

## **John and Rudolph Agnew and their contribution to the Australian mining sector**

By ROBERT PORTER

Key words: Mining engineers; City of London; Bewick Moreing; Collins House Group.

**J**ohn A. Agnew (1872–1939) and his son Rudolph (Dolph) J. Agnew (1896–1960) were both mining engineers and held senior positions within the British mining-finance house founded by Cecil Rhodes and Charles Rudd – The Consolidated Gold Fields of South Africa.<sup>1</sup> They worked for periods in Western Australia and made a major contribution to the development and operation of various gold mining interests from the mid-1920s, as well as broader investments in the mining industry in Australia and New Guinea. Their activities were a precursor to the formation in 1960 by Consolidated Gold Fields of a major company in the Australian mining sector, Consolidated Gold Fields Australia, which later became Renison Goldfields Consolidated. These entities developed interests in a range of Australian companies including The Mount Lyell Mining and Railway Company, Renison, Associated Minerals Consolidated and Mount Goldsworthy.

### **John Agnew**

John Agnew was a highly influential individual. At his death in 1939, he was described as having a ‘technical brilliance in engineering and a flair for finance’ and was viewed as a ‘dominant figure in the goldmining industry’.<sup>2</sup> Herbert Hoover, the former United States’ president, engineering colleague and life-long friend said that the ‘British Commonwealth had lost its most eminent mining engineer’.<sup>3</sup> While a major part of John Agnew’s career encompassed the broader responsibilities as chairman of The Consolidated Gold Fields of South Africa and its major gold mining interests in the Rand and Transvaal, as well as broader international interests, Agnew played a direct role in the involvement of the British mining-finance house’s investment in Australia, which included the revitalisation of the Western Australian gold sector in the late 1920s and 1930s.

Agnew was widely respected for his professional capabilities, experience, leadership qualities and capacity for work.<sup>4</sup> He developed close relationships with leading mining and finance men in the City of London, including stock broker Francis Govett; W.S. Robinson and his stock broker brother, Lionel Robinson; Western Australian mining entrepreneur Claude Albo de Bernales; and members of what became known as the Collins House Group of companies. Under his influence, Gold Fields in London established a major shareholding in the two largest gold producers in Western Australia in the 1930s, Wiluna and Lake View and Star. He was responsible for Gold Fields making a contribution, both technical and financial, to the formation of several Collins House group companies, not least Western Mining Corporation.

His son Dolph worked in Australian companies formed by his father and applied his own expertise to the development and operation of several Australian gold mining ventures, including Lake View and Star, the Moonlight Wiluna group of mines and Mount Ida gold mine, as well as playing a role in broader mining industry affairs. Dolph would serve in the role as general manager of a London-listed company, Gold Fields Australian Development Company, established to advance the British company's involvement in Australian mining from the early 1930s.

The Agnew family lineage in mining continued with Dolph's son, Rudolph (later Sir Rudolph). He was born in Perth and worked in Western Australia in the 1960s on the Mount Goldsworthy iron ore project and became chief executive officer and chairman of Consolidated Gold Fields from 1978 to 1989.

### **Early Years in Western Australia**

John Agnew was born in New Zealand in 1872, the son of Irish immigrants.<sup>5</sup> After studying and obtaining a mine managers' certificate at the Thames School of Mines, he worked initially as mine manager at the Victoria Gold Mining Company in the Thames gold fields, New Zealand, before travelling to Western Australia.<sup>6</sup> In 1898 Herbert Hoover, a young American mining engineer, appointed Agnew, aged twenty-six, to Bewick Moreing. The British mining engineering consultancy had had a presence in Western Australia since 1893 and in the first decade of the twentieth century managed twenty mines, which accounted for nearly three quarters of the gold produced in the state.<sup>7</sup> Agnew took charge of the underground mining operations of the Sons of Gwalia gold mine from 1898, the first of several mines at which he worked for Bewick Moreing. The others included the Golden Age Mine, the Lake View and Star mine and the Lancefield gold mine near Laverton.<sup>8</sup>

**Figure 1:** *Herbert Hoover, mining engineer (2<sup>nd</sup> left) and John Agnew (4<sup>th</sup> right) as employees of Bewick Moreing, Western Australia.*



Source: Herbert Hoover Presidential Library and Archives.

Agnew accompanied Hoover to China in 1899 to evaluate mining opportunities as part of Hoover's role as engineer in charge of the newly established Chinese Department of Mines. Mrs Hoover accompanied her husband and at one stage was installed in a settlement for foreigners near Tientsin which was surrounded by members of the Boxer Rebellion. The settlement came under prolonged bombardment from the Chinese Army and both the Hoovers and Agnew were fortunate not to lose their lives.<sup>9</sup> Agnew developed a warmth of appreciation for both of the Hoovers, viewing Mrs Hoover as 'the finest woman he had ever known'.<sup>10</sup> Of Herbert Hoover, Agnew was to say that Hoover had given him the chance to make his career while, at his death, it was recorded that Hoover's name was the last one Agnew mentioned.<sup>11</sup>

In 1900, Agnew returned to Western Australia and had responsibility for series of mines, including the Golden Age Mine at Wiluna, East Murchison United, Vivien Gold Mine near Leinster and Lancefield Gold Mine at Laverton. He was involved in the management of Bewick Moreing's agency and exploration company, London & Western Australia Exploration Co and its successor, London, Australian & General Exploration Co. Agnew was appointed assistant general manager of Bewick Moreing's Western Australian activities and, in 1912, general manager, located at Kalgoorlie.<sup>12</sup> He travelled widely in the state, providing management and technical oversight for the operations that came under the firm's control, and evaluating new mining investments. Agnew and Hoover developed a close professional and personal relationship. They maintained a correspondence after Hoover had left the employ of Bewick Moreing in 1908, and had established his own consultancy in London.

In 1913 W.J. Loring, who managed the firm's overall interests from Melbourne, wrote to the London office. The correspondence referred to Agnew and noted that he had been running the firm's Western Australian business for a number of years and during that time had done a great deal of hard work with the consequence that he was 'completely run down in health'.<sup>13</sup> The letter went on to state: 'A month ago he was stricken down by pneumonia, and I am told by his Medical Adviser that if it had been double pneumonia, he would have had a very bad time in getting right again...'<sup>14</sup> The view was that he required an extended holiday, and Agnew himself was keen to travel to England. Reflecting the fact that the relationship between Bewick Moreing and Hoover was still strained by legal claims, associated with Hoover's consulting activities after he left the firm, the correspondence remarked upon a letter of June 1912 from Hoover to Agnew. The contents had been communicated to Loring in Perth by Agnew's private secretary, who had been dismissed by Agnew. Loring wrote:

In my opinion, while there may be some reason to suspect a bit of collusion between a certain gentleman in London and J.A.A. [John A. Agnew] I do not for one moment think there is any reason for us to take any drastic stand in the matter.<sup>15</sup>

Agnew denied any knowledge of the letter, and Loring himself wrote: 'You can quite understand the high regard which Agnew had had for H.C.H [Herbert C. Hoover]...At the same time this regard has been so great that, more likely, the man on

this side has been misled to some extent, especially during the time that certain troubles were going on in London'.<sup>16</sup> A later note recorded:

In 1912 Mr. Agnew began to cause the firm a great deal of trouble in Western Australia. He stated, like Mr. Hoover, that he was very ill, and that he could not continue to carry on the business, he became very irritable, and did the firm considerable harm...However, as the firm knew him to be a very able man, and not suspecting any treachery, they did their best to persuade him to remain.<sup>17</sup>

Agnew had become disenchanted with his employer, based on the level of direction from London and his lack of confidence in Loring's management and technical abilities. After withdrawing an earlier letter of resignation, Agnew resigned in 1912.<sup>18</sup>

### **Joins Herbert Hoover in London**

After a short stay in New Zealand, Agnew joined Hoover in London, with his name appearing on the door of Hoover's office, 1 London Wall Buildings. The office was the registered office of companies of which Hoover had assisted in the formation, or in which he held an investment. By 1914, Hoover was the director of eighteen mining and financing companies, many with cross shareholdings and with the involvement of former colleagues and associates. Agnew served on technical committees and as a director of a number of these companies, some of which featured in subsequent Gold Fields' investments in Australia.

