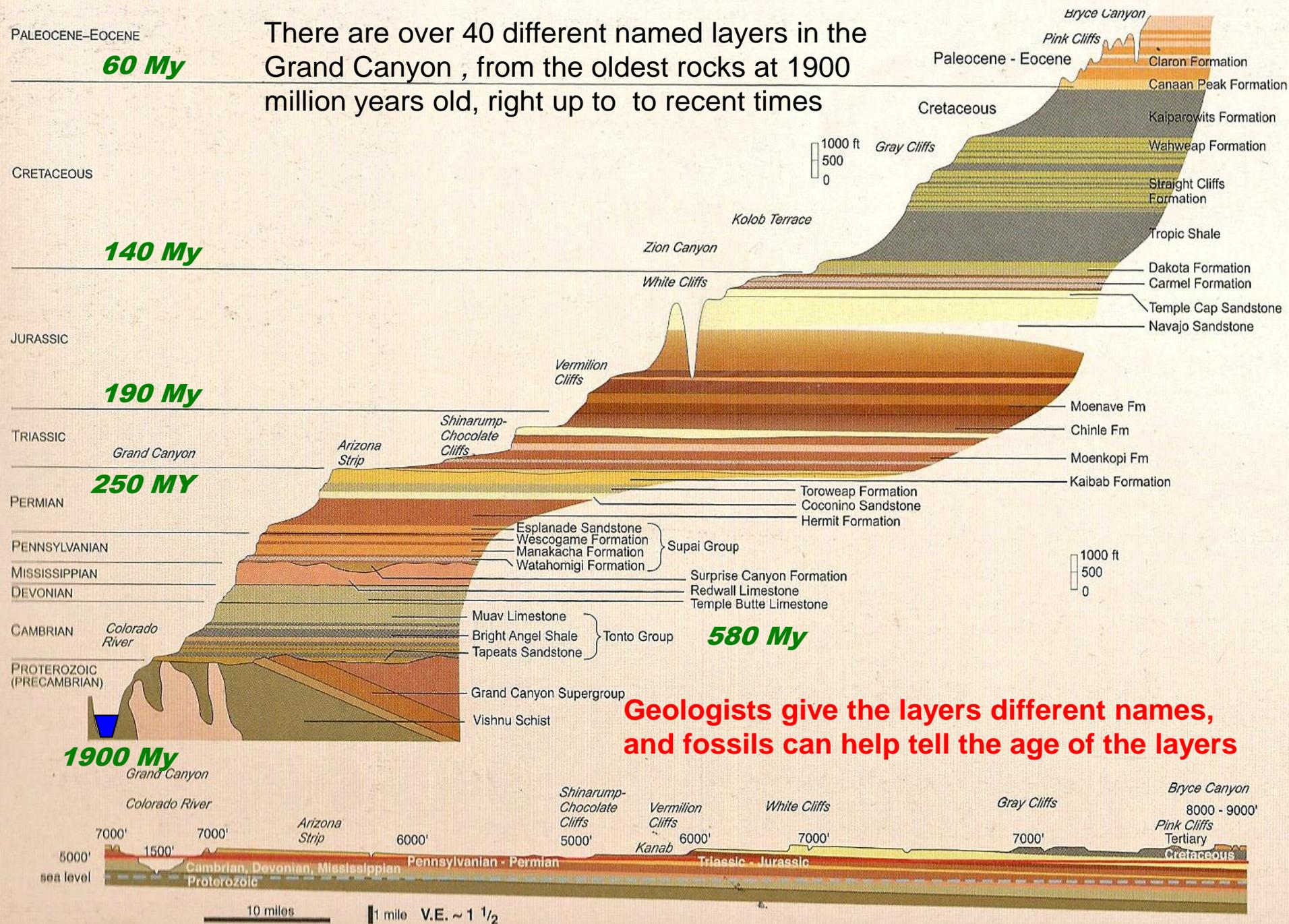
**So how do geologists  
actually find out the age of  
the Earth?**



BY COUNTING the layers: here in the Grand Canyon, the **SEDIMENTARY** rocks on top are **YOUNGER** than the rocks below – this is called **STRATIGRAPHY**



