

The gold deposits of the farms Lisbon and Berlyn in the Eastern Transvaal

by V. C. H. R. BRERETON* (Visitor)

SYNOPSIS

This paper describes the discovery and recovery of gold, over a period dating back to the 1870s, on the farms Lisbon and Berlyn, situated approximately 11 km north-east of Pilgrims Rest, where mining ceased in July 1971, 99 years after gold was first discovered in the Pilgrims Rest and Sabie districts.

Included in the paper are accounts of the discovery and mining operations of the Lisbon-Berlyn Company from 1884 to 1890. The operations of small companies and syndicates, the superficial winning of gold by diggers, and the encouraging reports of four mining engineers in 1890 are also mentioned.

SAMEVATTING

Hierdie verhandeling beskryf die ontdekking en herwinning van goud oor 'n tydperk wat strek vanaf die sewentigerjare van die vorige eeu, op die plase Lisbon en Berlyn, ongeveer 11 km noordoos van Pilgrims Rest waar mynbou in Julie 1971, 99 jaar na die eerste ontdekking van goud in die distrikte Pilgrims Rest en Sabie, gestaak is.

Die verhandeling sluit verslae oor die goudontdekking en die mynboubedrywighede van die Lisbon-Berlyn Company van 1884 tot 1890 in. Daar word ook melding gemaak van die bedrywighede van klein maatskappye en sindikate, die oppervlakkige winning van goud deur delwers en die bemoedigende verslae van vier myningenieurs in 1890.

INTRODUCTION

As shown in Fig. 1, the farms Lisbon (531KT) and Berlyn (506KT) are situated 8 km north of Graskop at an altitude of 1370 m. Graskop township is located at the terminus of a 123-km-long railway running northwards from Nelspruit. The country is very beautiful and the climate healthy, and there are large timber plantations and an abundance of clear water. The Lisbon Falls, with a drop over two stages totalling approximately 90 m, are situated on the Waterfall River, which traverses the two farms (Plate I).

Approximately 1 km below the falls, on the left side of the river, is a cave. A Mr Billy Davies, whilst prospecting on the farm Lisbon and the adjoining farm Berlyn, fled from some hostile natives and hid himself in the cave, which he subsequently fortified against any attacks. This portion of the cave and the fortifications can be seen today. Davies' prospecting activities led to the discovery of what has been described as 'a wall of gold'. The locality is in the vicinity of a large belt of leaders, the latter covering an



Plate I—Lisbon Falls

*Government Land Surveyor, retired.

