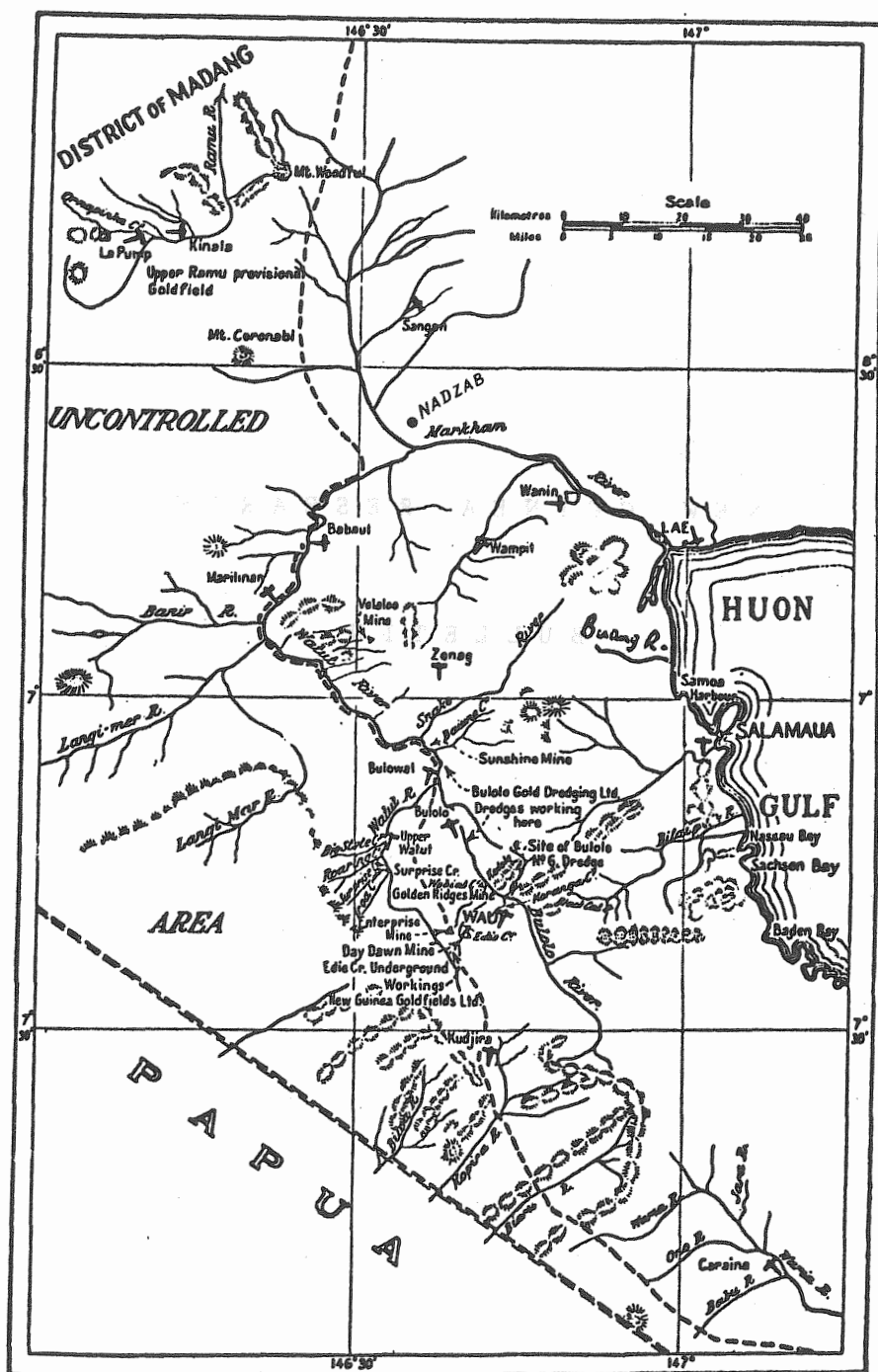


NEW GUINEA RESEARCH

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Map of goldfields, District of Morobe, 1934

Source: Fisher 1940

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B U L O L O

A HISTORY OF THE DEVELOPMENT OF THE BULOLO REGION,
NEW GUINEA

A.M. Healy

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Abbreviations used

BGD	Bulolo Gold Dredging Limited
GGNL	Guinea Gold No Liability
NGG	New Guinea Goldfields Limited
Placer	Placer Development Limited
CNGT	Commonwealth-New Guinea Timbers Ltd
NA	National Archives
DASF	Department of Agriculture, Stock and Fisheries

Pounds are £(Australian) unless specified otherwise.

Dollars are \$(Canadian) unless specified otherwise.

Preface

The writing of this study would have been impossible without the full co-operation of the companies principally involved in the development of Bulolo. I should like to thank in particular the senior officials of Bulolo Gold Dredging Limited of Sydney and of Guinea Gold No Liability of Adelaide, who freely made their records available to me. Executives of BGD in New Guinea also showed great kindness in explaining the company's present operations and in answering my many questions. All letters quoted without acknowledgement of source are from BGD records.

Other men associated with the early development of the Bulolo goldfield also allowed me to go through their private papers: thanks are due especially to Mr T. Yeomans of Sydney, to Mr J.C. Coldham of Melbourne; and to Mr E. Broughton Jensen of Adelaide.

Finally, I owe a very heavy debt to Dr R.G. Crocombe, Executive Officer of the New Guinea Research Unit, The Australian National University, who undertook the onerous editing of the original draft, and to Mrs Joanne Gray and Mrs Susan Faircloth for editorial assistance. I am also grateful to Professors J.W. Davidson and H.E. Maude, of the Department of Pacific History, The Australian National University, for having read and commented on a more finished version.

Introduction

This study traces the discovery and development of a remote valley in a remote country. It covers the period from the days when the presence of gold in New Guinea was only rumoured, to 1963, when most of the gold has been extracted and a permanent community is forming around other industrial interests.

Serious investigation for gold in New Guinea began about a century ago, when scientists and others first examined the coast and the outlying islands. At that time New Guinea was unannexed and uncoveted by Europeans. In 1884-85 came the intrusion of international rivalry, the division of eastern New Guinea between Britain and Germany, and the very gradual pacification of the more accessible areas.

Following this, the Germans mounted large scientific expeditions up the major rivers, while individual prospectors from the British side began to probe the mountain areas at the risk of their lives. It was not until the 1920s, however, that gold was found in phenomenal concentration in some of the streams near Bulolo. This precipitated a gold rush, which quickly exhausted those deposits amenable to working by small-scale methods.

After the rush the serious development of Bulolo began; and it is with this development that this study is primarily concerned. It largely derived from the imagination and business acumen of a few men, and from the superb organisation and detailed planning which went into the operating company, Bulolo Gold Dredging Limited (BGD). To overcome the tremendous obstacles to making Bulolo a viable enterprise they invented new designs and new methods, and pioneered the bulk air transportation of heavy equipment.

But this is not a benedictory tribute. I have tried to set out clearly the choices the company faced, the ways it made its decisions, the risks it ran, and the mistakes it sometimes made. What emerges is the picture of a highly profitable organisation which earned its wealth through hard work, foresight, and careful financing. Moreover, BGD had to build itself up three times: the total destruction during the Pacific War necessitated complete reorganisation in 1945, and as gold dredging petered out in the 1950s, the company diversified to keep its assets working and the Bulolo community alive.

If BGD comes out of this history with credit, it is because the credit is deserved. There are many sides to the argument one hears about foreign companies taking mineral wealth from poor countries, but none detract from the skill with which the job is done.

Chapter 1

Isla del Oro

Like most previous substances, gold derives its value from its scarcity in extractable forms. Its value generates a will to seek it out. This leads to a series of observations and analogies, which may eventually precipitate a major strike. In New Guinea the history of this process extends over four centuries.

The possession of gold and silver was a means to political eminence in sixteenth century Europe, and in 1525 Antonio Pigafetti associated New Guinea with the legendary Ophir, the Golden Isles, whose king he described as 'exceedingly rich in gold' (Kelly 1959:13). Three years later Alvaro de Saavedro sighted New Guinea and named it Isla del Oro, the Golden Isle; but in 1545 Inigo Ortiz de Retes was disillusioned by his visit to the north coast and set out to destroy the idea that New Guinea was a land of riches. The supposed location of Ophir tended to move further east thereafter, but the conviction that New Guinea was a land of virgin wealth lingered on.

The expedition of Quiros in 1605 perpetuated this conviction. Although personally sceptical of reports of gold in the southern ocean he sought financial support for his expedition by quoting the Captain-Mayor of Tidore, that New Guinea

is a land of much gold, of which the natives make chains... and bracelets which the women wear on their neck and arms, and the men on pommels of their swords; and that they have silver, and do not value it, and pearls to which they pay no heed.... (Kelly 1959:15.)

The predominance of Dutch mercantile capitalists in the East Indies early in the seventeenth century meant the end of a direct interest in gold. They sought profitable avenues for the exchange of Dutch goods for local goods; especially spices and silks, which could be monopolised, were not bulky, and could be relied on to bring consistently high prices in Europe. New Guinea's reputation as a potential source of gold receded; and as more became known of its swampy and jungle-clad coastline during the eighteenth and early nineteenth centuries, the less incentive was there for anyone to try to make his fortune by plunging into it in search of gold.

The revival of the idea that New Guinea held gold depended on scientific observation and shrewd deduction. This was followed towards the end of the nineteenth century by hundreds of hardy, experienced prospectors. Viewed in the perspective of a hundred years or more, the course of the gold search in New Guinea can be seen as a series of connected steps within a steadily shrinking circle, eventually focussing on the Edie Creek/Bulolo area in the 1920s.

The scientific phase of the search began in 1852 when the naturalist, John Macgillivray, who had accompanied Capt. Owen Stanley in the survey ship Rattlesnake in 1846-50, published his observations in London. He noted that the geological formations in the Louisiades Archipelago consisted of a mica-schist frequently found in association with gold. The direction of this and similar schists in the Calvados Chain pointed to the mountains of the main island as the major formation of which they were projections. Moreover, Macgillivray found traces of gold in pottery at Redscar Bay. The potting clay came from alluvial deposits which he assumed were washed down from the Owen Stanley Range.¹

There were doubters too: Otto Finsch (1865:16) concluded in 1865 that no evidence of precious metals had been found, though he may have been anxious not to arouse Australian interest. Other German writers later reported that in 1866 further traces of gold were found in pottery from the south-east.²

Macgillivray's book was a little too early to arouse Australian interest. By the 1870s, however, there was a very different atmosphere. The output of the Australian goldfields dramatically raised both personal incomes and government revenues, and provided incentives for the extension of the search. The fields also produced mineralogists and prospectors who knew what to look for; and gave rise to a nomadic, disappointed breed of digger who had always arrived at other fields too late and was prepared to take any risk to be first on a new find. A political factor complemented the economic one: in Australia in the 1870s a growing body of opinion sought to annex New Guinea in order to forestall any other power, and was eager to use evidence of mineral wealth to excite British interest.

In the early years of the decade further scientific evidence was brought forward. Richard Daintree, the Government geologist for North Queensland, drew attention to Macgillivray's forgotten

¹ Macgillivray 1852 Vol.2:69. See also Vol.1:188 and 210.

² e.g. Zbiller (1891:431), Blum (1900:111). According to Reed (1943:79), Germans in Australia in that year had urged German annexation of eastern New Guinea.

observations. Daintree had found new goldfields in Queensland by relying on Macgillivray's plotting of geological trends and saw no reason why Macgillivray should not be right about New Guinea too (Daintree 1870).

In February 1873, Captain Moresby of H.M.S. Basilisk picked up gold-bearing quartz on the hills around Fairfax Harbour (Moresby 1873-74:9). He tried to play down his discovery, saying that too much stress on mineral wealth would attract 'the least valuable, because the least plodding, class of colonists'. He feared the 'evils attending a gold-rush' and felt that the immediate need was for agricultural settlement (Moresby 1876:154, 326).

He was supported by the missionary W. Wyatt Gill, who was anxious not to see the natives demoralised by contact with white prospectors. Gill (1873-74:29-30) tried to dispel the impression that there were payable quantities of gold and pointed out that in three visits to the island he had seen none. He implied that in previous reports pulverised shells in native pottery had been mistaken for flake gold. This is unlikely in fact as Macgillivray was an accomplished conchologist.

The caution shown by Moresby and Gill was thrown to the winds by the Victorian Agent-General in London. In a rousing address to the Royal Colonial Institute in 1874 he inflated Moresby's pieces of quartz to 'gold reefs'; and to add subtle encouragement stated that it would be ridiculous to try to prevent a gold-rush (Michie 1874-75:129-38).

The question of New Guinea gold had now become involved with the agitation for Britain to annex the eastern sector of the island. In 1875 a delegation from the Royal Colonial Institute, mixing economic and humanitarian motives, petitioned the Secretary of State for the Colonies for British annexation which they claimed was imperative inter alia, to protect the natives from the diggers when the gold discoveries became widely known.¹

Rumours of a rush were bound to provoke one, as many annexationists undoubtedly hoped. The spark was provided by the rediscovery of gold quartz near Port Moresby in 1877 (Von Gnielinski 1958:78). The news leaked to Australia and, despite press warnings of the dangers, scores of ill-equipped prospectors arrived, many to die of fever and malnutrition within months.

Prospecting was carried on successively in the Louisiades, Milne Bay, and then in the north-east of British New Guinea,

¹ New Guinea Deputation 1874-75:191-3. On British aversion to becoming involved, see Sir W. MacGregor's Introduction to Murray 1912:21.

adjoining German territory. In the latter area payable gold was found on the Mambare River in 1896, and on the Gira in 1897. From the Gira prospecting extended northwards to the Upper Aikora, and then to the Waria River, which ran for most of its length through German New Guinea (Murray 1912:323-4).

Prospecting and panning in this region long entailed grave risks for the miners and complications for the government. For many miners low profits provided a constant incentive to go further afield. Prospectors strayed well beyond the frontiers of administrative control, sometimes spending months in unexplored country; mountainous and jungle-covered, and inhabited by people who were constantly fighting amongst themselves.

Gold quickly assumed an important place in the economy of British New Guinea. During the first decade of administration the colony produced at least 27,600 ounces of gold, at a value of £3.15.0 an ounce. During that period (1888-98) gold represented 54 per cent of the total value of the colony's exports.¹ Probably a great deal more was taken out but not declared to government.

¹ British New Guinea Annual Report 1897-98:Appendix p.xxxviii.

Chapter 2

The Germans and the gold search

The German annexation of north-eastern New Guinea, which influenced the search for gold there, began with the flotation of the Neu Guinea Kompanie in 1884 with a capital of six million Marks. It was granted Imperial protection for land secured from the natives in unannexed New Guinea.

Dr Otto Finsch, on behalf of the Kompanie, then made treaties for land with native 'chiefs'. German gunboats followed Finsch and raised the Imperial flag. In 1885 Britain and Germany defined their spheres of influence in New Guinea; and an Imperial Charter authorised the Kompanie to exercise sovereign rights in the name of the Government over north-eastern New Guinea. These rights were surrendered in 1899 when the Imperial Government assumed full responsibility for the colony's administration.

German policy concentrated on the production of raw materials (coal, oils, cotton, etc.) for her developing industries. This policy was unsuccessful but it dominated German thinking and discouraged the search for gold. The Germans' main achievement was in agricultural development in coastal areas. It did not lead to the far-ranging activities of gold prospectors which helped open up the interior of Papua, and which by the 1890s gave gold a major place in Papua's economy.

As far as the search for gold was concerned, German exploration was ill-directed and badly planned. They tended to place their faith in massive expeditions with dozens of scientists of assorted persuasions and hundreds of native carriers. Such expeditions had a wide variety of objects, geographical, geological, ethnological, economic, and so on. This thoroughness reduced mobility and single-mindedness, the very qualities which gold prospecting in New Guinea demanded. As early as 1891 Hugo Zöller (1891:181-2) pointed to the discrepancy between gold prospecting methods and successes in German and British New Guinea and insisted that payable gold would be located only by following the methods used over the border: Australian prospectors should be allowed, even assisted, to range into the mountains and should be given some assurance of adequate rewards from their finds.

Until 1906, however, there was no mining code for the German colonies. An article in the Sydney Morning Herald in 1897 pointed out that prospectors from the Mambare in British New Guinea could not be expected to stay on their own side of the border, even if they carried instruments to pinpoint their position; it was felt that if Germany could be persuaded to pass a mining law similar to that of Queensland or New South Wales, and to pursue a policy of limited non-interference, 'the ripe fruit will fall at her feet though she never lift a finger' (Blum 1900:140-5).

The failure of the Kompanie and, later, of the Imperial Government, to follow such a policy seems to have been due partly to an attitude of national exclusiveness. The determination to concentrate on the coastal areas probably also contributed, for officials were aware of the involuntary extensions of government influence which the activities of prospectors had compelled in British New Guinea.¹

Despite the uncertainties, many Australians applied for permits to seek gold in German New Guinea during the 1890s. Substantial financial interests were sometimes involved; but the Neu Guinea Kompanie reserved its rights. In the spring of 1897 however, a party of Australian prospectors received some help from von Hagen, the Landeshauptmann in Herbertshöhe; but his hands were tied, and although the party found traces of gold on the Astrolabe plains, the restrictions on their work seem to have made its continuance impracticable.

Because of their agricultural policy, the German Administration was not anxious to find gold. It has been claimed that Germans who made money by other means - for example, from Bird of Paradise plumes - were under an obligation to clear land and plant palms in proportion to their profits; and, according to one report, enquiring prospectors were told that one-third of all their gold proceeds would have to be reinvested in agricultural development.²

German economic conditions and the world's gold position did not impel a desperate search for gold. In Germany gold did not represent a direct source of income as an export commodity. Its value depended in the first instance on its function as a stabiliser of currencies and of exchange, and thereby of the growing industrial economy. It is significant that commentators

¹ See Blum 1900:112. Blum had been in direct correspondence with MacGregor, Governor of British New Guinea, who had led more than one relief expedition to extricate prospectors.

² For example, see an article in the Sydney Mail, 13.10.1926; also private information from a contemporary German resident.

such as Blum, who were anxious that the Imperial Government promote or at least not discourage prospecting, argued that a gold strike would be an incentive to inland development, leading to the production of more raw materials for industry (Clapham 1936:Chapter 8).

Some formal recognition was, however, given to the gold search when the Neu Guinea Kompanie was granted an exclusive concession to continue gold prospecting in the Ramu area after it surrendered its charter in 1899. Expeditions promoted by the Kompanie found many traces of gold on the upper Ramu about the turn of the century, but nothing in recoverable concentrations. All these expeditions were hampered by the wide range of studies to which they were expected to devote themselves (Werner 1911:10-11).

A similar exclusive concession, to search for gold over the south-eastern part of the possession, was granted in 1901 to a syndicate under the control of the Disconto Gesellschaft of Berlin. Between 1901 and 1904 this syndicate established temporary bases at the Markham River mouth and at Salamaua, explored the Francisco River, and found positive evidence of gold in the sands of the Waria River. Again, however, a good deal of time and money was spent on scientific work not directed towards finding gold, and the syndicate ceased operations in 1904.¹

The great expense and lamentable failures of these expeditions ended the phase of exclusive concessions, and opened the way for the small prospector, though no policy pronouncement to this effect was made. In 1906 the Imperial Government gazetted a Mining Ordinance applicable to all the colonies except South-West Africa.² This defined the maximum permissible sizes and configurations of claims and leases, the land taxes and royalties (1.5 per cent on the value of metals extracted), conditions and penalties for breaches (e.g. a fine of 3,000 Marks or gaol for six months for mining without taking out rights, or for trespassing). The conditions were reasonable and could be altered according to circumstances (Section 95). The change in attitude towards prospecting was opportune, for pressures towards the border from the Papuan side were very strong. And before 1906 those prospecting and mining in northern Papua included numbers of Germans (Macdonald 1907:171, 180-1).

None of the Papuan fields was sufficiently valuable to satisfy all the miners who flocked there. The prospectors moved northwards,

¹ Annual Reports on German New Guinea: 1900-01:18; 1901-02:23-4; 1902-03:13; 1903-04:3. Traces of gold were reported around the Huon Gulf as early as 1886 (Eckert 1937:467), but it was fifteen years before attempts were made to follow up such reports.

² Kolonial Gesetzgebung X, 27.2.1906.

following the general trend of gold occurrences delineated by Macgillivray, which led into the river sources within the coastal ranges. No one doubted that gold was there; it was simply a question of tracking it down (Pratt 1906:340; Ford n.d.:17). In 1906 C.A.W. Monckton, the resident magistrate at Ioma, made a patrol to the Waria River to verify a report of gold, made by two prospectors, Crowe and Darling, to find how much of the river lay within Australian territory, and to determine whether it would be worthwhile constructing a road to the area. He reported 'very good gold-dredging propositions' along about two miles of the river on the Australian side of the border (Monckton 1922:233).

There was no sensational strike; but from then on Australians drifted north to the Waria and filtered across the border. Official German attitudes to this movement are not clear. Lyng (n.d.:65-6) claims that they discouraged it whereas the miner Pryke claimed that although prospectors believed that the Germans did not like anyone prospecting in their territory, the German Governor Hahl had assured him that such was not the case, and allowed him and his brother to continue until their claim had been worked out, without paying royalties on gold shipped or duty on foodstuffs imported.¹

The cause of the change in the German attitude seems to have been plantation problems rather than the desire to extend administration inland. The rapid development of coastal plantations caused an acute shortage of labour; and the mountain areas constituted possible sources of supply (Rowley 1958:110; 1954:824). The German Annual Report for 1907-08 speaks of British miners in the vicinity of the border as 'exerting a pacifying influence on the natives'. This is surprising because in Papua miners had usually created situations which demanded government pacification.

In 1909 a government station was founded at Morobe to open up the Waria and to facilitate the delimiting of the border. By 1913 the Germans had built a road inland to the watershed of the Mouandinimbar, a tributary of the Waria, and another to the lower Waria, the latter being twenty feet wide, with twenty-two bridges (Rowley 1954:828-9).

Because the country around the intersection of the watersheds of the Waria/Ono and Watut/Bulolo systems was very rugged, the Germans failed to penetrate the area, for the natural ingress lay via the river valleys from the Markham to the north (Hahl 1942:92).

A route from the south was eventually found by the missionary Pilhofer in 1913. Following mountain paths in the vast tangled wilderness between the upper Waria, the upper Piaru and the upper

¹ An unidentified press-cutting, amongst Pryke's private papers.

Watut, his party crossed a plateau 8,000 feet high and eventually rafted down the lower Watut to the Markham junction.¹ Had the war not intervened, this journey might well have been followed up by prospectors.

The emphasis on the Waria after 1906 diverted further attempts to penetrate the Watut/Bulolo area from the north. Ehlers and Piering passed through this area from the Markham in 1895, but did not survive to relate their journey. Further exploration was deterred by the savage reputation of the Watut people and it was not until 1909 that Dammk hler and Old rp made another attempt and found gold. Dammk hler was killed by natives but Old rp struggled back with the news. He organised a new expedition but was drowned the day he arrived back at the Markham. Neuhauss (1911, Vol.1:442-4; see also Zimmermann 1912:372-6) published Old rp's story, but it seems to have discouraged further prospecting. He implies, however, that an 'English' prospector was on the Watut in 1910.

After 1910 the German Administration encouraged prospecting and at the same time tripled its aid to the colony. This was directed to agricultural development, but it was hoped that gold returns would give immediate relief.

During 1911 and 1912 various small miners held prospecting and mining rights and several syndicates were formed to exploit the Waria sands. The Waria Syndicate claimed that the Imperial Government in Berlin had given them exclusive rights to the entire area between the Waria and Markham rivers. Though local officials contested this claim, the rights seem to have been yielded as the Australian prospectors Park and Preston were in 1913 given the right to prospect in the whole district inland from the Huon Gulf, excluding that allocated to the Waria Syndicate.² Such interference from Berlin, though expressly embodied in the 1906 Ordinance (Sect. 93), threatened to bog prospecting down; but the man behind the Waria Syndicate, Rudolf Wahlen, had considerable influence with the Imperial Government. It was almost established procedure for the large companies to secure rights in Berlin which they had been refused in New Guinea (MacKenzie 1937:113). The claim to exclusive rights was revived by Wahlen and others in litigation forty years later, when they claimed compensation for the exploitation of Bulolo (German Government Records CP 103).

According to the German Mining Ordinance, the maximum size for any one alluvial lease was 100 hectares, but apparently there was

¹ Pilhofer 1915; a summary appeared in The Geographical Journal, Vol.XLVII:65-6.

² German Government Records CP 103, Set 11/188/011.

no limit to the number of such leases. Records show that one miner with extensive concessions was obliged to install equipment on only three leases at any one time. Restrictions on the number of native labourers employed were probably caused by the continuing agricultural bias in a time of acute labour shortage.¹

Gold royalties are one of the most striking provisions in the agreement. Under the 1906 Ordinance, a tax of 1.5 per cent of the value of metals extracted was authorised, though local authorities could in some cases depart from this provision. In one agreement, however, royalty was set at one-eighth of the value of metals extracted during the first five years, a quarter of the value during the next five years, and no less than half thereafter (German Government Records CP 103). Such a provision took no account of the marginal nature of the Waria sands. In 1914 the Director of Mines from Hindenburg, Silesia, estimated that the Waria contained 900,000 cubic yards of wash, but of an average value of only fourpence per cubic yard (Taylour and Morley 1933:5). This was not enough to make the river workable by machinery, and the only extraction method attempted was simple boxing. In 1912 this yielded the only gold reported to the Administration in the German period, though no doubt a certain amount was taken across the border by Australians. A total of only fourteen ounces was exported through the German Customs.²

The one significant feature of German policy when the war supervened was the assistance being given Australian prospectors. Had these men stumbled on the riches of Koranga and Edie creeks, the Germans might have tended to restrict substantial concessions to their own nationals, and there was statutory provision for all gold proceeds to be realised through the Reichsbank.

One of these prospectors did make a valuable strike. Arthur Darling, one of the pioneers of the Waria, ignored German warnings and disappeared alone into the mountains behind Morobe. It is said that he found gold at Koranga, which Park relocated nine years later; according to one account he showed nuggets to a German official (Demaitre 1936:43-5; Taylour and Morley 1933:6), but he was attacked by natives and died without revealing his route. Gold was again found in 1913 by a German party (German Annual Report 1912-13:28; Taylour and Morley 1933:6). Thus the scene was set for intensive prospecting in this area when the war ended.

¹ See H. Klink to Administrator, Rabaul, 3.3.1914, CP 103, Set 11.

² Hershheim Company (Rabaul) to Administrator, 24.7.1912 and 31.10.1912 - German Government Records CP 103 Set 11. Also Hahl 1942:92.

Chapter 3

Hiatus: World War I and the Australian occupation

New Guinea was the scene of the first military campaign by Australian troops in World War I. In September 1914 Colonel W. Holmes was appointed Administrator of the Territory, which he hoped would be 'held for all time as a British possession for Colonizing purposes',¹ meaning by this a continuation of the German plantation policy, with Australians as settlers.² This interest diverted attention from mineral possibilities.

Morobe was the last administrative district to be occupied, in March 1915. The new Administrator, Col. S.A. Pethebridge, noted the absence of plantations in the vicinity which he felt to be due to 'the possibility of considerable gold deposits being discovered in the Warrio [sic] river'.³

A.M. Davies, a corporal with some mining experience, was asked to investigate and reported that the Waria sands all contained gold, but in such light concentration that only small-scale treatment might be profitable.⁴ This was the last mention of gold prospects under the military Administration.⁵

In the Morobe District the only developmental activity was the laying out of a government plantation, to be worked by the natives

¹ Holmes to Minister of Defence, 29.9.1914 (Australian War Memorial Archives).

² 'British Administration of German New Guinea', Government Gazette, Vol.1, No.3, 15.11.1914.

³ Pethebridge to Defence Department, 10.3.1915.

⁴ Ibid., 29.4.1915.

⁵ After the war, when the major gold strikes had been made, C.H. Nelson, who had been in charge at Morobe in 1915, claimed to have reported substantial gold occurrences inland; but nothing can be found in the records to support this (Melbourne Herald, 28.6.1926).

in lieu of head tax.¹ The Officer in Charge in 1919 looked forward to the early exploitation by Australian settlers of the 'rich alluvial land' and forests along the Markham and its tributaries,² but gold discoveries of the 1920s ironically delayed the realisation of this hope for thirty years.

No one did any further inland exploration during the war years, with the possible exception of a surveyor named Detzner who claimed epic treks between 1915 and 1919, during which he crossed the Upper Watut and travelled along its eastern watershed (Behrmann 1919:371-6). However, a missionary claimed that Detzner spent the war near a mission station, drawing on the experiences of pioneer missionaries for his mythical travels.³ Detzner's story may be imaginary, but it must have given confidence to the post-war prospectors.

The granting of a Mandate over the former German possession to Australia, and the proclamation of civil administration in May 1921, opened up New Guinea to gold prospectors. Many of the 'old-timers', veterans of the Yodda and the Waria, lost no time in returning.

¹ Brig.-General G.J. Johnstone to Defence Department, 27.8.1918.

² Dillane, quoted by Johnstone, 4.3.1919.

³ Letter by Rev. F.O. Thiele, 17.5.1943.

Chapter 4

Koranga, Edie Creek and the small miner

In 1922 William (Sharkey) Park located payable alluvial gold on Koranga Creek. The story of his success has been told too often to bear repetition but it was a just reward for twenty years of persistence and daring (e.g. Idriess 1933:26-31; Rhys 1942:71-2). Park went into partnership with J. Nettleton, a former police officer, but it was some time before news of the discovery seeped down to the coast.

At that time the District Officer at Morobe was Cecil John Levien who later promoted the Bulolo valley as a gold dredging proposition; as the official responsible for the district, he knew precisely what progress was being made with prospecting, particularly after the promulgation of the first Mining Ordinance in 1922.

By 1923 Levien was financing Nettleton and Park. He acquired interests in a number of leases while still stationed at Morobe, transferring them to his wife; then, feeling that this arrangement was not compatible with his official position, he resigned from the administrative service towards the end of 1923 (Rabaul Times, 29.4.1927).

Mining in 1923 was still on a very small scale. The efforts of Park and Nettleton did not attract much attention; by later standards Koranga was not phenomenally rich, and only about twenty miners were working it, with primitive races and boxes (Waterhouse 1932:14).

The interest of those who looked for bigger returns was still focussed on the Waria River. Dredging and sluicing leases covering 9,220 acres had been applied for on the river, though operations were confined to testing whether values warranted the expense of going further (New Guinea Annual Report 1922-23:52-3).

A German, Kempf, who had held the pre-war concessions, was behind the moves to test the Waria. Through a noted Melbourne businessman two companies were formed, backed by a prominent member of the Melbourne Stock Exchange, a leading broker, and an industrialist, to investigate the Waria coastal tract and the enormous valley terraces. Intensive interest in the area had

been aroused by the claim for indemnity, reputed to be in the region of £4 million, which the former German Waria Syndicate had lodged with the Australian Government. Two well-qualified mining engineers, B.V. Barton and J.C. Coldham, were commissioned to examine the valley and the coastal tract respectively (private information).

The Waria testing proved disappointing and Barton and Coldham went on to investigate Koranga. Barton appears to have had some backing from a new syndicate, Kaili Gold Options N.L.; in late 1923 and early 1924 he put down a number of pits on the upper Bulolo between Edie Creek and Wau Creek; he concluded that the values were regular and warranted further investigation, but that because of the lack of adequate transport, the option taken by the company should be surrendered. On what later became Kaili 4 lease, immediately below the junction of Koranga Creek, Barton estimated 1,103,000 cu yd, of a value of one shilling and tenpence per cu yd (Waterhouse 1932:14).

When Coldham arrived at Koranga in September 1924 George Arnold was getting good returns on the main river and from shallow beaches at the lower end of the Bulolo gorge, but Arnold was unable, with primitive equipment, to reach bedrock where values would be more concentrated. Coldham moved downstream to the Watut junction and immediately realised the probable extent of the gold flow, as the river had meandered over a wide, flat valley for thousands of years. The prospectors regarded the flats as unworkable; and for a small man, the quality of the valley gold was not high.

Coldham made a reconnaissance testing of the central section 'by sinking about 30 potholes to water level and taking pan samples as the potholes were being deepened' (private information) and found that rich values began below what was workable at a profit by the means then in use. He concluded that Bulolo was 'a textbook certainty' and on his return to Arnold's camp pegged out six leases in the names of himself and the five Melbourne directors. When he returned to Melbourne, however, he found that his and Barton's adverse reports on the Waria had killed all interest in the investment of further capital.

This left the field open for Levien, that rare and formidable combination of opportunist, practical man and visionary. Already in his early fifties, he had mined in Western Australia between 1893 and 1906 and had extensive administrative and military experience since then. Although tests had shown that there were probably vast areas of gold-bearing gravel, others had passed them by because transport was lacking or capital could not be raised. Difficulties of this kind only roused Levien's determination and stimulated his imagination. During 1924 Levien continued working his Koranga claim, and at the same time watched the trend of results as other miners moved up and down the river. He noted

that some of the late arrivals won up to eight ounces per box per day by washing the beaches in the gorge, just above the flats, and he concluded that surface deposits, adjacent to the streams and recoverable by simple methods, were only a sample of what must have been gradually deposited on the flats. He realised that the phase of primitive exploitation by individuals must give way to large-scale development by companies with substantial capital.