There are over 40 different named layers in the Grand Canyon, from the oldest rocks at 1900 million years old, right up to recent times



Geologists also tell the ages of rock by studying radioactive zircons blasted out of the earth by volcanic ash clouds like the Puyehue volcano in Chile



The ash falls to ground, becomes very hard and forms a rock called a 'TUFF'. This pink-coloured tuff is 1650 Ma old



*Tin crystals*



*Pink  
diamond*

But how do **geologists** actually find the minerals and metals which we all need to build our cities and railways and ships and surgical instruments and computers and pipes and cameras and power stations??

These drill rigs working in often harsh and very hot landscapes are called “TRUTH MACHINES” because the geologist can now tell if his geological predictions are true.



**We go DRILLING !!**



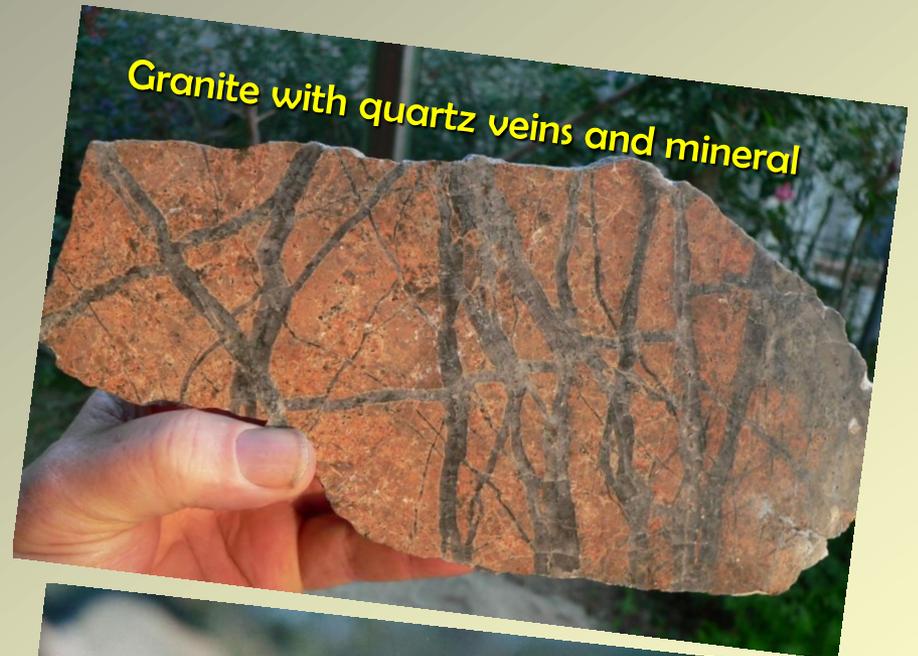


Geologists live for the thrill of discovering signs of metal in the drill hole. Here we have native copper metal in the drill cuttings, and samples of natural metallic copper recovered in drill core.

*This piece of drillcore contains very rich chalcopyrite, the main ore of copper – most of the world's copper comes from this mineral.*



What is the connection between stranded passengers at an airport, and samples of rock containing copper ??

