TO 00041

OLD TIMERS MINE

Historic Opal Mine

THE STORY OF OPAL AND COOBER PEDY

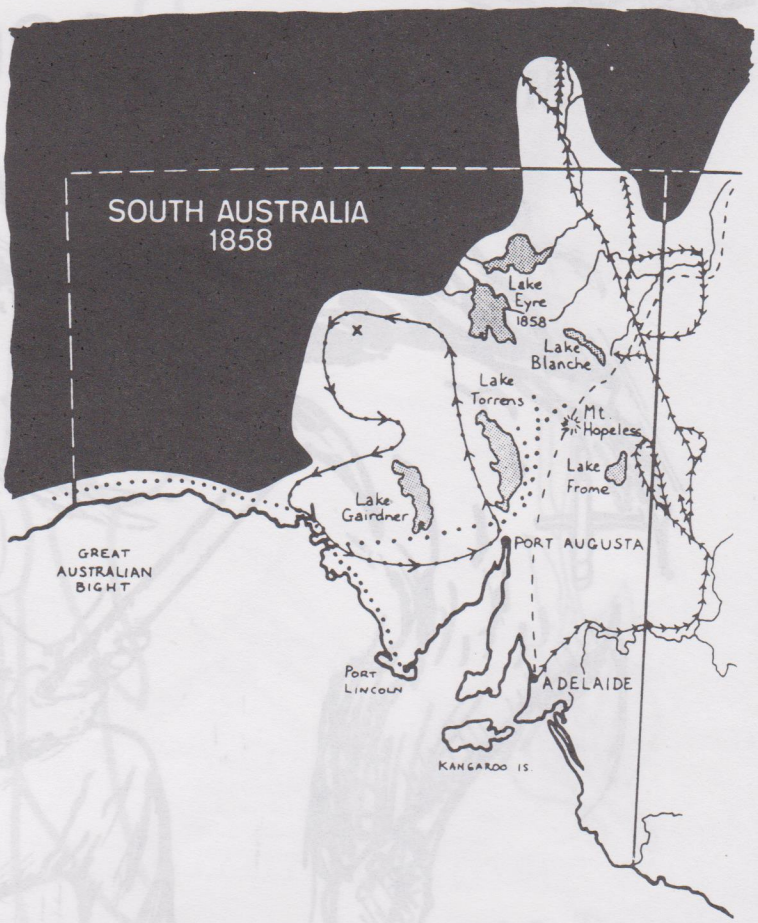
Educational Supplement No. 1

OLD TIMERS MINE

COOBER PEDY SOUTH AUSTRALIA

Where Is Coober Pedy?

Coober Pedy is situated midway along the Stuart Range, an eroded scarp of low hills 6-28 metres high. It is part of the Stony Desert of central Australia.



UNEXPLORED

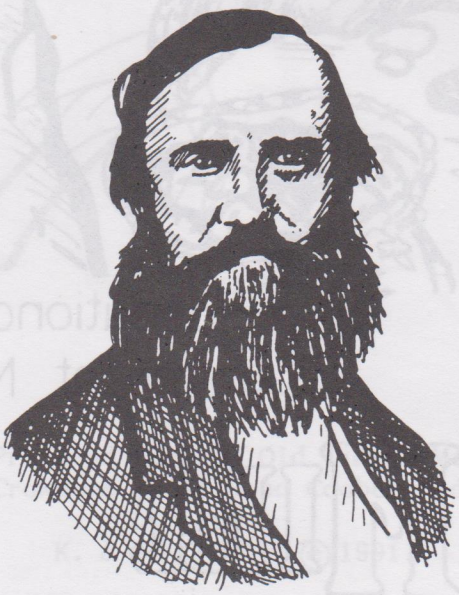
STUART 1858

A.C. GREGORY 1858

STURT 1845-6

EYRE 1839-41

(X COOBER PEDY 1915)



John McDouall Stuart

John McDouall Stuart, after whom the low range of eroded hills called Stuart Range is named, was the first explorer to pass through the area on the first of his five attempts to cross Australia from south to north.

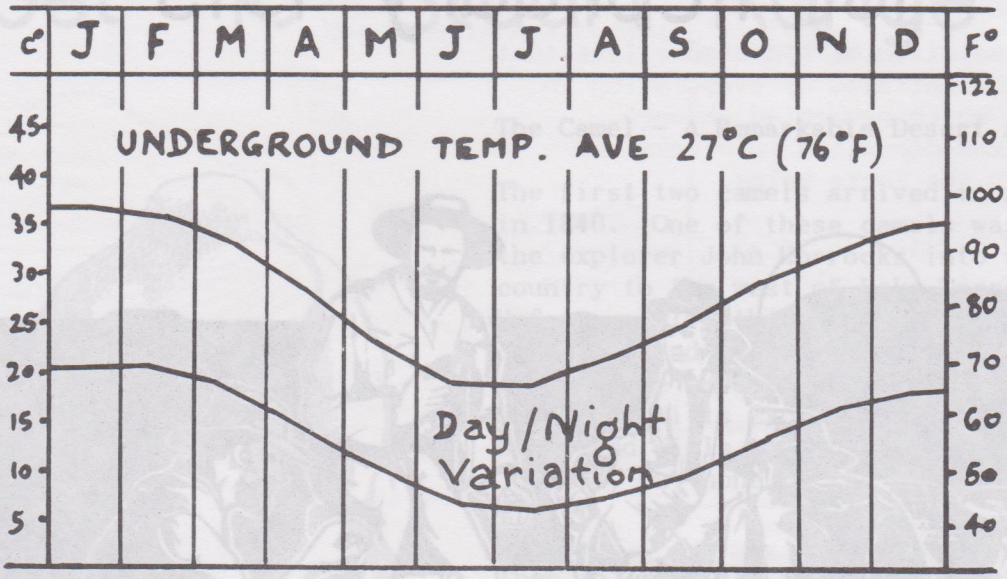
Stuart, with Foster and an Aboriginal guide, rode their horses through Stuart Range a little to the north of where Coober Pedy is situated in July 1858.

