

# Gemstones

Australia is a major world source of raw gems, in particular diamonds, opals and sapphires. Lower value stones produced in smaller quantities include nephrite jade, chrysoprase, rhodonite, zircon, garnet, agate and amethyst.

## Diamonds

Following the development of the **Argyle** deposit in the Kimberley region of Western Australia in the early 1980s, Australia has become the world's largest producer of diamonds. Output from this deposit alone now exceeds the annual diamond production of any other country. Production at Argyle consists of about 5% gem, 40% cheap gem and 55% industrial grade diamonds.

Alluvial diamonds were mined on a small scale in New South Wales as far back as the 1870s, mainly as by-products of gold or tin mining. An upsurge in exploration in the late 1960s led to the discovery of diamonds elsewhere in Australia. Nevertheless, it was not until 1979 that a commercially significant deposit of alluvial diamonds, at Smoke Creek in the Kimberleys, and the upstream lamproite source rock, the Argyle AK-1 pipe, were found.

Proven resources at Argyle are 54 Mt at a grade of 6.4 carats per tonne; probable reserves amount to a further 14 Mt at 6.1 carats per tonne. Mining of the easily extracted alluvial material started in 1983 and opencut mining of the pipe itself commenced in December 1985.

Production rose rapidly from 6.2 million carats in 1983 to almost 30 million carats valued at \$257 million in 1986. Resources are sufficient for about 20 years of mining at the current rate of production.

At 3 parts per million Argyle is the highest grade pipe in the world though 95% of the stones fall into the lower value cheap-gem and industrial categories. At full production Argyle will add over 20% to the world's diamond supply but, because of the low proportion of gem-quality stones, in value the mine will add only about 4%. Australia has only a small domestic market for diamonds and all Argyle production is exported.

## Opals

Australia has been the world's leading producer of precious opals since

the 1930s and currently supplies an estimated 95% of the world market, including all of the world's black opal. The estimated value of opal production has been steadily increasing in recent years and in 1986 amounted to over \$56 million.

The first recorded discoveries were in Queensland in 1872 but most production is now from three South Australian centres—**Andamooka, Coober Pedy** and **Mintabie**.

Lightning Ridge in north-western New South Wales, though accounting for only a small percentage of total production, is famous as the world's only source of black opal. Most boulder opal comes from Queensland, where opal occurs patchily in the west of the state in a broad zone extending from **Kynuna** and **Opalton** to **Yowah**.

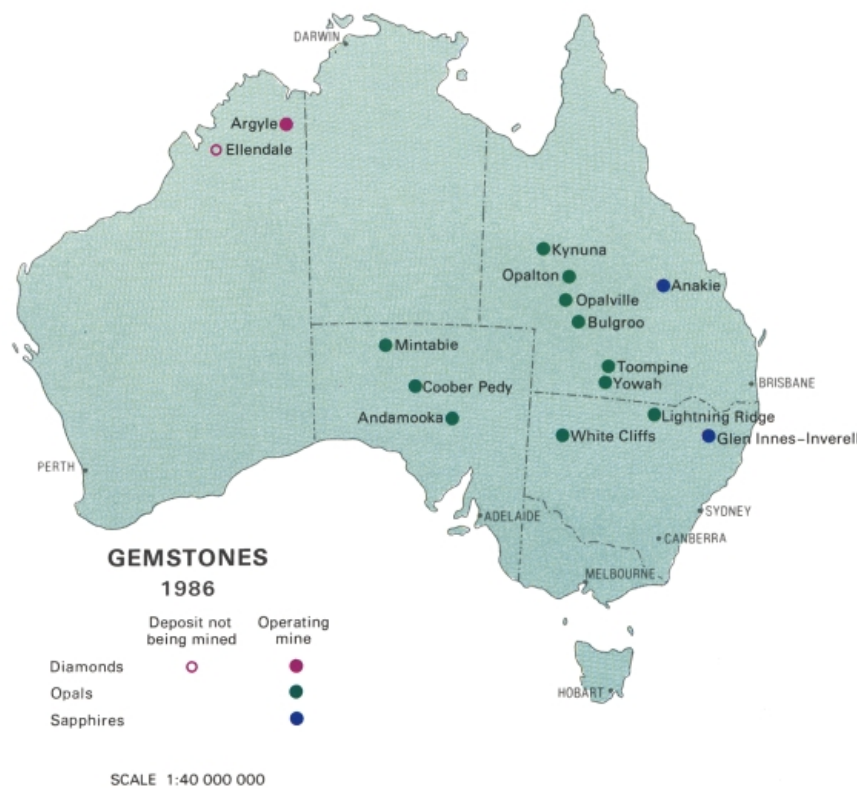
Opal is won by underground or opencut mining, or by retreating old dumps. Methods are extremely variable as miners use their own particular combinations of equipment and initiative.

The bulk of Australian opal is sold in Hong Kong, Japan and the U.S.A. with minimal processing. The exception is black opal from Lightning Ridge which, because of its opacity in uncut form, must be cut and polished so that the quality and hence the value can be determined.

## Sapphires

Australia is the world's largest supplier of sapphires, satisfying over 70% of the world market for uncut stones. In 1986 the estimated value of sapphire production was \$13 million.

Sapphires were first discovered in Australia in the New England district of north-eastern New South Wales in 1851. Commercial production began in Queensland in the 1890s and had commenced in New South Wales by 1920. The **Anakie** (Qld) and **Glen Innes-Inverell** (N.S.W.) areas are still the major fields, employing small scale mining methods similar to those used on the opal fields. Uncut stones are exported, mainly to Thailand.



SOURCE: Bureau of Mineral Resources (1987).



**Argyle diamond mine, Kimberley region (W.A.)**

Using highly automated mining and recovery techniques, the Argyle mine (left) is now the world's largest producer of diamonds. In 1986 production amounted to over 29 million carats. Comfortable air-conditioned, motel-style accommodation (above left) is provided adjacent to the mine. Because of the remoteness of the area and the harsh climatic conditions, the miners commute from Perth on a two week on/two week off basis.

### Opencut opal mining at Mintabie (S.A.)

After blasting, bulldozers progressively rake over and remove the silcrete surface and the softer underlying sandstone into fan-shaped heaps. Horizontal and vertical seams of opal—varying from milky white to almost black—are exposed as the trenches are cut, often to a depth of more than 25 metres.

