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Abstract on History of Mining from "The Geology and Mineral Potential of Papua New Guinea" compiled by Dr. Greg Corbett and edited by Anthony Williamson & Dr. Graeme Hancock.

1. INTRODUCTION

For thousands of years the indigenous people of Papua New Guinea have mined and traded stone implements and ochre, and used clay to make pottery. Gold was first discovered in Papua New Guinea in 1852 as accidental traces in pottery from Redscar Bay on the Papua Peninsula; Nye and Fisher (1954), Cotton (1975), Nelson (1976), Lowenstein (1982), Williamson (1982), Loudon (1984) and Davies (1992).

2. EARLY EXPLORATION - PRE-WORLD WAR 1

By the 1870s, gold prospectors, who had migrated northwards along the east coast of Australia, progressed to the islands of Papua New Guinea. In February 1873, Captain Moresby of HMS Basilisk reported traces of gold from the vicinity of what is now Port Moresby, and this was exaggerated in a speech to the Colonial Institute in London the following year. At that time, Papua New Guinea was unclaimed by any European powers. Aviation pioneer Lawrence Hargrave found a speck of gold and specimen of copper at the furthest point of D'Alberty's exploration voyage in the Ok Tedi River in 1876. In 1877, gold was again reported from the vicinity of Port Moresby and a small rush prospected the Laloki River without success - many of the miners died from malaria. In 1884, Britain established a protectorate over Papua, and Germany colonised northern New Guinea.

Papua New Guineans, returning from labouring on Queensland plantations, may have identified the first meaningful quantities of gold in PNG at Sudest Island. David Whyte produced 142oz of gold from there in 1888 and sparked a rush of miners from Australia, resulting in a further 15,000oz produced to 1898. The rush of 400 miners soon exhausted the shallow alluvial and eluvial gold on the island, so the British Administrator, William MacGregor (later Sir William), used HMS Swinger to take miners prospecting on nearby islands, eventually finding gold on Misima in October 1888. By 1895, gold had also been identified on Woodlark Island. As the miners began to prospect the Papuan Peninsula, gold was identified at Mambare River in 1896, Gira in 1897, and Yodda in 1899 (where platinum and osmiridium were also discovered). The prospectors moved progressively to Milne Bay, Cloudy Bay and eventually, by 1909, the rich Lakekamu River alluvials on mainland PNG were identified. Lode mining for gold began on Sudest Island as early as 1890; miners began to work the lodes at Woodlark in 1900 and on Misima in 1904. These operations remained active until World War II. Further details are included in the discussion of those projects later in the text.

At the Astrolabe mineral field near Port Moresby, massive copper ore was mined from 1907 to 1926 at the Laloki and Dubuna Mines and transported by light rail and aerial ropeway to a smelter near the Tahira Inlet wharf. Two other mines provided ore for another smelter from 1938 to 1942 (Davies, 1992; Williamson, 1982).

In the German New Guinea. Ernst Tappenbeck discovered gold in the lower Ramu River in 1898 and a German syndicate worked gold in the Waria River from 1901 to 1904. Some prospectors entered the Waria Valley from Papua with the blessing of the German administration, and an area was reserved for the Rudolf Wahlen syndicate. In 1910, a Canadian-Australian, Arthur Darling, identified gold in what became the Morobe Goldfield. However, the focus of the German administration in New Guinea was more on scientific endeavours than prospecting, as distinct from the Australian administration in Papua, which saw gold mining as a valuable source of revenue. Table 2.1 summarises gold production in Papua New Guinea to 1926.

(TABLE) not yet loaded.

3. THE WAR AND INTER-WAR YEARS (1914-1945)

At the start of World War I, Australia took possession of the German colony of New Guinea, which was administered from Rabaul at that time. In 1922, New Guinea was made a Mandated Territory of Australia by the League of Nations. In the same year, a mining ordinance was put in place to legalise prospecting.