Stuart finally succeeded in crossing Australia on the 24th July, 1862.

Ten years later, the Overland Telegraph Line, which closely followed the route taken by Stuart in 1862, brought Australia into direct cable contact with the rest of the world.

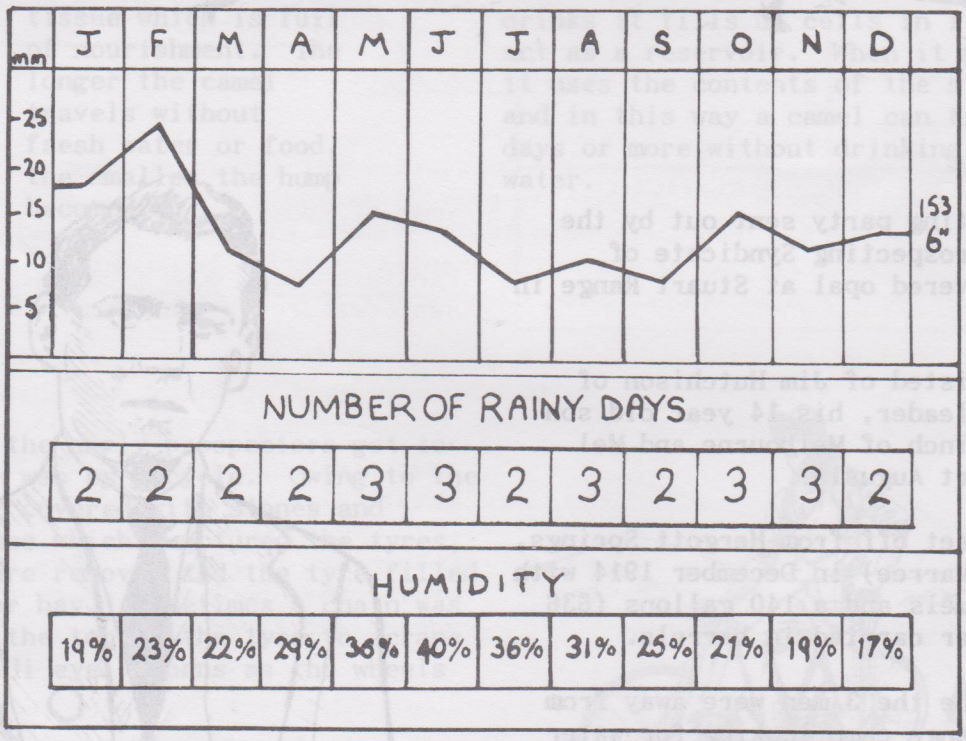
The Outback Environment

TEMPERATURE



As you can see from the Rainfall and Temperature Charts, Coober Pedy is located in a typical outback desert environment of low rainfall, combined with high summer temperatures which fluctuate widely between day and night. However, the low humidity means that the heat is not intolerable and living underground in a dugout is a very pleasant experience.

RAINFALL



The low rainfall, combined with the high temperatures, (which can reach up to 50 degrees Celsius), mean that there is hardly any surface water available as it evaporates very quickly after rain. This lack of surface water was a severe handicap to the exploration and development of the north west of South Australia by the early pastoralists and prospectors.

The Finding of the First Opal

1st. February 1915

A gold prospecting party sent out by the New Colorado Prospecting Syndicate of Adelaide discovered opal at Stuart Range in February 1915.

The party consisted of Jim Hutchison of Naracoorte as leader, his 14 year old son Will, Philip Winch of Melbourne and Mel McKenzie of Port Augusta.

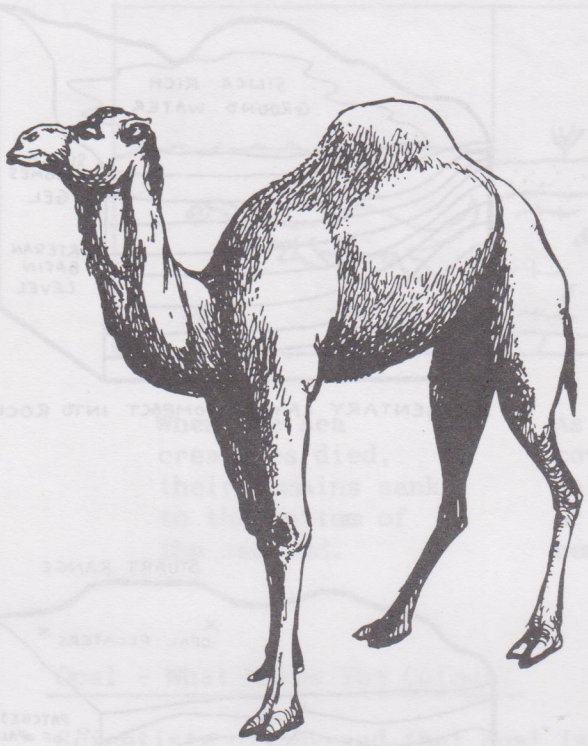
The party had set off from Hergott Springs, (now known as Marree) in December 1914 with a team of 6 camels and a 140 gallons (636 litres) of water carried in barrels.

