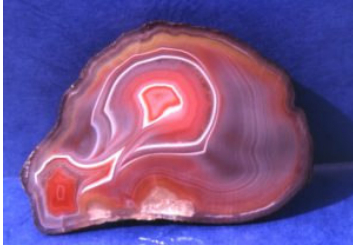


AGATE CREEK AGATE - Paul Howard

Adapted from *Australian Gemmologist* (1996) 19, 215-220

Introduction



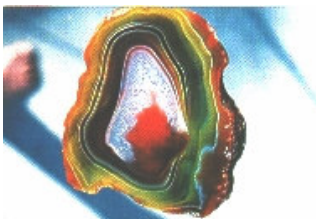
Typical pink/red Agate Creek agate. This specimen displays 'chatoyancy' (an illusion caused by light interplay with

Agate, a translucent cryptocrystalline variety of quartz, is one of Nature's most beautiful gemstones. For thousands of years man has prized agate for personal adornment, for this variegated chalcedony is characterised by oft-contrasting colours that may be arranged in either strongly contrasting bands, irregular swathes of colour, or moss-like inclusions¹.

Some 3,000 years ago the ancient Egyptians sought colourful agates and other chalcedonies from the Aghates River (now called the Drillo River) in Sicily. As a consequence, many agate artefacts and jewellery have been found in the tombs of long dead Kings and Queens of ancient Egypt.

Today, agate is still very much in demand, for it is a uniquely patterned gem material that offers its owner the desirable attributes of beauty and durability.

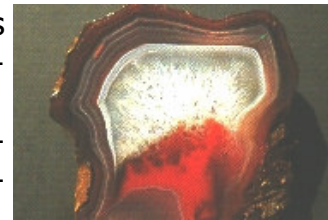
Agate Creek in far North Queensland is the acknowledged Australian source for attractively patterned agates that occur in and are weathered from amygdaloidal basalt of Carboniferous age.



Crystal filled agate, with strongly contrasting coloured banding

Agate Creek agates are renowned both for the beauty and diversity of their attractive colour patterns.

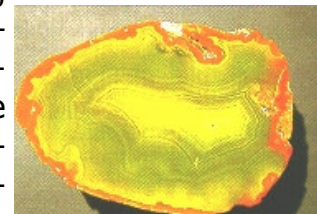
It is a pity that agate from Agate Creek in North Queensland is little appreciated outside of Australia, for this agate displays nearly every conceivable colour and pattern that is possible to observe in agate.



Dark red and blue-banded agate found near 'Crystal Hill'

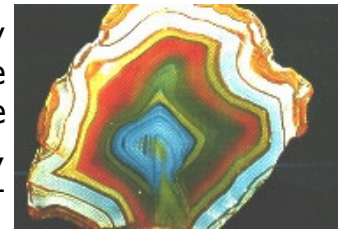
History

About a century ago, early prospectors searching for gold in the Gilberton area to the south of Georgetown, found an abundance of amygdule-derived nodules of agate that had accumulated in one of the creeks that flowed into the Robertson River. These agates had weathered and eroded from basalts of Carboniferous age that were overlain by a thick sedimentary deposit of Hampstead Sandstone This 235 million



Typical yellowish-green banded agate from 'The Saddle'

year old sandstone has a surface area of approximately 80 km² . The creek in which the agate nodules were discovered soon became known as Agate Creek. The occurrence of agate at Agate Creek was first reported, as an observation, by W.E. Cameron in his G.S.Q. Report No. 151, dated 1900.



Agate with unusual banding from Black Soil Creek

At the time of discovery of this large deposit, no significant value seems to have been attached to its agate, for the world's supply of rough agate came from either the ancient mines surrounding Idar Oberstein, in Germany, or from newly discovered deposits in Brazil. These agates were processed and sold by the traditional lapidaries of Idar Oberstein.

After World War 2, an attempt was made to use heavy machinery to mine the Agate Creek deposits for commercial purposes. The limited success of these operations was tempered by that fact that at that time the hobby of lapidary was becoming increasingly popular in Australia. As a consequence, the Agate Creek deposit became a target by enthusiastic fossickers, who appreciated the low cost of self-dug agate. In retrospect it is indeed unfortunate that the oft-unbridled enthusiasm of these early fossickers led to the development of animosity between miners of the



Rare 'gold fleck' agate

agate and those who soon were to be known as 'rockhounds'. As a direct consequence, subsequent amendments to mining regulations effectively prohibited the use of any type of machinery to mine agates at Agate Creek. Today, both professionals and amateurs are free to fossick this deposit - only with hand tools - for the total cost of the purchase of a Fossicking License from the Queensland Department of Minerals & Energy offices in Brisbane, Georgetown, or the goldfield town of Forsayth. It is an indication of the size of the Agate Creek deposit that significant quantities of good quality, well coloured agate are still being recovered, sawn, polished,

and exhibited.