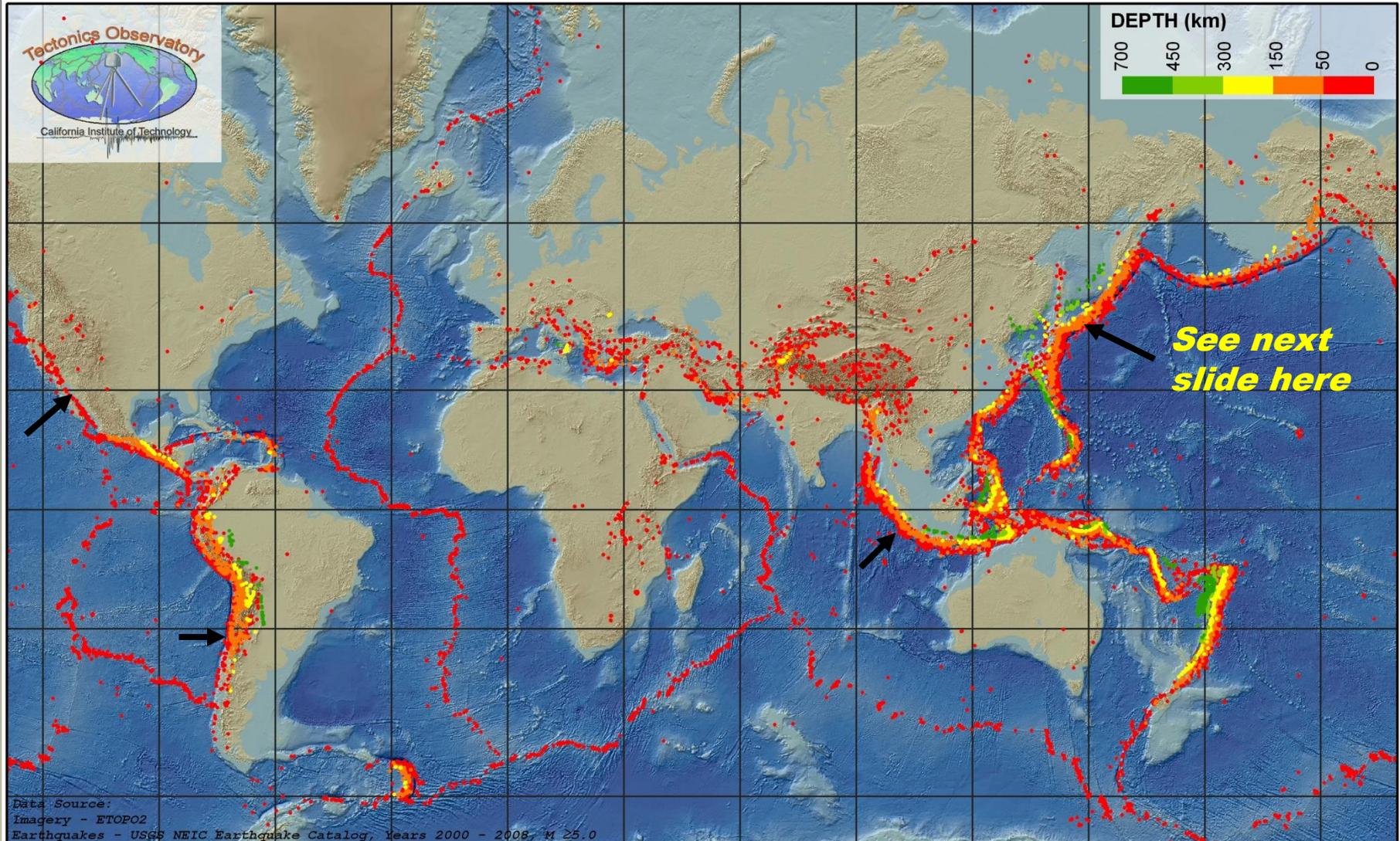


CONNECTION 1:



Granites commonly contain Cu minerals, especially when they contain veins

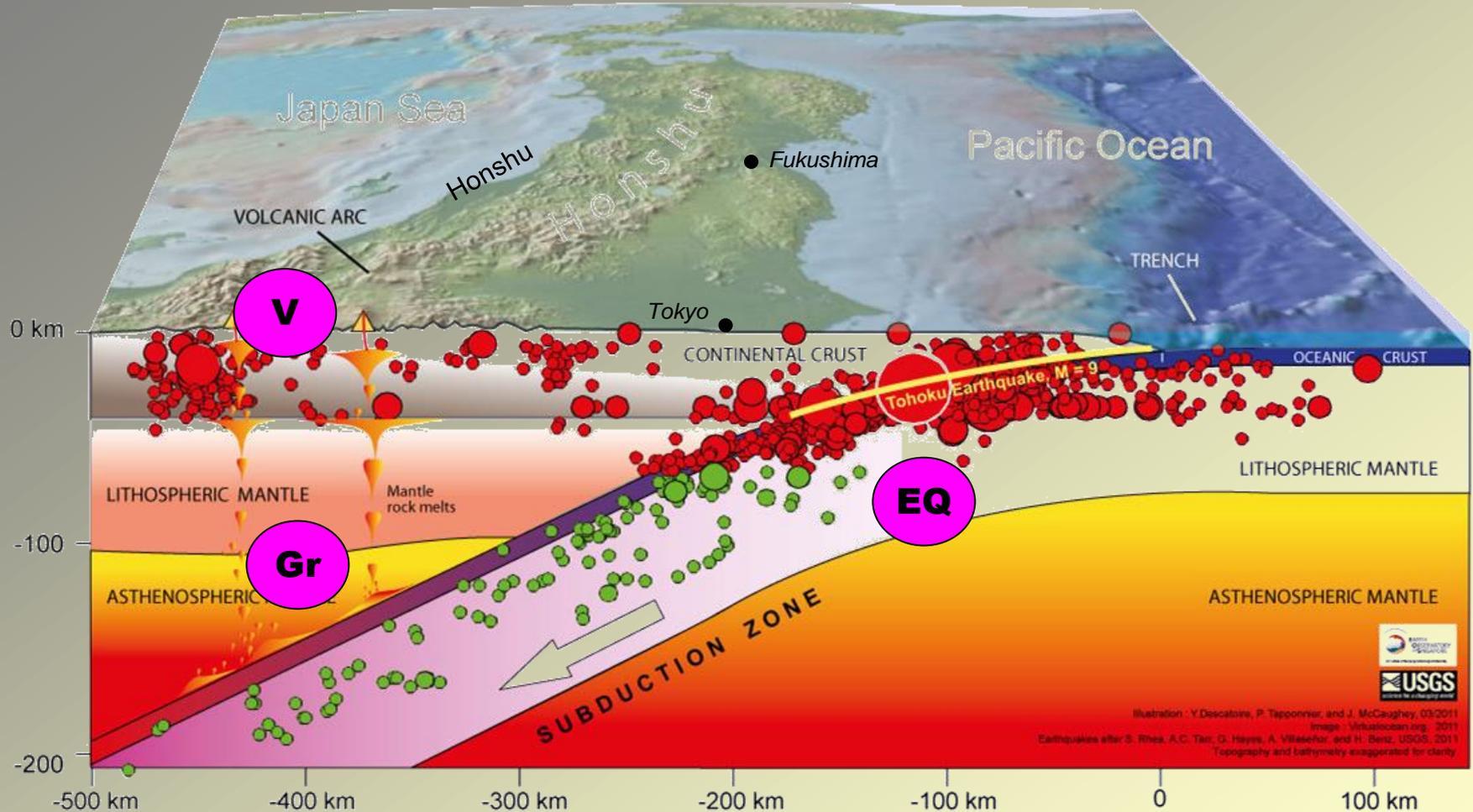
## CONNECTION 2:



Cu deposits and granites are very common along the 'Rings of Fire' of our dynamic planet, like the zones in Chile and East Asia where the earth plates collide

# CONNECTION 3:

## JAPAN



But our 'Rings of Fire' are also home to volcanoes, earthquakes and tsunamis. Granites and minerals form when rock melts, but the moving plates can cause troubles and disasters – like Japan and New Zealand in recent times.

● EQ= earthquakes; Gr = Granites; V= volcanoes

CONNECTION 4:

Volcanoes erupt in  
the Ring of Fire

**CONNECTION 5:**



**And send enormous ash clouds into our atmosphere**

CONNECTION 6:



Where the aeroplanes cannot fly. . .

## CONNECTION 7:



**Which is why passengers are held up in airports waiting for the ash to clear –**



***And that is why there was a connection between copper and our stranded passengers !!***

**The world  
of the  
GEOLOGIST**

**The world  
of  
HUMANKIND**

Are very closely linked. . .





So join in the SCIENCE – and  
have the world in your hands !!

Thank you for your  
attention , and the  
opportunity to discuss the  
beautiful world of  
geology with you.