It was while the the 3 men were away from their Stuart Range camp looking for water that young Willie Hutchison found the first pieces of opal on the 1st February 1915.

Tragically, some 5 years later, Will was drowned while swimming in the Georgina River in Queensland while working on a cattle drive.

The Boy Who Found The First Opal
W.J.S. Hutchison 1900-1920

How Did The Prospectors Get To Stuart Range



A camel's hump is made up of a fatty tissue which is full of nourishment. The longer the camel travels without fresh water or food, the smaller the hump becomes.

The Camel - A Remarkable Desert Animal

The first two camels arrived in Australia in 1840. One of these camels was ridden by the explorer John Horrocks into unexplored country to the west of Lake Torrens. Unfortunately, this camel had to be destroyed and it was not until 1860 that 24 camels were imported from India for the Burke and Wills Expedition. Not only did Burke and Wills perish on this ill-fated journey, but none of the camels survived either.

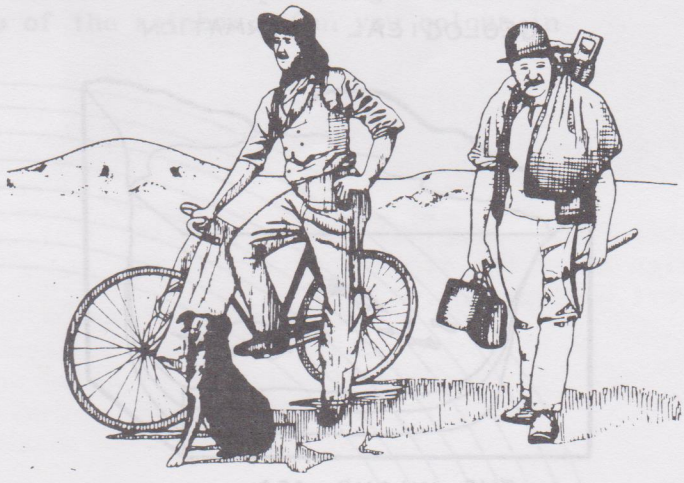
Then in 1870, the prominent South Australian pastoralist, Sir Thomas Elder, brought in large numbers of camels to be used on the construction of the Overland Telegraph Line. It was then that the camel was able to prove is superior ability to work in Australia's vast arid inland.

The Australian camel is a type known as 'dromedary' - meaning one hump. The camel stores water in its insides. As the camel drinks it fills up cells in its body which act as a reservoir. When it needs a drink, it uses the contents of the stored cells, and in this way a camel can travel for 10 days or more without drinking any fresh water.

Bicycle

Another way the early prospectors got to Stuart Range was by bicycle. Owing to the ground being covered with stones and prickle bushes which punctured the tyres, the tubes were removed and the tyre filled with grass or hay. Sometimes a chain was hung across the top of the tyre to scrape off the 'bindi eye' thorns as the wheels turned.

The prospector carried his swag slung across his shoulders with his tools and camp gear in a wooden box mounted above the back wheel.



The Story O

Opal - What Is It?

Opal is a solution of hydrated silica that has been concentrated by evaporation to form a gel which permeated through sandstone and deposited in cracks and cavities in the rocks below.

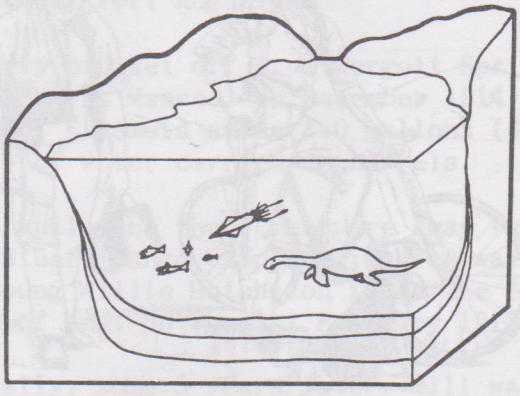
Over the 2 million to 70 million years since then, this gel has hardened under great pressure to form opal.

The central portion of Stuart Range is a remnant of a great tableland composed of beds of sandstone and claystone that were deposited in Upper Cretaceous times.

At that time, the sediments that were laid down were part of the Great Inland Sea and this explains why marine fossils (sometimes opalised), are found here today.

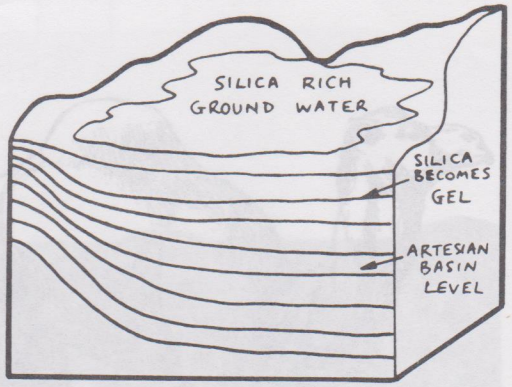
MILLIONS OF YEARS	ERA	PERIOD	GEOLOGICAL EVENT
1	CENOZOIC	QUARTENARY	DIPROTODON (GIANT WOMBAT?)
62	CENOZOIC	TERTIARY	- PRECIOUS OPAL FORMED
144	MESOZOIC	CRETACEOUS	
213	MESOZOIC	JURASSIC	PLESIOSAURUS
248	MESOZOIC	TRIASSIC	THE INLAND SEA (GREAT ARTESIAN BASIN)