Early in 1925 he moved down to the flats and conducted his own tests by sinking a long line of shafts. From these he estimated that he could peg an area of 2,000 acres containing a dredgeable yardage of 23,000,000 cu yd, for a gold value of two shillings per cu yd - an estimate, as it later proved, remarkably close to the truth. An integrated plan was taking shape in his mind. He noted that ample water was available for hydro-electric power; a timber industry could be created to pay the cost of a road or light railway to the coast, via the Markham and Watut; recognising that transport was the key problem, he even mentioned 'aviation possibilities'. He stated frankly that it would be pointless rushing into the proposal without further thorough investigation - though he thought optimistically that about £7,000 might be adequate for a start. Finally, he asked an accountant friend, C.V.T. Wells, to secure support in Melbourne for what he called 'a really good gold-dredging and saw-milling proposition' (Idriess 1933:100-1).

The essential features of the Bulolo of the 1930s were thus already mapped out in Levien's mind, but nobody was interested: so many glorious gold prospects had been claimed in New Guinea that Australian financial circles had become disillusioned. Then providentially came the big strike at Edie Creek in 1926. This regained the interest of Australian financiers, and led ultimately to a clarification of laws and official attitudes, allowing large-scale development.

In January 1926 W. Royal and R. Glasson decided to ascend Mt Kaindi in the hope of locating one of the main sources feeding alluvial gold into the Bulolo. They had to struggle upwards through damp, clinging undergrowth to an altitude of more than 6,000 ft before the stream levelled out to some extent. It was later shown that at this point upper Edie Creek tumbled over a barrier of hard slate which constituted a natural wall retaining most of the heavier gold.

The men had only to wash one or two dishes at this level to know that they were on to a strike far more valuable than anything yet known in Papua-New Guinea. Royal returned to Bulolo early in February 1926, and brought in four other men (F. Chisholm, W. Money, J. Sloane and A. Royal), and 'The Big Six' then pegged out the bulk of the most valuable ground.

The administration of the area created some difficulties. There was no government official at Bulolo, so that all claims for

registration had to be sent through messengers to Salamaua. A surveying party was not sent to the field from Rabaul until July. Moreover, the Mining Ordinance of 1922 was badly constructed and ill adapted to the kind of alluvial conditions found in the Edie-Bulolo area. Dredging and sluicing leases to the extent of 240 acres could be applied for, but the area could be pegged out in any shape so that, if approved, it could take in virtually the whole of the land worth working (Argus, 23.8.1926).

There was, too insufficient protection for the small miner. On a new field such as that at Edie it was customary for miners' claims, of small area, to be given priority until the potentialities had been more fully revealed. Company development was also obstructed for the legislation allowed individuals extensive pegging rights without adequate safeguards. These faults were to provoke much agitation and, ultimately, reform.

Due to the actions of the Six, the inaccessibility of the field, and sceptical reactions in the Australian press, the major rush to Edie did not begin until the second half of 1926. Edie Creek lay in an 'Uncontrolled' area, which meant that no one could travel there without official permission, and the Administration curbed immigration, mindful of the rush to the Lakekamu field in Papua in 1923, when 147 men died from dysentery alone in three weeks (Rabaul Times, 29.10.1926).

Few native labourers, even at £20 to £25 each, were willing to walk to Edie and work in the cold and the damp, and this restricted prospectors. The Administrator warned that Edie was not 'a poor man's field'; and the Rabaul Times calculated that financial backing of at least £700 was needed to satisfy the Administration that a prospective miner was capable of beginning work on a claim and of meeting his initial commitments (Rabaul Times, 29.10.1926).

For those who did raise the capital, travel to Rabaul and then to Salamaua, satisfy the Administration, and finally make the exhausting eight day climb over the mountains to Edie it was frustrating to find that the best ground was already in the hands of six men.

Angry protests were made throughout the second half of 1926. Though not directly involved, Levien was one of the principal instigators of the criticism (Rabaul Times, 29.4.1927). He thought to promote his own properties by using the agitation as a platform which would publicly connect his name with the area, and to demonstrate to the Administration how different his proposed development of Bulolo was from the exclusive pegging at Edie.

Levien knew that with the publicity of the strike, it would now be possible to raise capital, and on 22 February 1926 he sent a coded cable to Wells in Adelaide:

Phenomenal alluvial gold has been found at Edie Creek five miles from Kaili. Believe reef also. Get busy.

Cecil.¹

Wells approached F.A. Joyner, a solicitor, W.H. Lapthorne, a merchant, and A.E.H. Evans, a prominent accountant who was able to call on a wide circle of potential investors. This group floated a company known as Guinea Gold No Liability, which was first registered on 18 May 1926.² The public standing of the directors gave the company security, but it was hindered by the risks associated with any new mining venture.

The nominal capital initially was £2,000 in £1 shares, of which 800 were issued in lots of 50. Despite Levien's optimistic reports, no claims were made at any stage that did not have adequate, expert substantiation. This policy differed from those of other small companies which sprang up in late 1926 and throughout 1927, basing all their promises on what they hoped to find. As late as 1931 there was no system of official verification of the claims which went into company prospectuses, and all that the Administrator could do was to warn the public of 'fly-by-night' concerns batten- ing on Edie Creek's reputation and the Australian public's gullibility.

Levien was the only miner who had maintained leases on the Bulolo flats (Dunstan 1931) and one of these, the lease known as Kaili 4, was investigated by Guinea Gold.

A former manager of the Broken Hill Central mine, James Hebbard, was sent to test the area, and within a month he cabled the directors in Adelaide strongly recommending the exercise of the option, adding that he had also made arrangements to secure 1,500 acres on the lower Bulolo River (GGNL Minutes). The directors were now convinced that they were on to something with enormous promise. The authorised capital of the company was increased to £10,000 in July and to £50,000 in September.

Hebbard felt that Kaili 4 had been grossly underestimated when Barton had examined it earlier. He thought Barton had missed the river beds - the river having changed its course many times - and had sampled only the poorer terraces and he fully endorsed with Coldham the probability of greater values at depth on the Bulolo flats; with estimated working costs of sixpence per cu yd, an ample profit margin would be available (Report dated 30.6.1926). The

¹ The original is now amongst Wells' papers, MS 364.

² The first formal meeting to discuss formation was held on 7 May 1926. On 11 May power of attorney was forwarded to Levien in the field (Minute Book of GGNL).

depth of the river deposits was estimated at about fifteen feet, but no adequate testing equipment was available. This proved to be the first of those gross underestimates of depth which were not revealed until 1934.

At that time there was little interest in deeper gravels because transport difficulties appeared insoluble and only light machinery could be brought in. Hebbard's responsibility was merely to ascertain whether there were sufficient reserves of payable gold workable by existing methods.

While Guinea Gold was developing, Levien's interest in Edie Creek continued. By the end of 1926 there were almost 200 men on the field, living in a damp, cold climate under deplorable conditions. Much sickness occurred, and it fell to Mrs Booth, whose Cliffside lease lay along the Edie track at a height of only 3,000 feet, to set up a makeshift hospital and care for both Europeans and natives (Booth 1929:148-71).

Grievances among the miners, caused by official neglect and disappointment, created a situation at Edie which threatened to become ugly. As early as May 1926, protests at the extent of the 'Big Six' leases were being sent to the Administration. Levien, although he had no claim, played an instrumental role in the sending of one such letter.¹

Levien was also a member of the Morobe District Miners' Association, which was created in order to have clarified the question of leases and claims. The lack of a resident official and of surveyors was largely responsible for the allocation of leases instead of claims on new alluvial ground. In August the matter of the leases was raised in the Australian Parliament.²

The Association opened a campaign by pegging the whole area, including the leases, into individual claims, which were then ballotted. As some who started work on these claims were heavily fined, every man put a spadeful of ground through a sluice-box, making all equally guilty. When reported in the Australian press,

¹ Levien claimed that the situation was analogous to that on the Nami Creek, where he had been refused a lease under similar circumstances; and pointed to a similar anomaly in the Merri Creek area, where Guinea Gold was interested in a claim and another man had been granted a lease (Rabaul Times, 29.4.1927). Whereas a lease could be 240 acres, a claim was limited to 200 feet by 100 feet.

² H. of R. Debates, 3.8.1926, Vol.114:4771; also Sydney Sunday News, 15.8.1926.

these activities caused the Government some embarrassment.¹ In November 1926 the Association cabled the Prime Minister requesting positive action on the disputes surrounding the leases, the appointment of a warden, and medical facilities. A representative was also sent to Australia to press for an enquiry (Anon. 1928:153).

Levien, through an agent, had drawn one of the ballotted claims, but his real motives for participating in the Edie Creek dispute stemmed from his dissatisfaction with the Ordinance and Regulations, and the arrangements for policing them. Without reform, Levien knew there could be no promise of a stable industry attracting substantial capital.

In March 1927 the Commonwealth Government appointed a Brisbane lawyer, P.B. MacGregor, as Royal Commissioner to determine whether the Administrator had granted dredging and sluicing leases judiciously, and whether 'reasonable provision' had been made for the administration of the field (MacGregor 1926-27:3). Levien was one of the most forceful witnesses at the hearings, but the Commissioner attributed his intervention to 'his desire to help the flotation of his own properties on the Bulolo' (MacGregor 1926-27:9). In a sense, this was true; but the enquiry revealed that the Ordinances themselves were inadequate and that their application had been lax. The public hearing was necessary to safeguard future development.

Though the Commissioner concluded that the Administrator had been within his rights in awarding the leases, it was implied that the areas granted had been excessive, and were justifiable only because the reward claims which the Ordinance authorised (a maximum of five, each 100 feet by 50 feet) were totally inadequate. Under Section 37 of the Ordinance (No.19/1922) the Administrator could grant leases up to 240 acres over any Crown land proclaimed a dredging and sluicing area, and though hydraulic equipment was supposed to be used, such leases were normally regarded as a port-manteau category. Levien foresaw that small men, unready or unequipped to treat alluvial ground by dredging or sluicing, could thus keep large areas tied up.

A new Ordinance of 1928, based on the Queensland Mining Act of 1898, rectified the most prominent faults of the 1922 Ordinance. It drew precise distinctions between various Miner's Claims, and Leases which would normally be held by companies; and it provided safeguards for both types of development. For example, Dredging Claims could be granted only over land unsuitable for small-scale working; and Leases could not be granted on any field for at least two years after its proclamation.

¹ Rabaul Times, 1.10.1926; The Age, 8.11.1926. On 16.11.1926 an amendment to the 1922 Ordinance was approved, making the penalty for claim jumping six months gaol instead of £100 fine.

Paradoxically, the enquiry which had come about because of agitation by small miners marked the end of the small mining phase, and paved the way for development by large companies. This change has been vividly expressed by the pioneer prospector and explorer, Mick Leahy. He was successful in the ballot of October 1926 and together with a German named Baum, recovered enough in three days to pay for a return visit to Australia, and medical treatment.¹ At the time he went south, the population of Edie was at its zenith. Salamaua had most of the features of a typical goldrush town. Here miners could be seen buying their stores from Burleigh Corman's sac-sac store and pub, and organising carrier lines for the long haul over the mountains. Ragged, dirty figures stumbled in after three or six months on the field, clutching their winnings in whatever containers they had. The line of thatched shelters spread out along the narrow sandy isthmus and the atmosphere was that of a boom settlement. The Rabaul Times (29.10.1926) wrote:

See 12,000 ozs of gold go abroad the Montoro in one consignment, see a nonchalant bewhiskered miner who stacks his gold in billycans - and has some few! See poker played for ounces, and wagers made in bags of dust, and a yellow mist begins to haze the wits of the cautious. Salamaua may be a flash in the pan, but, WHAT A FLASH!

When he returned from Australia in 1927, however, Leahy noticed a marked change:

The gold rush was over, and mining was entering on a new phase - that of big business. The talk was now mostly about dredging leases rather than claims. It had begun to appear that large, low-grade deposits of alluvial gold along the larger streams, that could be worked with modern machinery handling hundreds of tons of gravel a day, were of much greater importance than rich but limited deposits on the creeks. (Leahy and Crain 1937:45.)

The inauguration of this phase was largely the work of the Guinea Gold Company.

¹ On some claims it was possible to win up to 200 ounces in a day. For a detailed description of the primitive methods used, see Booth 1929:87.

Chapter 5

The Guinea Gold phase

From 1926 to 1929 the alluvial gravels of the Bulolo were thoroughly explored. The Guinea Gold Company took the lead, and between May 1926 and February 1928 spent £45,000 establishing a settled organisation on the field and an air service from the coast, working a lease at Koranga, and testing more thoroughly the Kaili and Southern leases.¹ Early in 1928, the realisation of the enormous potential for development persuaded it to offer options to companies capable of raising adequate capital.

During Hebbard's first visit, in June 1926, he and Levien adopted a policy of widespread pegging and took leases as far as the Watut junction, giving Guinea Gold control over the major alluvial deposits. It was not the case of a giant arbitrarily pushing out small men in order to monopolise the ground, as some later claimed. The small miners who had tried simple boxing methods there were happy to give up, and astute men like George Arnold recognised the need for machinery and more capital (Hebbard to GGNL, 21.6.1926). This was true of Edie Creek as well. The warden's report for June 1927 stated that only those well versed in mining would get paying returns, but that there was a large field open for 'miners who are able to bring water on to higher points and terraces and who have a knowledge of mining by deep lead and tunnelling'.

The Administration was sympathetic to large-scale exploitation by companies. It is not clear how far Guinea Gold intended working the Bulolo Valley. The published Memorandum and Articles of Association listed (Section 2, d) the buying and selling of mining leases as one of the objects, as well as prospecting for, mining, and marketing gold.

During 1927, while the company investigated the hastily acquired Bulolo leases, the Koranga and Kaili leases (known as the upper leases) were developed. These were sold by Levien to the company in August 1926 for £9,800, which Hebbard pronounced as 'very reasonable'. The following month Levien was appointed field superintendent,

¹ Summary at General Meeting of Guinea Gold Shareholders, 28.2.1928.

with Coldham as resident mining engineer. Through Levien's close acquaintance with the district, 140 native labourers were procured, despite the general shortage. Unsystematic work on Koranga yielded 300 ounces of gold in six weeks; and in November 1926 an hydraulic elevating plant was ordered from Sydney.¹ Some returns were essential in order to maintain confidence and provide for the testing program: during 1927 Coldham carried out further tests by shafting on the southern Bulolo leases.

Hebbard was astounded by the lack of government interest in the transport problem when it had so much to gain from a rapid expansion of mining. He suggested that a light railway, possibly up the Francisco River, might be practicable, or else Guinea Gold should consider establishing its own air service² (Report of 29.5.1926). He had heard that an air transport company, which could reduce the cost of carriage to twopence per pound, was mooted.

The Adelaide directors of Guinea Gold moved quickly to forestall the inauguration of an air service by anyone else. Levien encouraged them, calculating that even on a conservative estimate, the profits to be made from air freight were 'startling'. Land for airstrips had been secured, and a weekly minimum freight of 20 tons to serve the 150 whites and 2,000 natives on the field was certain (GGNL Minutes of 16.12.1926).

The Salamaua Development Co. Pty Ltd had issued a prospectus stating that it had an option on a DH37 aircraft which was capable of carrying a useful payload of 600 lb. Wells contacted the principals, P.D. Mackenzie and H.S. Holdgate, and in December 1926 Guinea Gold took over the DH37 for £2,500 cash and 500 fully paid Guinea Gold shares and agreed to contribute up to £1,500 to put the service into operation. Mackenzie and Holdgate became employees of Guinea Gold, and had to agree not to engage in any form of competition for two years after the termination of the agreement.

The tiny DH37, piloted by Captain E.A. Mustar, began services between Lae and Wau in April 1927. Twice a day, five days a week, he followed the Markham, Wampit and Watut valleys into Wau, flying between mountains rising to 10,000 feet on one side and 8,000 feet on the other, with cumulus sometimes as high as 20,000 feet and extending to within a few hundred feet of the ground. The Wau airstrip was on the lower side of the mountain

¹ Minutes of 14.11.1926; Melbourne Argus, 15.11.1926. Levien held 2,500 of the original 10,000 shares; when the capital was increased to £50,000 he was awarded a further 600 shares.

² Carriage by porter at that time cost as much as 2s 4d per lb, and although the porters set off with regulation loads of 50 lb from Salamaua, they ate 20 lb of this in rations before reaching the field.

triangular in shape, about 800 yards long, 75 at the top and 400 at the bottom. Very high trees all round. From the timber at the lower end, for...200 yards, it is flat and soft. Then...a slope of 4 degrees, for the next 400 yards. Next...a slope of about 2 degrees. The balance is 4 degrees - perhaps more.... One must land up the slope - and hang the wind! Its usual direction is up the hill, too.... a small watercourse cuts the top end in two... so I use a piece of ground about 150 yards long by about 40 wide. (Mustar 1927:102-3.)

The service during 1927 was nevertheless regular and profitable and during the first six months 80,000 lb of freight and 150 passengers were carried. The single fare of more than £33 and freight costs of 1s 6d per lb, caused concern to those weighing the prospects of large-scale development. W.H. Corbould, a mining engineer who visited the field in April 1928, thought that freight costs (which he reckoned to be £200 a ton Sydney-Edie Creek) were crippling development of the field (Sydney Morning Herald, 28.5.1928). However, Wells of Guinea Gold claimed later that the charges were justified by the risks involved.

Guinea Gold was in a difficult position. Its air service had to stand on its own feet financially; at the same time it was anxious to develop, or persuade others to develop, the Bulolo alluvials, which called for a reduction in transport costs. During 1927 Guinea Gold, with others on the field, pressed the Administration to provide a road link with the coast; but if this had been built, it could well have ended profitable development of the air service.

This conflict of interests was accentuated towards the end of 1927 when Guinea Airways Limited was formed to operate the air service because Guinea Gold, as a No Liability company, could not legally enter into contracts. The new company was registered with authorised capital of £50,000 in £1 shares, 20,000 shares being issued and fully paid up. Guinea Gold received 10,100 fully paid up shares (and therefore control) and Guinea Gold shareholders were entitled to apply for 7,500 shares, in proportion to their holdings in Guinea Gold. The directorates were almost identical, and Wells was chairman of both companies. Nevertheless, there was now a definite responsibility to make Guinea Airways a continuing financial success.

Initially the aircraft were too small to carry machinery, but Levien's dream of air transportation for dredging machinery became a reality in 1928 when Guinea Airways acquired two German W-34

planes which could lift a payload of 1,800 lb. With their introduction fares and freight rates began to drop.¹

While Guinea Gold was floating Guinea Airways, prospects for the development of its leases had appreciated. In April 1927 a Sydney syndicate, Territory Investments Limited, made an offer for the Guinea Gold leases, on the basis of forming an operating company with nominal capital of £100,000 and working capital of £35,000. By later standards this sum was insignificant, but total values were then thought to be relatively small, and the transport problem remained. These factors made 1927-28 a time of chronic indecision, with an unpromising outlook for shareholders. Expenses were trimmed to the bone: Wells admitted in 1928 that 19 per cent of all expenditure had been wasted - the price of experience - but further non-productive outlay was still essential, and the company needed to assess the value of its leases before any sale was possible.

During 1927 Coldham carried out more detailed testing of the southern leases by sinking lines of shafts. He used this method because it was impossible to bring in a Keystone type drilling rig which the conditions really dictated, and he was afraid to use a portable drill because of the high percentage of boulders in the wash. The shafting method, though slow and arduous, was thought to give highly accurate results, and great care was taken. Samples taken at 3 foot intervals indicated an estimated 5 million cu yd valued at 2s 6d per cu yd, 400,000 cu yd at 5s 0d per cu yd, with a further 4 million cu yd of untested wash believed payable (all including overburden). Coldham calculated that if a small dredge could be brought in, working costs could be reduced to sixpence per cu yd. On these figures the southern leases were a valuable proposition.

It was extremely difficult to reach bedrock with shafting, but Coldham felt sure that the depth of the deposit was between 12 and 18 feet, though only six shafts 'bottomed'. Many others, he said, were within a few feet of bedrock, 'which could be estimated from the characteristic blue slimy nature of the wash, which is noticeable close to bedrock in all these deposits'.² A much more experienced engineer in this type of testing, Louis Decoto, in 1929 made a similar assumption.

¹ In November 1927 a contract freight rate of ninepence per lb, for up to 3,500 lb per week, was submitted to the Administration.

² Reports, considered at GGNL meetings of 16.11.1927, 30.11.1927. The area was 730 acres, over 24 chains of river frontage. Value of the gold here was £2.13.0 per oz, according to preliminary tests.

Both engineers had, however, struck a false bottom, a characteristic of placer deposits (see Friedensburg 1953:23) and the real depth in places approached 200 feet. The inability to get big power drills in to Bulolo continued the tradition of gross underestimates of depth begun by Hebbard. This was unfortunate, for it reduced the incentive for both private investment and government to solve the transport problem. Had the enormous extent of the deposits been known and a road been pushed through in consequence, development with reduced costs might have begun before the introduction of large aircraft.

In any case Coldham's report set Guinea Gold's sights a little higher. Now the flotation of an operating company with capital of £200,000 was discussed; but the raising of capital of this order depended on some assurance that the transport problem would be attacked. In November 1927, the building of a road via the Markham and Wapit rivers was discussed in Canberra,¹ and it was understood that it would be ready within eighteen months; but the Administration wavered in a choice of routes (see Chapter 6).

The directors of Guinea Gold now looked on the Bulolo leases as a sale proposition. Wells (to shareholders, 28.2.1928) claimed, in retrospect, that the company had never contemplated the large task of raising capital to exploit the area, but of course the size of the task had not initially been known. This point became significant when the Government assessed the profits from the sale of the leases as taxable, because they had originally been acquired for resale. The company disputed the Government's opinion and eventually its appeal to the High Court was upheld.² There had been a definite intention to work the main Bulolo leases, until the magnitude of what was involved had become apparent.

Wells (to shareholders, 28.2.1928) admitted that the future policy of the company was uncertain. The new field superintendent, E. Broughton Jensen, re-examined the upper leases and revalued them at little more than 50 per cent of the figures given by Barton and Coldham. Capital expenditure was stopped, and working costs were slashed so that sufficient profits would come in to keep Guinea Gold solvent. All hope was now pinned on disposing of the lower

¹ GGNL Minutes, 30.11.1927. A prominent Federal politician, F. Anstey, had a direct interest in the field, and worked for acceptance of a road.

² Judgement by Justices Rich, Dixon and Evatt in *A.E.H. Evans v Commissioner of Taxation*, 1934. There was a further complication because in March 1927, on legal advice that one company could not hold all the leases, separate but essentially subsidiary companies had been floated for the southern, central, and northern leases.

leases, but Territory Investments was unable to raise the necessary capital, and negotiations with the Waihi Gold Mining Company (New Zealand) were held up by the transport problem.

The arrival of the W-34s kept Guinea Gold out of trouble, through the company's percentage of the phenomenal profits made by Guinea Airways (in 1929-30 net profit was 157 per cent of subscribed capital).¹ Broughton Jensen (to GGNL, 27.4.1928, 5.5.1928) felt that some development of the lower leases was possible, using an 'aerial dredger' incorporating inventions of his own. But at this critical time Placer Development Limited appeared on the scene, and secured options on terms which promised more than salvation.

¹ Even in 1928-29, 4.1 per cent of Guinea Airways' gross revenue went into Reserves.

Chapter 6

Placer Development Limited takes over Bulolo

Placer Development Limited was a small minerals exploration company which had been registered in Vancouver, Canada, in 1926, under the directorship of William Addison Freeman and Charles Arthur Banks. Freeman was an Australian lawyer who specialised in company law. With his brother, A.W. Freeman, a mining engineer, he had built up a tin prospecting company in the Malay States. Banks, a New Zealander, was representing British gold interests in Vancouver when he met Freeman. Together they formed Placer Development Limited to inspect and acquire rights to likely placer (alluvial) deposits anywhere in the world. Within the next two years three other specialists were appointed directors to the Placer Board, Americans Frank W. Griffin, and Frank R. Short and an Australian, Leslie V. Waterhouse; Freeman became president, and Banks managing director.

The Board represented an excellent balance and range of knowledge for the purposes of the company, with a lawyer as head, and four engineers, all of whom had planning and executive backgrounds in addition to technical experience. In the exploration phase this balance worked smoothly and purposefully, while other concerns were scrambling and hesitating; and in the years of development it provided the operating company with wide consultative knowledge.

Moreover, the dispersal of the directors and their special interests and contacts proved invaluable. Freeman was acquainted with most men of importance and influence in the Australian legal, business, and political spheres. An engineers' office, established in San Francisco under the surveillance of Griffin, provided technical contacts in mining throughout the United States, and this was a key factor in efficiency. Waterhouse was appointed head of the Sydney executive staff, an office which assumed great importance as operations developed in New Guinea. But the success of Placer, and eventually of Bulolo, depended primarily on Banks.

Banks was the perfect mixture of technical engineer and adventurous businessman. Though he demanded the closest examination of every factor in every proposition, he was able to take a long term

view, to sort out transient difficulties from disqualifying obstacles, and, when necessary, to act swiftly on his own judgment. He had a notable capacity for compromise, and for reconciling factions, and a high sense of moral obligation towards his shareholders. Placer, too, recognised his personal value, for in the original terms it was agreed that Banks should receive, for ten years, 10 per cent of all profits.

The original capital of Placer consisted of 20,000 \$Can 5.00 shares. This was increased to 70,000 shares, with the acquisition of Clutha Development Limited, of New Zealand, but in relation to the requirements of operating companies, capital was still insignificant in 1927. Success depended on acuity in assessing prospects and in picking up options cheaply, relying on careful investigation, a high reputation, and wide contacts for floating separate operating companies. Freeman stated Placer's business policy in 1926:

It investigates some mining business, and being satisfied with it and the price, arranges to buy it, having previously arranged to sell it at as substantial an increase in price as its value will stand, but taking the management and control.

Freeman had a detailed knowledge of the value of Bulolo, and the course of negotiations there. Horton, who reported on the leases for Territory Investments had been employed by him in his tin mining days, and T. Yeomans,¹ Horton's field assistant, was a boyhood friend.

Terms for the option had been agreed on before a formal approach was made. In March Banks was advised that Freeman could secure the Guinea Gold option for an immediate payment of £2,000. Banks approved and the agreement signed in April ratified the £2,000 payment: if the option was taken up, Guinea Gold was to receive £50,000 plus 10 per cent of the shares representing issued capital in an operating company, together with the same percentage holding in any ancillary companies (e.g. to generate hydro-electricity).

There is no mention of these negotiations in the records of Guinea Gold until 26 April, when Freeman appeared at the directors' meeting seeking an option. A formal agreement giving Placer a

¹ In the period 1928-31 Yeomans proved invaluable to the Placer organisation; he had an intimate knowledge of the area, the ability to recruit and control native labour, a sound practical knowledge of mining and bushcraft, great conscientiousness, and the capacity to improvise. Yeomans laid out the first rough camp at Bulolo and cleared the first aerodrome sites in the area.

nine months option over the Guinea Gold leases on the Bulolo was signed the following day. The Bulolo option was vitally important to Placer, for it had had little success with previous prospects examined in Alaska, Oregon and California. In 1927 two highly experienced placer men, Louis Decoto and Louis Joubert, tested a dredging area known as the Asnazu in Colombia; this had potential but the average values were lower than had been hoped, and it was put aside when the Bulolo option was secured.

Decoto and Joubert were not sent to Bulolo to carry out more thorough testing until the end of June 1928. The delay was due both to the need to complete the Asnazu testing, and to uncertainty about the construction of a road to Bulolo. The agreement with Guinea Gold was entered into on their assurance that the Administration would build a road within eighteen months. Freeman would not sanction expenses for testing until he felt that the transport problem could be solved.

The Administration was under severe pressure to build a road, but it lacked money and, according to many mining people, leadership and technical skills. The Mandated Territory had to pay for itself. The New Guinea Administration passed this policy on to the mining community, which would have to pay for whatever facilities it needed. The royalty on gold production, which had been 1 per cent since 1.1.1923, was in February 1928 raised to 5 per cent, with the circumspect explanation that the rise would pay for 'special administrative arrangements...in the gold-fields area necessitated by the activities thereon'.¹ But it was well known that the prime purpose was to finance road construction.²

The rise in royalty was imposed when gold production by existing methods was becoming unprofitable. By 1929 the position was critical, for unless suitable machinery could be installed, Guinea Gold saw gold production falling to a few ounces a month (GGNL Minutes, 10.5.1929). But machinery could not be installed without transport.

The Administration was caught in a vicious circle. Confident promises were made to the mining companies to encourage investment but, as the companies realised, officials had no idea how the promises were to be kept. There was, too, confusion about the selection of a route for a road which continued intermittently until World War II.

¹ New Guinea Annual Report, 1927-28:43. Also summary of the history of the royalty by W.M. Hughes, H. of R. Debates, 23.9.1938, Vol.157:131.

² e.g. see interview with J.C. Coldham, Melbourne Argus, 25.9.1928.

At first, because the tracks used by porters came straight over the mountains from Salamaua, an equally direct road route was sought. Following Guinea Gold's representations to Canberra in November 1927, a promise was made by the Minister for Home and Territories and the Administrator that a road would be built from Buang, following Snake Creek; and 400 natives were put on to preliminary work (Anon. 1928:154). However, this route involved cutting across the ranges from north to south, which mean difficult grades and heavy maintenance. The growth of Lae as a base opened up the prospect of following the valleys of the Markham and its tributaries, and the aircraft flights into Wau enabled routes to be located quickly; though detailed ground surveying was still required.

In April 1928 the Administrator, Wisdom, inspected the terrain and selected the Markham-Wamped-Bulolo route. He acknowledge the need for urgency, and hoped construction would be completed within twelve months.¹ However, the Administration soon ran out of funds and road-building ceased.

As it became clear that the Administration was unlikely ever to complete a road or railway, the companies themselves began to search for some solution. Coldham (GGNL Minutes, 30.11.1927) suggested that a road at least as far as Labu, at the southern mouth of the Markham, was practicable. An Australian consultant went over the proposed route via the Wamped and estimated the cost at £225,000. Placer engineers independently thought construction could be completed for £200,000; but a road would take at least two years to build.

At this time Placer was not considered the senior company on the field, and it escaped the main burden of the problem. Overseas interest had focussed on the possibility of finding and developing the 'mother lode' at Edie Creek. The principal lode, its cap about 300 feet above the level of Merri Creek, was located in June 1927 (Warden's report, July 1927). Russo-Asiatic Consolidated Ltd, which was developing the Mount Isa field in Queensland, was attracted by the prospects of the area, and in May 1929 the general assets of the company were transferred to a new corporation, The Mining Trust Limited.² The Mining Trust two months later floated a new company named New Guinea Goldfields Ltd, to consolidate and develop a large number of leases which had been acquired at Edie and Koranga

¹ E. Broughton Jensen to GGNL, 27.4.1928; Wisdom to Placer, 10.5.1928 quoted in The Mining Standard, 5.7.1928.

² Summary to shareholders, The Times, 5.6.1929. An engineer was confident that at least £1,500,000 could be obtained from alluvial workings.

creeks. This company set out to do things on the grand scale: nominal capital was announced as £5,250,000, the largest recorded for any mining organisation in Australia up to that time; working capital was to be about £1,000,000, though eventually almost £4,500,000 was called up (Sydney Morning Herald, 27.7.1929).

Thus in the eyes of contemporary observers, of officials, and even of Placer directors, Placer Development Limited was very much a junior partner in the overall development of the Bulolo-Wau-Edie Creek area. Most of the hopes of New Guinea Goldfields proved illusory; but in 1929 major projects such as the building of a road were seen to depend on its attitude. Therefore Placer men hung back in the hope that if the Administration did not act, The Mining Trust would.

The Ellyou Corporation, an offshoot of Russo-Asiatic, commissioned Broughton Jensen to investigate the possibility of a railway along the Wamped Valley to the Markham, thence to Labu. Jensen was optimistic that maintenance would be neither costly nor difficult (private information). The great attraction of a railway to a private organisation was that the capital cost and maintenance expenses would be recouped through toll-charges. As late as August 1929 Decoto reported to Placer that a railway seemed 'the most likely means of transportation'.

Lack of finance, and the fact that neither road nor railway would give returns for at least three years, made the companies reluctant to abandon the attitude that such transport was a public utility which would reimburse the Administration, and therefore a governmental responsibility. Unfortunately the Ellyou Corporation in particular gave the impression that its sources of capital in 1929 were almost unlimited: Levien reported that it was spending money like water (GGNL Minutes, 19.7.1929).

Thus a confused situation was created, with both the Administration and the companies weighing up costs and possibilities and waiting for the others to make the first constructive move.

While the issue hung fire, Placer continued testing the Bulolo leases. Altogether there were seventeen under option from Guinea Gold, comprising a total of 2,509 acres and extending along the Bulolo River for some eleven and a half miles. Decoto and Joubert intended to drill both the southern and northern flats; but by March 1929 restrictions on time and mobility made them confine their tests to the southern leases, comprising about 1,102 acres of dredgeable ground. The postponed testing of the northern leases later exerted a great influence on the whole history of Bulolo.

In 1928-29 there was no aerodrome at Bulolo, and all men, equipment and supplies had to be brought in to Wau, whence it was a days walk to the southern flats. The flats themselves were covered

with dense primary growth, and preparations for testing were time-consuming.

On the map the flats were divided into a grid pattern, by lines at right angles to the river 1,320 feet apart, along each of which holes were spaced at 166 feet intervals. This was unusually close spacing, but Decoto believed that this would delimit well-defined pay channels. Testing an unknown area by drilling requires the greatest care: and value estimates depend entirely on the accuracy with which the samples are taken. Decoto had twenty years experience of such work. He introduced new equipment and new techniques to New Guinea and his scrupulous attention to detail earned him a high reputation.