After Arthur Darling's death in 1921, William 'Shark Eye' Park rediscovered Darling's gold find at Morobe in 1922, and together with Jack Nettleton began to work gold in secret at Koranga Creek, in what is now the Morobe Goldfield. By 1932, miners began to flock to the field, which was proclaimed that year. The number of expatriate miners grew rapidly to 219 in 1926. Also in 1926, William Royal and Dick Glasson climbed past substantial waterfalls to discover the incredibly rich alluvial gold deposits in Upper Edie Creek, winning up to 240oz/day from a single sluice box (Lowenstein, 1982). At that time, it took eight days for labourers to carry supplies from the coastal port of Salamaua to Wau, consuming part of the cargo along the way.

A milestone in prospecting and gold mining came in 1927 with the first Lae to Wau aeroplane flight, leading to the next stage in development of the Morobe Goldfield. From 1932, Bulolo Gold Dredging, floated by a precursor of the international Canadian gold mining company Placer Dome, constructed eight dredges at Bulolo and Wau from dismantled parts flown in using three Junkers aircraft. This resulted in a total airlift of 39,417 tons of freight, for production of 1.3 million ounces of gold, until the planes were destroyed by Japanese fighters in 1942. The Morobe Goldfield reached its peak production in 1938 when 700 expatriate and 6218 national miners produced 404,000oz gold. Dredging resumed after the war and continued until the last dredge closed down in the mid-1960s. By the mid-1980s, the field had produced 3.5 million ounces of alluvial gold and 0.5 million ounces of hard-rock gold (Nelson, 1976; Loudon, 1984).

Prospecting by Ned Rowlands in the Eastern Highlands led to the discovery in 1928 of gold near Kainantu, while in 1930 the Upper Ramu River was declared a provisional goldfield, and from 1934 the Sepik and Torricelli regions were explored.

Government patrol officers who entered new territories panned to test drainage systems for gold, and between 1933 and 1939 Jim Taylor and John Black identified gold downstream from Porgera. The government sanctioned epic prospecting expeditions such as the 1933 patrol of the Leahy brothers (the film of which still remains).

Between the two World Wars, gold mining represented a significant source of income to the Papua New Guinea administration. (Table 2.2) not yet loaded

4. POST-WORLD WAR II

After World War II, prospectors moved to follow up on the Porgera discovery in 1948, but only Joe Searson remained to work the alluvial gold. A road completed by army engineers linking Wau to Lae greatly aided mining in the Morobe Goldfield.

Jack Thompson, the Chief Government Geologist, promoted mineral exploration in PNG and in the late 1950s initiated geological surveys. International mining companies extended these surveys to evaluate the Papuan Ultramafic Belt on the Papuan Peninsula for lateritic Ni-Co deposits.

At Porgera, during the 1960s, Searson focused on the hard-rock potential, forming a syndicate to finance initial adit development. With the help of the Administration, he attracted other explorers such as Bulolo Gold Dredging and later Mount Isa Mines (MIM), which began to drill test the Waruwari hardrock resources at Porgera. Eventually, in 1983, continued geological studies by a consortium of Placer (now Placer Dome), Renison Goldfields Consolidated (RGC) and MIM identified the Zone VII high-grade mineralisation, dramatically improving the economics of the project.

5. THE 1960s PORPHYRY COPPER BOOM

At the time Searson was promoting Porgera to major mining companies, the science of porphyry Cu-Au mineralisation was beginning to emerge. In 1962, Ken Phillips of Conzinc Rio Tinto of Australia (CRA) applied a geological model, based on Philippine porphyry deposits, to Papua New Guinea mineral exploration. In 1964, following the advice of Jack Thompson and a 1930s report of alluvial gold and lode copper on Bougainville, Phillips identified the Panguna porphyry Cu-Au deposit. Panguna went into production in 1972, and had produced 30 Mt of copper and 9.6 million ounces of gold by its closure at the end of 1988.

The Australian Bureau of Mineral Resources (BMR) provided geological services to PNG from 1948 to 1972. The BMR contribution to the geological understanding of PNG was significant. In the late 1950s, BMR geologists discovered the Yandera copper mineralisation, were responsible for the preparation of most of the 1:250,000 scale geological maps of PNG, and in 1962 discovered the Ramu lateritic Ni-Co deposit. The Ramu project has been periodically evaluated ever since. Again in 1966, the BMR geologists recognised mineralised float in streams which subsequently led to the discovery of the Frieda porphyry Cu-Au system. MIM acted on reports of the BMR discovery to take up ground covering the Frieda prospect. Further exploration of the Frieda area led to discovery of the Nena high sulphidation Cu-Au mineralisation in 1979.