GEOLOGICAL FORMATION

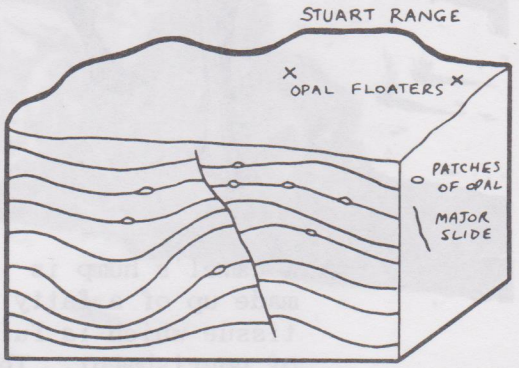


THE INLAND SEA

FORMATION OF SEDIMENTARY OPAL



SEDIMENTARY LAYERS COMPACT INTO ROCK



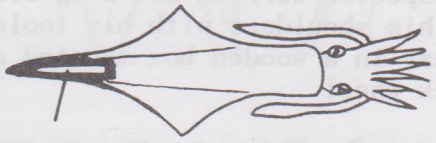
LATER ELEVATION OF THE MARINE SEDIMENTS

Some of these fossils are:-

Plesiosaurus - bone fragments of a large sea creature with a long neck and flippers.

Shells - a great number of shells of the bivalve type e.g. cockle shells - are found at Coober Pedy. Sometimes they are completely opalized and the opal is very beautiful.

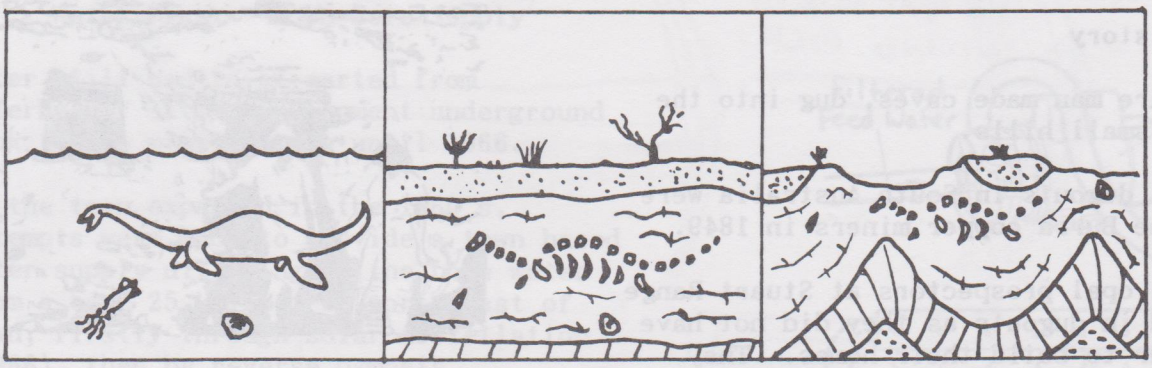
Belemnites or pipes. These are the remains of the hard body part of an ancient squid-like creature.



Belemnite

f Opal Part.1

How Fossils Are Formed



When the sea creatures died, their remains sank to the bottom of the sea bed.

As more sediment covered them over, only the hard body or shell parts remained.

When the sea had completely dried out, the layers of sediment had turned to rock and the remains had become fossils.

Opal - What Makes The Colour?

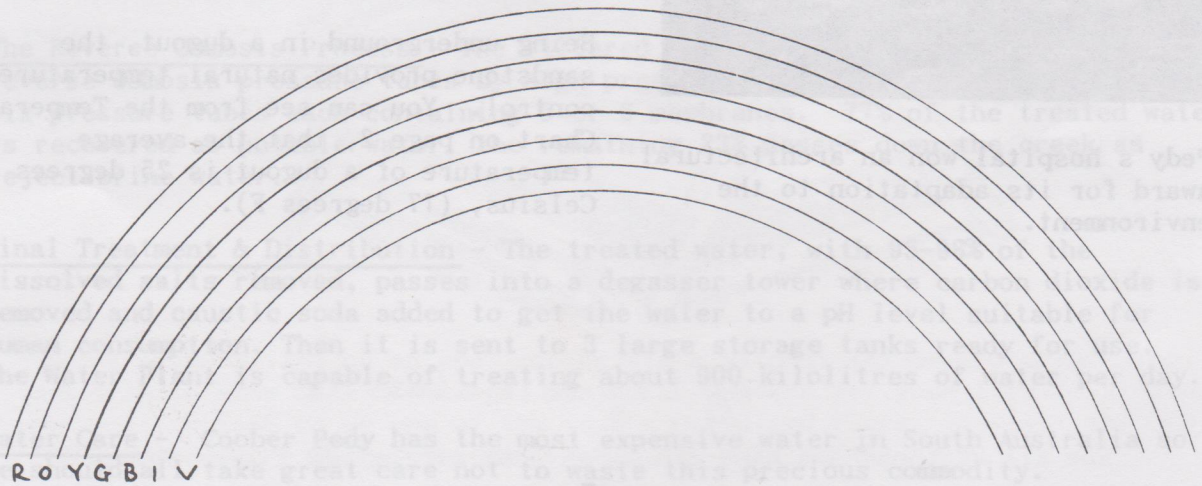
Scientists discovered that opal is made up of very small spheres of silica which grow around a central nucleus.

In precious opal, these spheres are regular in size and stacking allowing the spaces between the spheres to act as a prism.

Light And Colour

Sunlight is made up of all the colours of the rainbow. A ray of light is a long procession of tiny waves which vary in length; for example blue ones are shorter than red. When the beam of light passes through a glass prism, the direction of the light waves is altered slightly so that all the rays get separated and the colours come out side by side forming a spectrum.

In a rainbow, the sunlight shines on the tiny water-drops which bend the light waves making the broad bands of separate colours we see spreading across the sky. The red colour is always at the top of the rainbow. Can you colour in the rainbow correctly?