There was no means of transport for large, more accurate power drills, so Decoto imported a Ward Type hand drill, with a 4 inch casing. It was easily dismantled and it made the optimum use of the one source of energy available: manpower. However, it slowed down with depth, and it was difficult and tedious to penetrate beyond 40 feet. Decoto's results indicated no regular pay channels, but values which seemed to be distributed over the whole of the flats with 'remarkable evenness'. So the distance between the drilling holes was increased and eventually only every second line of holes was drilled.

By April 1929 prospects looked grim. Progress was slow, bringing in supplies and equipment had proved so formidable that Decoto's patience was sapped, and moving about, even on the flats, was frustrating and uncomfortable. Freeman was alarmed by all the unknowns in the Bulolo venture. Lack of transport was retarding testing and seemed certain to hold up the installation of dredges:

It is of course important to us, should we be going on, not only that the railway shall be built with maximum expedition, but that it shall cost the lowest possible figure. I can visualize it taking years to construct, and costing a million. (Freeman to Waterhouse, 6.4.1929.)

Freeman felt that Placer might have to approach Guinea Gold for better terms, and he cabled Banks in Vancouver that they should seriously consider abandoning the Bulolo investigation and saving further expenditure. Banks determined to visit the property immediately.

His visit to the field in July strengthened his resolve, for he did not allow difficulties to obscure the rich potentialities, as Freeman and Decoto had done. Testing had progressed, and it was clear that the Bulolo area was 'the world's most important placer deposit located since Klondyke' (Horton to Placer Ltd, 24.12.1929). In pressing ahead, Banks staked his reputation on a venture which presented apparently insuperable obstacles. The problems of

transport and of devising ways of dredging a wild, mountainous area had to be solved quickly. Placer's capital had been increased to \$300,000 to take advantage of the opportunity at Bulolo, and therefore success was essential. Moreover, Guinea Gold could not extend the option indefinitely; and if capital were to be raised for an operating company prospective investors would need to be given some definite assurance that the area could be worked profitably within a set time.

In his final report on the southern flats Decoto estimated a total of almost 39,000,000 cu yd of dredgeable gravel, worth 2s 1d per cu yd, for a total recoverable gold content of just over £4,000,000. He and Griffin envisaged working the deposits with two 8½ cu ft dredges, working to an average depth of 21.91 feet, handling about 3,000,000 cu yd each per year; this would give the field a life of about thirteen years on proven ground. On this basis, and estimating working costs initially at a maximum of 7.5 pence per cu yd, Decoto saw a handsome return on the purchase price and strongly recommended that the option be exercised.

This turned out to be a gross underestimate for which there are several possible explanations. It is difficult to reach bed rock with drillholes (Griffith 1960:32) and Decoto had no reason to doubt his results, as earlier tests had revealed shallow depths. His description of the bottom as 'a soft blue clay containing small white quartz particles' is, however, remarkable. A false bottom is a characteristic of such deposits, and though Decoto made no mention of this possibility, Joubert and Yeomans, who assisted him, felt at the time that they had not reached a true bottom.¹

It is important to realise that, in 1929, Decoto had not been asked to find more extensive gravels at greater depth. His principal task was to prove sufficient gravels within an allotted time in order to make possible the floating of an operating company. The proving of almost 40,000,000 cubic yards of valuable ground satisfied this responsibility, for this was just sufficient to enable substantial inducements to be offered to prospective investors: a life of twelve years for the field, with dividends of 28 per cent for all but the first year of operation (see Hoover 1909:46-50, BGD Prospectus, 19.2.1930).

However, Decoto's inaccuracy was in a sense fortunate for had he realised the true depth and extent of the gravels, the problems of raising appropriate capital and of designing and transporting

¹ Private information. Decoto himself had no explanation when the 'false bottom' was later revealed. He had used exactly the same methods at Asnazu, with great accuracy.

suitable machinery might well have seemed insuperable.¹ As it was, the problems associated with deep deposits were spread out over the first decade of working, instead of being concentrated at the beginning; and in this way, through the accumulation of experience and capital and the establishment of public confidence, major problems could be tackled one by one as dredging went on.

Little time remained to solve the transport problem before taking up the option. Placer tried every conceivable approach to obtain the Administration's assistance in putting a road through. In October Banks suggested that his company would gamble the £200,000 on building the road, if it was exempted from the gold royalty for the estimated life of the field. As calculations then stood, this would have returned the company only £102,000, so that Placer was offering to pay half the cost, and to allow the Administration to pay its half on terms. However, the waiving of the royalty presented an insuperable obstacle (Banks to Wisdom, 9.10.1929). Late in November Griffin told Guinea Gold shareholders that if the road went ahead, dredging could begin within three years.

A consultation between Freeman and Banks and the Commonwealth Government resulted in a promised grant of £50,000 towards the cost of construction, but the company was to take responsibility for both construction and maintenance. Fifty thousand pounds was only a fraction of the construction cost, and maintenance was unknown. Moreover, would subscribers be found, in the depths of the depression, for a company which had first to spend at least £200,000 and two and a half years on road construction? (Banks 1932-33:618.)

At this point air transport was considered. The use of aircraft in association with mining had been proven in Canada since 1921 and Guinea Airways had been operating into Wau for almost three years with remarkable safety and efficiency. The Ellyou Corporation had used a large Handley-Page machine to carry cargo in 1929, though it had crashed the following year (Dickinson 1933:275). Sectionalising mining machinery to fit the aircraft had also been successfully carried out in 1929 by Daydawn (New Guinea) Ltd, which was developing an area near the junction of the Merri and Edie creeks (see Morley 1932:58-9).

Placer's idea to use aircraft was, therefore, not revolutionary, but the scale on which an airlift would have to be arranged was unprecedented. Guinea Airways had already set world records in supplying Wau; but flying dredges and an entire township into

¹ According to generally accepted principles, profits in relation to units of working capital would have been estimated as declining with dredging depth beyond an optimum point.

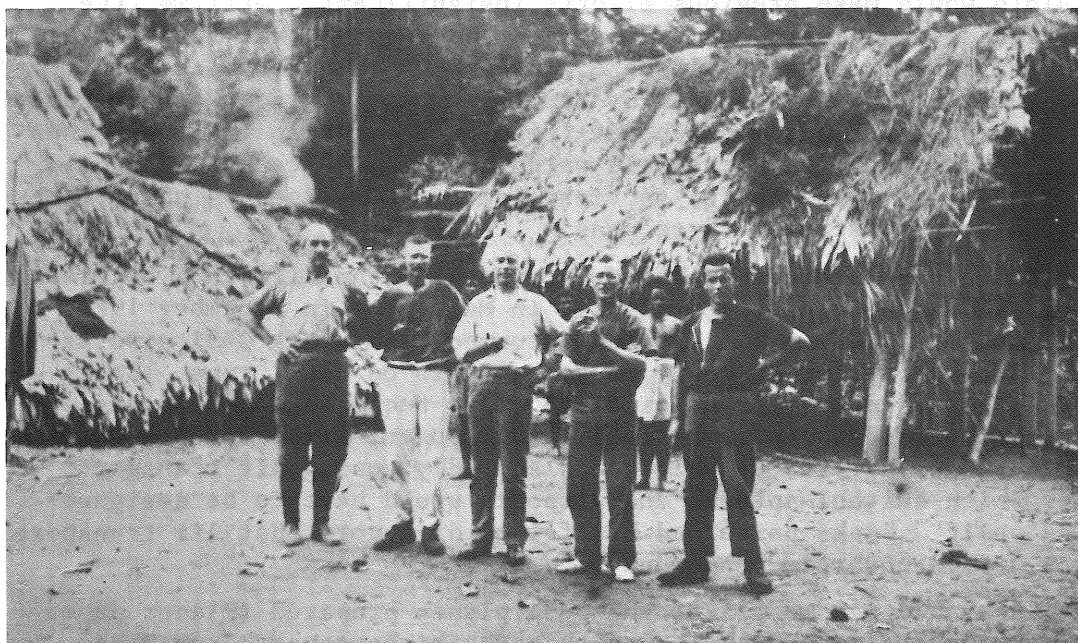


Plate 1. Long Island Camp, June 1929
(Decoto, Arnold, Waterhouse, Bayliss, Franklin)

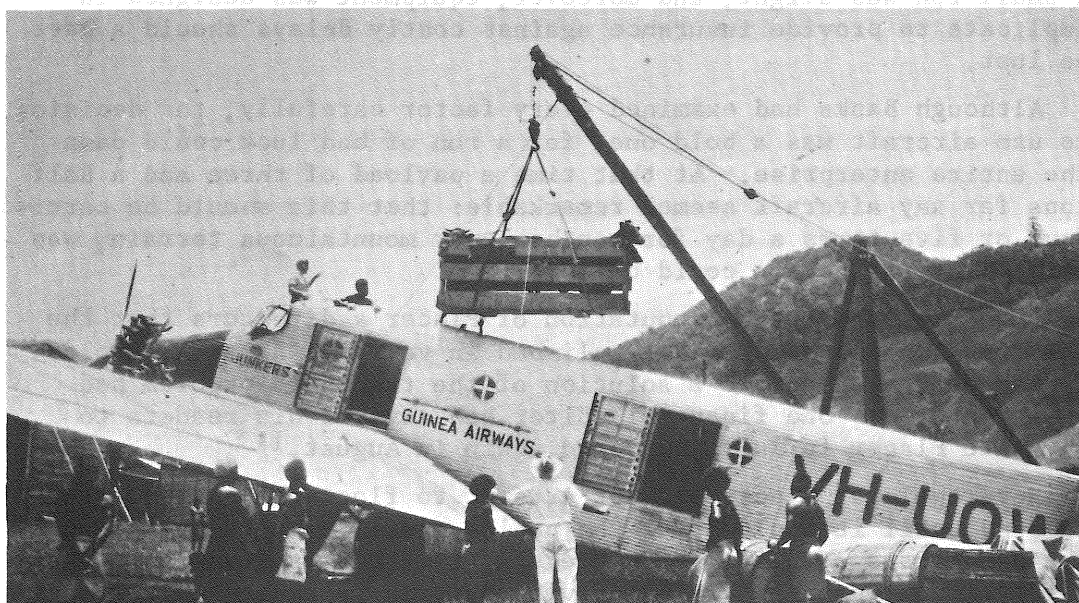


Plate 2. Unloading a crate of cattle from a Junkers G-31
aircraft, Wau.

Bulolo would make previous efforts insignificant. Griffin (the dredge design expert) and Waterhouse had decided that, to be most economical, dredges should be equipped with 10 cu ft buckets instead of those of 8½ ft, proposed by Decoto. These would be electrically driven, using local hydro-power (meaning the flying in of turbines and generators) and each would weigh about 1,500 tons. They calculated that with careful sectionalising, the largest single piece would weigh just over three tons.

A decisive conference took place between the directors of Placer and of Guinea Gold/Guinea Airways in Melbourne in December 1929. The Junkers factory had already informed Banks that G-31 aircraft could be converted to carry up to 7,000 lb on short runs. Banks had prepared estimates of time and money required to build and start two dredges using hydro-electric power; first using a road which would have to be built; and secondly, using air transport, for which suitable planes and airports would have to be designed and built. Banks persuaded his fellow directors that air transport would save both time and money.

Banks had had models of the G-31 planes prepared (Placer paper New Guinea Gold), which showed that the biggest parts could be loaded and unloaded through the hatch and secured over the centre of gravity. Mustar gave assurance that the risk of loss on such a small run was slight, and moreover, equipment was designed in duplicate to provide insurance against costly delays should a part be lost.

Although Banks had examined every factor carefully, the decision to use aircraft was a bold one, for a run of bad luck could damn the entire enterprise. At that time a payload of three and a half tons for any aircraft seemed remarkable: that this should be carried four or five times a day for months, over mountainous terrain, was more than many people could believe.

It says much for the reputation of Placer's directors that the company's shares had steadily climbed in value as news of Bulolo leaked out, even before a solution of the transport problem had been ventured. One financial editor had advised his readers to buy into Placer in July 1929, and again in August.¹

Nevertheless, Placer did not attempt to float the operating company until it could offer the public a well thought-out plan. The prospectus of Bulolo Gold Dredging Limited was filed with the Registrar of Companies in Vancouver, British Columbia, in February 1930.

¹ Sydney Mail, 21.8.1929. In a few weeks, pending Decoto's report, Placer shares climbed from 38s to 67s.

Chapter 7

Bringing Bulolo to production

The Placer company put proposals for the taking over of the Bulolo option to Guinea Gold on 31 December 1929. They were formally accepted on 4 January 1930.

During 1929 Guinea Gold had been concerned about the extent of capitalisation envisaged by Placer. Conscious of their responsibility to the Guinea Gold shareholders, Wells and Levien wanted to sell out for the maximum guaranteed cut (GGNL Minutes, 19.7.1929). Freeman (to GGNL, 17.7.1929) assured them that no extra or concealed capitalisation would reduce Guinea Gold's proportion of working profits. Placer wanted just enough capital raised to ensure that the property came into production, and that the original issue was as large as the undeveloped property could legitimately stand, because the measure of Placer's own promotion profit depended solely on the measure of the original capitalisation. At the same time Freeman's uncertainty about Bulolo prompted him to offer Guinea Gold £30,000 in lieu of shares as 'the simplest solution'. Guinea Gold 'did not find this attractive' (GGNL Minutes, August 1929).

Considerable cross-questioning went on between Placer and Guinea Gold and occasional friction derived from mutual anxieties about progress in testing, and from the fact that as a foreign company, Placer was dependent on Guinea Gold for maintaining or acquiring local rights until an operating company came into existence. Guinea Gold, in turn, was dependent on Levien, whose Powers of Attorney were continued long after 1927, when he gave up his managerial role. Two years later he was re-employed by the company as a prospector.¹

This complicated interdependency meant that Placer had to press Guinea Gold to press Levien to maintain leases and to secure water

¹ With Ned Rowlands he penetrated the Ramu-Markham Divide, being probably the first white man in the Kainantu Region. His account of the prospecting patrol is in the Wells papers, MS 364/3.

rights on the field. The 1928 Mining Ordinance was not ideal for large companies, for under Section 36 a lease could lapse unless a prescribed number of men were kept working on it. It was important that Levien pacify officials while many leases lay idle.

Placer eventually had to act quickly on water rights. Until 1929 it had been thought that New Guinea Goldfields would import substantial plant for power generation, and sell surplus electricity to Placer's operating company. A conference with Mining Trust officials in July 1929 showed that Placer would have to make its own provisions; therefore the company asked Guinea Gold to peg out water rights giving 300 cu ft per second by diverting the Bulolo at the south end of Arnold's lease, returning on Levien's lease. This was the original location of the Bulolo Powerhouse, and the decision, taken hurriedly without adequate investigation, was unfortunate. Under Levien's eye even the pegging of such rights in a well-known area was desultory (GGNL Minutes, 29.8.1929, 8.11.1929). Levien's day as the active promoter of the field was over: at heart he remained a discoverer and visionary rather than a developer, and company technicalities bored him.

These early difficulties made Placer determine to form an operating company as soon as possible, and to canvass the amendment of those sections of the Mining Ordinance which hindered large-scale working. An improvement in the law occurred before the formation of the operating company when in January 1930 it was made illegal for holders of miners' rights to mine land comprised in any dredging and sluicing lease under the old Ordinance (i.e. the Guinea Gold leases).¹

Newspapers in Australia sensed a connection between this change and the flotation of Bulolo Gold Dredging Limited, which was to be registered in Vancouver. The implication in the labour press was that Freeman and a Federal politician F. Anstey (who had interests in the gold-fields) had engineered the change against the small Australian 'digger'. 'Foreign' interests were seen as taking out of an Australian territory what rightly belonged to Australia (e.g. Sydney Daily Guardian, 21.3.1930).

Though Freeman did have considerable influence in Canberra, these allegations were misleading, for the Ordinance needed amendment to make the position of large companies secure. Moreover, a company registered in North America had access to more capital than was available from the Australian public, which was suffering a financial depression and was unfamiliar with alluvial gold dredging. (The history of recent oil exploration in Australia offers some interesting analogies.)

¹ Ordinance No.2/1930, Sect.5 (Commonwealth Gazette, 23.1.1930).

A week after the Bulolo Gold Dredging Company was registered, a further amendment to the Mining Ordinance permitted many small leases, which could be developed only by large-scale methods and were at least 800 hectares in total area, to be consolidated into a 'Special Area'. Not less than £7.10.0 per hectare had to be spent annually on 'mining operations or developmental work' in these areas. This emphasis on monetary expenditure cut across the Manning Regulations (keeping a prescribed number of men on each lease); consolidation of the leases implied consolidation of the labour force, and this was ultimately incorporated in the statute.¹ This amendment, too, proved invaluable to the company, and represented substantiation of the Commonwealth Government's desire to assist during a period of tight finance.

The prospectus of Bulolo Gold Dredging Limited stated the authorised capital as \$Can 4,000,000 of which all but \$500,000 was to be made the initial issue. All shares were of a nominal value of \$5, and those that were issued as fully paid up - that is, in payment for leases, services, and so on - amounted to \$1,120,000, leaving \$2,380,000 to be allotted. Placer proposed to Guinea Gold that both companies should retain their share issue for at least twelve months after the beginning of dredging. This was an attempt to maintain values, and to ensure the taking up of the public issue. If the operations were a success both Placer and Guinea Gold stood to gain, for Placer received 154,000 shares for itself (nominal value \$770,000) and only \$460,000 cash, while Guinea Gold received 70,000 shares (\$350,000) and about \$245,000 cash. It was intended that Bulolo Gold Dredging work only the central and southern leases which had been tested, and that Guinea Gold get a further 10 per cent share consideration in a separate operating company which would be formed to work the northern (Bulwa) leases if they proved valuable.

Under the Memorandum of Association of February 1930, Freeman became the first president of Bulolo Gold Dredging Limited, Banks the managing director, Griffin the consulting engineer, and Waterhouse the Sydney executive engineer. These men remained in charge during the boom years of the company.

The prospectus issued by the company was frank, confident, and yet conservative. It drew on Decoto's report, since which prospects had appreciated: further tests of the average value of gold had raised it from £2.12.9 per ounce to £2.16.1, but Decoto's figure was taken for estimating yields. It was calculated that it would cost \$2,136,000 to equip the property. The advantages and unknowns in air transportation were clearly set out, and the operation of

¹ Section 44A (No.10/1930, Sect.4), Commonwealth Gazette, 20.2.1930.

the first dredge was promised within twenty-one months of the company's registration (June 1930).

All of these targets were met. The estimated profit figures (10 per cent for the first year, 28 per cent for the following eleven years) were the most conservative feature of the entire proposal. Ample provision was made to amortise the whole of the capital outlay over the working period, and this left an estimated average annual return of 24.4 per cent. A careful policy on amortisation was a consistent feature of BGD's operations, until this was made difficult by the rapid expansion of the field.

Of the original issue of 476,000 shares, 170,000 were reserved for the Australian market; these had been taken up and the shares allotted by September 1930 (BGD Minutes, 9.9.1930). Australians held a majority of shares in Placer, and all shares in Guinea Gold, so that indirectly they had interests in a further 224,000 BGD shares. Sydney long remained the major market for both Placer and BGD stock.

In June 1930, Thomas D. Harris was appointed manager in New Guinea, at an annual salary of \$18,000, plus all expenses. This was \$3,000 more than Banks received as managing director (apart, of course, from his Placer earnings), but the organisation of development in New Guinea was crucial. Harris was an excellent leader in the field. He was a sound practical man in whom both directors and employees had the greatest confidence, and he was able to weld Australians and Americans into a solid working team unplagued by the frictions so commonly found and so often debilitating in an isolated tropical community.

Bringing Bulolo to production was a complex operation, for equipment had to be ordered from Australia, Europe, and the United States; simultaneously, a power supply had to be arranged, transport coordinated, further leases secured, and more prospecting and testing carried out.

The first two dredges designed for Bulolo were tailored to the conditions as they were then known: that is, a digging depth of twenty-eight feet and a length of life as given in the prospectus, though they were eventually to operate long beyond this. Each weighed well over 1,000 tons.

Sectionalising of the parts was an extension of normal practice, for dredges were usually located in difficult terrain with inadequate communications. But at Bulolo the dredges had to be sectionalised to such an extent that key parts were affected. The upper tumbler shaft, which provided the main drive for the bucket line and the means of tipping the full buckets, was normally cast in one piece weighing seven to nine tons. For Bulolo, shaft sections, the hexagonal centre piece, and side plates were made separately, and fitted together on the field. The ten-foot final

drive, too, was cut into two pieces and welded together after transportation. As the power was applied through a belt system from a single motor, the whole of the strain was taken by this drive unit; it was therefore most important that field assembly be performed with meticulous care. A fully equipped workshop, the best in New Guinea during the 1930s, was made ready at Bulolo, with depots at the assembly sites.

Before the parts were shipped, BGD had ordered the Junkers G-31 aircraft to be tested in Germany. Their performance exceeded all expectations. With a full load, equivalent to an all-up weight of 19,000 pounds, the machine could climb at the rate of 200 feet per minute, at an altitude of 3,000 feet and on only two engines.

Reserves of power and range were carefully examined, for the success of the Bulolo venture depended on them. They represented insurance against loss of life, time, and key pieces of machinery; and the margins insisted on were so great that no undue risk was involved.

The first G-31 went into service in April 1931, and the second in May. During May, 150 short tons of freight were carried without incident. This fell short of the 200 tons estimated as necessary to keep up with the construction program, but the radio-telephone link between Lae and Bulolo giving advance weather information was not in operation until June. By November the two G-31s were lifting over 300 short tons a month, and had already carried an upper tumbler shaft (see Banks 1932-22:625).

Rail cranes loaded and unloaded the aircraft at Lae and Bulolo. At Bulolo, unloading generally took little more than ten or fifteen minutes. In mid-1931 a record six round trips in a day were completed by Grabowsky, but four trips a day were common.

Although the transport of materials did not reach its peak until November 1931, the pace of dredge and power house construction was maintained. Plans drawn up in mid-1930 provided for the delivery at Bulolo of 2,400 tons of machinery, field fabrication, and the beginning of operations within fifteen months.¹ This schedule was completed on time, nothing was lost in transit, and on the one occasion of engine failure the aircraft completed the flight on its remaining two engines.

In 1932 Banks published a detailed account of the system of air transportation which he had been instrumental in promoting. This showed how closely all the estimates of 1930 tallied with results, and proved that it was as practicable to work within

¹ i.e. twenty-one months from the official date of registration, 11.6.1930.



Plate 3. Dredge at Bulolo.

narrow limits of cost projecting with aircraft as with any other form of transportation. This was an important milestone in the history of both mining and aviation. For his work he was awarded 'The Consolidated Gold Fields of South Africa Gold Medal' for 1932.

In July 1933 Junkers offered BGD a third G-31 for only \$40,000, just over half the cost of each of the previous two. This offer resulted from the economic depression, and from the change to a new Junker model. Banks obtained agreement for the purchase, which enabled BGD to exert pressure on Guinea Airways on operating costs, and helped to maintain supplies as construction programs waxed rather than waned towards the end of the 1930s.

Dredge No.1 was officially started on 21 March 1932. It was the only occasion on which almost everyone connected with the Bulolo venture assembled together, and during the following days there were many discussions on future development. Levien, the father of Bulolo, had died suddenly two months earlier. His dream of 1926 had turned into reality but, like those who honoured him at Bulolo, he had not imagined how enormous the reality would become.

C.V.T. Wells, the Chairman of Guinea Gold and of Guinea Airways, described the opening day in his diary (21.3.1932):

About 300 people at Bulolo. Whole show went off well.... Mrs Banks...broke the bottle of champagne, after which the general pressed the button and she (the dredge) STARTED! She rocked and groaned and up came the gravel and rocks and round the cylinders span and the boulders toppled over the back and the riffles simmered and splashed while the flags fluttered above.

The Administrator, Wisdom, assured Banks that 'the Administration will always be out to encourage any enterprise of this description to the utmost'.

In 1932 it was relatively easy for the Administration to adhere to its promise, for the era of the major company was well established, and even on the vexed transport question there was little friction or recrimination. BGD and other commercial opinion regarded the introduction of aircraft as a long-term and virtually a permanent solution.¹

The starting of the first dredge marked the end of the real pioneering phase at Bulolo. Concerted efforts were now made to put Bulolo on a permanent working basis: comfortable housing and amenities had to be provided, a stable labour force with a reservoir of experience had to be built up, and the production and shipping of gold had to be systematised.

Making regular arrangements with Guinea Airways for the operating of BGD's G-3ls proved one of the more difficult problems. The existing arrangements had never been formalised into a contract, but they involved a management fee of £5 per short ton, which made up a substantial proportion of the total field costs of 2.5 pence per lb for air transportation. Banks thought the fee over-large, but he recognised that some compromise agreement with Wells of Guinea Airways was essential, in view of Airways' holding at Lae - hangar, office, stores accommodation and servicing facilities. Separate operation by BGD would have involved duplication and great financial waste.

Eventually, through pressure exerted by the more intractable members of BGD, and through his personal contact with Wells, Banks secured a compromise agreement. Airways agreed to operate BGD's G-3ls for two years at £4 per short ton, while the costs of upkeep and improvement of Lae aerodrome were to be shared, and BGD paid a relatively small fixed sum for accounting and storage. Ultimately, in 1938, Airways management fee fell to £1 per short ton (although BGD assumed part of the insurance and amortisation

¹ See the editorial in Pacific Islands Monthly, November 1932, Vol.III:4.

responsibilities for buildings and plant at Lae). This reduction was made possible by greater operating experience and more streamlined organisation, by steadily increasing volumes of freight, and by more formidable air transport competition in the late 1930s. However, the co-operative spirit of the first agreement was preserved, for the two companies had buildings and plant located on one another's leases at Lae, and a rigid separation of their activities in practice was impossible.¹

A number of organisational matters were clarified at Bulolo in March 1932. An important one was the inauguration of a system of monthly reports from the field, under the heads of 'Construction' and 'Operations'. This system allowed the Sydney and San Francisco offices to have an adequate running appreciation of progress, and it compelled the field manager to make a regular coordinated assessment. This increased efficiency and the system proved so successful that an annual report was not required of the managers until the post-war period; monthly operating reports have continued to the present time.

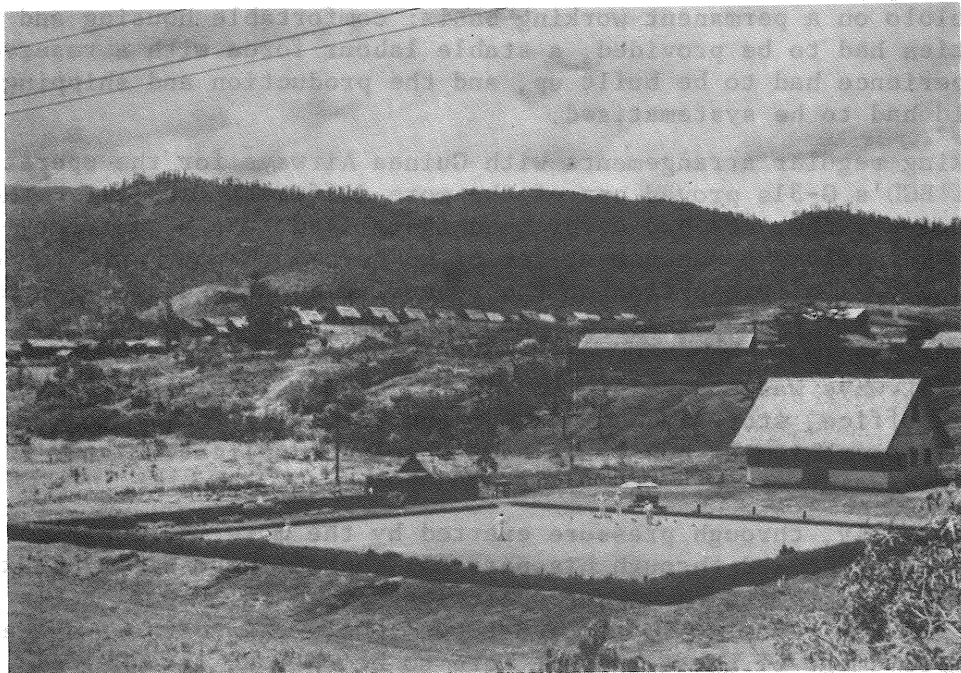


Plate 4. Amenities at Bulolo in the 1930s.

¹ H.M. Smith (managing director of Airways) to Banks, 28.1.1938.

Provisions for the realisation of gold were also determined: bars of approximately 430 ounces each were to be sent to Garrett and Davidson Limited of Sydney for further purification and assay, and 1 dwt from each bar was to be kept at Bulolo for checking, to provide for possible mistakes. BGD worked consistently on the principle that if the smallest discrepancies were watched, big mistakes could be eliminated.

Partly owing to pressure from Mrs Banks it was agreed that a solid and permanent camp should be built on a slight ridge running across the valley, to replace the sac-sac buildings which had housed the staff during the hectic preparatory phase. Initially twelve small houses and six larger ones were to be constructed of permanent materials, at a total cost of some £10,400. Provision was to be made for electric light, a piped water supply and sewerage, and a central mess building with a cold storage plant. By the time the war came Bulolo was a substantial township with stores, a swimming pool, clubs and a cinema. This was not, of course, altruism, for civilised living conditions produce men willing to work hard in order to stay. This was particularly so during the hard times of pre-war. And in an isolated mining community, provision for social relaxation lets out tensions which might otherwise be repressed to a point where they could endanger the smooth functioning of the organisation.

Chapter 8

The expansion of prospects

Long before BGD's first dredge was operating, the testing of Placer's northern acquisitions in the vicinity of the Bulolo/Watut junction, known as the Bulowat area, exerted an important influence on future planning, and on the financial prospects and structure of the company.

The northern Guinea Gold leases, still untested, remained under option to Placer. Further claims (which came to be known as the Bulwa leases) had been made independently by Placer beyond the junction. As soon as sufficient ground had been proved on the Bulolo proper, Placer had to test its further claims quickly, for six-monthly exemptions from the conditions of the Ordinance were granted only at the Administration's discretion: within this provision either the ground had to be tested or the claim surrendered.

After a quick survey in 1929 Yeomans commended the Bulowat area as a valuable proposition and systematic testing began in the second half of 1930, under the direction of F.R. Short. All the testing on the ground was carried out by F.W.R. Godden, whose work at Bulolo earned him an international reputation. In later years he became BGD's general manager.

The methods used at Bulowat resembled those employed by Decoto in the main Bulolo area. A similar transport problem ruled out heavy, power driven equipment, for Bulowat was miles downstream from the Bulolo airfield and testing was necessary before expensive communications could be justified.

The testing at Bulowat was thorough. There was less need for haste as the company was capitalised and moving towards production, and the deposits were less consolidated and more porous, so that the drill went down more quickly. However, water seepage caused a major problem. It was unusual to find even the first five feet dry, so that shafting to give a check on values proved virtually impossible. To compensate, Godden used great care with the drill and estimated the results very conservatively. Where at all possible with such equipment he tried to reach the sandstone bottom, and after six months of testing it was not uncommon for the drill to go down 50 feet or more.

By November 1930 Short predicted 30 million cubic yards on the Bulowat, without taking account of the northern Guinea Gold leases. The fineness appeared to be over 700, better than the Bulolo average.

By May 1931 estimates had jumped to 42 million cubic yards, with a net yield per cubic yard of twenty-one cents (Canadian).¹ The 1931 report to shareholders stated that BGD would take over these leases when testing was completed, and that the Bulolo position would be improved by an increase in dividends or an extended working life of the field.

In their calculations Banks and Short showed that conservatism characteristic of BGD. The prediction of net yield from Bulowat was based on the original Bulolo estimates of working costs at twelve cents per cubic yard. Both directors realised that overheads and operation costs could probably be trimmed and working costs reduced.

In the period 1930-32 prospects expanded, and it was clear that the limits were still unknown. Although the company was not yet in production, the directors realised that if they worked quickly and built on what had already been done, a steady rate of growth, implying progressively greater efficiency per unit, could be achieved. The Bulowat testing, which eventually produced an estimate of 60 million easily dredgeable cubic yards gave the impetus to this line of thinking.

It is one of the paradoxes of the world-wide dredging boom during the 1930s that gold production became more profitable although gold was losing its prime role as economic determinant. The chaos following World War I caused most countries to go off the Gold Standard; they relied instead on the backing of one or two key currencies, especially the American dollar. The strain on the dollar forced America to increase its gold buying; Britain did likewise. The financial collapse of 1929 accentuated this trend; for America raised the price of gold believing that this would lead to a rise in general price levels, a prerequisite for recovery. In this way the monetary value of the world's gold stocks doubled between 1932 and 1937. The American price of gold was eventually stabilised at \$35 an ounce in 1934, but those who realised their gold within the British Commonwealth continued to get increments in price until the war (Brand 1937, Heilperin 1962:108-10, 144-59).

This situation made it practicable for BGD to dredge poorer ground, giving it a great extension in reserves of gravel. A

¹ This yardage doubled the total for the field, as it was then known.

revolution in the company's program resulted; instead of constructing for two years and then dredging for twelve, a coordinated plan was evolved whereby dredging, testing ahead, acquiring further properties, prospecting, and turning earned capital into further dredges, went on simultaneously.

As early as March 1931 Banks discussed schemes for financing two further dredges to dig the lower leases. The Bulowat had opened up new horizons, and Banks realised the need to act quickly, if advantageous arrangements were to be made. Further capitalisation was needed, for the first dredges were still some time away from beginning production, and BGD had established itself on a basis of rigidly controlled financing.