When Hoover moved from mining engineer and company promoter to war time services and oversight of the provision of food aid to Belgium, Agnew took over the management of many of Hoover's business interests. Hoover transferred a number of directorships and engineering consulting responsibilities to his trusted associate and nominated Agnew as the person to take responsibility for dealing with his household effects in London.<sup>19</sup> In July of 1914 Hoover formalised the arrangements writing:

You are to give entire time and service to the conduct of my business; to undertake such professional work as I may direct, to act as Director or Engineer or Member of Technical Committee of such corporations as I may procure your appointment to...I agree to give you a participation on the ground-floor in any mining business which I may take up...<sup>20</sup>

According to Sir Rudolph Agnew's recollections, his grandfather persuaded Hoover not to sell his share investments, but allow him to manage them on his behalf, with some later sold at a more propitious time financially and at an enhanced profit. Hoover provided Agnew with a part of the profit from the sale of these shares.<sup>21</sup>

Agnew succeeded Hoover on a number of boards of companies, travelled internationally in evaluating mining properties and developed a reputation as a leading mining engineer. His reputation for commercial acumen and technical competence, mining and processing experience, was broadened by associations with leading mining men in the United Kingdom, United States, Australia and in other countries. Agnew developed a breadth of connections, mining company involvement and knowledge of

investment opportunities that would prove invaluable to subsequent investments by Gold Fields in Australia.

In 1919, National Mining Corporation was established. The company was formed by several United Kingdom mining houses to organise British capital for mining and metallurgical processing ventures internationally. The founders included New Consolidated Gold Fields, Mexican Corporation and Chemical and Metallurgical Corporation. Govett became a director. The chairman of the company, F.W. Baker, was also chairman of Camp Bird and Santa Gertrudis, two companies that Hoover had rescued from financial demise and for which Agnew served as a technical adviser. Baker had an involvement in the promotion of gold mines, including in Western Australia, during the 1890s.<sup>22</sup> He would play an influential role in the investment in the Lake George lead and zinc mine at Captains Flat, New South Wales, a Gold Fields investment from the 1930s.

### **Agnew Joins the Board of Gold Fields**

Agnew served as a director of the National Mining Corporation. His technical and commercial abilities, as well as directorships of companies in which Gold Fields held an interest – including Burma Corporation, Oroville Dredging and Camp Bird – meant that he was well known to the directors of Gold Fields. In 1922 Agnew was appointed a director of The Consolidated Gold Fields of South Africa and its associated company, New Consolidated Gold Fields, becoming in 1933, the first mining engineer to be appointed as chairman. As one writer of the period observed, Agnew's appointment meant that: 'The age of the amiable amateurs, the aristocrats and cricketers was fading... [and] the era of the chairman-engineer was beginning'.<sup>23</sup>

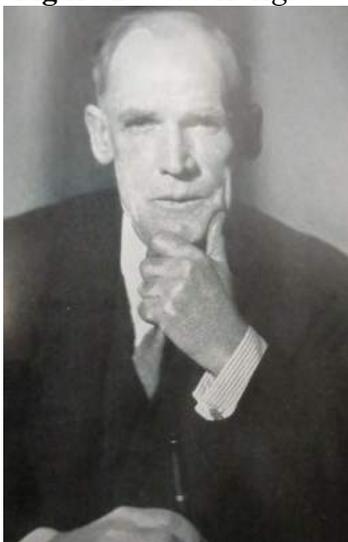
Agnew's experience meant that he was influential in Gold Fields' investments in Australia, and would bring his wide-ranging technical expertise, and the experience he had acquired in observing Hoover's ruthless efficiency, applied to Bewick Moreing controlled mining operations in Western Australia. Agnew also benefitted Bewick Moreing with his knowledge of work conducted on technologies for processing complex ores, his extensive contacts, including drawing upon a deep pool of professional mining engineers – many American – for the identification and pursuit of investments in gold mining and base metals in Australia.

Gold Fields was involved in the two largest producing gold fields in Western Australia in the 1930s and 1940s, Wiluna and Lake View and Star. Through the provision of capital and technical capabilities, Gold Fields played a pivotal role in the resurgence of gold mining in the state, particularly in the mining of sulphide ores. The company's investment in both mines was made from London, and in 1932 a London listed company, Gold Fields Australian Development Company, was formed. Its main purpose was to pursue the development of refractory gold deposits near the original Wiluna operation, including the Moonlight Wiluna mine, but also to establish the basis for broader investments in the Australian mining sector. Agnew was the initial chairman and Dolph served on the board, as well as acting as general manager of its operations in Australia.

### Wiluna and Lake View and Star

Gold Fields' first investment in Australia was in the Wiluna Gold Mine, which held leases at Wiluna 530 kilometres north of Kalgoorlie and 1,100 kilometres north-east of Perth. The investment was made through Wiluna Gold Corporation, listed on the London Stock Exchange in 1926. Gold Fields' involvement in Wiluna was directly facilitated by Claude Albo de Bernales, described as superbly elegant, impressive, articulate and a consummate salesman, who cultivated links with financiers, especially in London, for his numerous mining ventures in Western Australia.<sup>24</sup> While de Bernales would later be 'scorned in England' with the Stock Exchange of London delisting his companies and Scotland Yard investigating his activities, he was influential in opening up gold mines, considered marginal, by securing British financing.<sup>25</sup> In the case of the investments undertaken by Gold Fields and introduced to it by de Bernales, they were largely financially successful, aided by the metallurgical and mining knowledge of Agnew and his colleagues.

**Figure 2:** John A. Agnew



*Source:* Courtesy, Delia Buchan, daughter of R.J. Agnew.

The original mining at Wiluna had created two open cut pits from which oxidised ore had been extracted for over twenty years into the first decade of the twentieth century. While this ore had been largely exhausted, there remained large quantities of ores compounded with sulphides. It was recognised that Wiluna possessed one of the largest resources of low grade ores in the state, with the ore bodies characterised as 'where isolation greatly compounded formidable problems with metallurgical chemistry'.<sup>26</sup> The challenges related not only to the effective means for recovery of gold from the sulphide ores, but also in the isolation of Wiluna, located 160 kilometres from the nearest railway connection. The depletion of local wood supplies within a 12-mile radius, exhausted by earlier mining activity, was also an impediment to shaft mining at depth.