Living Underground In Dugouts

Dugout History

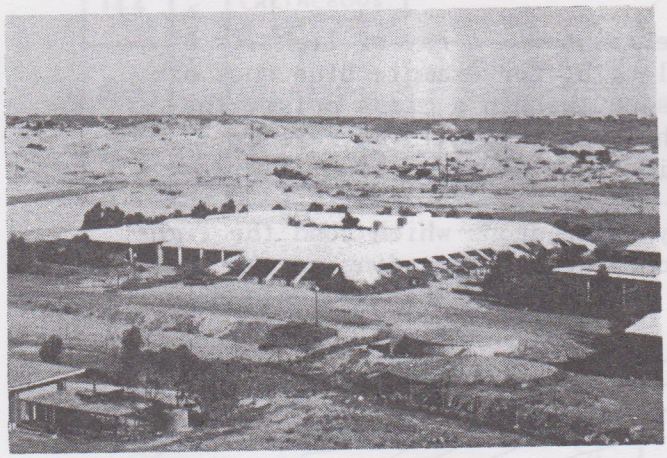
Dugouts are man made caves, dug into the sides of small hills.

The first dugouts in South Australia were dug by the Burra copper miners in 1849.

The first opal prospectors at Stuart Range all lived in dugouts as they did not have any timber to build their homes. They built bush shelters to shade their rainwater tanks and slept under the stars at night.

Dugouts are much cooler than above ground structures and protect the miner from dust and wind.

Post Office Hill Dugout - The only underground Post Office in the world from 1920 to 1947.



Coober Pedy's hospital won an architectural design award for its adaptation to the desert environment.

Modern Dugouts

Today, there are a lot more above ground buildings because most of the small hills around Coober Pedy have already been used to build dugouts.

Up to the 1960's, dugouts were all dug by hand. Then, when machinery became available, some of the hard work was done by jack picks and later by tunnelling machines.

Being underground in a dugout, the sandstone provides natural temperature control. You can see from the Temperature Chart on page 2, that the average temperature of a dugout is 25 degrees Celsius, (77 degrees F).

Our Precious Desert Water. Don't Waste A Drop

Water Plant - Town Bore Supply

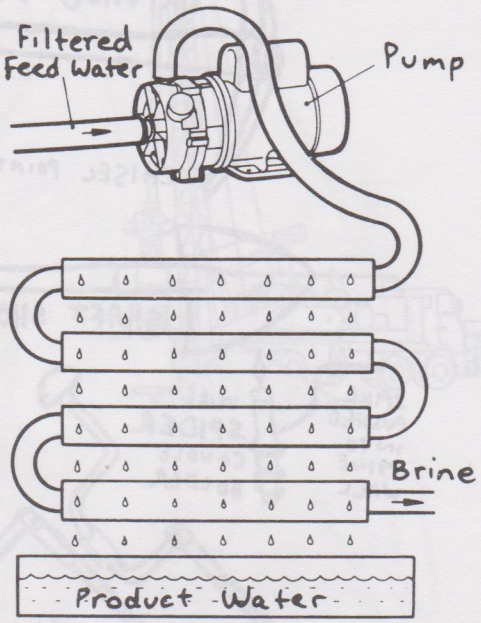
Water still had to be carted from waterholes, or the Government underground tank to the miners camps until 1966.

As the town expanded in the 1960's, attempts were made to provide a town based water supply utilising saline bore water from a bore 25 kilometres north-east of town, firstly through solar distillation (1966), then by reverse osmosis desalination (E&WS 1969).

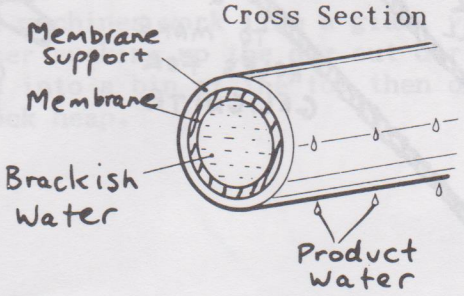
Still the problem remained that the water had to be carted to each individual resident, and at times, the supply could not keep up with the demand and water had to be rationed.

Then in 1985 a new water plant opened which supplies town residents with a fully reticulated and treated water supply. Outlying residents still need to get their water from the water bowser in Hutchison Street.

The R.O. Process



Cross Section



The Reverse Osmosis Water Treatment Process

The Feed Water - The saline bore water is pumped through pipes into town and stored in tanks at the water plant awaiting treatment.