In December 1931 the authorised capital of BGD was increased from \$4,000,000 to \$6,000,000. The increase was generous, for the directors realised that the first estimates at Bulolo were likely to be grossly understated; one of the objects of a 50 per cent expansion was the financing of further operations yet unpredictable. Within a month 65,000 of the new issue had been sold to four other American mining companies: a mark of the general confidence in BGD. The directorate, however, restricted capitalisation to actual requirements, and it was hoped to equip the new properties largely out of surplus profits, once dredge No.1 began work. Money for a new dredge was restricted to \$65,000 until March 1932, when No.1 began digging.

During 1931 BGD took over Placer's options to the Bulowat-Burnside-Guinea Gold northern leases.¹ Despite these and other acquisitions, the major expansion of BGD's prospects occurred at Bulolo itself, in the areas which had already been tested by Decoto. It was felt that Decoto's estimate of the reserves had been too conservative, and the suspicion that he had not reached bedrock was supported by the Bulowat tests, when a sandstone bottom was often found at a depth of 60 feet.

The first year of operation of dredge No.1 led BGD to re-examine the Bulolo deposits, for dredging values bore no relation to Decoto's computations: by February 1933 they were running at less than 30 cents per yard, compared with the predicted 50 cents. Similar results were obtained with No.2 dredge when it began operating in November 1932.

To maintain promised overall returns and dividends BGD therefore had to increase yardages and working efficiency. The yardage

¹ Because the directorates of the two companies were almost identical, this agreement had to be particularly carefully worked out in order to ensure that the terms for both sets of shareholders were equitable.

per day rose rapidly to nearly 9,000, but still little of the expected gold was realised. It was thought that the gold might not be readily amalgamable, and that more efficient gold saving methods might be required. Whatever the reason, the nature of the ground being dug was different from that suggested by Decoto.¹

BGD at this stage was under heavy pressure from mining engineers as well as from shareholders, for the discrepancy between actual and predicted recoveries was one of high professional as well as financial interest.² BGD could only express the company's equal concern and assure everyone that a thorough re-examination would be undertaken.

The wide spacing of tests, caused by lack of time and the apparent evenness of values, seemed the most likely hypothesis to explain the poor recoveries. However, the discrepancy threw considerable doubt on the reliability of Godden's Bulowat estimates. Values per yard there had been assessed at a much lower level, and if recoveries from dredging bore the same ratio to drill results as at Bulolo, a great deal of the ground would be marginal or completely unworkable.

In the second half of 1933, therefore, Godden began redrilling the lower Bulolo Valley, and by early 1934 he was going down to more than 120 feet in places, with values up to thirty-seven cents at that depth. Unlike Decoto, Godden was able to apply power to drilling, and by November 1934 three power drills were working continuously.

This was the beginning of a program of deep drilling which continued for some years, and which, as the price of gold rose to \$35 per ounce in 1934, extended to various side-lining areas previously considered undredgable. From June 1934 separate book accounts were kept for deep-drilling, marking its establishment as a regular practice.

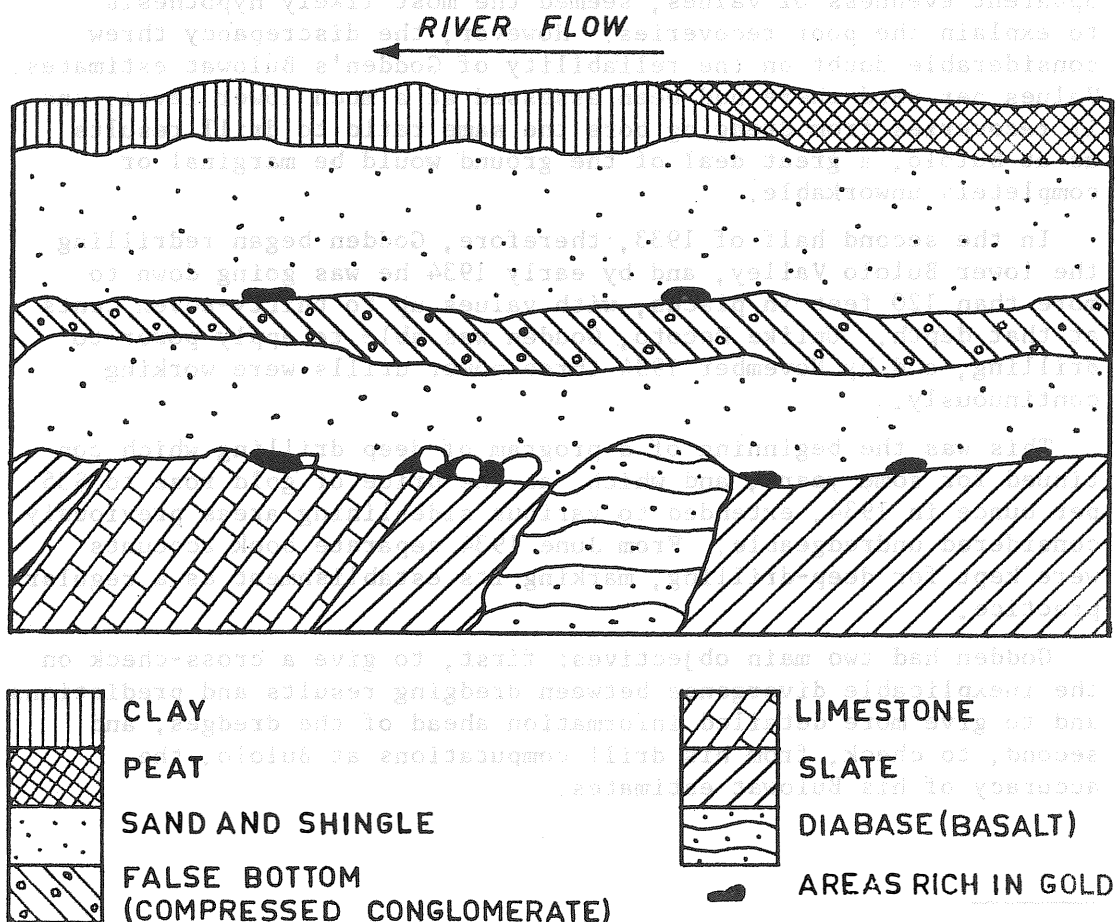
Godden had two main objectives: first, to give a cross-check on the inexplicable divergence between dredging results and predictions and to give more detailed information ahead of the dredges; and second, to check, from his drill computations at Bulolo, the accuracy of his Bulowat estimates.

¹ This was not intended to reflect on Decoto's methods, for in relating probable dredge recoveries to drill indications he had allowed a figure 2 per cent below that at Pato, which was itself only a marginal proposition.

² Baker to Griffin, 17.1.1933; Baker to Banks, 17.1.1933. Other American mining companies held shares in BGD.

The results revealed a topographical pattern similar to Bulowat, but at much greater depths: the valley was heavily overlain with gold-bearing alluvium, intersected by spurs which produced occasional areas of shallow bedrock. Harris (to Griffin, 19.5.1934) believed that 'the deposit must have been made by stream action and if so, there has definitely been an extensive fault since the deposit was made, changing the elevations and gradient of the deposit relative to the present Bulolo River bed'.

Throughout the 1930s the nature and origin of the gold in the Bulolo-Bulowat region excited speculation in both scientific and mining circles. There were many abstruse arguments and theories, but Harris's explanation was largely right.



Ideal cross-section of a placer deposit (after Friedensburg) showing a false bottom

In early Tertiary times (about 50,000,000 years ago) much of New Guinea was submerged. Then stupendous earth movements, accompanied by violent volcanic activity, uplifted the island and created the great mountain ranges. These movements may have continued until comparatively recent times. It is thought that one source of gold occurred with mineralisation in the early Tertiary period: this gave rise to metal of high quality (a fineness between 700 and 800). Most of the gold, however, was probably derived from porphyries of the later Tertiary period (perhaps 5,000,000 years ago), of lower quality (fineness about 500).

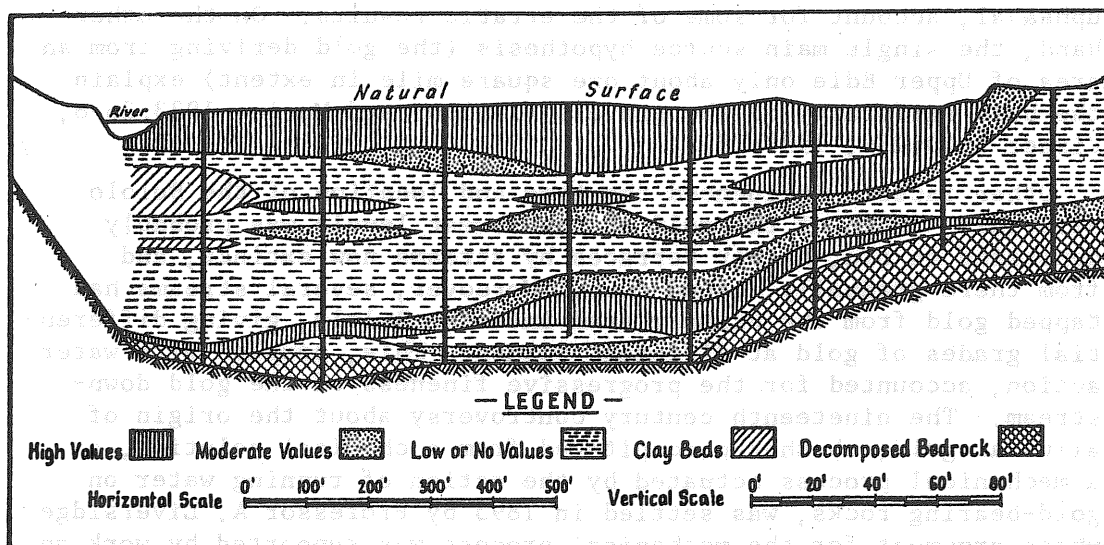
These two periods of gold deposition, during a period of violent upheaval, account for some of the erratic results. On the other hand, the single main source hypothesis (the gold deriving from an area of Upper Edie only about one square mile in extent) explain the bulk uniformity of the gravels (Taylour and Morley 1933:26-8, Fisher 1940:234, 1938:18).

Other factors influenced the type and location of the Bulolo alluvials. Much of the gold at the lowest levels was probably deposited on old, higher terraces by streams now extinct, and from there gradually washed down. Moreover, several streams had tapped gold from the primary area into the Bulolo, giving differential grades of gold at different points. This, coupled with water action, accounted for the progressive fineness of the gold downstream. The nineteenth century controversy about the origin of alluvial gold, whether precipitated from a chemical solution, or a mechanical process actuated by the action of running water on gold-bearing rocks, was settled in 1893 by Professor A. Liversidge whose argument for the mechanical process was supported by work on the Bulolo deposits. The finer, smaller particles, relatively free of quartz, were carried further, and the water dissolved more silver from the outside of the grains, leaving a higher percentage of gold (Fisher 1934-35:342-3, 378-80).

These factors explained most of the puzzles of Bulolo; their practical significance was that a hitherto undreamed of quantity of alluvium existed, and was workable to great depths. From its concentrated drilling BGD gained a general picture of new dredging possibilities. Banks told shareholders in November 1934 that the San Francisco design staff had begun work on two new dredges which would dig to 85 feet and 115 feet below pond level, making them two of the deepest digging in the world. The two shallow diggers were moved from the deeper areas to the eastern limits of the valley where shallow bedrock was known to occur.

Banks realised that because of the poor values, every available yard above marginal level should be dug. A carefully coordinated deep and shallow dredging program was developed. Banks and Harris realised that until the detailed results of the deep drilling were

known, potential profit was being whittled away, but there were obstacles in the way of a complete assessment. Competent staff was scarce because rising gold prices induced men to take up small-scale 'shows' of their own. The deeper ground was very 'tight' and hard to drill in places which Harris thought to be part of an old lakebed rather than stream deposits. Shafting, too, was difficult, because of the depth and water seepage from higher levels, so that it was uncertain whether cross-checks could be obtained by this method. However, both the directorate and field management were unwilling to take 'blind' drilling results.



Typical cross-section of a Bulolo dredging area

V.E. Bramming, who was head field engineer during the later stages of deep drilling, made detailed calculations and by November 1935 shareholders were told that results fully justified the building of the two deep-diggers: 90 million yards of gravel of an average recoverable value of 50 cents per yard were expected (working profit 38 cents per yard), with an additional 80 million yards at 32 cents (working profit 20 cents), making an estimated total dredgeable profit of \$50,000,000. In addition, further reserves of lower grade but still workable gravels were expected as deep drilling continued. By May 1936, when Decoto's original total estimate of 22 million yards had been worked, Bramming estimated that 204 million yards remained to be dredged.

In April 1936 the company issued a further 60,000 shares to finance the construction of the deep digging dredges. These shares were offered on preference to the existing shareholders; and it is an index of the established success of BGD that the offer was

limited to one new share for each sixteen held, and that the rate was \$20 for each nominal \$5 share.

One further problem remained concerning limitations on dredging and sluicing leases. These, comprising almost all the Placer leases, extended only to a depth of 50 feet. At the Administration's instigation, they were relocated as dredging claims which made no restrictions on depth. As Harris (to Waterhouse, 14.3.1934) pointed out, if the ground were dredged only to 50 feet, it would never pay anybody else to dredge below that depth at a later time, and the gold would have been lost forever.

Chapter 9

Improvements in gold recovery and further expansion

The retesting of Bulolo led to some important investigations. Griffin, who was supervising dredge No.1 during its 'breaking in', suspected that much gold was passing through without being recovered, involving losses up to 15 cents a yard. Though his modifications to the gold-saving tables and experiments with yardage and water-flow improved gold-saving, results were so far below expectations that any significant loss was serious.

Banks calculated that by September 1932 dredge No.1 was saving slightly over 90 per cent of all the gold passing through, but when the four dredges were working, a saving of only 1 cent per yard would mean an extra \$100,000 a year. Overall returns and profits were being maintained at the promised level only by dredge efficiency in handling yardage, and every effort had to be made to get extraction up to the economic limit.

A method for improving gold saving was devised by Short who had been experimenting at Placer's Natomas property with a jig of the American pulsating type, mounted in the tail sluices of the dredge. By a process of amalgamation, it was able to treat material which had escaped the tables.

Griffin (to Banks, 5.9.1932) suggested that a bank of three jigs be tried as auxiliary equipment on dredge No.2, then under construction. Banks (to Baker, 7.9.1932) determined to wait until the Natomas tests had been analysed, and then, in January 1933, Bramming was instructed to conduct further experiments at Bulolo. Meanwhile, Banks and Griffin decided to install jigs on dredges Nos 3 and 4, which were to dredge the Bulowat area. There the gold was even finer than at Bulolo, and possibly more difficult to amalgamate. The added cost per dredge was estimated at \$30,000.

These steps were taken before any deep testing had begun at Bulolo. Had the true depth of the deposits been known the management would probably have been less hesitant, for Banks' calculations could have been multiplied by three to allow for the enormously increased yardages for the later dredges. However, the installation of jigs on dredges was an unknown, and BGD was taking a

pioneer leap forward in design at a time when any additional costs had to be substantially justified.

Extra gold saving equipment was built into No.3 dredge, which began production in November 1933 - only two months later than originally programmed. It weighed 1,600 tons, was equipped with an 800 h.p. motor and could dig to 45 feet below water level.

No.4 was designed with a similar hull and power equipment, but with a larger ladder, digging to 56 feet below water. However, its jig was designed to treat material by flotation, the reverse of the amalgamation process. The new design worked on the concentrate with chemicals so that each gold particle attached itself to a rising air bubble, and was then removed from the pulp in a continuous froth. However, the innovation was subsequently abandoned for the motion of the dredge caused constant alterations in trim and consequent disturbances to the water flow within the flotation unit.

This is only one example of the unremitting technical attention devoted to the problem of improving gold recoveries. Towards the end of the 1930s the monthly field reports frequently refer to modifications to the gold-saving equipment. The jig results varied greatly depending on the material being dug. Because of heavy clay Placer's Pato property profited most, for there the overall recovery from the jigs (compared to that from the tables) rose to as much as 50 per cent, and never fell below 7 per cent; gold retained in the jigs amounted to 25 per cent of all that recovered. At Bulolo the proportion was less, but in terms of hard cash it was nevertheless substantial.¹

BGD became so well known for the use of jigs that a number of manufacturing engineers approached the company for the rights to make similar equipment under licence. The incorporation of jigs on the dredges became progressively important as the property approached the end of its life after the war; with rising costs, jig operations often meant the difference between marginal and sub-marginal working. This was particularly true of Nos 5 and 7, for these deep diggers had to dredge areas which had previously been treated. Thus the absence of jigs on the early shallow dredges proved fortuitous, for the gold they returned to the ground in tailings contributed later to the working profit of the deep dredges.

¹ For example, July 1940 gives the following figures for jig savings relative to total recoveries: No.2, 13.46 per cent; No.3, 5.51 per cent; No.4, 25.93 per cent; No.5, 6.49 per cent; No.6, too small for plant; No.7, under repair; No.8, 13.35 per cent.

All in all, the initial miscalculations at Bulolo had highly profitable results. The serious fall-off in values and recoveries compelled the company to devote every effort to make the most of every payable yard.

On the basis of high efficiency and through-put, the first four dredges operated satisfactorily and maintained profits until No.5 began digging in December 1937. Until early 1934, when No.3 came into full production, between 8,000 and 12,000 ounces of bullion were produced a month. With No.3 this rose to 15,000 ounces, and when No.4 began work in August 1934 the figure exceeded 16,000 ounces a month. On average recoveries Nos 3 and 4 never matched those of the first two dredges despite the steep fall below estimated values at Bulolo.

All dredge recoveries fell below the calculated expectations derived from drill tests at both Bulolo and Bulowat. In the seven years preceding the war, No.1 yielded 30.50 cents per cubic yard, No.2, 22.24 cents, and No.3, 20.65 cents. These figures hardly compare with the initial estimates of 50 and 30 cents respectively for Bulolo and Bulowat. Maintaining the profit level entailed a continual struggle to improve efficiency and reduce working costs. The dredges had to be worked to their maximum capacity for as long as possible; they had to dig in excess of the 150,000 monthly yardage for which they were designed, and at a lower handling cost than was originally estimated. It says much for BGD field management that all these objects were achieved. Over the seven years preceding the war these dredges worked for more than 90 per cent of the possible time. No.3 averaged 221,000 yards a month over that period, and No.2 dug an average of 253,000 yards. Though most of the ground was easy, these results were achieved mainly through the meticulous mechanical service and attention, and the ability of the experienced, stable dredge-crews, which BGD built up. BGD had the best equipped mechanical workshops in New Guinea, so that breakages and defects could be investigated and repaired on the spot. Existing dredge and power equipment was continually modified and new equipment and methods tested. The San Francisco office acted as a clearing and assessment centre for technical information. Experiments at Bulolo and at Placer's South American properties allowed for reciprocal benefits from field results.

Organisational procedure matched technical expertise. In the monthly field reports, any breakdown or loss of time, any fall-off in yardage or values, had to be accounted for. These reports were checked against the detailed test blueprints and surveys kept in the head offices in both Sydney and San Francisco. Consequently men and machines worked at a constant high pressure, but it was applied in such a systematic, coordinated way that it became an accepted feature of the job. When a fault or hold-up occurred, the men responded as a team working to a recognised procedure.

Table 1
Dredging returns, 1932-42

	Gravel dug	Total bullion	Gold (oz)	Grs of fine gold per yd*	Daily average per dredge	Working cost per yd
1932	558,800	10,442	6,890.82	5.957	7,000	4¢ (ex royalty)
1933	4,551,880	98,443.08	65,355.25	6.937	7,940	under 7¢
1934	6,674,300	134,827.73	89,737.081	6.500	7,184	9.15¢
1935	9,920,700	185,665.09	127,901.343	6.236	7,180	10.87¢
1936	10,915,500	175,459.77	121,352.693	5.372	7,700	10.702¢
1937	11,197,000	198,229.67	137,325.524	5.919	7,700	12.03¢
1938	11,222,000	194,956	134,715	5.793	6,571	12.03¢
1939	14,688,000	228,602	158,970	5.221	6,908	11.72¢
1940	18,353,000	268,108	185,016	4.862	7,306	12.59¢
1941	19,465,000	241,851	167,462	4.147	6,989	12.44¢
1942	11,526,000	149,770	102,691	4.301	6,154	13.297¢

* Includes silver values converted into gold.

Planning to cope with both normal and abnormal situations was one of the secrets of BGD's overall efficiency. The same outlook can be seen in the number and variety of spare parts always available, the availability of a reserve aircraft, the long-term ordering ahead for replacements and for new equipment, and the anticipation of delays due to weather or extraordinary field conditions.

The results of all these measures were impressive. BGD managed to raise the profit level of gravels in relation to their actual values and volumes by holding down working costs despite the gradual introduction of larger dredges digging at greater depths. In 1933-34 working costs per yard, excluding royalty and amortisation, were 9.15 cents; by 1939-40 this figure was 8.29 cents.

A careful balancing of profit and loss factors influenced the building of the two deep-digging dredges. It was intended that the second of these should dig to a depth of 165 feet. However, on consideration, the dredge was made a duplicate of the other (No.5) digging to 85 feet below a 40 feet bank.

An estimated 10 million cubic yards of gravel, lying at a depth greater than 125 feet, was thus sacrificed, but this loss was offset by a number of important savings: first, capital expenditure was reduced about \$500,000; secondly, aircraft were exposed to less risk, because No.5 was 1,700 tons lighter; thirdly, standardisation of the two dredges facilitated design and construction, and the replacement of parts; and fourthly, the dredge would be ready a year earlier, and interest on production at a time of peak gold prices made this a most significant factor. Lastly, financing the larger dredge would have necessitated a further issue of shares or a cut in dividends to existing shareholders (Banks to shareholders, 29.11.1935).

This dredge, called No.7, began production in July 1939. The No.6 dredge was the smallest, designed to dig a new property acquired by BGD near Wau in the mid-1930s. This late acquisition reflects the drive towards a cumulative increase in activity through a concurrent program of prospecting and testing.

This policy was not confined to BGD. NGG employed the pioneer Mick Leahy for some years as a prospector, and in the course of his work he penetrated much new country in the highlands, as far as Mount Hagen. BGD in the early days relied heavily on Tom Yeomans who, in 1933-34, explored the middle Ramu and the Tauri-Vailala areas, and 600 miles up the Sepik River. He was the first white man seen by many of the native people in these regions. In 1934 and again in 1938 Yeomans explored the mountainous areas between Wewak and Maprik. Behind all the exploration lay the idea that the main mountain chains were auriferous, and concentrations similar to those which had occurred at Bulolo could occur elsewhere. Little was found to support this theory, however, for

although many of the rivers contained traces of gold, they were not workable. Unlike Bulolo, there had been no shedding from a rich concentration.

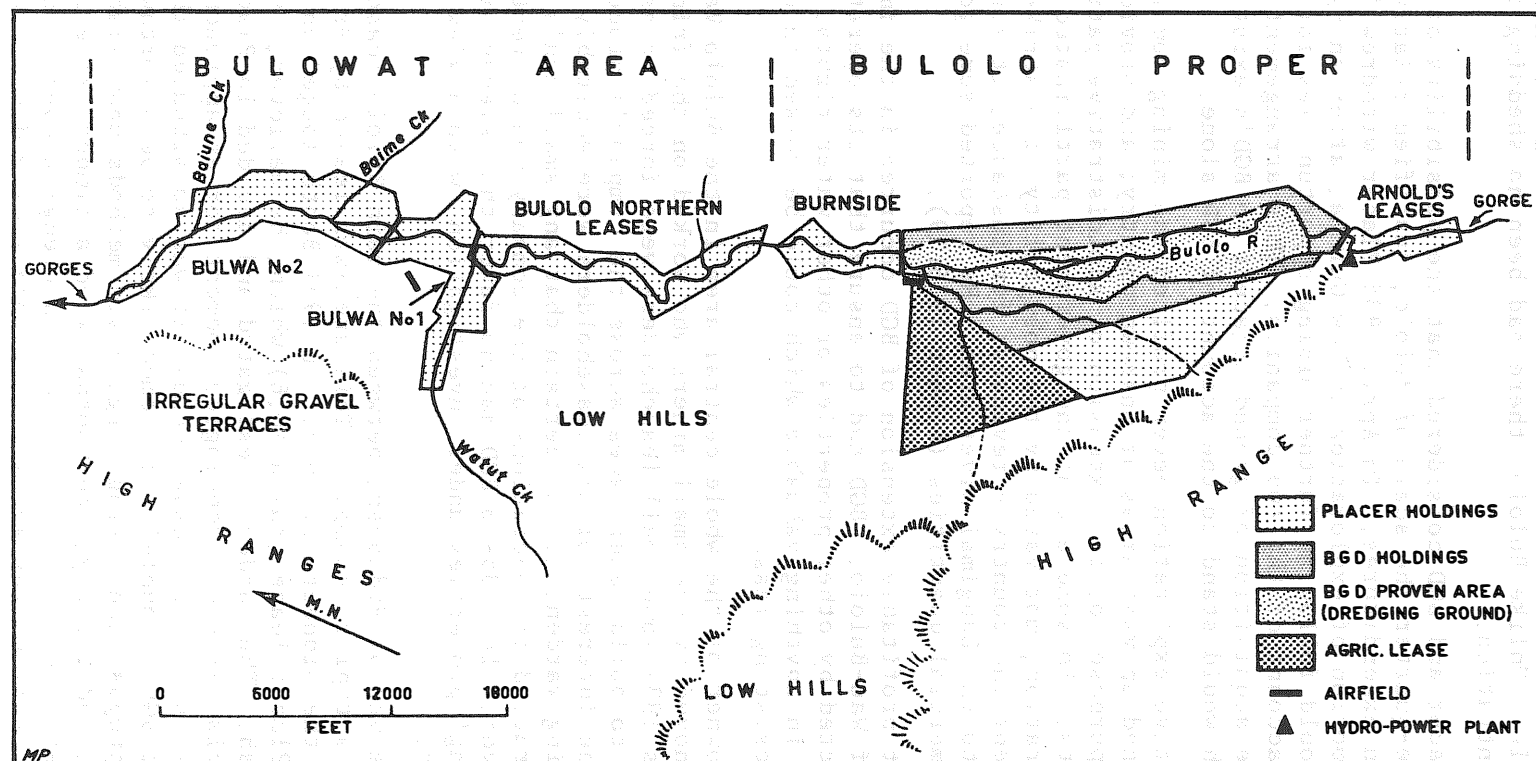
Both Placer and BGD considered that the possibility of success, even on one-quarter the scale of Bulolo, justified relatively small exploration expenditures. In April 1935 Placer withdrew from direct promotion of exploration in New Guinea, after an agreement that BGD would follow up further mining opportunities for the joint and equal account of the two companies. This arrangement did not include the acquisition of ground adjacent to BGD's existing holdings, which would stand to the account of BGD alone.

Prospective exploration never profited the mining companies, but it opened up vast areas of unknown country; and provided a focus and purpose for the extension of administrative patrols and police posts. To some extent the government participated in this gold exploration, motivated by the possibility of a strike which would augment the country's revenues; for instance, it sent a geologist to the Langimai River area. He reported some gold, but not in commercial quantities (Fisher 1936:19).

The most profitable extension of BGD occurred in the immediate vicinity of Wau-Bulolo. BGD had to ensure that its operations were not obstructed by other properties or other water rights. It was interested in anything valuable which could be worked in coordination with existing leases.

As the owner of the whole central area in the Bulolo Valley, BGD was annoyed by the small miners who worked on the fringes. As early as 1931 some small leaseholders were forced to ask BGD's permission to build water-races across the company's property. Although the interests of all leaseholders were equitably protected by the mining warden, it was certain that any small men's rights which obstructed the operations of the company would eventually be taken over. In 1935-36 BGD had no fewer than eleven small 'side-lining' properties under investigation, with a view to their acquisition.

The takeover of Widubosh, between the main Bulolo leases and Bulowat is a typical example. This area was leased by Mr and Mrs Booth, the pioneers of 1926. In 1931 Booth lodged an objection to a Placer lease (Bulwa No.6) which, he believed, overlapped the Widubosh. The warden investigated and decided in Placer's favour. This was the psychological moment for an approach by BGD. The company wanted the lease because it was so situated that it could cause BGD 'trouble', it seemed likely to be a worthwhile hydraulic proposition, using large-scale methods unavailable to the Booths; and thirdly, the Booths owned a timber lease along the Bulolo River which could interfere with dredging operations. Ultimately everyone was satisfied. Booth received £10,000, a sum far in excess of his original figure.



Mining leases on the Bulolo, July 1931

The introduction of the 'Special Area' provisions into the Ordinance enabled BGD to hold large areas of ground whether being worked or not, by virtue of its total expenditure. BGD's 'Special Area' of 2,326 hectares (about 5,750 acres) was officially declared in April 1932; by 1939 it had grown to 3,790 hectares (about 9,360 acres). The company always had a sound case for extension, because it always spent more than the obligatory annual average of £7.10.0 per hectare. When Freeman requested the inclusion of the Wau tenements in 1936, the estimated expenditure was £40, rising in the following year to £60.

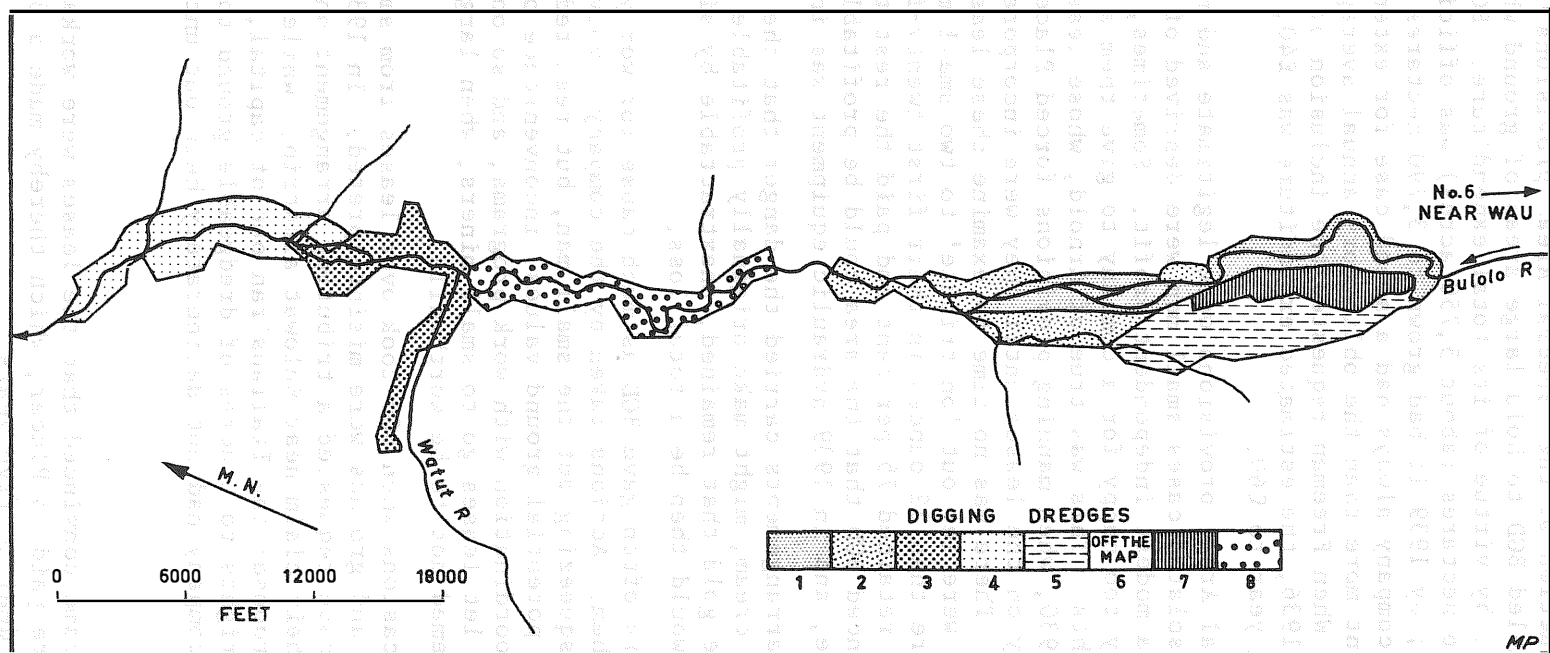
The 'Special Area' provisions were legitimate and necessary, although in isolated cases small men were deprived of the opportunity to make a modest independent profit. Sometimes, however, they were only too happy for a company to give them a lump sum for their rights. This was true of Arnold, whose leases were acquired in 1930, when manning provisions forced Placer to put a boxing party on the leases until they were incorporated in the 'Special Area'. There was no time to examine these leases immediately, so they were let out 'on tribute' to two small miners, who cleaned up more than 32 ounces in their first twenty-five days; the tributers retained 75 per cent and paid the rest to BGD. Such results convinced BGD that the area could be profitably worked on a larger scale, and in 1939 hydraulic equipment was installed.¹

Tributing arrangements carried the danger that the small men, by taking the cream, might make originally profitable leases sub-marginal. The gold that remained, unextractable by simple boxing or sluicing, would then be a total loss.

Small miners often gave BGD as much cause for worry as the company did them. Actions taken by the company involved no general principle of squeezing out the small man, but resulted from an assessment of potential ground values, inconvenience of one kind or another, coordination with work programs, and so on. In some instances BGD let leases go to small miners, when large-scale operations seemed not to be worthwhile.