Agnew had a familiarity with the deposits of the area, as from 1902 to 1904, he managed the Golden Age Consolidated Mine which, while a separate ore body, adjoined the Wiluna property. In 1909, while working for Bewick Moreing, an option was taken over a group of deposits, known as Bulletin, located on the east lode of Wiluna. A shaft was sunk to 250 feet and a gold bearing lode observed, while the Happy Jack deposit was also developed to a depth of 90 feet. However, the refractory nature of the ore meant that no further work was undertaken. As Agnew recalled in 1928, it was largely 'on account of the difficulty then apprehended in the treatment of this ore that the company was prompted to abandon the option on the Bulletin group'.<sup>27</sup>

Gold Fields held initial reservations about investing in the Western Australian gold industry. This hesitancy was associated with concerns with the difficult labour situation, as well as various scandals associated with the promotion of speculative or bogus mining ventures in the state. These reservations were overcome through Gold

Fields own evaluation, as well undertakings obtained by its associates from the Western Australian Government, to commit to build a railway line from Meekatharra to the site of the Wiluna mine, a distance of 110 miles.<sup>28</sup> This provided Gold Fields with the confidence to take an initial stake, viewing the potential of the Wiluna deposit and its northern extensions, as well as other mineralisation in the area, as sufficient to justify its investment.<sup>29</sup>

Wiluna Gold Corporation was the first of de Bernales' major gold company flotations in London. The Stock Exchange listing was associated with Gold Fields taking a major shareholding and Agnew becoming a director and, from 1934, the chairman of the company. The *Kalgoorlie Miner* recorded the initial investment of Gold Fields, describing it as 'the powerful company operating in South Africa' with its interest in Wiluna associated with the activities of John Agnew who had 'for years [been] professionally associated with mining enterprises in Western Australia'.<sup>30</sup>

The ore at Wiluna required a complex method of processing with experimental work undertaken to enhance the process. At both Wiluna and Gold Fields' other main gold mining interest in Western Australia, Lake View and Star, oil flotation was employed after crushing to separate the gold, followed by a process of roasting and cyaniding. The most appropriate form of flotation was an area of intense technical review and experimentation involving Agnew and his colleagues. These included the American mining engineer, H.E. (Herbert) Vail, a former Bewick Moreing employee who would become manager of Lake View and Star, a mine which had to tackle similar, although not as severe recovery issues. Wiluna commenced the operation of a flotation pilot plant in 1927 (Fig. 3), while Lake View and Star installed a commercial flotation plant in 1930.

**Figure 3:** Oil flotation, Wiluna Gold Mine, Wiluna.



Source: State Library of Western Australia.

Despite the technical challenges, Wiluna proved an excellent investment. In the first four and a half years of production, gold to the value of £3.5 million was extracted, with some of the most modern mining methods aiding recoveries and unit costs.<sup>31</sup>

In 1928, through the influence of Agnew, Gold Fields acquired an interest in Lake View and Star, located in the Boulder end of the Kalgoorlie gold fields. Lake View and Star was registered in London in 1910 to acquire the assets of Lake View Consols and Hannan's Star Consolidated. Described at the time as 'one of those meteoric mines, whose occasional flashes dazzle, but whose re-appearance, like the comet is a matter of conjecture', it was uncertain whether what had been 'a wonderful mine' had a life in front of it.<sup>32</sup> Govett had acquired an interest in the company and assumed the chairmanship in 1902. He had met Hoover while travelling to Australia to inspect the mine and subsequently employed Bewick Moreing, and Hoover in his capacity at the firm, for the operation of the mine.<sup>33</sup> Hoover served as a director of Lake View and Star in 1911 and 1912. Through his association with Hoover Agnew became involved with the mine's initial redevelopment. He sufficiently impressed Govett, who referred to the young mining engineer as 'the chief at Kalgoorlie' and a man 'universally respected'.<sup>34</sup> In 1929, Agnew became chairman of Lake View and Star and by 1931 Consolidated Gold Fields was the largest investor, providing technical assistance and loan funds for the mine's expansion.

**Figure 4:** *Lake View and Star mining and milling operations.*



Source: State Library of Western Australia.

The operations at Lake View and Star were transformed under Agnew's influence, and later under the management of Dolph. Agnew drew upon the capabilities of Vail, an American consulting mining engineer.<sup>35</sup> He also recruited another American mining engineer, Joseph Franklin Thorn, who became general manager in 1929 and remained in the role for twenty years until 1950, with a record of impressive achievement.<sup>36</sup> He was succeeded by Dolph Agnew. The improvement in the performance of Lake View and

Star was achieved by a combination of acquiring nearby mines and leases, deeper workings, the implementation of modern mining methods and investment in new plant, as well as the processing of tailings. The mine developed by repeated expansions, which made it possible to extend operations into new ground, as well as through continual technical advancements, including the decision to construct a central treatment plant and standardise operations. The application of modern techniques for drilling, the establishment of the mine's own power source, the transportation of ore by electric locomotives, the installation of electric shaft winders and the adoption of modern processing techniques, were all part of the measures adopted.<sup>37</sup> In turn, they led Lake View and Star to be one of the most modern and efficient gold operations in Western Australia.

Agnew and Thorn's efforts were such that in 1932 Lake View and Star was producing at ten times the 1924 level. By 1930, it was the largest gold producing operation in the state. According to a 1934 report on gold mining in Australia, of the operating mines on the Golden Mile, Lake View and Star 'is by far the greatest and best equipped', comprising thirty-seven gold mining leases and six tailings blocks, over an area of 626 acres.<sup>38</sup> In 1939, the year of Agnew's death, Lake View and Star generated a profit of GBP£526,459.<sup>39</sup> At its fiftieth year anniversary in 1960, Lake View and Star remained the largest gold producer in Western Australia and Gold Fields' most successful investment in Australia.<sup>40</sup>

Consolidated Gold Fields had established a commanding position in the Western Australian gold mining sector. While Lake View and Star was the major gold producer in the 1930s, the development of Wiluna and the technical advances applied led one commentator to observe that '...Wiluna must be ranked as second only to Kalgoorlie's Golden Mile among Australia's goldfields'.<sup>41</sup> In the 1934 financial year Lake View and Star produced over £1.2 million worth of gold and Wiluna over £1 million. Profitability was impressive, with Wiluna generating a profit of GBP£615,283 and Lake View and Star, GBP£573,097.<sup>42</sup> The share price performance of its investments on the London Stock Exchange was equally impressive:

Wiluna Gold Corporation...enjoyed very handsome rises, from a low of 19/- in 1929. By 1931, reflecting shortages and fears of the mine's future, the shares were down to 8/3 but it was only a temporary drop and those that bought them did well. Three years later Wiluna shares climbed to more than ten times that...It became WA's biggest goldfield after Kalgoorlie.<sup>43</sup>

### **Involvement with the Collins House Group of Companies**

In 1930 Gold Mines of Australia was established in London at the initiative of W.S. Robinson in conjunction with his brother's stock broking firm, Lionel Robinson, Clark & Co. The syndicate that formed the company included The Zinc Corporation, of which Govett was a director. New Consolidated Gold Fields held a major interest. Gold Mines of Australia was designed to undertake large scale exploration for gold and facilitate potential mine developments in Australia. It was one of the principal companies, along

with Gold Exploration and Finance Company of Australia, that pursued multiple investments in mining ventures across Australia.

Gold Mines of Australia's initial interests included options related to the Mount Coolon Gold Mine in Queensland, in which Gold Fields was entitled to a one third interest; Mount Triton Gold Mine, Western Australia; as well as the evaluation of gold opportunities associated with the Berry Leads alluvial system near Ballarat in Victoria. To accommodate the spread of potential activities, a new company, Western Mining Corporation was incorporated in London in 1933. Robinson was again influential in garnering both technical and financial resources, with the shareholding in London including New Consolidated Goldfields, its associate Camp Bird, as well as two South African gold mining companies. North Broken Hill and Broken Hill South were the major Australian shareholders.