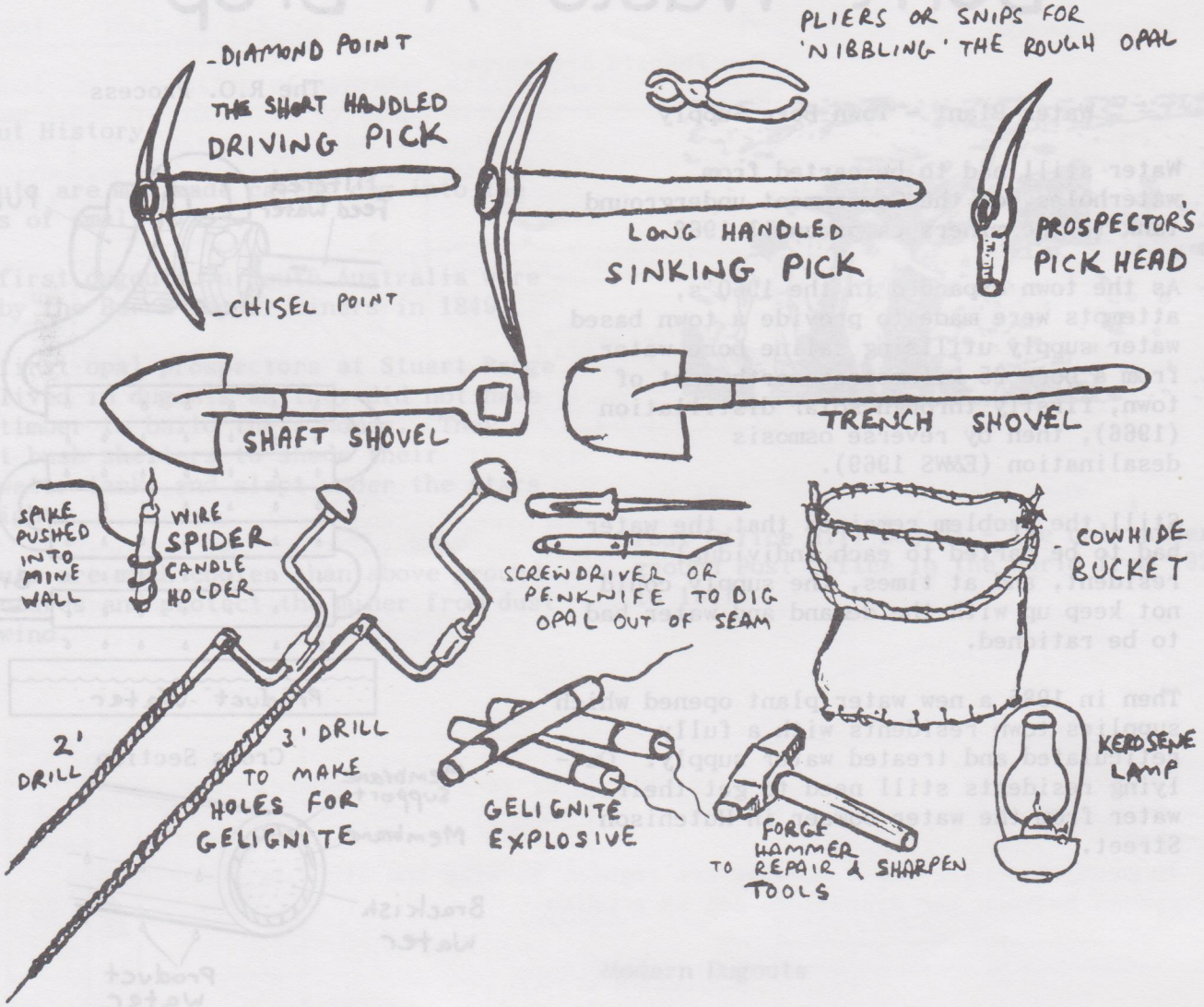
Pre-treatment - This salty bore water is then brought into contact with chlorine and potassium permanganate under great pressure so that the iron and manganese in the water oxidizes and settles out of the water. The water is then passed through four filtering units where almost all the iron and manganese is removed.

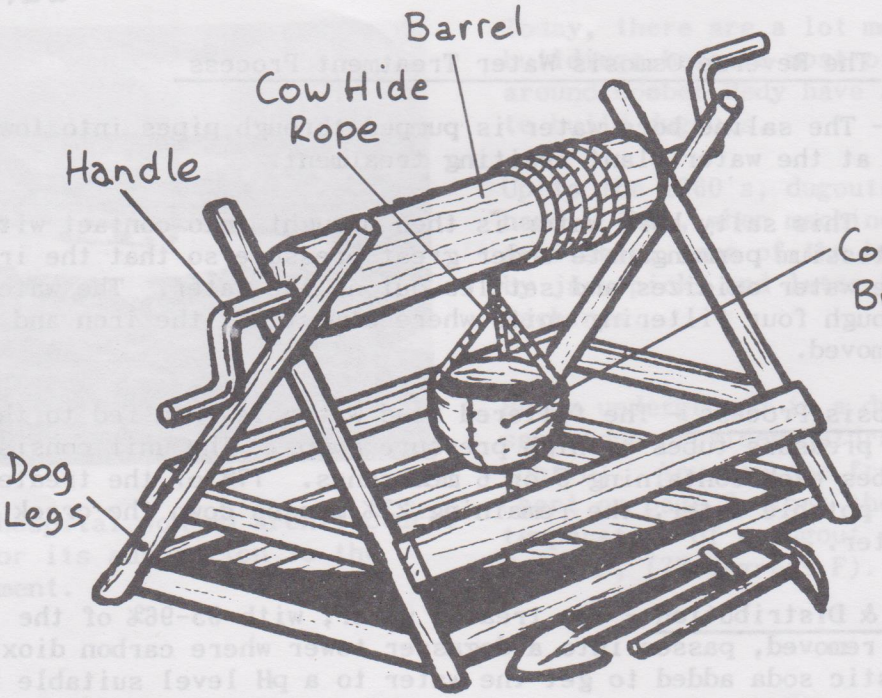
The Reverse Osmosis Process - The filtered feed water is then fed to the reverse osmosis pressure tubes by high pressure pumps. The unit consists of six pressure tubes each containing 5 or 6 membranes. 77% of the treated water is recovered as potable water, the remaining 23% passes down the creek as reject brine water.

Final Treatment & Distribution - The treated water, with 95-96% of the dissolved salts removed, passes into a degasser tower where carbon dioxide is removed and caustic soda added to get the water to a pH level suitable for human consumption. Then it is sent to 3 large storage tanks ready for use. The Water Plant is capable of treating about 900 kilolitres of water per day.