On some occasions when BGD took over leases from small miners, their motives and grounds were misinterpreted. In 1938-39 an Italian syndicate requested a tributing arrangement on land adjacent to their claim near Bulowat airstrip. While BGD considered the proposal the Italians ran out of capital, and sold the race and rights to 6 acres of dredgeable ground to BGD for £1,598. The company had not deliberately held out until the small

¹ When BGD became convinced that the leases were workable, 5,000 BGD shares were paid to Placer, which thereby made a 300 per cent profit on the deal in five years.



Dredge courses, Bulolo and Bulowat

syndicate, starved of capital and refused access to good ground, was forced to get out and sell its assets at a nominal sum. The syndicate spent money on an area which could not give commensurate returns, and then turned to a tributing arrangement as a last resort to rescue it from its miscalculations. Such an arrangement could have involved BGD in considerable inconvenience and in the loss of a substantial sum of money.

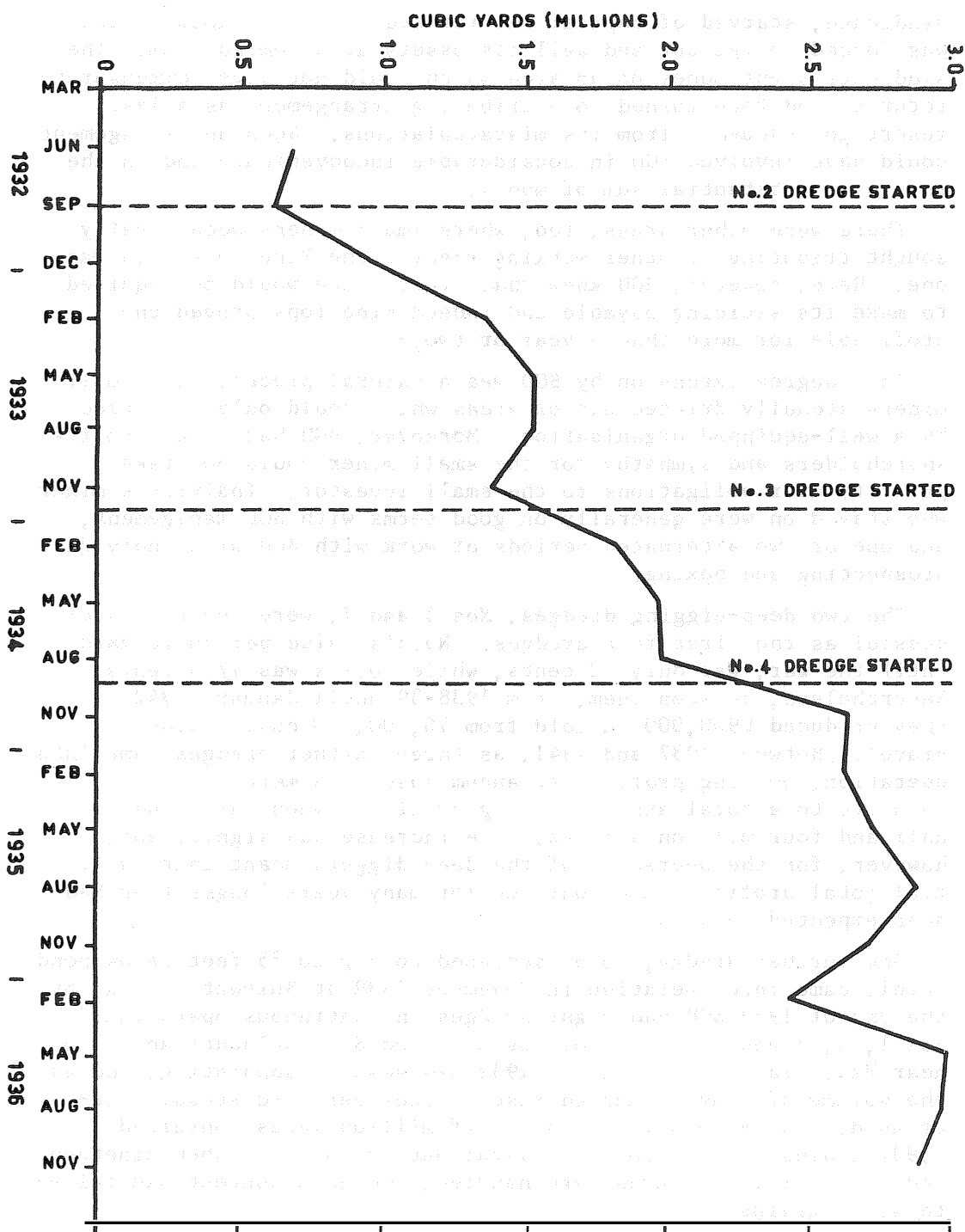
There were other areas, too, where small miners occasionally sought tributing or other working rights: the Pine Tops area was one. Here, however, BGD knew that every ounce would be required to make its sluicing payable and indeed Pine Tops proved unprofitable for more than a year or two.¹

To a degree extension by BGD was a natural process, for small miners steadily drifted out of areas which could only be worked by a well-equipped organisation. Moreover, BGD had a duty to its shareholders and sympathy for the small miner could not take priority over obligations to the small investor. Individual miners who stayed on were generally on good terms with BGD management, and one or two alternated periods of work with BGD with individual prospecting and boxing.

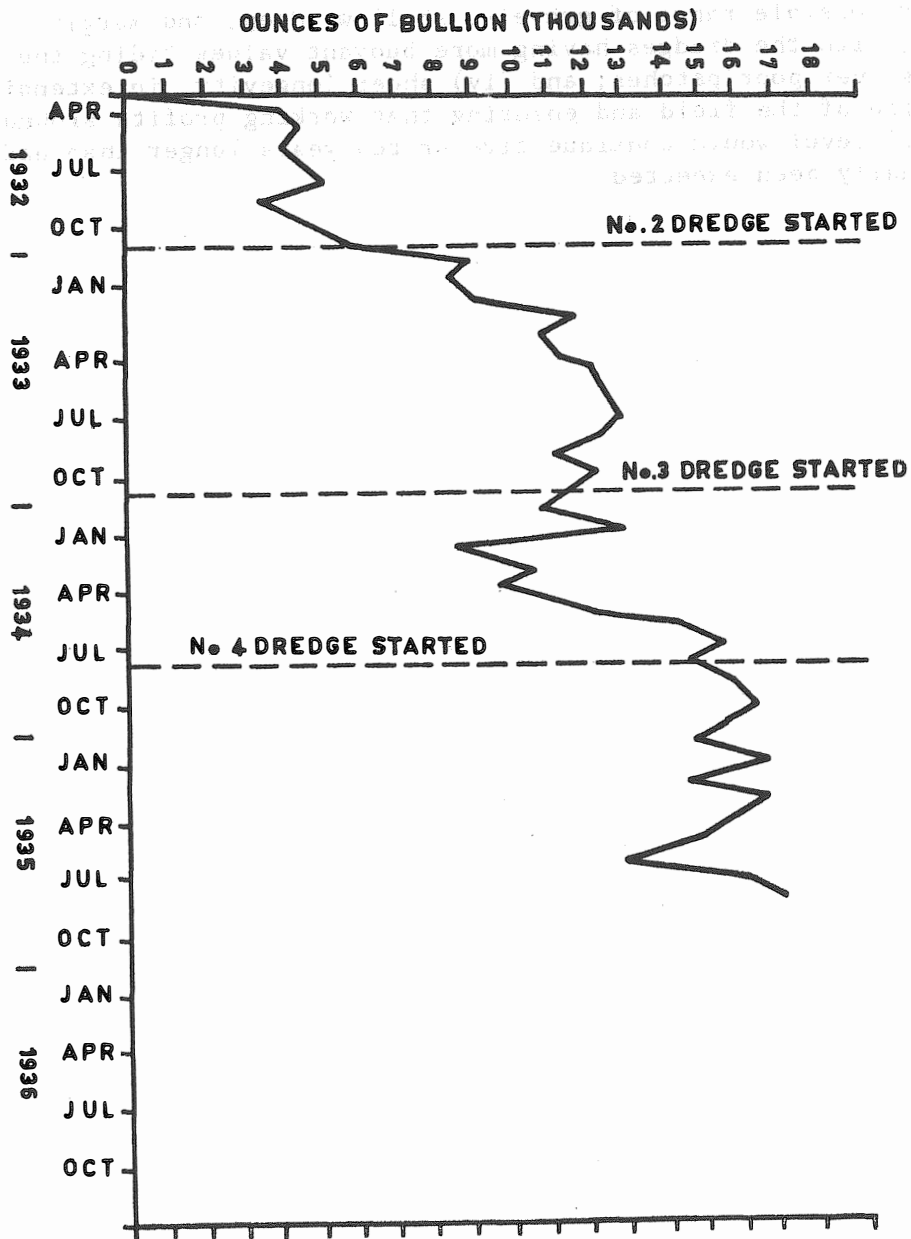
The two deep-digging dredges, Nos 5 and 7, were never as successful as the first four dredges. No.5's value per cubic yard, until the war, was only 12 cents, while No.7's was 17.5 cents. Nevertheless, between them, from 1938-39 until January 1942, they produced £900,000 in gold from 16,000,000 cubic yards of gravel. Between 1937 and 1941, as three further dredges came into operation, working profits per annum rose by a mere \$350,000, relative to a total annual working profit between three and a half and four million dollars. The increase was significant, however, for the operation of the deep diggers meant that substantial total profits could continue for many years longer than had been expected in 1930.

One further dredge, No.8, designed to dig to 35 feet below pond level, came into operation in November 1939 at Bulowat. Thus, by the end of 1939 BGD had eight dredges in continuous operation: Nos 1, 2, 5 and 7 at Bulolo; Nos 3, 4 and 8 at Bulowat; and No.6 near Wau. Values as early as 1932 had been disappointing, and as the volume of gravel handled rose, values per yard steadily decreased. In 1932-33 four and a half million yards contained 6.937 grains of fine gold per yard; but by 1940-41, when nineteen and a half million yards were handled, the gold content had fallen to 4.147 grains.

¹ Working profit was originally estimated at £70,000; but because the area was left until the post-war period of high costs, profits could not be realised.



Steady build-up of yardage processed, 1932-36.



Decelerating but cumulative build-up of gold
recovery

The advantages of several dredges working simultaneously were:
 (i) rationalisation of overheads, reducing working costs per unit;
 (ii) extraction of the maximum quantities of gold while its price was rising and working costs were stable; (iii) access to the widest possible range of gravels, shallow, deep, and marginal in value, with the dredges having more buoyant values tiding the others over poor patches; and (iv) sheer longevity, in extending the life of the field and ensuring that working profits around the 1936-37 level would continue five or ten years longer than had originally been expected.

Chapter 10

The problem of power supply

Apart from air transportation, the biggest obstacle was the supply of adequate electric power. The two problems were related, for weight limitations restricted the type and size of equipment which could be imported. The many technical and economic questions involved required a balance between expenditure, life of the field and type of equipment.

As vast reserves were uncovered, power provisions had to be continually increased. The type and location of equipment posed a further problem; the initial arrangements made at Bulolo revealed glaring deficiencies, and new methods had to be devised quickly to keep up with dredge construction.

During this period BGD benefited from the Depression, buying electrical equipment at bargain rates, and recruiting highly qualified engineers for whose skills the world demand was decreasing. For example, in 1930-31, BGD employed F.B. Hislop and A.P. Aldridge, who had been leading hydro-electric consultants in Australia and New Zealand respectively. Both remained at Bulolo and provided continuous and highly efficient supervision of power installation and operation.

In 1929 when NGG abandoned the idea of major hydro development, Placer had acquired water rights at the southern end of the Bulolo leases for its first installation. This site lay below a sharp drop in the river, and it was close to the proven dredging areas. Extensive fluming and tunnelling were necessary but there was little loss of line power. If more had been known about the untested leases and the true extent of the Bulolo gravels, other and better solutions to the power problem might have been found earlier.

When the G-31s began operating, wood-fired boilers driving compound engines connected to a generator were flown in, and this enabled work to proceed on dredge construction. The building of the main power house involved building a weir and then a 7,700-ft race consisting of cedar fluming, a long ditch, and a timbered tunnel. Two Swedish Boving turbines which provided 2,000 h.p. came into operation in March 1932, just in time for the opening of dredge No.1.

As testing proceeded at Bulowat during 1931-32, two more Boving generators were installed. However, line voltage had to be stepped up from 6,600 to 11,000 in order to travel the further nine miles to Bulowat, and management realised that the Bulolo station would be inadequate. The Bulolo site was susceptible to blockages caused by landslips and falling timber, so in 1931 Godden suggested an additional power source in Baiune Creek where at least 2,000 kW could be produced for a fraction of the unit cost at Bulolo (Report by Carter, 29.2.1932). In November 1932 floods clogged the Bulolo intake and caused heavy wear on the turbines, and Harris urged Banks to move quickly with the construction of a power station at Baiune. Banks hesitated until he realised that NGG, whose lode development was lagging, could be induced to buy surplus power. Falling prices enabled him to buy equipment at only one-third of the 1930 quotations.

There was considerable argument over what sort of equipment should be installed at Baiune. Turbines had been a constant trouble, and it was finally agreed to install Pelton wheels, which were simpler and more economical. The stator (or stationary inductance coil) of each generator weighed over 7,000 lb, and could not be sectionalised because factory treatment was necessary to exclude tropical humidity. However, the G-3ls handled the extra load without difficulty.

The Bulolo and Baiune plants together made about 8,000 h.p. available by November 1934. Banks, again on his own initiative, had expanded Baiune to four generating units; and the opening up of the Bulolo deep gravels showed that BGD would require all the additional power. Power was sold to NGG out of goodwill rather than financial necessity. BGD rejected many requests for power from other sources for the company saw that to supply electricity on a public utility basis would involve insupportable moral and perhaps legal obligations. The wisdom of this policy was proved, for by 1940 NGG's demands often exceeded the agreement by up to 65 per cent, and thus threatened the operation of one or more of BGD's dredges.¹

In 1938 a further high-level scheme at Baiune was planned. The outbreak of the European war increased the need for installation in order to extract every ounce of gold quickly from New Guinea. Any surplus power from Baiune was to be used for 'running-down' propositions such as sluicing in the Widubosh and Pine Tops areas (Waterhouse to Hoffman, 16.1.1941). However, construction was

¹ The arrangement with NGG provided for temporary overload peaks of 25 per cent. After 1937 there was definite inter-dependence, for No.6 dredge at Wau was supplied through NGG's power lines.

held up by a shortage of supplies caused by the war and in 1940-41 BGD's power needs became critical. Safety margins had to be reduced and enough power was kept in reserve only by carefully programming overhauls and clean-ups, so that one dredge was always idle.

With the accelerated growth of gold production at the time, even the commissioning of two large Pelton wheels and generators at Upper Baiune did not ease the power crisis. When the Pacific war broke out BGD was actively planning yet a third power station at Baiune (involving the transfer of some of the Bulolo equipment) in order to promote and safeguard peak operations.

The periodic deficiencies in power were caused by the unexpected extent of gravel reserves, by the pressures resulting from the outbreak of war, and by NGG's demands. It was an achievement that the ratio of investment in hydro-electric equipment to total fixed assets steadily declined, while gold production was boosted to levels undreamed of in 1931.

Chapter 11

Air and road transport

Until 1935 there had been general satisfaction with air transport. The early years were the testing period, for the bulk of capitalisation occurred in the first two or three years. £12,600 was spent on the aerodromes at Bulolo and Bulwa, the cost of the three G-3ls was approximately £85,000, and installations at Lae cost £43,000. Banks (1932:630) claimed the entire outlay had been met as dredges had begun operation a year or two earlier than otherwise possible. Over the first 2,500 tons of cargo he estimated the savings on air versus road transportation (allowing for the original capital outlays) as \$438,000 or 36.5 per cent, and this he felt justified continued reliance on air transport.

An aura had grown up about air transportation, and this made it very difficult for the proponents of a road to fit in a rational word. By 1934, when air freight costs had dropped to threepence per pound, even independent observers stopped pressing the Administration for a road. The editor of Pacific Islands Monthly (June 1934) calculated that even ignoring capital costs carriage by road could not cost less than that.

There was widespread agreement that air transportation had permanently solved the transport problem. In the first seven years of aircraft operation in New Guinea - including the 'lean' years with tiny Moths - 28,000 flights had been made, more than two million miles had been flown and 25,000 passengers and 21,000 short tons of cargo had been carried. In every respect this constituted a world record. Those associated with it had reasons for being sanguine.

Nevertheless, other interests including some less successful mining concerns, depended for their survival on reduced transport costs and revived the road proposals. The Administration felt in 1934 that a road might be built for £100,000 and could drastically reduce living costs on the goldfields. Airways representatives felt that the money would be better spent in subsidising the air companies, and determined to stop further expenditure on road surveys or works.

Competition and conditions in the goldfields forced operators to reduce profit margins. In 1933 Guinea Airways had to draw on

reserves to maintain its 20 per cent dividend, and some of the small operators were carrying goods for as little as one and seven eights pence per pound. Airways felt that only improved efficiency and rationalisation would enable services to be maintained at an economic level of freight charges, and suggested to the Administration that the existing air transport operators be merged. Discussion continued for some months and in February 1936 a special meeting of the New Guinea Legislative Council was convened. Eventually, for reasons which are still not clear, the idea fell through. BGD's attitude was affected by the arrangement with Guinea Airways; indeed, Waterhouse was now a director on Airways' Board, 'to assist in furthering the smooth running of affairs between the two companies' (Banks 1937:807). Both companies were dedicated to air transport, though this was seen in many quarters as reactionary, selfish, and inimical to the broad interests of the field.

NGG saw only that freight rates were being brought down through competition, and its support of increased competition was unconditional. Blaikie Webster of NGG wrote to Banks in June 1936 that their two companies should co-operate in fighting the air merger scheme. Banks saw the implications of a stand on either side and was non-committal. Moreover, as BGD ran its own planes, and the only 'outside' costs were the management fees from Airways, BGD had little to gain from becoming embroiled.¹

With the failure of the merger proposals, conditions remained difficult for the transport companies, especially Guinea Airways. The average freight rate charged by the company fell to 1.94 pence per pound in 1938. The gross revenue, per ton and per person carried, reached an all-time low (£11 and £7.12.0 respectively compared to the corresponding 1930 figures of £76.14.0 and £35.10.0). Air transportation, as then organised, had been forced to its economic limit.

Because the system had proved highly reliable BGD continued to stress its advantages, in particular its predictability. Developments to 1937 supported Banks' view that air transport showed an overall capital saving over road transport.

The three G-31s had carried 17,255 short tons for the company (to 1 December 1936), nothing had been lost, and there had been no serious mishaps. Banks (1937:807) felt it inconceivable that this tonnage could have been trucked over a mountainous tropical road without accidents to personnel or loss of equipment.

¹ Webster to Banks, 22.6.1936, Banks to Webster, 3.7.1936. Webster claimed that NGG had 'successfully fought' an air monopoly.

Table 2

Guinea Airways Ltd
carriage and profits, 1929-39

Year	Tonnage carried	Passengers carried	Gross revenue £	Net revenue £	Net profit £	Dividend Ord. % Pref. %		Amount £	Av. freight charged per lb cargo (pence)
1929	434	869	44,006	6,226	10,898	20	-	4,000	10.61
1930	949	2,047	72,756	31,567	31,568	40	-	8,000	8.28
1931	1,146	1,995	67,922	22,077	22,077	40	-	20,000	6.50
1932	3,947	1,607	95,619	28,725	28,725	22.5	-	16,875	5.91
1933	3,980	3,856	77,695	13,053	13,053	20	-	15,000	4.31
1934	6,044	7,398	111,203	30,202	30,202	20	-	15,000	4.12
1935	6,102	9,721	114,465	20,818	20,818	20	-	15,000	3.36
1936	6,476	12,137	137,729	25,876	25,876	20	-	15,000	2.90
1937	6,705	11,869	96,134	13,887	13,887	17.5	-	13,375	2.49
1938	8,408	12,120	92,451	10,895	10,895	-	7	3,267	1.94
1939	8,804	11,626	102,576	17,020	16,265	5	7	9,600	2.07

The cost to BGD decreased from £18.4.0 per short ton in 1932 to £12.9.8 in 1936 due to decreases in the insurance rate (consequent on proven reliability), and Airways' fee, devaluation by about 20 per cent of the Australian pound in relation to the dollar, and an increase in tonnage. Banks (1937:808-9) was confident that at least two of these factors could decrease further and anticipated reduction to at least £10.5.0 per short ton.

Sectionalising was an additional expense with air transport, but Banks claimed in 1937 that the time factor in assembling the machinery and commencing dredging was even more important than had been allowed in 1931-32. He felt sure that at least two years working had been gained by using aircraft. The cash returns in those two years had exceeded expectations; and Banks calculated that the interest accruing over that period, at only 3 per cent would still amount to three million dollars. In addition, he felt that the difficulties and cost of road maintenance had been underestimated. In 1938 Banks was awarded the gold medal of the Mining and Metallurgical Society of America for the application of aviation to mining in remote areas.

By 1937-38 the advantages of aircraft were being reappraised in many quarters. The aeroplane could not sustain agricultural or other industries, and attention was rapidly swinging to this kind of settlement. An article on rural development in New Guinea stressed the potentialities of the Markham-Wau nexus for cattle, timber and general farming (A.F.K. 1938:38). The highland pioneer Leahy had taken up land at Zenag, just north of Bulolo, and the opening up of the highlands, which presupposed similar transport problems promoted a change in outlook towards Bulolo.

The re-siting of New Guinea's administrative centre, after the volcanic eruption in Rabaul in 1937 brought the problem of road communications into sharper focus. For twelve months the respective merits of Salamaua and Lae for the new capital were argued. In both cases the early construction of a road to Wau was accepted as an integral part of the plan. In July 1938 the Federal Parliament passed the New Guinea Loan Guarantee Act, in order to raise £150,000, the estimated construction cost of such a road. It was proposed that a toll be levied on road users, to repay the loan.

Nevertheless, sections of the mining community at Wau remained sceptical. They had had long experience in seeing resolutions substituted for action, and in April 1938 the New Guinea Mining Association was formed to represent the smaller concerns, the individual miners, and those wishing to promote agricultural settlement. Large companies were excluded. The Association quickly established liaison with the Returned Soldiers' League, the Planters Association, the Citizens' Association in Rabaul and other groups (Rabaul Times, 13.5.1938). The prime object of the

Mining Association was to force down costs so that lower grade ores could be profitably worked, and the life of the fields extended.

The mining warden at Wau, Feldt, wrote in 1938 that the area would be deserted within ten years if no road were built. With a road the cost of freight and indentured labour would be reduced, making it feasible to exploit poorer ores at Edie Creek. The reserves might thus be worked a further five years, and serious agricultural and forestry development would be made possible.¹ A report prepared by the warden, the Government geologist, and the inspector of mines, emphasised that 'vast' deposits of marginal value would be workable if costs were reduced.

This argument appealed to the mining groups. The former mining warden, H. Taylour, then chairman of a small company, had consistently advocated the construction of a road; NGG too, became actively concerned in the campaign for a road. A member of the Australian Cabinet, Senator Foll, was one of NGG's directors, and he used his influence to hurry on the idea.

There were further problems, however. Those who had no direct interest in the road suspected that they might be asked to pay tax to finance it and freedom from taxation was one of the major benefits of living in the country. These people were clearly not convinced that the loan money would be adequate, as the Mining Association claimed.²

By the end of 1938 rifts became open on the goldfields, counter-pressures and confusion arose in Australia and the Minister responsible for the Territory, W.M. Hughes, clung to the idea of Salamaua as the new capital, despite the recommendation of Lae by an expert committee. Moreover, parliamentary debate on the road had been desultory, and gave promise of further delay. The Mining Association began to hint darkly of collusion between the air companies and certain politicians, including J.V. Fairbairn, who became Minister for Civil Aviation shortly afterwards (Rabaul Times, 9.12.1938).

These arguments and counter-arguments created the feeling, both in Australia and in New Guinea, that more careful consideration was needed before a decision was made. This attitude was shared by Banks and Airways.

BGD avoided direct participation in this controversy. The capital they had tied up in air transportation was best liquidated

¹ Report in National Archives, A.D. 834/2.

² See Rabaul Times editorial, 12.8.1938. It was claimed in Parliament that £150,000 would be totally inadequate - H. of R. Debates, 22.11.1938, Vol.158:1808-9.

in use rather than through supersession, and their position was not critical as far as the dredging or sluicing of marginal ground was concerned. As the company saw it, the problem was to extract all the gold economically accessible; the decision had already been taken to leave ten million yards of deep gravels undisturbed. Lowering of costs and extension of marginal reserves therefore did not seem sufficient to warrant a new gamble over road-building. But BGD's dominance of the field and reliance on air transportation meant that Banks could not afford to give the appearance of obstructing something which the smaller concerns viewed as vital to survival.

The official committee on the field which advocated the construction of a road in 1938 used BGD's No.5 dredge as an argument for the lowering of costs. It was claimed that the demands of sectionalising made the dredge too light for the job, and that it had been able to work, uneconomically, to only 40 feet of its 80 foot capacity. The argument was unsound, however, because although this was so at the time, by the end of 1938 the dredge had been digging for more than three months at an average depth of 90 feet for more than 90 per cent of total digging time.

The air versus road argument continued until the Japanese invasion. In the Australian Parliament in 1940 it was implied that the air companies were responsible for the failure to get on with the road.¹ Wells wanted to retaliate that Airways did not oppose the idea of a road, but that they did oppose the expenditure of public money on the routes which had been proposed (over the mountains from Salamaua). He was restrained with difficulty by Waterhouse, who realised that public statements would be construed as general opposition. Like Banks, Waterhouse was convinced that a road would be a costly luxury, made superfluous in advance by the use of the aeroplane, and economically suspect in view of the estimated short life of the field (Waterhouse to Wells, 18.4.1940).

BGD continued to demonstrate the reliability of air transportation. By 1937 the total cost of carrying a short ton from the ship at Lae to Bulolo had fallen to \$50, and to \$35 by 1940, and was still falling; in the latter year Airways management fee was only £1 per short ton, compared with the £4 fee agreed on originally in 1932. By January 1942, when operations ceased, 40,259 short tons of equipment and supplies had been flown in to Bulolo and Wau for BGD, all but 842 tons of this being carried in the company's own G-31s. There had been no serious mishaps and no losses of any kind, an astonishing achievement at that time.

¹ H. of R. Debates, 30.5.1940, Vol.163:1598-9. Routes were still being suggested and surveyed in 1941: e.g. that via the Buisaval River valley, commended by Taylour (Morobe News, 15.2.1941).

On the other hand, all Banks' arguments related to the boom years, when costs were decreasing, while the price of gold was rising and BGD production was at a peak. Had the war not intervened, shareholders might have come to regret an exclusive reliance on air transport. It is probable that had BGD supported the road proposal in 1938, there would not have been the same procrastination.

The fact that the road was not built until 1945 is an argument for the lower cost of road transport. It was claimed that the demand for transport was too high for the road, and that it had been too expensive to build, especially in the early years of the war.

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Chapter 12

Labour conditions and labour relations to 1942

Labour conditions

In attempting to deal with labour conditions on the goldfields, the New Guinea Administration had before it the sad example of the Lakekamu goldfield, both before and after World War I. There, official control had been inadequate, and miners had arrived penniless, with little prospect of supporting themselves or even of paying their labour. Some starved; the death toll was high.

The New Guinea Administration tried to control the influx of Europeans, mainly by demanding cash sureties. They laid down more definite and rigidly policed standards for indentured natives; these covered recruitment, equipping, accommodation, pay and repatriation.

The difficulty of recruiting enough workers to keep pace with the phenomenal expansion of the goldfields imposed more limitations than labour regulations. New Guinea has a very scattered population and there were few economic or other pressures on them to leave home. As a result, companies had to build up a good reputation amongst native labour in order to maintain a steady supply, and to induce workers to re-engage.

This was especially so in the late 1920s and early 1930s, when most mining was concentrated at Edie Creek: the cold was intense, most regular native foods were unavailable, and it was difficult for the Administration to insist on adequate hygiene. The death rate in the Morobe District was extraordinarily high: it was considered an improvement in 1933 when the rate fell to 3.0 per cent, though this was almost double the average for the whole of Papua-New Guinea. By that time more than 6,000 natives were employed on the goldfields; BGD alone employed more than 1,300.¹

¹ New Guinea Annual Report 1932-33:64-5; Eckert 1937:473. The major definable cause of death was endemic dysentery - 12.5 per cent of all cases died.

During the 1930s the pressure for labour eased slightly as further areas were opened up. BGD employed its own recruiters, who had a launch for operating up the Sepik, where poor conditions made the people more susceptible to inducements.

Workers were usually engaged under the indenture system; for a number of reasons, particularly unreliability, employers shied away from casual contracting, though this was provided for under the Native Labour Ordinance. In 1932 indentures were extended from two to three years, following the recommendation of Commissioner Dunstan (who stated in 1931 that native labour was being coddled). Under the conditions which employers observed and often exceeded the three year term was reasonable, for raw villagers speaking a multiplicity of languages spent up to twelve months adjusting to the new surroundings before they began to work efficiently. But it was less than fair to native families and communities.

Controls were rigorous. A recruiter had to give security for the observance of the Native Labour Ordinance, and, if recruiting for a company, he had to be authorised by licence to act as its agent. At the beginning and end of the indenture period recruits had to be passed by an Administration medical official; while spot checks by other officials were authorised by the Labour Ordinance to see that the specified housing, food and medical treatment were being provided.

At the end of a contract workers had to be paid off in the presence of the District Officer or his representative, and they had to spend a few months at home before being allowed to re-engage. The wages for adult male labourers in the 1930s ranged from five to ten shillings a month: the sum was small, but everything else was provided, while the use of money and the ability to buy goods at a trade store was a novelty to many recruits, who were often more attracted by the experience rather than by the ability to purchase cash goods. BGD's management was at times puzzled and concerned at workers who spent their meagre earnings on aeroplane rides over the goldfields.

It is easy to raise the cry of exploitation when considering native wages. Many of the employers in the early stages of Morobe were small men who had to struggle to raise wages; and the wages bill was a major item for most of the companies in the pre-productive phase. It is true that in the most productive years labourers could have been paid more, but this argument raises a number of points: first, should supply and demand operate as the determinant of wage policy? How is wage policy to be determined and controlled in a colonial situation, where many basic governmental institutions are only rudimentary? Is it realistic to judge a colony of thirty years ago by concepts still evolving in many of the industrialised nations of the West? (See Wootton 1962.)

There are no satisfactory answers to these questions. Throughout the 1930s there were critics of the indenture system: an American who visited the goldfields claimed that it represented a form of slavery (Ballock 1932). But conditions in New Guinea were such that without the indenture system, development would have been seriously impeded.

Criticism of working conditions was more pertinent: the same American critic complained that natives lacked adequate warmth and accommodation, and in the Wau-Edie area this was true. For instance, four or five blankets were essential for warmth at night, but the statutory issue for natives over 3,000 feet was only two per year (Taylour and Morley 1933:20, 44).

However, such problems were exceptional in New Guinea. The remoteness of the field and labour scarcity avoided the acute problems caused in the urban mining areas of Africa by pools of unemployed, detribalised paupers. Australians prided themselves on their standards of paternalism, and surveillance of labour matters was stressed.

On the other hand some employers did only what they were compelled to do, and some left native labour to perform all operations and did nothing themselves: Commissioner Dunstan in 1931 complained of teams of labourers being allowed to work entirely unsupervised.

BGD was more progressive in labour matters. The company was fortunate in that Bulolo is a pleasant, warm valley under 2,500 ft in altitude, while many of NGG's physical problems were caused by higher altitudes. Moreover, while NGG's work was largely underground, BGD's was in the open. These reasons alone enhanced BGD's reputation: Reed reported that in 1938 'there was universal agreement among the Sepik natives that Bulolo was a fine place to work'.

The accommodation and amenities that BGD provided for native labour surpassed anything else in the country, government or private. In 1931 a permanent native hospital was erected at Bulolo. This and the European hospital with a modern pathological laboratory were supervised by Dr Carl Gunther. BGD's hospital system was a model for the time, with the result that the morbidity rate at Bulolo in 1935 was only 1.8 per cent compared with 4.3 per cent at NGG.

BGD aimed to create a contented community of indentured workers. Extensive recreational facilities were provided, sports teams were given fields and equipment, and to some extent native workers were encouraged to plant their own plots of ground. These things represented an attempt to retain elements of the familiar village atmosphere, and to blend them with those of a wider community. Housing reflected a similar approach: BGD rejected the large, impersonal barracks typical of the plantation compounds, and built

instead a number of small huts holding two to four workers each. Instead of a communal mess, rations were issued individually, so that the natives were free to do their own cooking in little groups of friends and wantoks (people speaking the same language). Following both government policy and its own inclinations, BGD encouraged men to bring their families, but its efforts were not successful and the number of native men accompanied by their wives never exceeded 1.5 per cent of the work force. According to native custom, men faced unusual situations alone - a legacy from the days of warfare - and, too, the men were reluctant to place their womenfolk in the midst of large numbers of other men over whom they had no social control. Moreover, the need for each native family to maintain its place and its rights in the village was met by the women.

Throughout the 1930s it became increasingly difficult to attract families, for natives tended to work under indenture before marriage, and this meant that proportionately more single men were engaged as time went on.

Discipline and working conditions for the native labour force were carefully watched by the mining wardens; indeed, natives were even more protected than European employees, in that the European in charge was held responsible for any accident to a native. However, it was not until 1936 that a comprehensive Mines and Works Regulations Ordinance came into effect.¹ This was based on a Queensland statute, but protective provisions for natives were added. These, too, seem to have been policed more rigidly than those relating to Europeans, who were held responsible for their own conduct. Convictions of Europeans for inadequate supervision of natives were not uncommon. In 1937 a European supervisor was arraigned for manslaughter because of the accidental death of a native employee and in the same year BGD was strongly censured for allowing natives without adequate supervision to paint a building holding a transformer.