Given Consolidated Gold Field's intentions to expand its presence in Australia, and the connections with W.S. Robinson, it was an ideal venture in which to become involved.<sup>44</sup> In 1932 and 1933, the principal shareholders of Gold Mines of Australia were New Consolidated Gold Fields, as well as company in which Gold Fields had an interest, Camp Bird.<sup>45</sup> Gold Fields acted not only as a financier but also played an active role in reviewing mining prospects. As such, New Consolidated Gold Fields, with Agnew as the key individual, was ideally placed to take advantage of broader associations in Australia for the pursuit of its mining interests in the country. Gold Fields had established itself in an extraordinary position in relation to a number of companies that had the opportunity and capability to identify mining prospects across Australia.

The intention was for Gold Mines of Australia to manage all interests in eastern Australia, while Western Mining Corporation would manage Western Australian interests. Agnew was on the London Advisory Committee of Western Mining Corporation. To manage the financing of the two companies, Gold Exploration and Finance Company of Australia was incorporated in June 1934, which in turn had a controlling interest in Western Mining Corporation. New Consolidated Goldfields had an initial 22 per cent shareholding in Gold exploration and Finance Company, with both Agnew and his Gold Fields' colleague, Robert Annan, as directors. Agnew assumed the chairmanship of the board at the company's fourth board meeting, in August 1934.<sup>46</sup>

Two main methods exploration were adopted: aerial photographic surveys, and a focus on the evaluation of Precambrian geology. Even here, Gold Fields was influential, with Annan and Agnew suggesting the introduction of aerial photographic surveys across the eastern goldfields of Western Australia. This was a technique that New Consolidated Gold Fields had used successfully in its geological evaluation of the Witwatersrand of South Africa in the early 1930s,<sup>47</sup> and Agnew remained an advocate of aerial surveys of mineral depositions throughout his career.

Apart from its controlling interest in Western Mining Corporation and Gold Mines of Kalgoorlie, Gold Exploration and Finance Company had shareholdings in a range of other mines while Agnew was on the board.<sup>48</sup> The association with Gold Fields was of importance for the future plans of this Collins House sponsored group of companies. Colin Fraser, the chairman of Western Mining Corporation, referred in 1934

to the assistance provided ‘particularly by our friends connected with the management of Lake View and Star and Wiluna, the Goldfields Australian Development Co...’.<sup>49</sup> In the case of Gold Mines of Kalgoorlie, Lake View and Star provided exploration and technical resources, while a mill on the company’s Associated leases was made available for treatment of oxidised and semi-oxidised ores by Gold Mines of Kalgoorlie. Ore bodies close to those of Gold Mines of Kalgoorlie also presented the opportunity for joint development.<sup>50</sup>

However, Gold Fields’ motivations and those of the other parties began to diverge, the divergence being hastened by the presence of the other South African mining houses. As early as 1934, consideration was given at board level to inviting Johannesburg Consolidated Investment Company to participate in the affairs of the company. Central Mining and Investment Corporation, the largest gold producer in South Africa, and Union Corporation, were introduced to the consortium by Robinson when he sought to expand the focus of Gold Mines of Australia from eastern Australia to Western Australia. Agnew, through his knowledge and that of his mining colleagues in Western Australia, believed that Gold Fields had the best insights into the mineral potential in the state. There was little appetite to share this knowledge with South African competitors nor to do so in a company that had been established to progress interests outside of Western Australia.

Clark believed Gold Fields’ motivation was to seek to confine Gold Mines of Australia’s exploration activities to eastern Australia and have the affairs of the company managed from London by Gold Fields itself. The divergence of interests further increased after Gold Fields established its own exploration and investment vehicle, Gold Fields Australian Development Company, in 1932, although this did reflect the then co-operative arrangements with the W.S. Robinson companies. Lionel Robinson was an initial director, with Clive Baillieu, a director of Zinc Corporation, as his alternate.

Gold Fields severed its relations with the Australian group and its shareholdings in the three companies over the period to 1936, and in early 1935, Agnew resigned as a director of Gold Exploration and Finance Company.<sup>51</sup> The respect in which Agnew was held was manifest by the warm ‘acknowledgement of the Board’s indebtedness to Mr. Agnew for the valuable counsel which he had always made so readily available’, while Agnew volunteered his continuing ‘advice and opinions... at the disposal of the Directors on any matter...’.<sup>52</sup> He was replaced by Annan, who resigned as a director a year later in February 1936. The severing of relations with the expansive mining and secondary processing interests of the Collins House Group of companies may well have truncated opportunities for Gold Fields, particularly outside of Western Australia.

### **Lake George Mine, Captains Flat, New South Wales**

Through the activities of companies associated with The Consolidated Gold Fields in South Africa, including a number in which Agnew was involved due to his association with Hoover, involvement was secured in a lead-zinc mine in New South Wales. The Lake George mine was located at Captains Flat (Fig. 5), 65 kilometres south-east of

Canberra in the Australian Capital Territory and 37 kilometres from the town of Bungendore in New South Wales, from where a railway connection was established in 1939. First worked for gold from 1882, it was discovered that the oxidised ore was underlain by copper-bearing ore. Mining was undertaken for copper, lead, silver and gold from 1889 to 1899 when the mine was closed.

**Figure 5:** *Lake George mine, Captains Flat, New South Wales.*



Source: National Archives of Australia.

The redevelopment of Lake George in the 1920s and 1930s was the result of the interaction of a number of the companies established in London, in some of which Agnew played a direct role. The mine came to the attention of a group of London mining engineers and financing companies, the attraction being its large ore reserves of lead and zinc, with the zinc content being of a high quality. The mine was considered second only to that of Mount Isa in terms of its lead content, while the high pyritic content of the deposit was viewed as a major source of sulphur production, capable of being made into sulphuric acid for the production of super phosphate at a level considered sufficient to exceed the entire consumption in New South Wales.<sup>53</sup>

The interest came at a time when the United Kingdom, after its experience in the First World War, felt a need to assemble technical and financial interests to promote and have access to large base metals deposits. The challenge of processing complex ores was also being tackled at a variety of mines, not least in Australia, with advances in

flotation techniques providing greater confidence that sulphide deposits at depth could be brought into commercial production and be profitable.

In 1925, a London company, National Metal & Chemical Bank, which had been formed in 1918 by an Australian born banker, Richard Tilden Smith, entered into a contract with Australian mining engineer, Leslie Vickery Waterhouse, to report upon the mining properties at Lake George. The National Metal & Chemical Bank had an interest in acquiring an involvement in iron ore, coal and non-ferrous metal opportunities, and with a specific interest in the potential to manufacture superphosphate.<sup>54</sup> Tilden Smith had an association with Hoover and some of his investments, including The Burma Corporation, where he was a shareholder and director. The Burma Corporation was involved in the development of an experimental plant in England to test the complex ores of the Burma mining operation. Zinc Corporation, of which Govett was chairman, had an involvement in this work for its Broken Hill mine and was a major shareholder in The Burma Corporation.

The National Metal & Chemical Bank granted an option to the National Mining Corporation to undertake further development work. On the National Mining Corporation board Agnew served as both a director and member of the technical committee, responsible for examining many mines for potential investment. An experienced mining engineer, F.L. Thomas, was sent to Captain's Flat on behalf of National Mining Corporation to continue the evaluation and to plan development work, as well as undertake development and diamond drilling to improve delineation of reserves. In 1926 samples of the complex sulphide ores containing, lead, zinc, copper and some silver and gold were sent to England for evaluation.