The Deposit

The Agate Creek agate deposit lies at the head of three creeks - Blacksoil Creek, Spring Creek, and Agate Creek. Geological features and fossils found in the area drained by this three creek system indicate that the agates have an age of less than 300 million years.

The amygdaloidal (gas cavity containing) basalt, that flowed over the countryside to an estimated depth of 50-100 m, crystallised many millions of years before a large inland sea covered the area to subsequently form the thick sandstone that now covers the original basalt flows. It was the subsequent



Pink banded agate, with aragonite pseudo-morph cavity infilling, Simpsons Creek

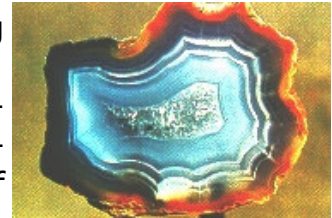


*Magnificent
'Flame' agate*

leaching of silica from this sandstone that filled the amygdules within this basalt and set the stage for the formation of the Agate Creek agates.

The three creek system, that drains this lightly timbered savanna country, has a length of approximately 26 km and generally runs in a north westerly direction to join the Robertson River about 40 km south-south-west of Forsayth. The Robertson River ultimately drains into the Gulf of Carpentaria once it joins the Gilbert River.

Today, a graded gravel road and tracks lead the intrepid fossicker to the Agate Creek agate field. These roads and tracks are quite suitable for conventional vehicles during the drier May to September winter months in Australia. A Mining Guide, presently available from the Queensland Department of Minerals & Energy office in Georgetown, indicates that within the 11 x 3 km boundaries of the present field there are several well known localities at which agates can be mined from either their primary basaltic source, or alluvial deposits derived from these rocks. Recently, the area has been gazetted the Agate Creek Fossicking Area.



*Predominantly blue-banded
agate from Black Soil Creek*

Features & Characteristics of Agate Creek Agates

Agate, a chalcedonic variety of the mineral quartz (silicon dioxide or SiO₂), has a cryptocrystalline structure, and is it is formed from oriented bundles of submicroscopic fibres of quartz. Agate has the following identifying gem gemmological properties and features:

Property	
HARDNESS	6½ (Mohs scale)
SPECIFIC GRAVITY	2.57 to 2.64
REFRACTIVE INDICES	1.534-1.538
FORM BIREFRINGENCE	0.004
LUSTRE	Waxy
DIAPHANEITY	Translucent
FLUORESCENCE	Variable

Most Agate Creek agates display a concentric banded structure, however

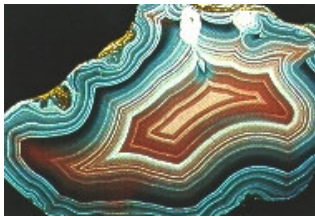
seam agate, tube agate, moss agate, and dendritic agates are found commonly. Banded onyx and sardonyx can also be found in nodules of Agate Creek agate. While some Agate Creek agates consist of solid agate, others either have interiors filled with colourless quartz crystals, or are partly hollow and lined with crystals of amethyst, aragonite, or even calcite.

In the Agate Creek valley, no two agates are the same; but agates found in the same primary locality may display certain features that allow the expert to identify the location from which the agate was removed. Indeed, some agate 'buffs' can examine an agate and inform you from which hill or creek a particular agate came from!!!

Some Agate-bearing Localities at Agate Creek

Within the approximately 45 km² area of the Agate Creek Fossicking Area several well known agate-bearing deposits have been recognised. These localities, and their characteristic agates include:

Flanagans, located on a hill a short walk to the south-east of the well appointed Safari Camp that services this fossicking area. This deposit was host to one of the first commercial mines, yet it still yields good quantities of red, green, and white-banded agates - many displaying inclusions of haematite and with distinctive chatoyancy.