BGD had long understood the economic disadvantages of poor working supervision and poor living conditions. Reed (1943:222-6), an American sociologist who might have been expected to take a highly critical attitude towards a colonial employer, praised the company's treatment of its native labourers.

Attitudes towards native discipline, however, reflected colonial attitudes typical of the time. Under the Native Labour Ordinance, corporal punishment of labourers was forbidden. Even government officials, however, considered natives had a 'poor mentality', so that a knowledge of 'native psychology', allied with 'firm treatment', was considered necessary (Taylour and Morley 1933:38-40).

¹ Ordinance No.21/1935, operative 6.4.1936.

Among employers the occasional cuff administered to 'difficult' natives was approved (see Reed 1943:177).

Excellent conditions were also provided for Europeans on the Bulolo field. In those depression days BGD could have obtained men prepared to work under almost any conditions. Unlike some other companies in the Morobe area, BGD recruited good quality men by providing good facilities and by showing concern for their welfare. Around 1939-40, when the construction phase was coming to a close, about 350 Europeans were employed at Bulolo. Roughly one-third of these had their wives and families on the field. Providing housing and welfare for this community, as well as 1,300 natives was a serious problem. Nevertheless, the employees lived more comfortably, and with more varied outlets for recreation, than they would have done in Australian suburbia. The coherence and camaraderie of the community were a prime attraction, and many men, despite their two-year contracts, came to regard Bulolo as home.

Most employees lived in the main area at Bulolo, for the extreme concentration of gravels in the small valley enabled them to travel daily to the job. There were smaller camps for crews engaged in dredge and power house construction, at Wau, Bulowat, Baiune, and one or two other places for a time. Married men could rent at low rates well-designed, furnished company houses. When a shortage arose in the mid 1930s, men who desired to build their own in their spare time were provided with materials, as company houses were allocated according to the date of engagement. Single men were accommodated in blocks of three-bedroom units, each with its lounge-verandah and shower room.

Living costs at Bulolo were high; consequently the company tried to control the supply and prices of all commodities, especially food. In 1932-33 agricultural leases were acquired, but, though the company tried to grow both European and native vegetables and fruits the soil at Bulolo proved to be low-yielding. Married men cultivated plots attached to their bungalows, and with intensive work managed to produce most types of vegetables.

A large refrigeration house was built at the main camp as soon as power from the Bulolo power station became available, and later smaller units for the storage of perishables were installed at the other camps. Frozen meat was imported from Australia until the late 1930s, when BGD flew a small herd of cattle into Bulolo. A piggery was added in 1941. The company also maintained poultry.

A general store was set up to check excessive retailing and importing margins, as a service rather than a profit-making venture. Moreover, the large island trading firm of Burns Philp was encouraged to open a branch store on company land nearby, and this offered both variety and competition.

The temperature at Bulolo (range 55°-87°) and moderate rainfall (75 inches p.a.) made the valley ideal for sport: at the time of the Japanese invasion in 1942 there were four tennis courts, three swimming pools, a six rink bowling green, two golf courses, a 600 yard rifle range, and a concrete cricket pitch available to employees. In addition, the company had built four recreation halls, with facilities for billiards and table tennis and a library, and a cinema equipped with the latest projectors and screening the latest films (Dunkin n.d.:13).

At the peak of employment there were about ninety children at Bulolo. The Administration took little direct responsibility for education, so in 1940 BGD built a primary school, which was handed over to the government. In 1941 over thirty children aged 5-14 attended the school, which was controlled by one of the employees' wives, a qualified teacher. Most of the older children went to school in Australia.

In this way Bulolo became a settled and harmonious community. There was, however, a rigid division on racial lines. Living areas and amenities were, and still are, quite separate. Contemporary attitudes, and the great dissimilarity of background and culture made contact difficult.

Possibly more effort could have been made to bridge the occupational gulf. The generally poor opinion of native capacities meant that work demanding any degree of skill or judgement was done by Europeans; gangs of natives worked at heavy labouring jobs under Europeans who had no concept of inter-racial job mobility, nor of equipping natives with skills. Such ideas did not occur until the post-war years (Reed 1943:213).

Labour relations

In the whole Australasian area, only the giant Broken Hill Proprietary Company matched the efforts of BGD for its workers. However, towards the end of the 1930s bubbles of labour discontent began to rise to the surface on the goldfields. These were mainly caused by the poor conditions at NGG, but there was additional agitation amongst a section of BGD's staff.

The conflict of interests on the goldfields was deep. The extreme isolation of the area made men dependent on the mining companies for accommodation, and the expense of fares back to Australia prevented them from leaving before the end of their contracts. A section of employees at Bulolo came to think that working conditions had been imposed unilaterally by the management in contrast with the Australian tradition that conditions must be jointly accepted by management and organised labour. Most of BGD's European employees were used to the protection of unions and arbitration machinery which had never existed in New Guinea. The

Miners' Association which resisted the 'Big Six' in the 1920s had been an organisation of individual small capitalists, resembling a workers' union only in its recourse to joint action. (The Mining Association of 1938 was similar in its constitution.)

Moreover, the influences on BGD's management were largely American, and in the early days the senior field executives were Americans. Allen (1931:48) described the American businessman as considering it his right to 'kick the union organizer out of his workshop'. Conflict between BGD's attitude and Australian principles of labour organisation endangered BGD's position. Most work at Bulolo demanded some experience of alluvial mining, and of local conditions. Alluvial mining was unimportant in Australia, so that the company had to train most of its employees in specialised tasks, and the possibility of mass defection was a serious threat.

Secondly, the community was divided into three tiers, with the large native labour force forming the bottom layer. Rigid divisions between Europeans and natives created a constant fear of organised native agitation, which had its origin in the Rabaul strike of 1929, when the entire labour force of the town had organised itself and abruptly refused to work unless wages were raised (McCarthy 1959b).

Discontent at Bulolo was partly linked with more serious trouble amongst NGG's employees at Edie Creek. In September 1935 about 100 European miners and artisans at NGG's mill and cyanide plant (Golden Ridges) went on strike over a proposed wage reduction, and were dismissed. 'All the unemployed men were thus without quarters, and proceeded to Wau, where lack of accommodation led to a good deal of discomfort.'¹ Eventually the men returned to work on the old terms, but a legacy of bitterness remained that had repercussions for BGD in 1941.

BGD employees had become disturbed over employment security. All employees were engaged on two-year contracts, renewable by agreement subject to resignation, dismissal, or redundancy provisions. Redundancy difficulties always occur in the mining industry, and the company regarded its welfare measures as the best compensation and labour inducement it could provide. In August 1937, however, demands were made for higher wages and guarantees of long-service contracts and other benefits, which the management considered exorbitant.

Joubert, the American field manager, increased wages to keep desirable employees longer on the job and maintain efficiency, but

¹ Pacific Islands Monthly, October 1935. In the November issue the Sydney manager of NGG denied that the company had intended reducing wages.

this did not resolve the issue. In January 1938 delegates from various departments presented Joubert with an ultimatum, threatening strike action within five days unless all their demands were met.

BGD's handling of the case lacked tact and understanding. By voluntarily providing good conditions, the company had lulled itself into the belief that it had fulfilled all reasonable obligations. Joubert's answer (25.1.1938) reflects this belief, and its mixture of threats and promises was far from reassuring. Provided the men remained 'loyal', he said, they need not fear the future, but anyone who failed to report for work would automatically be dismissed, would forfeit all rights to accumulated holiday pay, and would be required to vacate company accommodation at once.

Joubert feared that the spectacle of European employees defying the company might have an inflammatory effect on the native labour force. He therefore called in the local inspector of police who drew up a warning notice threatening that if a general strike took place a number of Ordinances, including that providing for the expulsion of undesirables, would allow legal action to be taken.¹

These threats showed the men how vulnerable they were; the right to strike, the prerogative of the Australian workman, was denied them. The attitude of BGD did little to pacify the radical spirits among its employees, nor was it calculated to win the support of the majority. Nevertheless, there was a temporary respite until 1941.

Serious trouble began again with the death of two NGG miners early in 1941; the subsequent inquest revealed gross breaches of the safety regulations by management: the mine manager was not certificated, and a winding-engine driver had been on the job fourteen hours a day (Morobe News, 29.3.1941). The Australian Labor Party, which was kept informed by its Wau branch, initiated parliamentary debate on the matter in March² and again in June, after 120 of NGG's employees had gone on strike. By this time the Minister for External Territories, T.J. Collins, had visited the field and described the working conditions of NGG miners as 'intolerable'.³ Thus the two major parties in Australia were agreed

¹ There is a copy on the company's files. The original document was pasted on the mess notice-board, whence it disappeared. It must have been removed for future reference by a far-sighted employee, for it reappeared, unbeknown to the company, at arbitration hearings in 1941.

² H. of R. Debates, 25.3.1941, Vol.166:169.

³ Ibid., 20.6.1941, Vol.167:236-55.

that the position was highly unsatisfactory and in July 1941 it was decided to send a senior inspector of the Commonwealth Arbitration Court (A. Blakely) to New Guinea 'to exercise the powers of a conciliation commissioner in relation to the dispute'. If this failed, consideration was to be given to the need for a general law to deal with industrial disputes in New Guinea. The commission was given extensive freedom of action under the National Security Regulations.¹

A substantial number of the men might have resumed work earlier, if a small group led by John Doolan and King Lawrance had not appealed to Australia for a settlement of the dispute and a form of permanent protection for mine workers. Through the idea of introducing Australian methods of regular arbitration the whole field became involved.

Godden, then field manager of BGD, was summoned (14.7.1941) to appear before the Commissioner to give evidence on the conditions, benefits, and privileges enjoyed by BGD's European employees: this was to include a statement of the value of accommodation and amenities. BGD was alarmed: their conditions were exceptional, and Waterhouse doubted that the less prosperous companies could survive if BGD's standards were incorporated in a general award. The Minister for External Territories had advised the NGG strikers to form a miners' union. BGD feared the possibility of unlimited demands being made, and felt that they were to be punished for poor conditions which they had not caused.²

After the initial hearing Blakely ordered a compulsory conference of workers and employers to discuss the provisions of an industrial award; and insisted that all workers on the goldfields be organised into one union beforehand. At the conference, he proposed to incorporate compulsory unionism in an award, and to force companies to dismiss men who refused to join.

BGD could not influence its employees on the issue, but felt that unionism would disrupt the existing arrangements by setting all workers against all employers.³ Nevertheless, after a hearing of the original dispute before Blakely, a draft award was produced to cover all employees.

BGD employees immediately organised strong and apparently unprompted opposition to the award. A large majority protested against compulsory unionism and petitions were forwarded to the Administrator and the Prime Minister. Such opposition to unionism by Australian workers is at first sight inexplicable, but many of

¹ New Guinea Gazette, No.640, 15.7.1941.

² Godden to Waterhouse, 8.8.1941.

³ Ibid., 13.8.1941.

the men who went to New Guinea were individualists who disliked being involved in union-management disputes and enforced arbitration. Moreover, BGD employees feared that an award would fix median conditions inferior to those which they already enjoyed, and that the company would be dissuaded from making further improvements. In addition, and possibly most importantly, some men shared the management's fear that native employees would imitate agitators amongst the Europeans and organise to raise their status and conditions; already there had been one instance at Bulolo where natives had acted collectively in refusing to go to work at the appointed time.¹

However, the Commissioner could not enforce his decisions,² and most men did not join the union. The companies made no attempt to dismiss them, and unionism and the embryonic system of arbitration died a natural death.

Pre-war BGD management were concerned that wages and conditions might be fixed by arbitration procedures. One implication of the proposed award, which provided for a reduction in working hours, was a 27 per cent increase in hourly rates of pay. According to Simpson (to Waterhouse, 3.10.1941), this would have caused the closing down of the marginal dredges, especially Nos 1 and 6, and a 25 per cent cut in staff.

If this were so it was perhaps fortunate that such labour dissatisfaction as existed at BGD before the war came to nothing, for some men would have lost their jobs, and the New Guinea and Australian governments would have lost revenue.

After the war, the idea of unions for Europeans was never revived. Although there was considerable labour agitation, the Federal A.L.P. Government thought the position of the workers, possibly because of the labour shortage, strong enough to safeguard their rights. The emphasis after the war was on improving native labour conditions, though unions for natives were considered premature; moreover, it would have been difficult to introduce labour machinery for Europeans without extending it to natives.

¹ BGD to the Minister for External Territories, 5.9.1941.

² Sir Robert Garran to Freeman, undated (October 1941).

Chapter 13

Gold marketing, royalties and taxes

The marketing and taxing of gold caused New Guinea producers considerable anxiety during the 1930s, for shareholders, especially those outside Australia, had to be assured that their dividends would be convertible, and that there would be no untoward restrictions on gold realisation. Official attitudes were determined by the policy of economic self-reliance for the Mandated Territory, which depended on gold as a financial prop for general administration, and by the erratic status and function of gold within Australia during the critical depressed years after 1929.

Early in 1929 export prices began to slide, building up an enormous trade deficit and it became impossible to raise long-term loans abroad. The result was an enormous pressure towards the export of gold. Government control was difficult, for large gold exports had to be authorised to meet obligations, at a time when gold production within Australia had fallen to £1.8 million per annum.

The Commonwealth Bank Act of 1929 provided for the mobilisation of gold reserves and for an embargo on gold exports when necessary. However, exports continued and by June 1931 total holdings of gold in Australia were down to about £15 million, of which £13 million were required by law as backing for the currency. The immediate need for £5 million sterling to avoid default on loans in London forced the Government to reduce the currency backing for two years from 25 per cent to 15 per cent, in order to allow further depreciation of the gold reserves.¹

As the Bulolo company neared the production phase there were strong pressures on the Australian Government to hold all gold in Australia. On the other hand, the chronic shortage of gold gave

¹ As Australia was a gold producing country, it was customary for the banks, as happened in 1930, to increase their London balances by overseas gold shipments - see Jauncey 1933:206. There was strong resistance within the Commonwealth Bank to the embargo provision of the 1929 Act - see Giblin 1951:61-81.

the mining interests considerable influence over the government. The authorities were caught between the need to secure international solvency and sound currency and the urgent need to boost gold production. The New Guinea Administration was involved through its dependence on Australia, and through the importance of gold for its revenue. Gold produced in New Guinea from 1921 until March 1932 (when BGD began production) was worth £1,149,333 of which the Administration had received 5 per cent royalty since 1928. This was insignificant compared with the output expected once the large companies began production, and the Administration encouraged the companies to begin work (by 1938-39 royalties were yielding some £100,000 a year).¹

Australian authorities had already shown sensitivity to the demands of the gold industry. In 1927 the Federal Treasurer waived Australian income tax on gold produced in New Guinea, on appeal against a ruling by the taxation authorities.² In 1929 Placer persuaded the New South Wales government to waive its separate taxing powers on New Guinea gold, for an initial period of five years.³

However, by 1931 pressures on the Federal Government to restrict the realisation of gold had increased. Freeman feared that the company's shares on the London market would be depressed, at a time when activity seemed to be reviving. In December 1930 the Administrator of New Guinea had prohibited the export of gold without his consent; and Canberra sources indicated that compulsory gold marketing in Australia would follow. Such action was within Australia's legal mandatory powers.

Waterhouse and Short felt that because one-third of BGD's proceeds was already spent on expansion expenses in Australia, and a large proportion of the shareholders was Australian, it mattered little if the gold were retained in that country. Banks and Freeman, however, knew that freedom of gold realisation was essential to sustain overseas interest in the company. Freeman therefore sought and obtained in August 1931 definite assurances from high officials of the Commonwealth Bank, at least two of whom were BGD shareholders, that no restrictions would be placed on the remission abroad of the proceeds of gold sales. The Australian Government realised that such restrictions could only discourage gold production.

¹ W.H. Hughes, Minister for External Territories, H. of R. Debates, 23.9.1938, Vol.157:131-2.

² NA, CP 141 - J.834/2.

³ Quoted the Electrolytic Refining and Smelting Co. of Australia to Waterhouse, 28.10.1929.

From then on Australia moved further from gold, and in 1932-33 most of the Commonwealth Bank's gold reserve was converted to sterling (Giblin 1951:134-5).

Now that the principle of free exchange for gold proceeds had been established, BGD enquired into the prospects of gold marketing in Australia. By June 1933 the company was producing about 12,000 ounces of bullion per month, with a fineness of approximately 667 parts gold and 331 parts silver. However, the results showed that it was more advantageous to continue selling in London, regardless of any further fears about Australian controls, and despite extra freight and insurance and the loss of forty days interest; the company's bullion agents in Sydney calculated a difference of 0.1 per cent, though Waterhouse thought it closer to 0.5 per cent. Either way it represented a large sum over the life of the field, and so realisation in London continued until the war.

Methods for the payment of New Guinea's royalty caused the company financial loss. BGD always checked the preparation, shipping, and assaying of bullion: gold from each dredge was treated separately in the retort house (a foreknowledge of probable fineness facilitated smelting and refining); the bars were then made up (maximum weight about 500 ounces), and each was numbered and identified according to the dredge from which the gold came. From the assay results an accurate check was kept on the work of each dredge.

This made possible an advance declaration of the probable fineness of each bar. Royalty payments were made direct to the warden at Wau before the gold left Bulolo, but precise assay results were not available until the bullion was re-treated in Sydney. The warden used previous results from each area and each dredge to assess the amount payable - with the small miner he also allowed an extra margin for fluctuations in values.¹

Once precise assays were received, the warden adjusted his calculations, which were always overestimates, and made refunds to the company. At first this method was satisfactory, because overall yields were relatively low, and the base metal content was exceptionally low (because of dredging the upper levels). As production increased, assay variations tended to be greater and it became progressively more difficult to make accurate assessments on the spot.

By 1940 Godden estimated that the company was overpaying royalties by an average of 12 per cent. Refunds entailed much office work, and deprived the company of interest. Late in 1940, however, the Administration drew up an adjusted scale of royalty

¹ Summary, Royalty on Gold: Papua-New Guinea (official).

charges, graded according to locality and known yields. This reduced interim royalty by nearly 10 per cent, and left the Administration with a 2 per cent margin for safety. Outstanding refunds were reduced by 83 per cent.

Though instigated by BGD, the change applied to all producers, some of whom had gone to extraordinary trouble to avoid overpayments: NGG, for example, conducted its own fineness tests on every bar produced, on the field.

BGD did not object to the 5 per cent royalty, though there were some complaints that payments went into consolidated revenue instead of being expended on the field, as the Administration had originally intended in 1928. Had BGD not put good relations with the Administration first, other aspects of the royalty system might have been raised. For example, payments could have been made after assay in Australia. Some felt that the royalty system was an unnecessary restriction on a developing goldfield, for it taxed equally established companies and those struggling for capital to establish themselves. A system of fixed payments can be the last straw to a company in its early stages. The royalty system was introduced hastily, before such methods as a fixed percentage tax on profits with a moratorium for the first two or three years on a new field, had been considered. It was fortunate that BGD, being well organised and capitalised, could stand the strain: for throughout the 1930s their royalty payments exceeded the annual wages bill.

Progress in New Guinea depended on mining royalties, which supplied 25.7 per cent of all government revenue. In the nine years from 1 July 1931 to 30 June 1940, BGD paid £676,984 (including royalties, customs dues and postage) or 18.14 per cent of the Administration's total revenue for the period. This included 9.8 per cent of all customs revenue, as a 10 per cent duty was levied on mining machinery and aircraft.

Royalties and duty were used within the country, even if the goldfields saw little of it, until the principle was violated by the Commonwealth Government's Gold Tax of 1939, which took 50 per cent of all proceeds of the realisation of gold in excess of £9 per fine ounce.

Hancock (1943:99) calls it a fundamental principle that a rich industry in a poor country should be taxed exclusively for the benefit of that country. The official argument for the 1939 tax was that as the Commonwealth was responsible for New Guinea's defence (which was part of Australian defence), New Guinea should contribute. One Federal Senator (McBride) justified the tax on the ground that the mining companies were profiting from war conditions, and the acting Federal Treasurer, P.C. Spender, thought the Government lenient: in Southern Rhodesia, he said, everything over £7.10.0 sterling was appropriated. But Southern Rhodesia was

a self-governing colony, with the money going into its own exchequer. Despite these arguments, the imposition of an additional tax is difficult to justify. The Gold Tax payments by BGD represented 172 per cent of those for royalty. The Commonwealth was finally unable to sustain its original argument for the Gold Tax, which was paid into a reserve fund, to be resurrected after the war.

Chapter 14

January 1942: the end - for the duration

The possibility of a Pacific war was discussed two years before it began by BGD officials who felt it would end the boom days at Bulolo. This contributed to the drive for maximum production during 1940-41. On 21 January 1942, the Japanese made their first raid on Bulolo, destroying the three Junker aircraft. Four days later, all citizens were ordered to evacuate, and operations ceased for the duration of the war. All the bullion, sponge gold and amalgam on hand were buried in a safe place, known only to three senior men. Apart from the planes, nothing was damaged.

In March the Japanese landed at Lae and Salamaua, but made no immediate moves towards Wau-Bulolo. Then, in August 1942, N.L. Fleay, the commanding colonel, ordered the destruction of Wau and the Bulolo Valley: 'the demolition parties worked steadily with petrol and dynamite. The night resounded with explosions as demolition charges were blown on the Wau and other aerodromes, roads were cratered and bridges shattered' (McCarthy 1959a:59).

To the men who had built up Bulolo, this was a grievous blow. Feelings of resentment among the officials grew as it became evident that Fleay's decision had been premature. He had been misled by exaggerated reports of Japanese troop movements near Mubo, and had wrongly assumed that an immediate move on Wau was intended. Lack of road access had made the Japanese hesitate, and they were deeply committed to action further south.

The Japanese advance came in January-February 1943. They reached the edge of the airfield at Wau but the mountain tracks from Salamaua - the only established routes of access - delayed supplies and reinforcements, and they were driven back. Thus the area was not 'occupied' in the accepted sense, but there is no doubt that the installations would have been destroyed, if this had not already been done. Despite the grumbles of BGD management, the result would have been the same.

The war brought one compensation: this was the road built by the Army from Wau to the south bank of the Markham. If BGD's pre-war adherence to air transport had continued the revival of mining and the later program of diversification would have been impossible.

Chapter 15

The rehabilitation phase

As the war in the Pacific neared its end, BGD faced the unenviable task of reconstruction. Some members of the company, who felt that total destruction had not been warranted, criticised the military authorities. But as Professor Dunkin (1950:13) pointed out, hindsight often gives a misleading impression. Had the Army been able to consult more fully with BGD, the destruction of much ancillary equipment useless to the enemy might have been avoided, but at the time such consultation was impossible, and it was pointless to allocate blame in later years.

However, the company was justly indignant that military personnel had smashed equipment to get at gold residues. Extensive sections of the dredges were unnecessarily damaged, and individual soldiers were known to have sent parcels of gold to Australia. Much of this might have been prevented; though occasionally the Army did take severe disciplinary measures against those caught. In August 1942, for example, a member of the New Guinea Volunteer Rifles was court-martialled at Wau for having 'souvenired' a small quantity of gold.

BGD had great trouble in obtaining replacement parts. Finance was less of a problem, for it was covered by the War Damage Insurance which the company had taken out with the Commonwealth Government shortly after the outbreak of the war. To ensure that finance for rehabilitation was immediately available, in 1943 the management instituted a policy of not disbursing any funds in hand to ensure that ready cash would be available, pending payments by the Commonwealth.¹

The main problems were the detailed assessment of losses and the location of parts, so that the dredges could be got into production again in the shortest possible time. This resembled the problem of 1930-31 when loss of time threatened loss of production, and this in turn implied delays in dividends and an absolute loss

¹ Gould to shareholders, 29.3.1943 (Gould was the permanent secretary, and a director).

of interest payments. BGD management faced these problems as soon as the area was vacated, and it waited impatiently for permission from the Army to begin an assessment.

All of BGD's field account records had been lost, so that while the company's skeleton staff waited impatiently in Sydney in 1942-44, they quizzed every available man who had been associated with Bulolo in order to build up a substitute record of equipment, stores, and parts. In May 1944 permission came through the Department of External Territories for a representative party of six men to visit Wau-Bulolo to make a survey of damage. The BGD men in this party were J.D. Simpson, L.W. Bergstrand and E.E. Gibb. Their primary aim was to make a detailed list of losses to enable the formulation of a scheme for the preservation and restoration of the company's assets. They also surveyed losses on a number of small properties, on behalf of other companies and individuals.

The resulting report of 280 typed quarto pages attempted to list everything that had been destroyed or removed and against each item was shown the probable cause of loss: Army acquisition, direct war damage, or indirect damage. The great bulk of what was missing came under the first heading.

The principal matters of concern, however, were the condition of the dredges and the extensive damage to the power stations and water races, since both of these would demand coordinated planning and the early ordering of parts. Structurally, most of the dredges had withstood the years of neglect and military tampering extremely well. But almost all the electrical equipment had suffered smashing, corrosion or removal, and what remained was wet and impregnated with dirt. Most greasecup covers on the machinery had been removed, and sand and gravel had had free play - rehabilitation necessitated complete dismantling. Practically all tools, spares and stores had been 'acquired' by the Army. BGD had always paid close attention to a forward program of water control and diversion, which had assisted the hurried protective measures taken in 1942. Several dredges operating in close proximity to one another had necessitated the careful planning of courses, pond control, and tailings disposal: this paid dividends during the years when the river ran unchecked.

The report, which included a priority system for restoration of the dredges, was carried to San Francisco in September 1944, and the directors worked out a detailed rehabilitation program. The difficulty of getting spare parts called for makeshift and improvisation, with the equipment on some dredges being removed to those which could be more easily restored. Meanwhile, full orders for replacements were made. By doing this in 1944 BGD (with assistance from the Placer Group) ensured first preference when the suppliers changed over from military to civil production at the end of the war. Thus BGD could spread its difficulties - as in the early

1930s - so that the more arduous tasks could be tackled while gold was actually coming in.

In September 1944, as a result of the War Damage Survey, the Army allowed a party of eight BGD men to visit Bulolo to carry out preventive work only, but the party remained and later began rehabilitation also.

The protective party consisted of a small staff of Europeans and a poorly trained gang of fifty natives (specific permission had to be sought to engage labour at all). Their difficulties were enormous; even hand tools were often lacking. The continuous presence of the party on the field, however, made possible direct representations to the War Damage and Disposals Commissions, which resulted in more sympathetic treatment than would have been likely from impersonal dealings in Australia.

The War Damage Commission agreed that compensation under insurance would pay in toto for protective work (including the restoration of the water races for power generation) and for the replacement of all wearing parts on a 50 per cent depreciated basis. In Australia negotiations were simultaneously proceeding on the company's claim for \$2,620,270 under War Damage Insurance. In addition the Commission agreed to persuade the Australian Government of the need for urgent rehabilitation in order to avoid further losses. Civil administration south of the Markham was restored on 31 October 1945.

During 1945 the party concentrated on preventive work and the restoration of power. However, the entire program of rehabilitation depended on adequate transport. BGD management, and especially Godden, were hopeful at first, as it was estimated that the use of the Army road to Labu would reduce transport costs to about two-thirds of the 1940-41 figure. But road transport proved unreliable and floods in 1945-46 constantly interrupted the carriage of supplies. Moreover, the Army maintenance of the road ceased before civil authorities were prepared to take over the job, so that the major burden of keeping the road open fell on the companies, and especially BGD; indeed, in 1946 BGD took over the operation of the barges from Lae to Labu. Matters were not improved by a suggestion from the Minister for External Territories, E.J. Ward, that the companies pay a toll for the use of the road. This they rejected, and arrangements for the upkeep of the road remained chaotic until at least mid-1947.¹ In that period BGD adopted a policy of sending all light cargo by air in order to keep an airlift going as a form of insurance against road closures; but this was very expensive, and

¹ In the years 1946-51 BGD engineers estimated that the Administration spent a total of about £500,000 on road maintenance that was often stopgap and ineffectual.

the post-war aircraft, unlike the G-31s, were not adapted to the carriage of heavy equipment.

Rehabilitation was pressed ahead with typical vigour and co-ordinated organisation. The early restoration of electric power was fundamental. Before the war the gradual increase of hydro-generating plants had spread problems out, but this piecemeal approach had involved mistakes and waste. The need for total planning after the war avoided many of the old pitfalls, and the Bulolo road eased many of the pre-war transport restrictions.

For example, as early as October 1944 the consultant H.G. Carter, suggested that line voltage be raised from the pre-war 11,000 to 33,000 to overcome the major problem of distance, and to allow all power development to be concentrated at Baiune.¹ The economics of this change were calculated in the United States in 1944, and orders for Pelton wheels and generators were placed accordingly. Temporary power was provided by a Pelton wheel connected to a small generator, and a makeshift timber mill was put into operation. The first of the new Upper Baiune generators was ready in November 1946. During 1947 generators were installed there, and two larger ones at Lower Baiune. These made available 5,500 kW of power, without which the rehabilitation of dredges would have been impossible.

The rebuilding program was vitally affected by the availability of, and provisions for, both European and native labour. BGD feared that the official environment, dominated by Labor Party ideals, would be hostile to 'capitalist enterprise'. In October 1945, the Minister, Ward, caused consternation by cancelling all native labour contracts, but in the same month Simpson received special permission from the Civil Administrator, Col J.K. Murray, to recruit more natives. Although few were willing to leave their villages in the immediate aftermath of the war, BGD had built up its native labour force to 216 by March 1946. A slight decline then prompted the company to resume direct recruiting in the Sepik area.

The shortage of 'old hands' amongst the Europeans proved a greater trial. Towards the end of 1945 the exhausted party of Europeans went on leave, and a substantial European staff, many of whom knew nothing about gold dredging, had to be recruited. This had to be done in competition with labour-hungry Australian employers.

As a result much effort had to be diverted to the provision of housing, medical facilities, and staff amenities. Accommodation was first put up for single men and for native labour. Housing

¹ Line losses were estimated to drop from 20 per cent to 5 per cent.

for married men presented greater problems and led the company to adopt a system of pre-cutting materials for three standard types of houses. The new system showed labour savings of 41 per cent and overall cost savings of 20 per cent over the old hand-cutting method. Moreover, the finished house was found to be more accurately constructed, stronger, and easier to repair and maintain.¹

A new recreation hall was built, a weekly cinema was begun again, tennis courts were resurfaced, the native employees were provided with equipment for football, and so on. Medical services were restored with remarkable speed during 1945-47. A native sick-bay was provided in 1945, and in May 1946 BGD's pre-war medical officer, Dr Carl Gunther, returned to the field. Gunther's pre-war research had almost eliminated tropical typhus from Bulolo; post-war he aimed at malaria and bacillary dysentery, using new drugs, and his work resulted in spectacular falls in sickness and absenteeism among both Europeans and natives.²

The sheer physical task of rehabilitating No.1 dredge was immense, and the fate of operations depended on the success of improvisation. An anxious period began when it was put into service again on 20 February 1947. Until the makeshift equipment could be gradually replaced, the field staff expected breakdowns at any time. It was a tribute to their care that none occurred, for the great bulk of the electrical equipment, as well as the gold saving plant, had been totally destroyed. No.1's record after it restarted was remarkable: in May, for example, it dug to an average depth of 27.7 feet in virgin ground, with an average daily yardage of 5,355, compared with the average of 5,016 for the same dredge in November-December 1941. No.2 was in a similar condition to No.1, sitting evenly in its pond but with most of its electrical and gold-saving equipment missing or smashed. The dredge began operating again on 3 April 1947, and during its first month it dug an average depth of 40.6 feet, being in service 86.67 per cent of the possible time.

Dredge crews had to be trained hastily, in contrast to the gradual program of the 1930s; despite this, the other dredges were got back into operation quickly and efficiently - Nos 3 and 8 were next, thus recommencing dredging in the Bulowat area. As

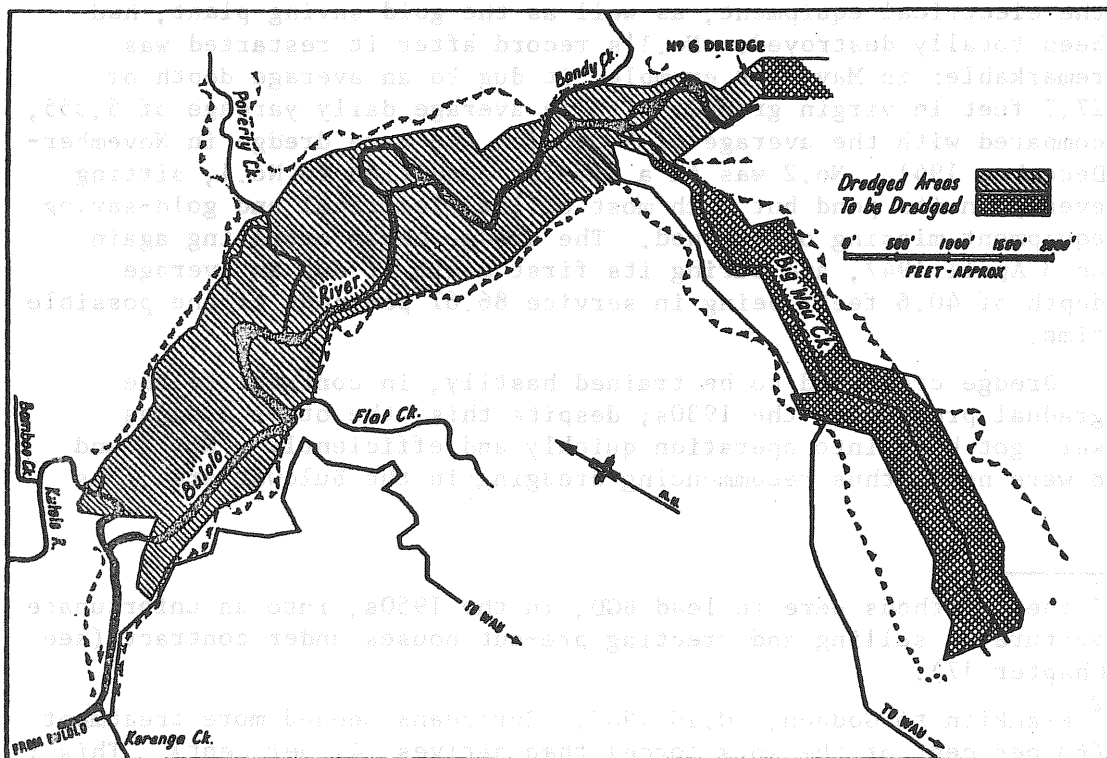
¹ These methods were to lead BGD, in the 1950s, into an unfortunate venture in selling and erecting pre-cut houses under contract (see Chapter 17).