Camp Bird also retained an option on a sub-lease that it exercised in 1927, while in 1929, a co-operative business arrangement occurred between Camp Bird and New Consolidated Gold Fields, with Gold Fields represented, through Agnew, on the board. In turn, New Consolidated Gold Fields offered Camp Bird the opportunity to become involved in any ventures it identified. By this stage Camp Bird held a 75 per cent interest in Lake George Metal Corporation. Drilling and development efforts had resulted in potential reserves that could exceed one million tons of lead, zinc, copper and silver, with iron in a marketable form as sulphide ore planned to be used for the manufacture of super phosphate. Metallurgical research work continued in England, while the plans for the plant at the Lake George mine described as likely to represent 'the most modern structure in the southern hemisphere'.<sup>55</sup>

Through Agnew's network of contacts and the companies associated with National Mining Corporation, a range of specialist personnel were deployed to Lake George for the evaluation of the deposit and the complex process required for the separation of the metals from the pyritic ores. Hugh Rose, a mining engineer associated with the Santa Gertrudis mine in Mexico, as well as Thomas Baker, travelled to Captains Flat for the planning of mining and milling activities, including overseeing the construction of a pilot plant.<sup>56</sup> Baker, an American who was associated with the Mexican Corporation, which operated a mine that had to contend with similar issues associated with the treatment of sulfide ores, was responsible for the mine's commencement. He became managing director and chairman of Lake George Mines.

Sibley McCluskey, a metallurgical engineer who had consulted to Fresnillo, another company in which Gold Fields had a shareholding, was also sent to Lake George while Tom Owen, who had worked on flotation techniques at the Broken Hill mines, was appointed mine manager. Owen worked assiduously during the period from 1924 through to the early 1930s on the metallurgical challenges associated with the Lake George ore body, with separation issues to the forefront. In this regard, he called on the technical expertise not only of his own colleagues within the Consolidated Gold Fields group but also that of Sir Herbert William Gepp, a noted mining metallurgist with a long career, which included general manager of the Electrolytic Zinc Co. of Australasia.<sup>57</sup>

Arnold Harris, the mill superintendent at Wiluna, was responsible for the flotation plant equipment at Lake George, while a fellow American, Herbert C. Wilkins, who had worked as underground manager at Wiluna, became underground mine superintendent at Lake George. Yet another American, Charles Prior, the general manager of Wiluna, assisted in the introduction of battery powered locomotives for underground ore transportation - it was a formidable array of technical experience. According to one contemporary observer, the mine's plant would involve expenditure of £400,000 with the new plant expected 'the last word in mining and milling'.<sup>58</sup>

Lake George Mining Corporation was incorporated in September 1930, its registered office that of The Consolidated Gold Fields of South Africa at 49 Moorgate, London. In the context of the prevailing price of lead and zinc, the mine remained closed during the early 1930s, with experimental work, including a pilot plant, focussing on the recovery of the pyritic concentrate. Lake George's metallurgist, McCluskey, spent time at Wiluna assisting the mine manager, Vail, in the design of the flotation section of the Wiluna mine, as well as that at Lake View and Star.<sup>59</sup> Mining operations commenced in 1937 and milling operations in January of 1939. The operation gained from the input of Harris, who had worked as a superintendent of the Wiluna gold mine, while the extensive technical resources of various arms of the Gold Fields group were drawn upon. Mining was conducted at Lake George from 1937 to 1962.

### **Gold Mining in New Guinea**

Concurrent with its investments in Australian gold companies, Gold Fields also pursued gold interests in the Territory of New Guinea, where Australian civil administration was established under a League of Nations trusteeship in 1921 after German occupation. Prospecting and minor gold mining activity had been undertaken by Australians in New Guinea since the early 1920s.<sup>60</sup> In the Morobe district on the northern coast of the country, the topography is noted for the rugged and mountainous terrain, with a number of valleys including the Wau and Bulolo. The Edie, Koranga and Wau creeks flow into the Bulolo River, which courses down a wide gorge. The alluvial gold deposits in the Morobe district, near the Bulolo River had come to the attention of Cecil John Levien, a district officer with the Australian administration.<sup>61</sup> In 1928, Placer Development, a British Columbia company, sent a mining engineer and his assistant to New Guinea to

evaluate the lower Bulolo leases of an Adelaide company, Guinea Gold. Gold Fields had an involvement in alluvial mining which began when it took an interest in the Oroville and Yuba gold dredging companies in California in 1909, and then a prospecting partnership with Placer Development in the 1920s.<sup>62</sup> Placer's evaluation determined the existence of payable gold leases which extended into leases held by Guinea Gold. Some of the company's leases were sold to Placer and a new company, Bulolo Gold Dredging, was established in 1930 as a Canadian incorporated company.

Two arms of Gold Fields, including The Gold Fields American Development Company, purchased shares in Bulolo Gold Dredging and in doing so contributed a large part of the capital necessary for development work to commence. They also acquired shares in Placer Development which, in turn, had a 22 per cent interest in Bulolo Gold Dredging. In 1932, Placer issued shares to assist with the funding for two dredges with Oroville Dredging Company acquiring the majority of these shares. Oroville was considered one of the world's most successful gold dredging companies and was involved with Placer in gold dredging activities in Colombia.<sup>63</sup> Gold Fields held a substantial interest in Oroville and, as such, gained a further involvement in the Bulolo fields.

**Figure 6:** *Bulolo gold dredge 3. One of several dredges used on the Bulolo gold fields, New Guinea.*



Source: State Library of South Australia.

Leases were also secured in the upper Bulolo and Edie Creek areas from Guinea Gold by a company established by Mount Isa chairman, Lesley Urquhart. A new company, New Guinea Goldfields, was subsequently listed in Sydney, and Gold Fields also established a shareholding in this company. New Guinea Goldfields developed its deposits using a mining approach which entailed alluvial recovery of gold as well as shaft mining of reefs at depth.

Gold Fields thus established a significant presence in the gold mining activities in New Guinea through a shareholding in the two main companies involved in the

Morobe district. A later form of the company would acquire New Guinea Goldfields, while in the 1980s, in partnership with Placer and Mount Isa Mines, Renison Goldfields Consolidated would be involved in the development of the Porgera gold mine.

### John Agnew's Death

In 1939, John Agnew died in California at the age of 67 years, after contracting pneumonia while visiting mining properties. His funeral service in London was attended by dozens of former colleagues and friends, including de Bernales, Sir Frederic Hamilton, representatives of the Zinc Corporation and the Agent-General in London for Western Australia, and many tributes were given, including by former President, Herbert Hoover.<sup>64</sup> At the time of his death Agnew was chairman of The Consolidated Gold Fields of South Africa and twelve other companies, and a director of thirteen more. As one contemporary recalled of Agnew: 'He had a wide knowledge of man and things... a great sobriety and sagacity of judgment, amazing industry, and a sense of probity and a habit of straightforwardness which commanded the confidence of all whom he came into contact.'<sup>65</sup> His obituary in *The Times* recorded that Agnew had been awarded a gold medal of the Institute of Mining and Metallurgy in recognition of services in the 'development of mineral resources of the Empire, and to the mining industry'.<sup>66</sup>

### Dolph Agnew

Rudolph Agnew (1896–1960) was born in Thames, New Zealand. He travelled with his parents to Western Australia and was educated at Christian Brothers College, Perth. Dolph, as he was commonly referred to, lived in London when his father moved to England to take up employment with Hoover, and followed in his father's footsteps, when studying mining engineering, and attending the Royal School of Mines between 1915 and 1916.<sup>67</sup>

**Figure 7:** Rudolph (Dolph) Agnew as Chairman of Gold Fields Australian Development Company c.1942.



*Source:* Courtesy of Delia Buchan, daughter of R.J. Agnew.