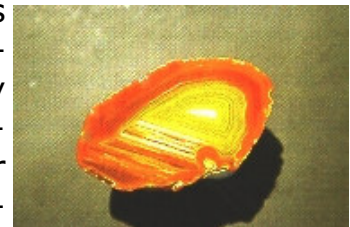


Typical blue-banded agate, with pink and red centre from Blue Hills area

Simpsons, another previously commercially mined area that is located about a kilometre north-west of the Safari Camp. On the right hand side of the track that leads to this deposit, nodules containing porcelain-pink and white agates can be found in an area where past miners have removed large amounts of overburden that contained large quartzite boulders.

Blue Hills, located directly across the valley to the south of Simpsons, is renowned for its blue agates with pink or red centres. These agates must be recovered from rather large previous excavations.

The *Spring Creek* area is accessed to the left off the main track that winds westwards down Agate Creek from the Safari Camp. For a long time *Banyan Springs*, located on one of the small feeder creeks to Spring Creek, has been a major source of fresh water for the area. This area is renowned for the variety of its agates. These include: straight banded agates - particularly those of the sardonyx variety; 'thunder eggs' infilled with straight banded agate, agates concentrically banded in reds, greens, and creams, moss agate and tube agate.



Orange, yellow and white banded agate, from the Spring Creek area

Bald Hills and *Black Rock* are two features on a range of hills to the north of Agate Creek that divide the Agate Creek valley from Blacksoil Creek valley further to the north-west. Black Rock, the most prominent feature, is located about 4 km NW of the Safari Camp. At both these localities carnelian agates, some containing quartz crystals, may be recovered. Darker red and blue agates, with "a suspended agate pattern", also may be found at this locality.



Concentric banded red, brown and yellow agate from Flanagans

The Saddle, located at the eastern end of the range of hills a little under 2 km north-west of the Safari Camp, is a long established source of agates. Here yellowish green agates and red agates are eagerly sought. Some of the agates from this locality tend to be 'stained' with patches of pale blues, reds and yellows, thus enhancing their uniqueness and beauty.



Yellow, green and red concentric banded agate from Flanagans

About 7 km along the north-west trending track from the Safari Camp, a small track to the right passes around a small isolated hill known locally as *Crystal Hill*. Here, colourful seam agates, tube agate, and nodules of red agate with quartz and aragonitic cavity infillings have and are still recovered from time to time.

Agate Creek, itself, is a prolific source of 'flood' or eroded agates. As the road/track access from Forsayth to the Safari Camp crosses Agate Creek at least eight times, a diligent search of the alluvial gravels at these crossings often will yield choice agates that have been weathered from their parental basalt and transported by the waters that flood Agate Creek during the 'wet season'. The best time to locate agates, in Agate Creek, is during the winter dry season (May to September) when the creek will be dry.

At about 10 km along the track towards Forsayth, a track to the right leads to the *Black Soil Creek* valley, yet another prolific source of agates. This valley hosts many localities at which colourful agates can be obtained with a little digging. A virtual "rainbow of agates" occur in the Black Soil valley. At the far (northern) end of this valley, agate-bearing 'thunder eggs', that are strikingly patterned in red and cream, occur in a location that is yet to attract a popular



Amethyst filled agate geode from Flanagans



Seam agate from the Spring Creek area

name.

Possible Causes of Colour

It would appear that the various oxides of iron play an important role in colouring many of the agates from Agate Creek. Consequently reds, and various shades of red, seem to predominate in Agate Creek agates. Indeed, when the colours caused by iron are combined with other colours due to the oxides of other transitional elements, a virtual rainbow of colours is not only possible but is created in Agate Creek agate.

Sizes

Agate Creek agates come in all sizes and shapes. However, most agates from this deposit are somewhat ovoid in shape and range from pigeon's egg to football size.

While football sized Agate Creek agates are quite rare, the average sized agates from this deposit seldom exceeds 50-70 mm in length. One observation worth recording is that the larger the agate, the more irregular its shape is likely to be.

Lapidary Potential

From the lapidary viewpoint, although the agates of Agate Creek appear to be quite dense, stress fractures that may appear after sawing and polishing can devalue these otherwise beautiful agates. Agate Creek agates occur in a wide range of colours and colour patterns. But, when rarely found, somewhat chatoyant and gold flecked varieties of agate are the real 'find' when you go fossicking at Agate Creek.



Quartz crystal filled red agate from the Bald Hills

Conclusions

North Queensland's Agate Creek Fossicking Area hosts a little described agate resource of world significance. Although generally small in size, the vibrantly coloured, attractively patterned agates from many individual deposits that are scattered throughout this area have an aesthetic appeal that is second-to-none.

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