Water Care - Coober Pedy has the most expensive water in South Australia so we should all take great care not to waste this precious commodity.

Early Opal Mining Tools

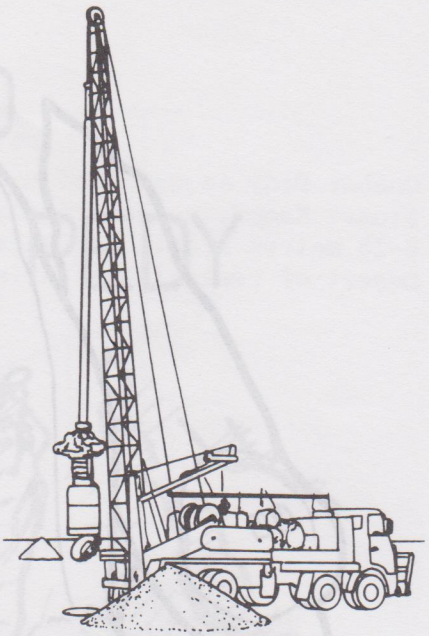




Dog Leg Windlass

See all of these old hand-mining methods at the Old Timers Mine.

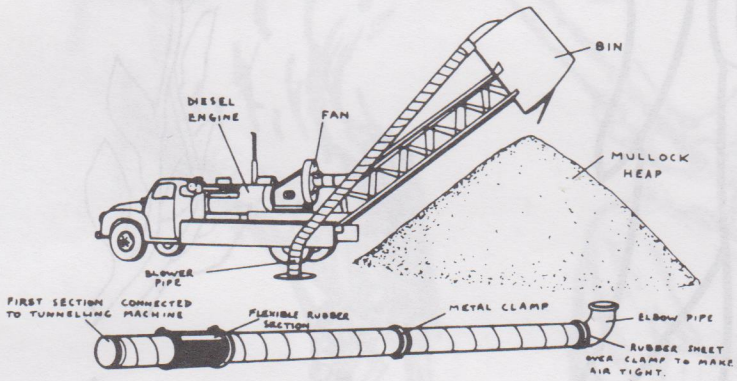
Modern Mining Machines



Calweld Drill

A truck mounted machine which digs a shaft down to the 'opal level' with a revolving toothed scoop on the end of a steel pole.

These machines make it possible to dig a shaft in one day instead of the month or so that it took by hand.



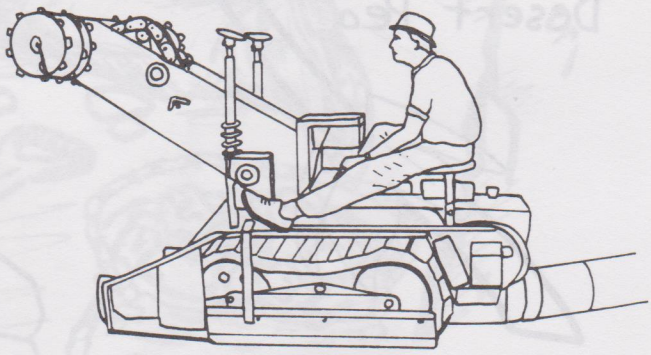
Blower

These machines work like a giant vacuum cleaner sucking up the dug out dirt through pipes into a bin at the top then onto a mullock heap.

Tunnelling Machines

Tunnelling machines look like small tractors with a revolving or rotating cutting head at the front which grinds away the opal dirt.

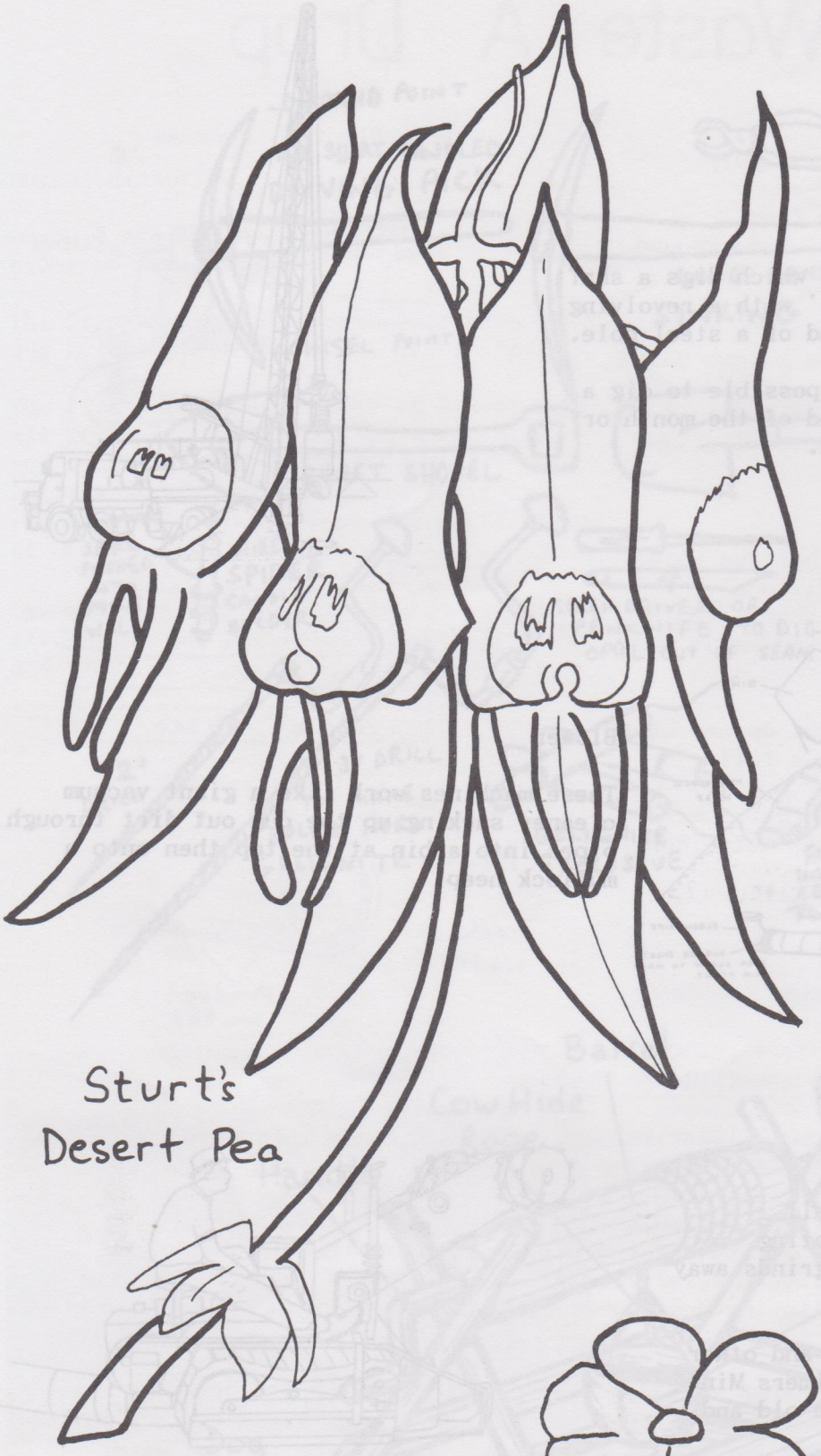
For more information about these and other mining machines, visit the Old Timers Mine where you can see and compare the old and new opal mining methods.