² Franklin to Godden, 10.10.1947. Europeans needed more treatment (66 per cent of the work force) than natives (41 per cent). This is explicable partly by the unfamiliarity of the natives with recourse to medical services.

time went on, less improvisation became necessary, for replacement parts arrived more regularly from the United States.

The two largest dredges, Nos 5 and 7, each weighing about 4,000 tons, were the last to be put back into service. No. 5 presented particularly difficult problems: its pond had to be drained and its hull cleared of debris which covered it to a depth of more than 6 feet. When this was done, however, it was found that the dredge was still quite sound. It began production again in February 1949, so that for a time all eight dredges were working.

It had been hoped to make improvements on several dredges during rehabilitation, but the cost of changes and their likely production results had to be correlated with a number of other factors, including delivery times and the probable life of the dredges. Radical alterations therefore had to be rejected. A few changes were made; for example, BGD went over to integrally cast manganese steel buckets for the dredges, because the labour content in these, which largely caused price rises, was relatively low. Delivery dates from the United States stabilised more quickly than those in Australia; partly for this reason, and partly because of standardisation with orders placed through Placer, BGD looked to the United States rather than to Australia for dredge parts.



BGD dredging areas near Wau, February 1949

BGD continued to experiment with the washing-tables and jibs on the dredges. Romanowitz (1962:91) has suggested that manufacturers of gold-saving devices could have standardised rather more in the factory, so that individual companies could be spared constant experiment. However, even under the very regular conditions at Bulolo, BGD constantly had to vary the settings of its jigs and other gold-saving equipment in order to ensure the best possible recovery from day to day. It is difficult to see how this could be altogether avoided, for the conditions under which gold lies are infinitely variable.

Due to rising costs in relation to the stable price of gold, which remained at the pre-war level, BGD was unable to pay the pre-war dividend of \$3 on a \$5 share.¹ Some assistance was given when the Commonwealth Government, in September 1947, suspended the Gold Tax first introduced in 1939. This added about 17s 0d per fine ounce to the company's returns.

During the financial year 1947-48 six of the eight dredges were back in operation, and gold to a value of \$2,614,638 was recovered; a dividend of \$1 per share was accordingly declared. This proved to be the post-war limit; though, in view of all the factors involved, shareholders could hardly grumble at a face value of 20 per cent. BGD was forced to eliminate 17,000,000 cubic yards of low-grade ores from the estimated reserves, but this was eventually offset by keeping the dredges working, partly in untested ground, for years beyond their estimated lives.

No matter what measures were taken, however, continued rises in operating costs gave increasing concern to the company. Labour could not be pressed to raise production commensurately with costs. BGD had to march with Australian conditions, and early in 1948 a 40 hour week and a 10 per cent increase in basic wage rates were introduced simultaneously.² The result for No.2 dredge, for example, was a cost jump from 5.9 pence per yard to 7.56 pence, calculated for three monthly periods before and after the rise. In the period 1948-50 wage rises contributed markedly to the shrinking margins for all the dredges, and directly affected the closing-down of Nos 3 and 6. BGD used the consequent reduction of the labour force to get rid of men who had been most vociferous in agitation: in 1950-51 the labour turnover was 44 per cent.

In following years a production bonus scheme was introduced and between 1950 and 1953 the average daily yardage per dredge rose

¹ Statement to shareholders, 19.12.1947.

² Although New Guinea lacked industrial legislation, the labour shortage compelled these measures.

33 per cent, so that post-war production records were achieved while dredges were actually closing down. However, it was seen that once this temporary peak was passed, production would decline rapidly. It was the anticipated speed of this decline which led the management to the possibilities of diversifying into other branches of industrial activity, in order to make use of existing assets.¹

The management of the company was faced with the problem of how to maintain the production level of the dredges, which was the main asset of the company, and how to diversify into other branches of industrial activity. The management decided to diversify into the production of dredges, which was the main asset of the company, and how to diversify into other branches of industrial activity. The management decided to diversify into the production of dredges, which was the main asset of the company, and how to diversify into other branches of industrial activity.

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¹ See Chapters 17-18.

Chapter 16

The running down phase

The period 1949-51 was expected to see a post-war peak in dredge throughput and gold recoveries; but the quantities of gravel handled were lower than expected, while dredge production was neither simultaneous nor constant, compared with pre-war performances. For example in November 1949 a major accident put No.5 dredge out of action for more than two years.

This accident was one of the few avoidable catastrophies suffered throughout the whole of the company's operations. The dredge had been closed for an emergency repair and to save time it was left in its dredging position beneath an exceptionally high bank, with its ladder and spuds (which act as stabilisers when lowered) left raised. The bank caved in, generating a huge wave which lifted the dredge and overturned it completely. Sheer luck prevented any loss of life.

It was fully insured (for \$1,200,000, and for overhead charges for a maximum shutdown of one year), but most of BGD's remaining reserves - something over twenty million dollars in gold - lay within the range of the two deep digging dredges, so salvage was essential for the continuation of the program. This salvage, one of the few successful operations of its type in the mining world, was a triumph of technical ingenuity. The dredge was upright again in September 1950, but reconstruction was delayed by steel shortages caused by the Korean war, and it did not begin production until February 1952.

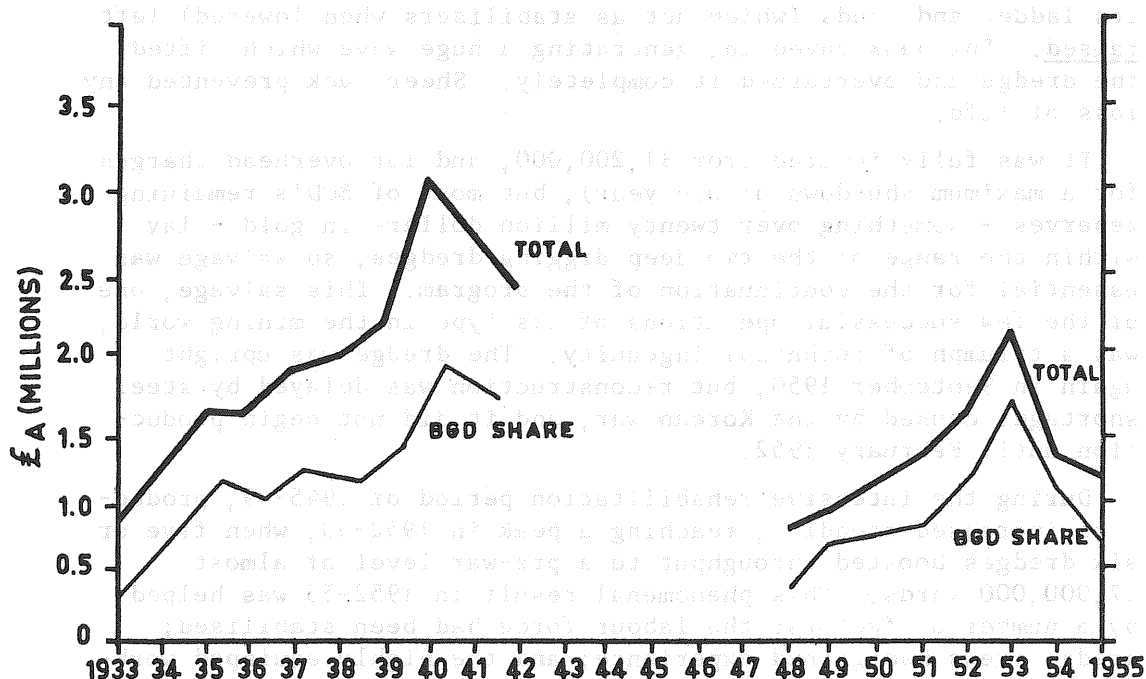
During the intensive rehabilitation period of 1945-49, production increased steadily, reaching a peak in 1952-53, when five or six dredges boosted throughput to a pre-war level of almost 17,000,000 yards. This phenomenal result in 1952-53 was helped by a number of factors: the labour force had been stabilised; dredge crews had gained experience; and the highly equipped workshops could concentrate more on the remaining dredges as others closed down. Another significant influence was the introduction of the production bonus system, calculated on throughput per working group over and above estimated average yardage.

However, the 1952-53 result was followed by a sudden decline, as dredges reached the limits of workable ground. The simultaneous

operation of all dredges reached its post-war peak in 1949, and from then on Bulolo was running down.

Banks had explained to shareholders as early as December 1947 that most of the dredges were approaching the margins of the ground for which they had been designed, and that over the following six or seven years all but the two deep diggers would be closed down. Meanwhile, the value of the gold recovered, per cubic yard dredged, was falling much more quickly than had been anticipated. For the first year or two after the war it was over thirty cents, but by 1950 it was nineteen cents. Average operating costs were concomitantly reduced from fourteen to ten cents per yard, despite rising wages; but it was realised that this was temporary, and that as more dredges closed the overheads for those still working would mount.

This was a critical situation. In the immediate pre-war years the recovery in relation to estimate had averaged about 96 per cent.



Gold production in Papua-New Guinea, 1933-55,
in fA (millions)

(World gold production post-war ran at only
70-80 per cent of pre-war figures)

Now, most of the dredges were getting into marginal ground which had been less intensively drilled in the 1930s, so that there were violent fluctuations in results compared to estimates. Estimates for each dredge had to be revised in the light of recoveries, and the life of each was correspondingly shortened a little. This was an unpredictable factor independent of the inflation of wage and other costs.

Dredge No.1 was permanently closed in July 1949, Nos 3 and 6 in May 1951, No.8 in March 1953 and No.2 in April 1955. A number of factors had to be considered before each closure decision was made, for the poor ground in front of a particular dredge might be just a channel separating it from richer gravels; and overheads were lowered as maximum units were kept working; on the other hand, as it became necessary to close dredges, it became correspondingly more difficult for the remaining ones to 'carry' those with poor recoveries, which might or might not turn out to be temporary.

The result was that closures, once they began, progressed quickly. The general working life of the dredges had exceeded Banks' 1947 predictions though overall recovery had fallen to 14.91 cents per yard by 1955.

As reserves ran down and dredges stopped, dividends fell until by 1955 they were seventy-five cents a share. By 1957 the dividend had fallen further to fifty cents, half of which was provided by the timber interests. During this period the company distributed the remainder of the amortisation fund, amounting to a total of \$1,730,000, or one-third of the total face value of the shares issued.

Dredge No.7 capsized and sank in May 1956, partly because of a fault in design. It did not warrant salvage, for No.5 took over the reserves originally allocated to its twin. This extended the life of the field, though at a reduced level. No.4, the last of the Bulowat dredges, closed down permanently in May 1957.

The disposal of idle dredges posed a problem. Nos 1 and 2 had reached the end of their working life, and their parts were broken up for those dredges still operating. Dredges Nos 3 and 4 were bought by South American mining interests shortly after they closed down: the sectionalising made them ideal for dismantling, removal, and re-erection. Nos 6 and 8 still lie anchored, seeking buyers. No.6 is too small to be useful with the present price of gold and level of operating costs.

In the years since 1950 several thousand tons of scrap steel have been sold to Japanese interests (including the remains of equipment destroyed during the war and otherwise unsalvageable), so that very little that is not working at Bulolo has been wasted.

BGD hoped that further outlets for the dredges, or the company's mining skills, might be found in Papua-New Guinea. In 1952-53 the

Table 3

**BGD operating profits from goldmining and dividends,
1932-62**

Year ending 31 May	\$ Canadian	Dividends per \$5 share
1932	141,459	-
1933	1,335,000	-
1934	2,235,698	1.20
1935	3,368,997	2.10
1936	3,190,850	2.80
1937	3,585,975	2.90
1938	3,453,463	3.00
1939	3,874,085	3.00
1940	4,806,409	3.00
1941	3,935,022	3.00
1942 (to mid-Jan.)	2,354,644	1.50
1947	363,273	-
1948	1,677,763	1.00
1949	1,007,163	1.00
1950	1,238,687	0.75
1951	1,200,455	0.75
1952	1,710,716*	0.75
1953	2,523,479*	1.00
1954	1,085,955	1.00**
1955	710,764	0.75***
1956	282,745#	0.75
1957	812,246	0.50
1958	229,729	0.50
1959	216,876	0.40
1960	222,224##	0.50
1961	186,250	0.50
1962	215,927	0.50

* The production bonus scheme and the stabilisation of labour conditions enormously boosted average yardages for the four or five dredges still operating.

** Distribution of \$1,000,000 from amortisation fund.

*** Further distribution of balance (\$730,000) of amortisation fund.

\$500,000 was spent in 1956 on dredge repairs and sluicing equipment.

Figures for 1960-62 are not precisely comparable, because some cost factors previously allowed for have been consolidated with those for the timber venture.

possibilities of tin dredging in the Goodenough-Fergusson Islands area were investigated but they were eventually abandoned as uneconomic. A later search, assisted by Placer and by the Administration, for commercial concentration of nickel proved equally unpromising.

As recently as 1960 BGD undertook a more thorough program of testing the upper Lakekamu for dredgeable gravels. Mining by small-scale methods had been spasmodically pursued in this area for fifty years, and it was thought that gold in workable quantities might have been shed on both sides of the Bulolo-Lakekamu watershed. However, few holes showed values even above five cents per cubic yard and this supports the theories for the enrichment of Bulolo advanced in the 1930s, namely, that there is one major source around Edie, very limited in area, and that gold elsewhere (for example, on the Waria) whilst widespread, comes from a much poorer and older granodioritic formation. If this is so, there is little hope for the future of gold elsewhere in New Guinea.

In recent years, No.5 has been the only dredge still in operation, and its yardage has increased enormously. In November 1941, for example, the dredge had returned an average daily yardage of 6,423; but by 1959-60 this had been raised to 12,500, even though the dredge was working in very heavy ground, often beyond its estimated limits. These phenomenal results alone kept the dredge running; for by 1962 average values were down to about twelve cents per yard. In the closing days of dredging, therefore, BGD has been facing up to a problem similar to that of the early days, when greatly increased throughput had to compensate for poor values.

As dredging declined, BGD devoted more attention to sluicing, which had been held in reserve. The ground at Widubosh, which had been considered suitable for hydraulicing, had been originally estimated to contain some 21,000,000 cubic yards; but as costs rose this figure was whittled down to 16,000,000 yards, and later decreased further. Nevertheless, sluicing offered some prospects of offsetting overheads, and equipment and methods were simple, so leading to low operating costs.

Between 1956 and 1962 almost 1,500,000 cubic yards of gravel were sluiced annually, at a value per yard varying between ten and a half and twelve and a half cents. In some sections the disposal of tailings increased costs. The Widubosh area comprises completely flat land some little distance from the river. Thus the tailings had to be both washed down and washed away as a separate operation. The operation at Widubosh, while adding appreciably to the total gold recovered as dredges closed down, never contributed as much as had been hoped to working profits.¹

¹ About 20 per cent on the gold-mining side of operations.



Plate 5. Indigenous miners at Bulolo in the 1960s

About 1958, other small areas which had been held in reserve were opened up for hydraulicizing: the old Pine Tops area, and part of Booth's Cliffside lease. But both of these proved uneconomic, and had to be abandoned. These areas had proved uneconomic for small miners some years previously and in recent years indigenous miners have moved in, being content with smaller returns. Their methods are very well directed, with elaborate races in one or two places.

BGD's gold mining future now hinged on the continuation of No.5 and the sluicing at Widubosh. In 1962 there were thought to be another twelve or thirteen million yards of gravel remaining in reserve; but No.5 had to be able to hold together mechanically, and to turn in extremely heavy ground at the end of the valley. Company confidence that means would be found was such that as recently as 1962 heavy further expenditure (some £50,000) was incurred in fitting the dredge for future work.

However, dredging ended in 1965 and sluicing is now undertaken mostly by small indigenous prospectors. BGD's future now lies in its diversification into more permanent activities.

The prime movers in the original project, Freeman and Banks, did not live to see this ultimate decline. Freeman resigned from the Board because of persistent ill health in February 1952, and died shortly afterwards. He had been president of BGD since its inception; his conservatism, business acumen, and many contacts in Australia had been invaluable, particularly in the early 1930s.

Banks had been both the complement and foil to Freeman, for he supplied detailed technical knowledge, as well as a sense of adventure without which Bulolo would never have been developed. He became president after Freeman's death, after being managing director for thirty years, and he was still in office when he died in September 1961. Banks' career was notable not only because of his association with Placer and with BGD; during the war he had had a key position as the London representative of the Canadian Ministry of Supply and Munitions, and in later years he was Lieutenant-Governor of his province of adoption, British Columbia. The dominant impression he gave many people was not his courage or his foresight or his business drive, but his kindly disposition: no mean epitaph in the risky and highly competitive world of mining.

All the men presently in charge have graduated to their positions through long service to the company in more lowly capacities. The president is J.D. Simpson, once assistant manager on the field, a man who has known many years of supervising and assisting in mining operations. The managing director, based in Sydney, is J.W. Austin, who became involved with the company in the 1930s as local auditor of its accounts. His tenure maintains the technical/business balance in direction from the top, which Freeman had espoused in the embryonic days of Placer. The general manager in charge of day to day operations, A.E. Gazzard (appointed in 1957 to replace Bergstrand), began his career with BGD in 1936 as an ordinary Australian artisan. The only real qualifications for promotion within the company have been devotion, demonstrated ability, and hard work. This augurs well for the future as diversification proceeds.

Chapter 17

Diversification 1:

Manufacturing plywood: Commonwealth New Guinea Timbers

Flying in to Bulolo from Lae, aircraft hug the western hills in order to bank into the wind for landing. Below is a sea of huge straight trees with white, bare trunks and tops resembling a bottle-brush. These are the klinkii pines (araucaria species) which have made possible the development of a major timber industry at Bulolo since the war. They are confined in commercial number almost exclusively to the Bulolo Valley, though there is a small stand in the region of the Jimmi River. Generally associated with klinkii is another species of araucaria (cunninghamii), popularly known as the hoop pine. Both species grow at altitudes of two to four thousand feet.

The first serious approaches to milling the Bulolo timbers were frustrated by the absence of transport. In addition, official interest was concentrated on mining development. In 1931, Dunstan, the Commonwealth Commissioner, called for a revision of the 1922 Timber Ordinance, to promote and safeguard development, but the Ordinance was not reconsidered until 1935, when substantial Australian timber interests intervened.

A new Timber Ordinance was legislated in 1936, and it remained in force till after the war. This laid down stringent conditions for timber exploitation, and gave new definitions of 'licence' and 'permit': a permit now governed the commercial extraction of timber, conferring exclusive rights to remove trees from a defined area, with a ten year time limit; extensions were to be at the discretion of the Administrator and dependent on compliance with other conditions. The area to which permit rights could be sought was made unlimited, though royalties were fixed at 2s 0d per 100 super feet for pines, and 3s 6d per 100 super feet for cedar. Commercial interests were thus given the prospect of access to substantial stands of timber, and the Administration was given greater control over the manner of working timber concessions, particularly with regard to reafforestation.¹

¹ Forestry Ordinance No.46/1936.

Shortly before the war the total quantity of pine available in the Bulolo Valley was estimated at about 500 million super feet. Other commercial varieties, including red cedar, gave an additional 50 million super feet. Of this quantity, however, 300 million super feet of pine were native owned, and therefore could not be allocated under the Ordinance. On the east side of the river 10,000 acres, containing about 135 million super feet, had been acquired from the natives: in 1938 this was advertised for allotment by public tender, but the many submissions were made out on such diverse bases that it proved impossible to make a decision. In the same year the Commonwealth Government announced plans to build a road from Salamau to make export of timber practicable; those acquiring timber rights were to be given two years grace in consequence. But by the time the Pacific war broke out this road proposal had proved as much a chimaera as that of 1928.¹

The building of a road between Bulolo and Labu during the war removed a major impediment to the timber industry. Military saw-mills produced some 80 million super feet of sawn timber, and this spurred on Australian interest. There was intense competition between rival Australian concerns for timber permits, but all applications were deferred, pending the determination of an official developmental policy. In May 1946 the Forestry Secretary, J.B. McAdam, recommended (Ligertwood 1948-49:4) that all existing applications be refused, and that future concessions be allotted by private tender. That at Bulolo, he felt, should contain specific provisions for reafforestation, and for the establishment in the valley of a plywood mill: by the latter he hoped 'to effect the industrial education of the natives'.

At about the same time the chairman of the Australian Plywood Manufacturers Association suggested to the Prime Minister that a joint undertaking by the Government and the manufacturers would be the best method of development; though he wanted the logs to be brought to Australia to be turned into veneers under a co-operative profit-sharing scheme.

A Cabinet sub-committee, formed in July 1946, set up a Plywood Advisory Panel, which drew together government representatives, plywood manufacturers, and delegates from timber and furniture-manufacturing unions. In March 1947 this panel submitted a scheme whereby the Bulolo timber would be extracted and processed by a joint company in which the Government would hold 51 per cent of the share capital, while the other 49 per cent would be held by a separate company to be formed for the purpose by a consortium of Australian timber interests. However, it was felt in official circles that such an organisation would be too cumbersome to

¹ See H. of R. Debates, 23.9.1958, Vol.157:132.

function efficiently. It was then proposed that development be left entirely to private enterprise.

In October 1947 the Minister adopted McAdam's suggestion that the Commonwealth ally itself with BGD. BGD had had years of local timber-milling experience, it had a high reputation for efficiency, and it owned a great deal of plant and facilities (e.g. power stations) which could be integrated with requirements for plywood manufacturing. Such an arrangement would preserve the original co-operative principle, while ensuring easy consultation and smooth organisation.

Thus Commonwealth New Guinea Timbers was formed, and its structure was eventually accepted by two governments which held diametrically opposed economic philosophies. The Chifley Labor Government favoured a socialist enterprise and wanted a provision whereby the government would buy out BGD after a specified period. But they were under pressure to relieve a chronic shortage of timber for the Australian market, and BGD already possessed machinery, staff, know-how and ancillary facilities which would have been expensive and difficult to build up independently.

The succeeding Liberal Government compromised in much the same way, from the opposite side; for their Minister would have preferred development by private enterprise. But the Liberals were led, as their predecessors had been, to the conception of a joint company with BGD, by the sheer economics of the project.

When Labor left office in December 1949 only the general principles had been decided. Banks had arranged for logs to be tested for their peeling and bonding properties by MacMillan Industries Limited of Canada - the first of many instances in which BGD's experience and contacts facilitated matters. Meanwhile the details of the agreement had to be thrashed out with the new Liberal administration: cost and profit projections and divisions, the source and level of capitalisation, the machinery that would be required, transport arrangements, direct assistance by BGD to the new company, the cuts of timber that would be allowed annually, and so on.

Cabinet gave approval to Heads of Agreement for the joint company in December 1950. The following year was taken up with technical investigations: for BGD would not commit itself until all the facts were known.

There was a feeling in some government circles that BGD had been straining at the leash to get into partnership with the Commonwealth. This was far from being so. BGD had reached the peak of post-war gold production and, although the prospect of a run-down was being faced, the operation of a plywood factory hardly seemed to offer profits commensurate with those in mining or with the risks involved in going into something new and untried.

Moreover, there was serious opposition within the government to BGD's participation in the venture. Queensland timber interests, whose hoop pine reserves were running low, commanded a good deal of political support: and for long that State, with a big turnover of labour and a strong sensitivity to the economic barometer, decided the fate of governments. Opposition was so strong that as late as 1958, when the plywood factory was an established success, a Queensland senator and Government supporter, R. Kendall, implied in the House that his agreement had been won in 1950 by an assurance that veneer and very little plywood would be sent to Australia.¹

It was felt, too, that BGD should not have a monopoly of the Bulolo timber, but BGD would not participate without a guarantee of the minimum cut necessary for economic veneer production. Forestry officials had decided as an initial precaution that the cut could not exceed ten million super feet (on McAdam's advice, to ensure regeneration), and this set an upper limit to the economics of the project. BGD then insisted that the proposed plywood factory have this cut available, and this settled the issue. According to estimates at the time, the Bulolo timber would support only one commercial operation.² Other interests were told that it would take at least five years of research to assess probable regrowth rates more accurately. This might then allow for another organisation; but BGD was well aware that their factory would be in production, and that it was unlikely that any substantial Australian concern would later be interested in the gleanings.

The technical aspects of investigation for the plywood factory were left mainly to BGD, though there was close liaison with government and costs were shared. Investigations during 1951 - months before an agreement was formally entered into - covered the practicability of logging, the selection of factory equipment, and a close analysis of cost and profit projections. It appeared that a very substantial market existed in the United States, where a prodigious post-war building boom had caused serious shortages of building materials (especially ply, which had been in favour since the 1920s, and had forced up prices. In addition, the demand for ply within Australia greatly exceeded the supply, and there was

¹ Senate Debates, 25.2.1958, Vol.S.12:18-19. At that time the Queensland ply industry was beginning to feel the pinch, caused partly by out-dated methods. There was also some hostility in New Guinea. As late as April 1952 NGG management protested angrily to the visiting Federal Minister for Works about BGD's 'privileged position'.

² Simpson to Godden, 2.10.1950.

no prospect of detriment to the Australian industry for a considerable time if imports were allowed to continue on a large scale.¹

Nevertheless, it was realised that a factory in New Guinea would have to be exceptionally efficient to sell its products in foreign markets which already had local and more experienced suppliers. Products would have to be of high quality and the most modern equipment, lay-out and coordination in production would be needed. The most searching advice from the long established ply centres was therefore sought.

In April 1951 BGD, through the agency of Banks and Placer, secured the services of a Canadian expert, J.D. Gilmour, to report on logging. At the same time the company was in touch with Paul Savidge of Industrial Engineers and Contractors Inc. of Washington, one of the foremost consultants on plywood manufacturing. When Gilmour's report and further tests of logs proved to be highly favourable, plans for an up-to-date mill and ply factory were drawn up. Concurrently, the original Heads of Agreement with government were revised. Before the middle of 1952 BGD was able to take to its shareholders, and the Government to Parliament, precise details of incorporation.

The New Guinea Timber Agreement Act (No.40 of 1952) passed through Parliament and was approved in June 1952. This established Commonwealth New Guinea Timbers Limited as a private company formed to develop the timber resources of the Bulolo Valley, primarily by operating a plywood factory. A fraction over 50 per cent of the shares were to be held by the Commonwealth, and a fraction under 50 per cent by BGD. The board of directors was to consist of two Commonwealth and two BGD nominees; in the event of final disagreement between the two sides, the board was to act as directed by the Commonwealth (the chairman was to be elected from amongst the four). The board was to control general policy, and to appoint commercial management. 'Until suitable alternative arrangements had been made' BGD was to provide CNGT with stores, services, power and accommodation - this paved the way for later arrangements which virtually fused the two companies in these spheres. On its side the Commonwealth, apart from taking responsibility through majority shareholding, undertook to keep the Lae road trafficable, and 'to use its best endeavours' to complete bridges over the Markham and

¹ Australian Tariff Board Report, C.P.P. No.89/1951-52:12. By 1952, there was a lessened demand for ply in Australia; but this was attributed largely to the poor quality and high price of the Australian product (C.P.P. No.159/1952-53:19-20). By that date, of course, CNGT was already in existence, with specific provision for access to the Australian market.

Mumeng before ply production began. (In fact, these things were not done as they should have been.) In addition it was written into the Act (Sect.5) that 'The assurance of the supply to the Australian market of plywood...is fundamental to this Agreement'.

CNGT was to be allowed to cut at least seven million super feet of hoop and klinkii after two years; and thereafter not more than twelve million super feet in any one year. The Administration was to receive continuing royalties and during the first five years additional royalties at four shillings per 100 super feet were to be payable on the araucaria and two other species.

In 1952 the Liberal Government was still embarrassed by its association with a private company in a venture designed to make profits out of New Guinea's timber. Introducing the second reading of the Agreement Bill in Parliament, the Minister for Territories, P.M.C. Hasluck, emphasised that the arrangement was confined to the Bulolo Valley, and that ample provision would be made for the regeneration of the forests. In this way CNGT would benefit both Australia and New Guinea by forming a permanent nucleus of development and community life. (In other colonies in days gone by this was known as 'the dual mandate'.) In 1952 it was possible to be sanguine about indefinite future prospects for CNGT. The Government gave no undertaking beyond ten years; but the Minister made it clear that there was in view a quantity of 500 million super feet to be cut over fifty years. In addition, it was stated that a second cutting cycle of fifty years 'would be looked upon favourably'. Confidence of this order in the future of colonial government was perhaps inappropriate, but the Minister argued that the industries of New Guinea and Australia were indistinguishable: 'New Guinea', he said, 'is Australia.'

The arrangement with BGD was justified at considerable length. The Minister described BGD as 'hard-headed', 'practical', 'well-organized', and 'experienced' and said the Commonwealth was assured of a long and stable business association.¹ The former Minister, Ward, argued that the Chifley Government had insisted that any agreement should include provision for the buying out of BGD after 'a period of years'; but they can scarcely have expected BGD to participate on such a basis. He was on rather stronger ground in claiming protection for the Australian veneer industry, for conditions had changed since the conception was first formed. On the other hand, the Tariff Board had from the beginning seen no threat to Australian industry for a long time from the importation of plywood. Moreover, CNGT set out to provide a different and better ply, which in the long run could only benefit Australia.

¹ H. of R. Debates, 29.5.1952, Vol.217:1088-93.

Ward also objected strongly to a provision in the agreement (Sect.14) that the Commonwealth could repay by subsidy up to the full amount of customs duty on ply imported from New Guinea into Australia.¹ But there were already too few assurances of this kind to encourage the founding of industries in New Guinea, and the country had suffered, and was to suffer still, from a generally protectionist attitude towards Australian industry. The provision was permissive and not mandatory, for access to markets in Australia had been granted.

During 1952 BGD set out to ensure that, by using the latest methods and a lay-out planned for efficiency, the plywood factory would be able to compete on the Australian and U.S. markets. Meanwhile, in 1950-52 the venture into plywood manufacturing had begun to assume much greater importance for BGD than had initially been admitted. As has been described, the dredges were failing and recovery in relation to estimates had declined far more drastically than had been expected. Diversification was essential and fitted into a pattern of expanding interests being developed by the parent Placer group, which had planned for another subsidiary to enter the coal producing and export business in Australia. Possibilities on the fringe of mining were considered: for example, quantities of commercial marketable mica were found in the d'Entrecasteaux Islands to the south-east, and BGD had expert investigation of qualities and possible returns before deciding against development.²

However, BGD was influenced mainly by the possibility of sustaining what had been built up over such a long period in the valley. Recognition that the prolongation of gold-dredging and the speed and degree of diversification were interdependent brought Charles Banks to Australia again early in 1952. After discussions with Placer and BGD officials on the diversification propositions (mainly plywood and coal), he went on to Canberra where his standing as Lieutenant-Governor of British Columbia, and his contact with government leaders facilitated consultation. Banks saw both the Minister for Territories, Hasluck, and the Prime Minister, Menzies. The Prime Minister had caused BGD a little embarrassment in February 1952 by a rather premature announcement on CNGT, before the shareholders of BGD had been consulted. Banks' visit finalised the arrangement, and assured the Commonwealth Government that the plywood business was, in BGD's eyes, of fundamental importance. Banks sought clarification of future provisions for the plywood

¹ H. of R. Debates, 4.6.1952, Vol.218:1413-16. As will be seen, the customs provision was later to cause BGD shareholders financial embarrassment.

² Although good, the mica was of the 'green' variety, whereas the 'ruby' type was generally more favoured.

industry, and his representations undoubtedly influenced the wide undertakings which the Minister made.

While BGD's participation offered advantages to the company, it also entailed heavy responsibilities in return for relatively small anticipated profits. It was not easy for a management and shareholders accustomed to the enormous dividends from gold mining to face up to the more pedestrian profit level - including depreciation of their holdings - which diversification promised. On the other hand, something was better than nothing: because of the build-up of amortisation reserves and the savings to be gained from the employment of fixed assets, BGD's contribution to CNGT made surprisingly little dent in the company's finances. Slightly less than half of the company's amortisation reserve (\$3,433,507 in November 1952) was set aside to provide BGD's share of CNGT's capital.

Once expert reports were in, the design of the factory took only a matter of months, and construction began in March 1953. Its completion within the ten months was a remarkable achievement in view of the size, novelty and isolation of the project. It was officially opened by the Minister for Territories on 26 January 1954. Shaped like an aircraft hangar, the factory covers more than four acres, including areas for administration and for the storage of cut logs. The entire building depends on beams, joints and struts of local softwood. The factory was designed to produce 40 million square feet of ply annually, on a 3/16 inch thickness basis: this was almost 50 per cent above what could be expected from the authorised cut of 10 million super feet of peeler logs a year.