Regional exploration continued elsewhere in the rugged jungles of Papua New Guinea. In 1968, Kennecott Copper Corporation geologists followed a cupriferous float train from the junction of the Ok Menga and Ok Tedi drainages to identify the Ok Tedi porphyry Cu-Au intrusion at Mt Fubilan. After its success with the discovery of Panguna, CRA outfitted a ship (the CRAEStar) with its own laboratory and helicopter, which was used to prospect the western Pacific rim for porphyry Cu-Au deposits. Many anomalies identified during this time are still being explored (e.g. Wafi), and surprisingly, some still remain to be followed up.

From the mid 1960s to the early 70s, vast areas of Papua New Guinea were subjected to first-pass prospecting for porphyry copper style mineralisation. This work was carried out at a time of relatively low gold prices. Thus, the exploration programs gave little or no consideration to gold as a possible exploration target.

6. THE 1980s GOLD BOOM

When Papua New Guinea gained independence in 1975, Panguna was the only major mine operating. As the price of gold rose in 1974 and again more spectacularly in 1979, there was increasing international recognition of the gold potential of Papua New Guinea. This led to a significant increase in applications for Exploration Licences.

A moratorium was placed on granting new application in 1980 to enable the Department time to assess and process the Applications. The moratorium was lifted in November 1982, resulting in a flood of new applications from international companies and consortia (e.g Niugini Minine - Konnecott Joint Venture, CRA, RGC), and many other junior exploration companies. The 1980s saw the start of a new gold rush in the country (Fig. 2.3).

As mentioned above, much of the earlier porphyry copper exploration did not include assaying for gold (e.g CRAEStar) as it was not considered economically significant at that time. The new gold discoveries in areas such as Kerimenge, Hamata and Hidden Valley (all in the Morobe Goldfields), as well as Mt Kare and Tolukuma, were the result of a new generation of helicopter-supported reconnaissance which explored much of Papua New Guinea for gold mineralisation. The exploration efforts were given a conceptual basis by the Geological Survey of Papua New Guinea which promoted the application of new tectonic theories (Rogerson et al., 1988). Geochemical studies by the BMR (Wallace et al., 1983) played a distinct role in discovery of the giant Ladolam gold deposit on Lihir Island, while the application of new conceptual geological models led to discoveries such as Raferty's at Wafi in 1989 (Corbett and Leach, 1998).

Reappraisal of the oxidised low-grade gold mineralisation surrounding the previously mined (underground 1911-41) high-grade mineralisation at Umuna, on Misima Island in 1976-7 by Peter Macnab, led to its redevelopment as an open-cut mine in the late 1980s.

Tolukuma, discovered during helicopter-supported regional reconnaissance geochemistry in 1985, saw mine construction begin in May 1995. The mine now operates without a road link, depending entirely on helicopter support.

The perceived high prospectivity of Papua New Guinea for gold mineralisation first took hold in 1982, and was subsequently validated with several new discoveries being made over the ensuing few years. In addition to the examples cited above, the gold rush at Mt Kare (1987-91), the bonanza gold grades produced from early mining at Porgera zone VII (1991-02), and good results from drilling the Minifie zone on Lihir Island could be added to substantiate the high prospectivity for gold mineralisation of PNG. All of this has encouraged further prospecting and exploration.

The 1987 stock market crash brought the 1980s gold exploration boom to an abrupt end in Papua New Guinea and indeed throughout the world. Mergers, acquisitions, a declining commitment to explore, and lacklustre investor sentiment in the mining sector, reigned throughout the nineties. Only recently has there been an increase in exploration activity in PNG.

Detailed accounts of the discovery and development of mines (e.g. Lihir, Tolukuma) and many exploration projects (e.g. Wafi, Hidden Valley) are presented later in this document.