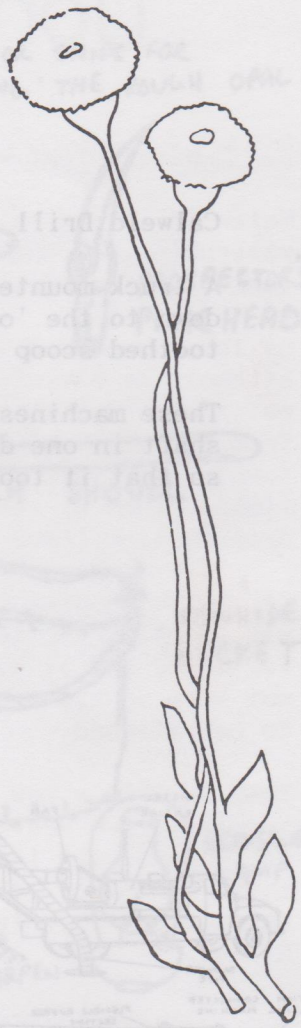
TAKE CARE - OPAL MINING IS DANGEROUS
DANGER DEEP SHAFTS

No-one is permitted on an opal mining claim without the owners permission. If you wish to know more about opal mining or want to try your luck fossicking for opal, PLEASE go on one of the town's Organised Tours, or visit the OLD TIMERS MINE where safe fossicking areas are available.

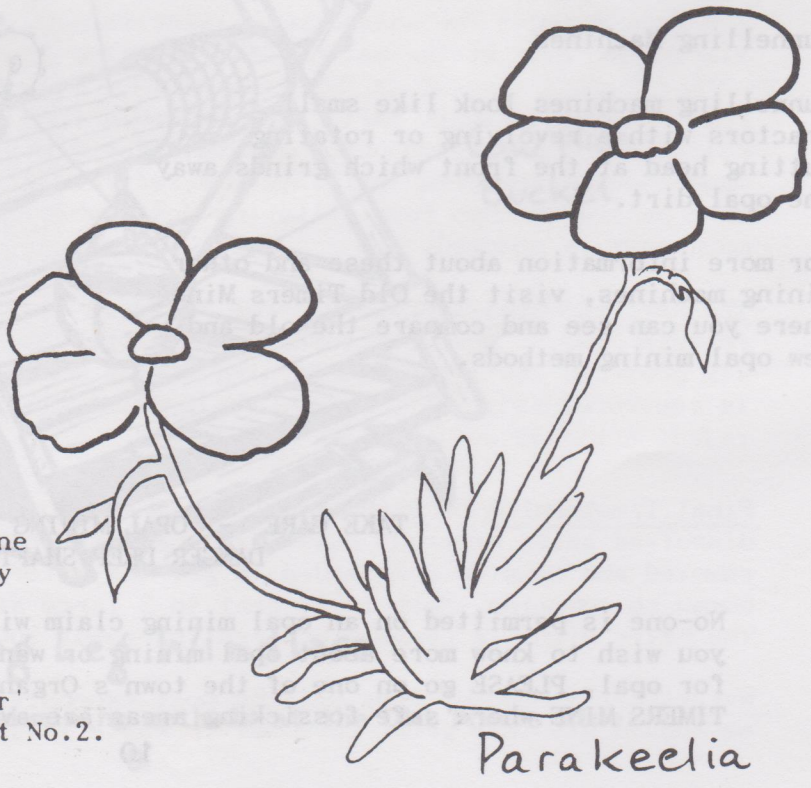
Desert Flowers To Colour In



Sturt's
Desert Pea



Plover Daisy



Parakeelia

Prepared for the Old Timers Mine
Crowders Gully Road Coober Pedy
by
K. & I. Crilly

More information on 'Opal' and 'Water'
appears in OTM Educational Supplement No.2.