In 1919, Dolph and his wife arrived in Perth and travelled to Kalgoorlie where he took up a position at the Ivanhoe Mine. He broadened his geological and mining skills by attending the Kalgoorlie School of Mines between 1921 and 1924. In 1925, Dolph returned to England and became surveyor at the Mill Close lead mine in Derbyshire. In 1928, the family, which now included three children, travelled to Slovenia where Dolph

worked as a mine manager in a lead-zinc mine as well as manager of a lead-zinc mine in

northern Italy.<sup>68</sup> The fortuitous circumstances for Gold Fields' initial investments meant Dolph Agnew returned to Western Australia in 1933, following the establishment in 1932 of Gold Fields Australian Development Company. He took charge of the Wiluna mine and the evaluation of the nearby Moonlight Wiluna leases, as well as other mining opportunities.

### **Gold Fields Australian Development Company – Wiluna Extensions**

Gold Fields Australian Development Company was designed to act as a vehicle for investments in a range of Western Australian gold mines, with an office established in Kalgoorlie. Principally, it was formed to take a shareholding in The Moonlight Wiluna Gold Mines, The Starlight Gold Mines, The Horseshoe Wiluna Gold Mines, and thirteen leases at the northern end of the leases already held by Wiluna Gold Mines.<sup>69</sup>

In 1935 Wiluna commenced treating ore from the Moonlight mine, located to the north. The processing of the Moonlight ore introduced greater complexities, with the ore described by Prior, the general manager of Wiluna, as one of the most difficult to treat in Australia.<sup>70</sup> The arsenopyritic component of the ores led to various technical evaluations of the best means of treatment with the decision made to adopt a smelting process from October 1936 to remove arsenic followed by sintering the gold with lead.<sup>71</sup> The process entailed the acquisition of two lead deposits at Northampton.<sup>72</sup> According to a later review of the Moonlight Wiluna ore: 'Never before had a gold ore containing such large amounts of arsenic and antimony sulfides been treated on a large scale'.<sup>73</sup>

In 1936, the dewatering was undertaken of the Happy Jack leases less than a mile north of the Wiluna main shaft, prior to production commencing, but by 1938, further difficulties associated with the Wiluna deposit became apparent. A limited reserve life meant that extensive diamond drilling had commenced to attempt to delineate further reserves to extend production. In addition, while smelting continued intermittently, it introduced technical issues and higher operating costs. Smelting operations were suspended in March 1938.

The conditions for both the Wiluna and Moonlight Wiluna deposits deteriorated, while the onset of the war years, with equipment and manpower shortages, created further difficulties. The London corporation reported a loss in 1939, to be repeated in subsequent years. The consulting engineer for the Wiluna Gold Corporation reported in 1940 that the Wiluna deposits had a remaining life of two and a half years, with 'no alternative but to cut expenditure to the minimum and concentrate on salvaging the existing reserves at the greatest possible profit'.<sup>74</sup>

In 1941 the Moonlight Wiluna mine reserves and grade were declining at depth, while exploration activities conveyed 'little prospect of any new ore being discovered'.<sup>75</sup> During the war years, the Wiluna mine continued to operate only by obtaining government subsidies, defined as it was as a protected industry due to the production of antimony, used in the manufacture of bullets and shell casings.<sup>76</sup> Planning for operations after the war, in light of the contraction in reserves, led to the need to acquire additional properties as new sources of ore.<sup>77</sup>

In 1945 Moonlight Wiluna closed and in 1947 underground mining operations ceased on the Happy Jack leases. Wiluna mining ceased in 1948 after producing over £12 million worth of gold over its fifteen years of operation, with activities restricted to the processing of residual tailings.<sup>78</sup> By 1949, Wiluna had returned to a profit based on the recovery of tailings. However, it was a lean period for the London holding company and its major shareholder, with no dividends received for an extended period. Despite the earlier than expected decline in the ore bodies, Wiluna was one of the largest and most profitable gold mines in Western Australia.

The decline in the contribution from Wiluna and the short mine life of Moonlight Wiluna had led to a consideration to acquiring new mining properties. Mount Ida was one such mine while an option was held to acquire the Mount Charlotte (Kalgoorlie) Gold Mines. Gold Fields Australian Development Company undertook evaluation of other opportunities and drew a wide net over potential investment opportunities, including tin opportunities in Malaya. In 1937, the entire capital of Gold Fields Australian Development was called up to take an investment in Yellowdine Investments, which in turn owned 93 per cent of the de Bernales' Yellowdine Gold Development gold mine, near Mount Palmer, west of Kalgoorlie.<sup>79</sup> In 1938, an interest was acquired in the Kintore Mine at Kunanalling, with options over other deposits in the Coolgardie area.<sup>80</sup> Despite the efforts, Gold Fields Australian Development Company was not successful in replenishing its portfolio with material new mining interests, while Mount Ida remained its only operating mining venture. By 1956, the results of underground development work at Mount Ida were deemed disappointing with 'little or no prospect of the mine extending beyond present known limits' and as such, dependent on drawing down the existing limited reserves.<sup>81</sup> It continued in operation until 1960. Only Lake View and Star remained a profitable gold mining operation for Gold Fields in Australia, retaining its position as the largest gold producer in Western Australia and retained as a shareholding by Gold Fields until 1970.

### **Industry Contribution**

Dolph was a practical and efficient mining man, preferring the activities of the mine site to board meetings and the administrative responsibilities of a company executive, particularly those associated with Gold Fields' head office in London. Agnew was an advocate for Gold Fields' interests in Australia and, more broadly, the development of the mining sector in Western Australia. During the Second World War he served with the Department of Munitions in Victoria and in 1946 returned to England for a period, before returning to Western Australia in 1950. With only brief periods in London, Dolph lived in Western Australia for the remainder of his life. He served as vice-president and president of the Chamber of Mines of Western Australia in Perth and Kalgoorlie. He was President of the Australian Institute of Mining and Metallurgy and was influential in establishing the Gold Producers' Association, the establishment of the Kalgoorlie and Boulder Mines Medical Fund and welfare scheme, as well as being associated with the Ministry of Munitions during the war years.<sup>82</sup> His services to the mining industry led to him being awarded the Coronation Medal of the Australian

Institute of Mining and Metallurgy in 1953. Dolph Agnew died in 1960 at the age of sixty-four and was buried at the Kalgoorlie Cemetery.

The prodigious efforts of John and Dolph Agnew contributed to Gold Fields controlling the two largest gold mines in Western Australia in the 1930s, as well as establishing investment interests in a range of other Australian and New Guinea mining ventures. However, Gold Fields' mining activities in Australia, especially after the Second World War, meant that by 1960 they had severely contracted and had not been able to be replenished. A new era for Gold Fields' investment in Australia would commence in 1960, following the significant contribution made by the Agnews in the first half of the twentieth century.