The production flow line through the factory has been recognised by visiting experts as a model of its kind.¹ The methods of production made CNGT confident about its prospects of breaking into established markets. Although there were further outbursts of protest by Australian interests,² CNGT produced exceptional ply. For example, the Australian industry in the early 1950s produced no real HMR plywood. Its glues were poor, and its quality control was uneven, as the Tariff Board in Australia recognised. Moreover, the Australian industry used cold press methods - often only clamps - to bond the veneers, whereas CNGT introduced machinery using controlled pressures and temperatures. CNGT's advantages were partly accidental, for klinkii is ideal timber for peeling and for facing ply: it has long fibres (which gives great cross-grain strength), it is particularly dry (facilitating processing),

¹ e.g. see Lembke 1958; also Hall 1959:32-3.

² e.g. Senator Kendall, quoted on p.115.

and it has an uncluttered appearance, with almost no natural features (which makes it suitable for the impressing of other patterns).

One of the objects of BGD's participation had been to provide an outlet for its employees as gold-dredging ran down. Accordingly, senior BGD men were sent on a five months training course in the United States to fit them for management posts with CNGT. Other employees who were becoming redundant were also siphoned off at lower levels for more routine tasks. Few overseas experts have been recruited. J. Sneddon, who had come to BGD in a lowly capacity in the 1930s, has managed the factory for a number of years, while the company has a fully qualified graduate secretary also located at Bulolo. Because the company is registered in New Guinea all company meetings have to be held at Bulolo, and this ensures regular consultation with those engaged in production, despite other pressures on both the private and government members of the Board. Control is therefore not as remote as the constitution of the company might make it appear: this avoids one of the worst faults of other Australian undertakings in Papua-New Guinea.

The balance of labour has, nevertheless, presented CNGT with a problem: for while Europeans have been successfully transferred or recruited into the plywood factory, this has meant a corresponding exclusion of natives. McAdam's original hopes for native education have not been justified. By 1962 CNGT employed about ninety Europeans and 400 natives; but the tasks given the natives were neither responsible, nor likely to give skills useful for anything other than the same routine factory tasks. At the same time, CNGT had steadily reduced the number of Europeans, so that it was possible to find a native operating the debarking machine, while a European carried out the dreary mechanical task of winding the veneer from the peeling machine on to rollers. The employment of European women (on shorter hours) to sort the veneers before their assembly was attacked by Clyde Cameron, M.P., in 1962; but the company claimed that the accurate marking of the sheets and the keeping of tallies demanded more education and discrimination than the natives it employed possessed.

Overheads would be reduced if CNGT were to dispense with Europeans and employ only natives at lower rates, but experienced control of production must be paramount, for it would be pointless for New Guinea as a self-supporting state to inherit an industry which had been destroyed by incompetence. Moreover, opposition of the Australian trades unions to klinkii ply has centred on its production by 'cheap native labour', and the employment of a proportion of Australians at inflated wages has helped to counter this criticism and mitigate opposition to the export of plywood to the very important Australian market.

CNGT has functioned remarkably smoothly for a new venture. In the first full year - ended 30 June 1955 - the throughput of all logs at Bulolo was more than fourteen million super feet, and the plywood produced amounted to 27,632,918 square feet, on a 3/16 inch basis. This production was in a way exceptional, for the quota of timber which could be processed had built up from the previous year. In the first year of operations, CNGT showed a net profit of £169,690, after providing for depreciation of fixed assets of £101,306; the following year the net profit held up, and a dividend of 5 per cent was declared, BGD's share being £37,500.

These results were excellent, but BGD, accustomed to the higher returns from mining, was dissatisfied and began to seek new ways of extending their timber interests. As throughput was controlled by the cut of timber allowed, the only solution was to find more timber outside the Bulolo area.

Klinkii, on which the ply industry was being built, did not occur elsewhere, and early in 1956 the management conceived the idea of replacing the unseen middle core of CNGT ply with a veneer made from another timber. This promised to spin out production by up to 50 per cent. The klinkii had proved so amenable that it was possible to fine down the backs and faces slightly, and make a corresponding increase in the thickness of the 'core'. (In fact, the factory would in any case have been forced to this recourse, for the substitute timbers which were found elsewhere proved extraordinarily difficult to peel, and particularly to peel thinly.) As long as quality control remained high, this would not spoil the strength or appearance of the ply.

In 1956 BGD as a separate company negotiated to purchase the assets and forestry licence (which required extension) of the South Pacific Lumber Company Limited. This company was based at Lae, and held a timber concession in the rugged trans-Busu area north-west of the town; for some years it had milled logs for local sale, and had unprofitably exported some peeler logs to Australia.

The rehabilitation of this company was a major task for its mill was sited in a swamp and the area was susceptible to flooding. Its equipment was old and needed extensive refurbishing. Moreover, the logging areas were situated in extremely difficult country, with rutted and jungle-clad slopes leading upwards to knife-edge ridges. Furthermore, it was not known whether the timber available in this concession would be suitable for peeling, to supplement the veneers produced by CNGT.

The investment, which was likely to cost about £200,000, had an element of risk, so BGD decided to go ahead with the purchase independently; if CNGT had been involved there would have been much political lobbying and red tape. However, CNGT was offered an

extension of the joint relationship to South Pacific Lumber once the takeover had been consolidated.¹ It was realised that independent activities by one of the partners, in selling materials to the joint enterprise, could lead to friction.

BGD also argued the advantages of a broad spread of timber types and markets rather than reliance on the klinkii ply alone. This pleased the Administration for Lae was rapidly growing and its labour surplus would be alleviated by an expanded timber mill. The Lae site had particular advantages for BGD, for wherever new timber was found, it would have to be converted into veneer before being taken to Bulolo. This would economise on transport, and also avoid damaging the equipment and organisation at Bulolo by trying to peel large quantities of second-grade timber.

For many years most freight to Bulolo had been inward, so that outgoing trips were an economic waste. The establishment of a timber industry at Bulolo threatened to throw the balance the other way. In March-April 1951 outward loadings for the first time exceeded ingoing ones; this was partly fortuitous, for it resulted from a contract by BGD to build houses at Lae, but it was a warning of what was to come. However, the acquisition of South Pacific Lumber promised to offset this, and by 1960 an excellent balance had been struck, with loadings both ways running at about the 10,000 short tons mark annually. The only costs of taking the Lae veneers to Bulolo lay in slightly increased fuel and maintenance charges.

BGD formed its new acquisition at Lae into a subsidiary company, called South Pacific Timbers Limited. This company faced great technical problems for the mill and its machinery had to be extensively repaired, new quarters had to be provided for native staff, and a wide range of coastal timbers tested for suitability. Moreover, all these problems had to be overcome quickly so that CNGT could expand and take advantage of the open markets then offering in Australia and the United States. To take one example of the difficulties, the principal timbers suitable for peeling were hardwoods, especially anisoptera and celtis. Anisoptera is full of sap and extremely wet, and it had to be run through a borax bath before being sent to Bulolo for drying, otherwise it arrived covered in fungus.

In addition great logging obstacles had to be overcome during the first year of full-scale operations, 1957-58, one of the wettest years on record. Trucks and tractors were struggling up steep slopes in mud that was feet thick. Late in 1958 the bridge over the Busu River was washed away, and the Administration refused

¹ Austin to Secretary, Department of Territories, 7.11.1956.

to replace it because the trans-Busu forests were estimated to have only a short working life. The company therefore was forced to build the bridge itself. Logging proved a perennial problem, due to difficulties of terrain.

Nevertheless, South Pacific Timbers had all the makings of an economic success within two or three years of its acquisition. In 1958-59 the recovery rate from logs was 43.8 per cent, although the Busu bridge trouble had forced the company to use inferior timbers. In the following year the recovery rate at Lae rose to 54.3 per cent, with veneer production of 45 million square feet, of which 97 per cent was absorbed by CNGT. Though production tapered off later, South Pacific Timbers represented a particular triumph for BGD, because it was taken over at short notice and put into economic production on entirely new lines.

In 1957-58 there was a recession in the American demand for plywood, conditions on the Australian market were becoming more difficult, and the attitude of the Tariff Board hardened. Despite this, the amount of klinkii ply that could be imported into Australia (in effect, duty free) was raised from twelve million square feet (on a 3/16 inch basis) to sixteen million square feet. This, however, did not make provision for all CNGT's HMR ply, let alone for the waterproof material. Still further improvement and differentiation of the ply was necessary to spread its saleability.

Accordingly, BGD in 1958 bought a controlling interest in Associated Plywoods Ltd of Sydney and installed Graindek machinery for over-printing patterns on plain ply. It was not located at Bulolo because the chrome 'masters' have to be imported to order and as patterns depend largely on buyers' demands, separation from markets was highly undesirable.

A subsidiary, Associated Plywoods Sales Pty Ltd, acquaints management with the precise difficulties of wholesale marketing, though it is not favoured over other wholesalers. CNGT marketing liaises closely with the Australian Plywood Distributors Association and the Australian Plywood Board, although the company is not directly represented on either body.

The period after 1959 did not fulfil the expectations of CNGT and BGD's timber interests. The recession in the American market continued and the Australian government applied a 'credit squeeze' policy which retarded building and caused a slump in Australian demand for ply.¹ The New Zealand market was restricted by import licensing. CNGT began to stockpile and to search for further

¹ In 1961-62 sales in Australia were down to a little over 19 million square feet (3/16 inches). This was almost 8 million square feet down on the previous year's sales in Australia.

markets. It was felt that more ply could be used in New Guinea. CNGT had surveys made through Australian Government Trade Commissioners in the United Kingdom, South Africa and South America but lack of direct shipping services necessitated costly transshipment and storage.

In September 1957, after a five months study by methods experts, CNGT introduced a production incentive scheme calculated on a basis of output-per-working-group (which applied only to Europeans) which had dramatic results during the years when production was building up. The following table illustrates the differences between 1956-57 and 1957-58:

<u>Section of factory</u>	<u>Production per man/hour</u>	
	1956-57	1957-58
	sq ft	sq ft
Dry veneer	1,939	3,343
Salvage	331	581
Panel-making: HMR	748	850
Waterproof	576	578
Finished wrapped product	575	1,172

In the following year the finished wrapped product per man/hour rose to 1,466 sq ft, and the quality of the ply improved: the greater concentration which the scheme demanded seemed to work in both directions simultaneously.

Areas to be logged are decided on by CNGT in association with the Department of Agriculture, Stock and Fisheries, though the Department has the power to select unilaterally. CNGT then takes out all the commercial timber. The department arranges for the cutting and burning of the residue, and for replanting. Experiments with regeneration of the forests indicated that the replacement time may be forty years, but artificial seeding could increase the density of suitable timbers four or five times. This could mean greatly increased cuts during the second cycle.

Extensive experiments had to precede replanting. Test areas planted with hoop did well from the beginning, but klinkii ran to many tap roots, and was susceptible to fungus. In 1956 the trouble was traced to the use of strongly alkaline hill water on the seed beds; when water was reticulated from the river, and sulphur added, the problem disappeared. However, these difficulties held up plantings for several years, and little is yet known about the rate of klinkii regeneration. Present growth and thinning processes suggest that CNGT may be justified in planning for significantly greater cuts in another twenty to thirty years.

Liaison with DASF has been admirable. The Department's seed beds covered 100,000 sq ft and contained some one and a half million

seedlings by 1962. These are planted out at 600 to the acre, and gradually thinned down to some forty commercial trees in carefully controlled cycles. It is believed that this density will hold. The maximum area needed to ensure full replacement, about 1,200 acres, is now being replanted annually.¹

CNGT represents a mutually beneficial dove-tailing of activities by BGD, the Administration, and the Commonwealth Government. The sharing by CNGT of power, workshops, accommodation and amenities with BGD reduces overheads for each party and standardisation of vehicles has facilitated the ordering of parts and servicing.

Related prospects and projects

CNGT have hopes of making paper pulp, for which klinkii is ideal, from 'thinnings' from the regenerating forest. As yet these are insufficient, but this problem may be overcome within five to ten years. The manufacture of pulp would demand extensive capitalisation and expert staff.

BGD independently explored possibilities in other New Guinea forests. This type of investigation is expensive and almost as speculative as mineral prospecting. In 1960, therefore, BGD and NGG combined to form Territory Timbers, for further investigation. BGD had a controlling interest. A preliminary examination was made of a concession in (then) Dutch New Guinea, estimated to contain 294 million super feet of kauri pine. However, the economic location of roads proved so difficult as to deter any expenditure of capital in development. Later, areas in New Britain and near Port Moresby were investigated, but they were rejected on the respective grounds of poor timber and an inadequate cutting quota. There is no doubt, however, that the success of CNGT has given BGD further determination to expand.

In 1960-61 CNGT made a net profit of £204,655, after allowing £72,500 for income tax (introduced in 1959) and £51,159 for the Special Reserve. This made possible a 10 per cent dividend, while assets were shown at £2,178,362 compared with the issued capital of £1,500,000.² Placer could see that diversification at Bulolo was a practicable alternative to winding up and offered one Placer share for three BGD shares. On prevailing market values it meant a profit of up to 25 per cent for BGD shareholders during the period the offer was open.

¹ The storage of seeds presents problems and has demanded the co-operation of BGD: hoop seeds can be stored for nine to ten months at 32° and klinkii seeds at 45°.

² See H. of R. Debates, 23.9.1938, Vol.157:132.

Unfortunately, complications with CNGT caused Placer to drop the offer in May 1963. These arose from the controversial section of the original Agreement which provided that the Commonwealth could refund the duty paid on CNGT ply entering Australia. BGD had taken this to mean, in conjunction with the further section assuring access to the Australian market, that the duty would be refunded. Refunds were made up to the end of the financial year 1959-60; in the following and subsequent years no further payments were forthcoming from the Commonwealth, though CNGT continued to build up its Special Reserve as an advance fund against payments. But what CNGT and BGD took to be established practice was viewed by the Commonwealth Treasury as an interim subsidy subject to changes in the Australian financial and industrial climate. This introduced a continuing element of uncertainty into CNGT's affairs. Placer could not recommend to its shareholders that BGD be absorbed until the matter had been clarified; and the division in attitudes between the Treasury and CNGT made this clarification unattainable.¹

One other diversification by BGD was the building of the Pine Lodge hotel at Bulolo in 1955 by which time the flow of visitors had become so great as to be an embarrassment to BGD and CNGT. Management of the hotel was put out to tender under a lease which provides for negligible returns to the company.

In the post-war rush to provide housing, offices and workshops, the prefabrication method was extensively developed by BGD. As this burden eased in the mid 1950s the company proposed to keep it going on a commercial basis. A number of houses had already been built in Lae for Qantas airline staff. However, the erection of 106 houses for the Administration in Port Moresby, though completed on schedule, cost the company \$191,050 due to pilfering of materials from building sites. Such pilfering upset the system of building to a time-table, for if some sections were missing, the whole mill at Bulolo had to be re-set to produce just one or two parts of various kinds. No further building contracts were sought.

¹ There had previously been delays in payment: the refunds of duty for 1957-58 and 1958-59 were both received in the financial year 1960-61.

Chapter 18

Diversification 2: The Leron beef project

The broad kunai-covered plains of the Markham River were regarded by the military Administration during World War I as one of the prime fields for settlement, but the goldfields diverted capital and enterprise.

Until 1959 BGD's activities in agriculture and stock-raising had been on a small scale, but in the year to 31 May 1960 the company's gardens produced 84,550 pounds of fruits and pumpkin, apart from native subsistence crops. Simultaneously, more efforts were being made with livestock: 75 head of cattle, 112 pigs, and 151 ducks were included in the inventory, and it was intended to increase stock to supply all the fresh meat requirements of the Bulolo community. In June 1960 BGD applied to have its agricultural leases put on a more permanent basis. A ninety-nine year lease over an area of 1,128 acres, incorporating the existing gardens, was confirmed in January 1961.

The decision to raise cattle commercially was influenced by many factors. The search for other profitable mineral areas had proved fruitless. The District Commissioner at Lae, H.R. Niall, had long advocated the pastoral and agricultural potentialities of the Markham Valley; and landed settlers showed what could be done with enterprise and hard work. By 1959 the limit of further employment in the timber industry seemed to have been reached, and the company embarked on cattle-raising while dividends were still healthy and the shareholders unlikely to become embarrassingly querulous.

In May 1959 BGD applied for the lease of 30,000 acres on the Leron Plains, adjacent to the Markham: flat, well-watered and grassed with kunai. But part of the area applied for was assessed by government as being suitable for sisal growing, with the result that BGD obtained only 18,800 acres.

New Guinea offers a prime opportunity for a local meat industry. In 1959-60 about 2,500 tons of canned beef or veal, and about 500 tons of frozen beef were imported into New Guinea. The retail price of frozen beef was two to three times that of fresh beef in

Australia. The availability of fresh meat would raise consumption figures substantially, and cheaper cuts of beef could find a ready sale in the native markets, as they have, for example, in East Africa.¹

The widespread location of potential markets raised the communications problem and it was clear that outside assistance would be needed in killing and marketing. This might mean either a guaranteed price to overcome airfreight and the established methods of Australian competitors, and/or the setting up of a local cannery.

BGD's application for the Leron Plains land met strong opposition from Australian producers. However, BGD had a reputation for efficiency, it had detailed cost projections ready, and could commit itself to definite expenditure at an early stage (estimated at £60,000 for the initial establishment period) and the Administration thus awarded it the land in May 1960.²

Preparations for establishing a herd and for improving the property had already been made. Surveys estimated that Leron would cost about £5 an acre for improvement and would carry about one beast to the acre comfortably. (The unimproved carrying capacity was estimated by DASF at only one beast to ten acres.)

The Administration was anxious to promote commercial stock-raising and in 1955 a freight subsidy scheme was introduced to reimburse importers for transport from Australia to Papua-New Guinea ports, up to a maximum of £55 for bulls and £30 for young beasts, as long as specified numbers of breeding cattle were imported. This subsidy applied, however, only to a total of 400 head for each leasehold property, above which it was clearly intended that herds should be augmented by natural increase.³ BGD estimates showed that for a rapid build-up to a large scale enterprise, it was impracticable to import stock at full cost above the 400 limit, while at the same time a dependence on reproduction above that figure postponed commercial prospects considerably. In view of this the Administration relaxed the condition in 1962.

After weighing the advantages of air and sea transportation, the company shipped 238 cattle to Leron in September 1960. These were predominantly Shorthorn but, in view of their uncertain

¹ Commonwealth Bureau of Census and Statistics, Canberra. Overseas Trade Bulletin No.57/1959-60. Also Kenya Meat Commission Report, 1961-62; in the ways of co-operation between government and private enterprise perhaps more could be learned from the highly successful developments in Kenya.

² Sydney Morning Herald, 12.5.1960.

³ Administration Press Release No.46, 4.10.1955.

breeding record in the lowlands, some Aberdeen Angus were included for comparison. By 31 May 1961 the overall death rate en route stood at only 4.6 per cent; for an extensive and laborious journey this was considered highly satisfactory.

Meanwhile the managing director, Austin, surveyed potential markets in Papua-New Guinea, the neighbouring Pacific countries, and Asian countries to the north. Local canning could offset the expense of sending out fresh or frozen beef: in July 1960 the general manager announced that the ultimate objective of the Leron Plains project was a herd of 10,000 head, and a canning factory to supply all the needs of Papua-New Guinea.¹ The Administration undertook to set up an abattoir at Lae to kill all stock coming from the developing Markham and Highlands areas, and put a substantial bridge across the Markham at Leron.

During the first year at Leron housing was built for European and native staff, a small power plant was installed, several miles of fencing were erected, a number of cattle paddocks and a shelter were laid out, and an airstrip for light aircraft was completed. The location and tapping of water caused rather more trouble than had been expected: water levels proved most uneven, and a laborious system of shafting was devised to counter this. An unexpected occurrence of carbon dioxide gas during shafting caused the death of an employee and the company referred to drilling instead of shafting for water. By mid 1961 nine successful holes had been drilled, and during the following year six windmills with auxiliary engines were installed.

The relatively slow progress in water location retarded experiments in pasture improvement: only 130 acres were sown in the first year, instead of the 400 intended. This held back the conditioning of the initial herd and was certainly a factor in the survival calving rate of only 37 per cent.

The natural pasture of kunai and kangaroo grass was not bad but once cattle were turned on to the small area of artificial pasture their condition improved greatly.

Plant pests created further problems during the first year, and the sorghum alnum recommended for pasture proved to be toxic in its new environment. The only methods of plant control so far are laborious bulldozing, or fencing off.

Although DASf has maintained an experimental station in the area for some years, work there seems to have led to few clear results either in the breeding of lowland cattle or in the elimination of noxious flora. This has imposed added strains on BGD, for it must experiment and try to build up a commercial herd simultaneously.

¹ New Guinea Times Courier, 20.7.1960.

Despite these drawbacks, the manager in charge of Leron remained confident that there was 'an excellent chance of a successful cattle property being developed'.¹ The company has concentrated on building up the herd as quickly as possible, and on injecting a variety of types to secure the best adapted crosses. By mid 1962 the stock purchased numbered 535, including twenty-one bulls; the heifers were then evenly divided between Shorthorn (and crosses), and Aberdeen Angus (and crosses). Most of the bulls were pure or cross Brahman - the former costing £1,000 each.² It was found that 3/8 or 5/8 crosses with the Brahmans produced a hardy and adaptable beast. A locally bred cross at six months had almost overtaken in weight the pure British strains of two years which many of the original cows had been carrying when they arrived.

The breeding program has been rigidly controlled and documented. All varieties have been kept segregated. £20,000 was spent on materials for firm and durable fencing. The Leron Plains are absolutely treeless, and BGD had to erect large shelters in every paddock to give cover to 100 or more animals at a time. Meanwhile, the company was experimenting with the transplanting of fully-grown trees from Bulolo, as a potentially rapid means of providing natural shade.

How quickly the property can be made profitable will depend on breeding rates, the quick evolution of suitable types, and the subordination of pasture and pest difficulties. Senior officials do not predict any working profits until 1970; but this does not cause concern, for the company believes that it will stimulate the growth of a lowland beef industry, and that this in turn will ultimately lead to a worthwhile and remunerative enterprise. The scale of the company's commitment may be gauged from the fact that roughly £100,000 were invested in Leron in the first two years; expenditure is bound to exceed £250,000 for the first decade.

¹ BGD Sectional Annual Report, 1960-61.

² A pure Santa Gertrudis bull was also used, but the progeny did not compare well with the Brahman crosses.

Chapter 19

Post-war labour conditions

The Labor Government concentrated on better conditions for native workers, by removing the indenture system and putting natives on a par with Europeans in their commitments to employers. Concomitantly the obligations of employers towards their native labour were redefined and expanded. But since 1941, there has been no attempt to give official protection to European workers at Bulolo or elsewhere in Papua-New Guinea.

BGD's Australian employees are engaged on two-year contracts, renewable at the discretion of the company. They have almost no rights beyond the provision in their contract for two-way fares to Australia and leave payments: eight weeks after the first contract, twelve weeks after subsequent contracts. For Australians, this is a remarkable state of affairs. They have no union, no superannuation fund, no pension schemes and no security outside the contract. A man who becomes unfit or redundant may be removed with no further claim on the company, though long-service gratuities are sometimes paid to old members of staff on retirement.

On the other hand, housing is provided for £1.9.0 a week, salaries are about 20 per cent above comparable base rates in Australia and there are further returns from overtime and a production bonus scheme. Many wives work, some part-time, in the offices, trade stores, and plymill, where they receive almost seven shillings an hour for a thirty hour week. The ordinary workman can save more money than in Australia. Australian social services are absent, but the company maintains a hospital, and a good primary school is available locally.

Retail costs are controlled by the company and extensive entertainment and recreational facilities are provided, thus continuing the pre-war emphasis on group morale.

However, the fact remains that all provisions are made unilaterally by BGD management and this leads to an unnecessarily one-sided approach to labour relations. As gold-dredging ran down, known 'agitators' were removed; and labour grievances about company policy are now kept concealed. On the other hand, the absence of any arbitration system for employees is balanced by a number of

factors which constrain the management: supply and demand determine the importance of attractive conditions; any serious discontent would decrease efficiency; and the premature removal of men could involve the company in the avoidable expense of repatriation provisions. The American business principles of hard work and self-reliance have not aroused serious discontent at Bulolo, partly because of the facilities provided by the company, and partly due to the ease with which the dissatisfied can now find jobs in Australia.

The division between the native and European communities is intensified by the legislation which is designed to protect the native labour force, thus placing the native in a separate category. Controls are rigid and moves toward greater liberty apply only to labourers: for example, when the strict indentures of pre-war were revoked, the breaking of an engagement contract by a native became a civil breach rather than an offence, but it is impracticable to enforce this. The period of engagement is now two years, though married men with families generally contract for three years.

The total labour force fell from 1,300 pre-war to about 900 in 1962, and BGD's conditions no longer surpass those elsewhere. Many single men now live twelve to a hut measuring thirty feet by sixteen. This complies with the Native Labour Ordinance but is inadequate compared to the progress in legislation and conditions elsewhere.

BGD has always favoured Sepik men whose home conditions are appalling and who serve with great contentment and often re-engage.¹ BGD recruits also from Manam Island, the Madang area and elsewhere, in the belief that a mixture of peoples encourages discipline and discourages the fomenting of discontent. In order to avoid discrepancies in conditions, however, and to simplify allocations of funds and rations, few local natives are engaged on a casual basis: in October 1962 there were only twenty-two. Attempts to bring in families have been no more successful than before the war: men are still unwilling to see their wives surrounded by strangers. Moreover, the tightening of the regulations on accommodation for married labourers discouraged the importing of families into the compound. Existing buildings which, before 1950, accommodated up to six families, are now permitted to house only two.

Where pre-war an ordinary labourer received five shillings a month, plus rations, equipment, and housing, in 1962 he received thirty shillings per lunar month during his first contract year

¹ The Employment of Natives Ordinance (No.48/1950) controls recruiting more rigidly than pre-war. Formerly recruiters used the phrase 'trading in humans' with a clear conscience (Maclaren 1923:223). Today a permit to engage labour can be issued only to an employer or his agent (Sect.13), a principle which BGD had always followed.

and thirty-five shillings the following year. Ten shillings monthly is paid in cash, the remainder being banked and paid to him on his discharge. This means that a labourer leaves with £29.5.0 in cash, plus the equipment which the company must issue to him under the Ordinance: cutlery, clothing, bedding and a wooden box to put them in, to the total value (when new) of £8.

In October 1962 the native labour force included 511 men on the basic wage rate, and 318 semi-skilled men who received between thirty-five and eighty shillings per lunar month. In addition, there were seventy-six 'specialists' earning up to £15 a month.

Sporting fields and equipment, a large hall, and a cheap trade store, have been provided. A pre-school kindergarten (under a European teacher) and a primary school (under two native teachers) served the children of the compound.¹

Until 1959-60 there was a shortage of native labour in New Guinea but BGD never had any serious difficulty, because of its pre-war reputation for fair treatment and good conditions. The provision of a minimum urban wage of £3 per week laid down by the Administration caused many employers to offset the rise in cost by cutting down on the number of their employees. A labour surplus resulted, and in recent years BGD has had more applicants for jobs than it has been able to cope with. On the other hand, because of improving conditions in home villages, fewer labourers re-engage for a second term. Pre-war about 50 per cent signed on again, but by the 1960s this was down to 30 per cent.

Those who do serve two years or more at Bulolo return to their villages in better physical condition: most men gain half a stone or more in weight. BGD has always regarded the ration issues laid down in the Native Labour Ordinance as a bare minimum: employees are regularly provided with a hot lunch, and three tins of meat instead of the regulation two are issued to every man weekly. The regulations on hygiene are rigidly policed. Prophylactic treatment of the labour force is insisted on: malarial attacks are almost wiped out, and the worms and other body parasites which infect most natives in their villages are also eliminated. Many labourers learn new standards of cleanliness and general health while working at Bulolo; and, with the expansion of Administration medical facilities, they are more able to continue such standards when they return home.

Unfortunately the same cannot be said of education. The lowly work which most natives perform is unlikely to have application anywhere else, or to confer any lasting benefit. Labour division

¹ In October 1962 there were thirty-nine resident families, with ninety children.

is largely on a race basis, so that almost all natives, lacking education, perform routine tasks whatever their innate intelligence. Even the so-called 'specialists' come into this category: for example, the highest paid of them are truck drivers. (See also Chapter 17.)

The Administration's first attempt to create the conditions for interracial occupational mobility was the passing of the Native Apprenticeship Ordinance (No. 77 of 1952) which defined conditions for trade training of qualified indigenous people; but there was little active promotion before 1955. The Ordinance was revised in that year, and detailed regulations - under which private individuals or companies could take on apprentices - were issued. It was some years, however, before the apprenticeship system gathered momentum: BGD came into the scheme for the first time in 1958, and by 1962 four of the nine native apprentices at Bulolo were in their last year of training. With some of the best-equipped workshops in New Guinea BGD is perfectly designed for apprenticeship. The principle of European replacement, consistent with the maintenance of standards, has recently been accepted.

Conditions for apprentices detailed in the 1955 regulations automatically give them a higher status than natives employed under the Native Labour Ordinance. A new 'compound' was created for the housing of apprentices. Apprentices have to be accommodated individually in cabins measuring at least ten feet by ten feet. BGD made these cabins bright and attractive; and the statutory equipment (including a reading lamp, book-shelf, and other features) is regularly inspected and maintained. Every six months employers must report on the progress of their apprentices, who must go to Port Moresby for a month at a time for 'block training' courses. Wage rates for apprentices are considerably higher than those for other native workers. This results in a situation quite different from that in Australia, where apprentices are paid at rates well below the adult basic wage.

One of the major difficulties in expanding the apprenticeship system is the poverty of basic education amongst the native population. A qualification of Standard VII (a very modest primary education) is usual, and this necessitates teaching elementary English and arithmetic before proper technical studies can begin. This 'pre-apprenticeship' training involves much time. By the 1960s the number of openings for apprentices exceeded the supply of qualified applicants. One factor was the growth in employment opportunities open to natives with some education, another was the refusal of the Administration to fix wage rates for trained native tradesmen: an apprentice on graduation can find himself worse off financially in employment than during the last year or two of his 'time'.

Criticisms of the number of Europeans still employed at Bulolo often overlook the difficulties facing both management and native recruits. It is difficult for an industrial company to take steps to overcome educational obstacles for which the Administration is responsible. One unfortunate aspect of the apprenticeship system has been the division between Europeans and natives. Recruits were accepted at two grades, for two classes of training; inevitably European boys had a great advantage in basic education, and they did not require the degree of 'protection' which is extended to the natives. In this way a gulf was created; though at the time of writing the Administration was proposing to remove the word 'Native' from the Native Apprenticeship Ordinance and bring all trainees under the one piece of legislation. Clearly the real application of this will depend not only on good will but also on a rapid improvement in native educational standards.

This division, however, reflects a deep-seated and fairly thorough segregation at Bulolo. Where educated Europeans and their families, requiring houses and amenities, are brought together with illiterate labourers living in a compound and unused to civilised conditions, segregation automatically occurs. It is perhaps unfortunate that natives were not advanced earlier in the company, so that a better base for relations could have been made practicable. Europeans and natives work together, it is true, but the latter are invariably subordinate (this is beginning to break down in the plywood factory); however, they live and take their leisure quite separately, and natives even buy their goods through hatches at the stores, while Europeans are served inside.

One major blow against segregation was struck in November 1962 when natives were allowed to drink alcoholic liquor, and Europeans and natives stood together for the first time at the hotel bar in Bulolo. The training of local tradesmen and the breaking down of barriers between the races give good promise in the future of a stable, harmonious, and productive community, with BGD capital and skills continuing to contribute to the economic development of New Guinea.

Appendix

A note on profits

Many have deprecated the mineral exploitation of underdeveloped areas by private interests. Hancock (1943:101) stated that the era of immense private mining profits had passed away, and should never again be permitted.

This is a post hoc argument, and the retrospective implications are not clear. It is true that in the period 1932-42 BGD made an operating profit of \$32,281,602, with regular annual dividends to shareholders of \$3 per \$5 share. There was, however, no foreknowledge of such a profit, and Placer had had to gamble funds even for investigation at a particularly critical period. BGD had had to hold out high promises to potential shareholders to raise the working capital, for mining is inherently risky, and people never invest in it without the hope of substantial rewards. And if a mining venture turns out to be a bonanza, as did Bulolo, should a government limit the profits of those who took the chance? To do so would make investors cautious of such investments.

Had this situation not existed, New Guinea gold could have been developed only through massive public investment. But could any government justify the risk?

Granted the special nature of mining, there is nothing sinister about the use of private capital in undeveloped areas. The moral overtones derive from Marxism-Leninism, and from the early work of economists like Hobson, who saw the export of 'surplus' capital as the driving force behind 'imperialism'. This has been conclusively refuted (see Brown 1963) and it is now realised that a greatly increased inflow of private capital to such areas is necessary. The result can be seen in the fact, already noted, that BGD contributed almost 20 per cent to New Guinea's revenue over the pre-war years.

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1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the problem and the objectives of the research. The second part of the report is a detailed description of the methods used in the study. This includes a description of the experimental design, the subjects involved, and the procedures used to collect and analyze the data. The third part of the report is a discussion of the results of the study. This includes a description of the findings and an interpretation of their meaning. The final part of the report is a conclusion that summarizes the main points of the study and provides recommendations for future research.