---

## Endnotes

- <sup>1</sup> The shortened form, Consolidated Gold Fields, will be used for ease of reference on occasions in this article for both The Consolidated Gold Fields of South Africa and its associated entity New Consolidated Gold Fields.
- <sup>2</sup> Obituary, Mr. John A. Agnew, *The Times*, 4 August 1939.
- <sup>3</sup> *The Financial Times*, 4 August 1939.
- <sup>4</sup> *The Times*, 4 August 1939.
- <sup>5</sup> Information on the Agnew family history has been supplied by Delia Buchan, daughter from the second marriage of Rudolph Agnew and Roma Leigh Stephens, and from Hugh Agnew, grandson of Rudolph Agnew from his first marriage to Pamela Geraldine Campbell. I am grateful for their contributions.
- <sup>6</sup> The Goldfields of New Zealand: Report on Roads, Water-Races, Mining Machinery and Other Works in Connection with Mining, Appendix to the Journals of the House of Representatives, 1898, www.atojs.natlibgovt.nz, C-3, p. 9 lists Agnew as a former student of the Thames School of Mines. Information on John and Dolph's career is also drawn from Denis A. Cumming and Richard G. Hartley, (compilers) *Western founders of twentieth century mining: career biographies of mining engineers, mine managers and metallurgists who worked in the Western Australian mining industry 1890-1920*, Rossmoyne, Western Australia, 2014, pp. 2-4.
- <sup>7</sup> Richard Hartley, Bewick Moreing in Western Australian Gold Mining 1897-1904: Management Policies & Goldfields Responses, *Labour History*, No. 65, November 1993, p. 1.
- <sup>8</sup> George H. Nash, *The Life of Herbert Hoover. The Engineer, 1874-1914*, W.W. Norton & Company, New York, 1983, p. 303.
- <sup>9</sup> Herbert Hoover Presidential Library [HHPL], Post Presidential Individual File, Agnew, John A. Correspondence: 1933, 1937, 1939.
- <sup>10</sup> Letter from Miss E.A. Rolfe to Mr. H. Hoover, 7 August 1939, in *ibid.*
- <sup>11</sup> *Ibid.*
- <sup>12</sup> *Daily News, Perth*, 4 August 1939; *West Australian*, 5 August 1939; Alex Palmer, *Agnew*, Hesperian Press & LAP Industries, Victoria Park, 2000, p. 35.
- <sup>13</sup> Messrs Bewick, Moreing and Co. London from W.J. Loring, Moreing Chambers, Kalgoorlie, 30<sup>th</sup> April 1913, p. 4, in Bewick, Moreing & Co, State Library of Western Australia [SLWA], MN2530, 6736A.
- <sup>14</sup> *Ibid.*
- <sup>15</sup> *Ibid.*
- <sup>16</sup> *Ibid.*, See also, letter from John A. Agnew to Herbert Hoover, 3<sup>rd</sup> July 1911, HHPL, Pre-Commerce Subject File, Mining Correspondence, Agnew, John A., 1905-1914.
- <sup>17</sup> Bewick, Moreing & Co, SLWA, MN2530, 6736A.
- <sup>18</sup> *Ibid.*
- <sup>19</sup> Kenneth Whyte, *Hoover. An Extraordinary Life in Extraordinary Times*, Alfred A. Knopf, New York, 2017, pp. 130, 207-208.
- <sup>20</sup> 16 July 1914, To J.A. Agnew, 1 London Wall Buildings, Arrangement dated July 1 1914, HHPL, Pre-Commerce Subject File, Mining Correspondence, Agnew, John A. 1905-1914.
- <sup>21</sup> Discussion with Sir Rudolph Agnew by the author, 9 August 2018.
- <sup>22</sup> David Kynaston, *The City of London. Volume II. Golden Years. 1890-1914*, Chatto & Windus, London, 1995, p. 187.

- 
- <sup>23</sup> Roy Macnab, *Gold Their Touchstone. Gold Fields of South Africa 1887-1987. A Centenary Story*, p. 120. See also A.J. Wilson, *The Professionals. The Institute of Mining and Metallurgy, 1892-1992*, The IM&M, London, 1992, p. 227.
- <sup>24</sup> Melville Davies, 'Claude Albo de Bernales, 'Wizard' of Australia's Gold West', in Raymond Dumett (ed.), *Mining Tycoons in the Age of Empire, 1870-1945. Entrepreneurship, High Politics, Finance and Territorial Expansion*, Ashgate Publishing, Surrey, 2009, p. 186. See also Geoffrey Bolton, *A Fine Country to Starve In*, University of Western Australian Press, Nedlands, 1974, p. 86.
- <sup>25</sup> Geoffrey Blainey, *The Rush that Never Ended. A History of Australian Mining*, Melbourne University Press, Parkville, 1964, pp. 312-313.
- <sup>26</sup> Hal Colebatch, *Claude de Bernales: The Magnificent Miner*, Hesperian Press, Victoria Park, 1996, p. 50.
- <sup>27</sup> Wiluna Gold Corporation, Reprinted from *The Financial Times*, 27 April 1928, Butlin Archives, Australian National University, [BA], 67/71.
- <sup>28</sup> The Consolidated Gold Fields of South Africa Limited, *Report of the Proceedings at the Ordinary General Meeting, 2<sup>nd</sup> December 1926*, University of Melbourne Archives [UMA], Stock Exchange of Melbourne, 1968.0018, Box 67
- <sup>29</sup> *Ibid.*
- <sup>30</sup> *Kalgoorlie Miner*, 19 1926.
- <sup>31</sup> According to Snooks, the application of modern large scale, modern mining techniques, such as those employed at Wiluna and Lake View and Star, enabled the handling of large quantities of low grade ores and 'opened up a new phase of Western Australian mining, as nothing equal to it had ever been seen in the State before'. G.D. Snooks, *Depression and Recovery in Western Australia, 1928'29-1938'39. A Study in Cyclical and Structural Change*, University of Western Australian Press, 1974, p. 66.
- <sup>32</sup> Donald Clark, *Australian Mining and Metallurgy*, Australian Mining Standard, London, 1907, p. 65.
- <sup>33</sup> Peter Yule, *William Lawrence Baillieu. Founder of Australia's Greatest Business Empire*, Hardie Grant Books, Richmond, 2012, p. 127.
- <sup>34</sup> *The Financial Times*, 14 June 1912.
- <sup>35</sup> *The Daily News, Perth*, 28 July 1934.
- <sup>36</sup> *Kalgoorlie Miner*, 13 May 1950.
- <sup>37</sup> Snooks, *Depression and Recovery in Western Australia*, p. 65.
- <sup>38</sup> (No author) *Gold Mines of Australia and New Guinea. Leading Companies*, H. Byron Moore, Day & Journeaux, Melbourne, p. 39.
- <sup>39</sup> Lake View and Star, Limited, Reprinted from *The Mining World*, December 16, 1939, UMA, Stock Exchange of Melbourne, 1968.0018, Box 151.
- <sup>40</sup> *Ibid.*
- <sup>41</sup> *Chemical Engineering and Mining Review*, 8 August 1936, p. 397.
- <sup>42</sup> *Ibid.*, 8 February 1935, p. 168.
- <sup>43</sup> Colebatch, *Claude de Bernales: The Magnificent Miner*, p. 53.
- <sup>44</sup> Clark suggested that the initial shareholding was dominated by companies controlled by Consolidated Gold Fields of South Africa, with New Consolidated Gold Fields having a 60 per cent shareholding. G. Lindesay Clark, *Built on Gold. Recollections of Western Mining*, Hill of Content, Melbourne 1983, p. 3.
- <sup>45</sup> Gold Mines of Australia Limited, List of Shareholdings as at 25<sup>th</sup> October 1932 and List of Shareholdings as at 17 January, 1934, UMA, Melbourne Stock Exchange, 1968.0018, Box 99.
- <sup>46</sup> *Minutes of Fourth Meeting of the Board of Directors of Gold Exploration and Finance Company Australia Limited, 15 August 1934* and *Minutes of Eighth Meeting of the Board of Directors of Gold Exploration and Finance Company Australia Limited, 8 November 1934*, UMA, Western Mining Corporation 2012.0015, Unit 215.
- <sup>47</sup> *West Australian Mining and Commercial Review*, Vol. 7, No. 1, 1942, p. 23.
- <sup>48</sup> These included the Champagne Syndicate, Costerfield Gold-Antimony mine, Victoria Deep Leads, Nell Gwynne (B.M.L.) Mine, Bendigo Mine, Triton Gold Mine and Western Gold Mine. Gold Exploration and Finance Company of Australia Limited, *Reports and Statements of Accounts for the Period 23<sup>rd</sup> July 1934 (the date of incorporation) to 31<sup>st</sup> March, 1935*, UMA, Stock Exchange of Melbourne, 1968.0018, Box 98.
- <sup>49</sup> Western Mining Corporation Limited, *Report of Proceedings at First Annual Ordinary General Meeting of Shareholders, held on Thursday, The 30<sup>th</sup> Day of August, 1934*, UMA, Stock Exchange of Melbourne, 1968.0018, Box 343.
- <sup>50</sup> Gold Mines of Kalgoorlie Limited, *Reports and Statements of Accounts for the Period 29<sup>th</sup> October 1934 (date of incorporation) to 31<sup>st</sup> March 1935*, UMA, Stock Exchange of Melbourne, 1968.0018, Box 100.

- 
- <sup>51</sup> *Minutes of Eleventh Meeting of the Board of Directors of Gold Exploration and Finance Company Australia Limited*, 6 February 1945, UMA, Western Mining Corporation 2012.0015, Unit 215.
- <sup>52</sup> *Ibid.*
- <sup>53</sup> *Chemical Engineering and Mining Review*, 5 May 1928, p. 230.
- <sup>54</sup> *The Times*, 16 July 1918.
- <sup>55</sup> *Chemical Engineering and Mining Review*, 5 April 1928.
- <sup>56</sup> *Ibid.*, November 5, 1929, p. 42.
- <sup>57</sup> B.E. Kennedy, *Gepp, Sir Herbert William (Bert) (1877–1954)*, Australian Dictionary of Biography, National Centre of Biography, Australian National University, <http://adb.anu.edu.au/biography/gepp-sir-herbert-william-bert-6298>
- <sup>58</sup> *Chemical Engineering and Mining Review*, 5 May 1928, p. 230.
- <sup>59</sup> L. Thomas Esq, Lake George Mine from H.E. Vail, 10 September 1929, BA 67/12, and Ross Mainwaring, *Riches Beneath the Flat. A History of Lake George Mine at Captains Flat*, Light Railway Research Society of Australia Inc. Melbourne, 2011, pp. 19, 21, 24.
- <sup>60</sup> The discovery and development of the Morobe goldfields, as well as the development of aviation in New Guinea, are told in Lloyd Rhys, *High Lights and Flights in New Guinea. Being in the Main Account of the Discovery and Development of the Morobe Goldfields*, Hodder and Stoughton, London, 1942, p. 183. For other accounts of gold mining in Morobe district of New Guinea, see: Hank Nelson, *Black, white and gold: gold mining in Papua New Guinea, 1878–1930*, ANU Press, Acton, 2016; Ion L. Idriess, *Gold-Dust and Ashes*, Angus and Robertson, Sydney; Lewis Lett, *Papuan Gold. Story of the Early Gold Seekers*, Angus and Robertson, Sydney, 1943.
- <sup>61</sup> A.M. Healy, Levien, Cecil John (1874–1932), Australian Dictionary of Biography, National Centre of Biography, Australian National University, [www.adb.anu.edu.au/biography/levien-cecil-john-7179/text12407](http://www.adb.anu.edu.au/biography/levien-cecil-john-7179/text12407)
- <sup>62</sup> *The Consolidated Gold Fields of South Africa, Limited, "The Gold Fields" 1887-1937*, The Consolidated Gold Fields of South Africa Ltd., London, 1937, p. 97.
- <sup>63</sup> Placer Development Limited, Bulolo Gold Dredging Limited, Memorandum to Shareholders, February 29<sup>th</sup> 1932, p. 1, UMA, Stock Exchange of Melbourne, 1968.0018, Box 49.
- <sup>64</sup> *The Financial Times*, 4 August 1939.
- <sup>65</sup> Wiluna Gold Corporation, Reprinted from *The Mining World*, 16 December 1939.
- <sup>66</sup> *The Times*, 4 August 1939.
- <sup>67</sup> Royal School of Mines, *Register of Old Students, 1851–1920 and History of the Royal School of Mines*, Royal School of Mines Old Student's Association, 1920, p. 17.
- <sup>68</sup> I am grateful to Delia Buchan, Dolph's daughter, for family information related to this section. A photograph in the possession of Delia indicates that he was also manager of the Mezica mine in Slovenia, located near the border with Austria. The mines were the Central European Mine at Klagenfurt near the Austrian border and Societe au Miniera Cave de Predil at Raibi, northern Italy.
- <sup>69</sup> Fields Australian Development Company Limited, Reprinted from *The Financial Times*, 20 February 20, 1935.
- <sup>70</sup> *Chemical Engineering and Mining Review*, 8 February 1937, p. 201.
- <sup>71</sup> *Ibid.*
- <sup>72</sup> The mines were Grand Junction and Wheal May near Northampton, Western Australia.
- <sup>73</sup> *Chemical Engineering and Mining Review*, 10 July 1952, p. 385.
- <sup>74</sup> *Ibid.*, 10 January 1940, p. 165.
- <sup>75</sup> *Ibid.*, March 11, 1940, p. 250 and 10 January 1941, p. 121.
- <sup>76</sup> *West Australian Mining and Commercial Review*, Vol. 9, No. 6, August 1944, p. 21 and Vol. 10, No. 1, March 1945, p. 15.
- <sup>77</sup> *Ibid.*, Vol. 11, No. 1, March 1946.
- <sup>78</sup> *Ibid.*, Vol 11, No. 10, December 1946, p. 26.
- <sup>79</sup> *Western Argus*, 28 May 1935, *The Advertiser*, 25 September 1935, *Sunday Times*, 19 July 1938, *Sunday Times*, 9 June 1940. According to the July 1938 *Sunday Times* article, a de Bernales' associated company, Commonwealth Mining and Finance, held a 46 per cent interest in the Yellowdine mine.
- <sup>80</sup> Spargo's Reward Gold Mine (1935) No Liability, *Reports and Statement of Accounts, For the Period 8<sup>th</sup> April 1936, to 30<sup>th</sup> June 1937 and Notice of Annual General Meeting*, UMA, Stock Exchange of Melbourne 1968.0018, Box 259.
- <sup>81</sup> *Chemical Engineering and Mining Review*, 11 June 11 1956, p. 291.
- <sup>82</sup> *Western Australian Mining Review*, Vol. 10. No. 9, November 1945.