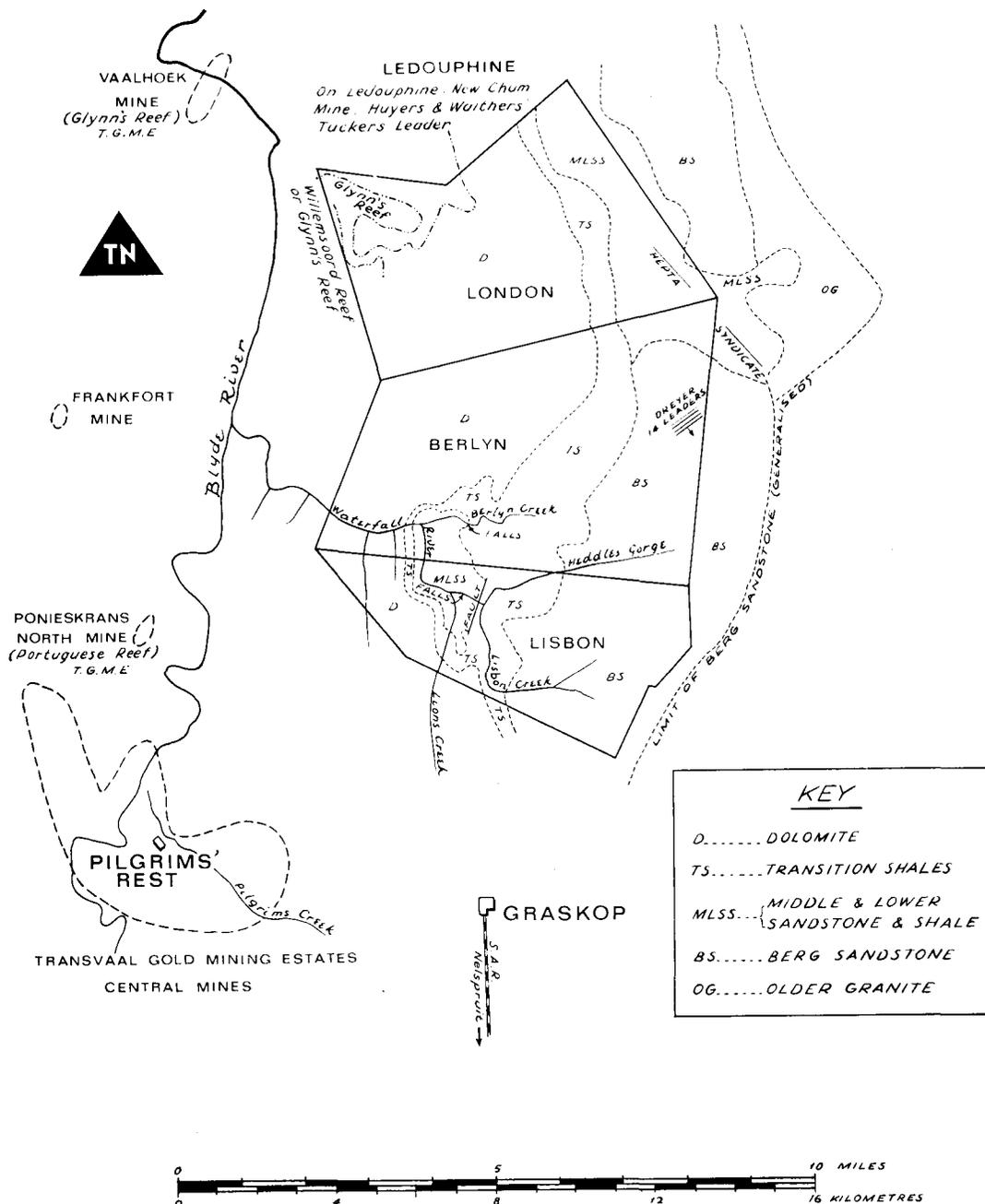


Fig. 1—Plan showing the position of Lisbon and Berlyn in relation to Pilgrims Rest

area of approximately 50 acres (20 ha) and situated on the north side of the Waterfall River and approximately 1 km north-west of Lisbon Falls. Davies established himself in this Leader Belt, his workings being described as 'Davies' Jeweller's Shop'.

Mr Archie Fraser, an employee of the Lisbon-Berlyn Company, which

operated on Lisbon-Berlyn from 1884 to 1890, described how he panned out 41 ounces of nuggets from a single prospecting pan of Leader ore from the face of one of Davies' adits. Mr Fraser said, 'The Leader must have been well named and was really the start of the Lisbon-Berlyn Company being formed'.

In 1882, Mr Gwynne Owen arrived in Pretoria with some fine samples of gold from the farms Lisbon and Berlyn, whose ownership he had acquired. Taking some of the samples to London, he succeeded in obtaining financial backing and the Lisbon-Berlyn Company was floated.

THE GEOLOGY AND THE ORIGIN OF THE GOLD

The well-known geologist, the late Dr Leopold Reinecke, who was intimately connected with the discovery of the Far West Rand, referred to Lisbon as one of the three areas in the Pilgrims Rest district where the presence of a payable gold field was due to the intrusion of a granite batholith into the Black Reef Series, namely, the boss at the base of the falls¹.

The geological horizon is the Black Reef Series (shales and quartzites). At one time the strata, with their associated reefs, sloped westwards at a low angle of dip. At a later period, a great eruption took place in the area, disturbing the strata over a distance of some 1050 m, the western and eastern limits being 600 m west and 450 m east of the falls. The apex of this eruption was over the position where the Lisbon Falls subsequently formed, the strata being erupted hundreds of metres into the air. With this eruption, there was an upthrust of the batholith previously mentioned, and of numerous vertical or nearly vertical leaders, the latter bringing up gold from the nethermost regions (Fig. 2).

That the upthrust of these leaders brought about a heavy deposition of gold on Lisbon and Berlyn is evidenced by reports, totalling 750 words, by the four mining engineers mentioned in the following quotation².

It is well-known that amongst the richest properties in the Transvaal are the two estates Lisbon and Berlyn, which adjoin and are practically one property. The combined area totals 18 000 acres [7500 ha]. Four mining engineers, John M. Stuart, John Webster, Mr Hamilton and Mr Penning issued glowing reports on the findings and prospects. Whilst not mentioning any specific localities, they reported favourable mineralization over considerable areas. Mr Stuart estimated the alluvial ground as extending over 3000 acres [1250 ha] with values running from 10 to 1000 ounces to the ton. Mr Hamilton's estimate was 5000 acres [2100 ha]. Mr Penning in his report quoted that taking into consideration the proved extent of ground containing auriferous leaders, their average yield and probable extension, the value of the alluvial ground and the existence of a large and constant supply of water at a great elevation, he had no hesitation in declaring that "Waterfall" [Lisbon and Berlyn] is an extremely valuable gold mining property.

Whilst these engineers may have been over-enthusiastic in their findings, their reports must still have considerable bearing on the future possibilities of Lisbon and Berlyn.

MINING AND PRODUCTIVITY

The Lisbon-Berlyn Group was in active production over seven years from 1884 to 1890. Operations took place on three areas of the farms.

Leaders

The large belt of leaders previously mentioned. For the purpose of 'hydrauliclicking' the area, the Company in 1884 erected a weir 610 m back from the falls, at a junction of the Lisbon Creek, Heddle's Gorge, and the Waterfall River. From the weir, a water-race, 2 km long, was dug to supply the water for the hydraulic operations at the Mass of Leaders. The Company did some sluicing with monitors on this section but, owing to the exposure of an extensive dolomite bar, the work was abandoned. The weir and the water-race, which can take the whole river during low flow periods, are still in existence.

The Vertical Reef

This is a wide leader cutting across the Waterfall River from north to south and situated a short distance west of the weir. The Company erected a treatment plant, but, as no cyaniding plants were in existence in the late 80s and early

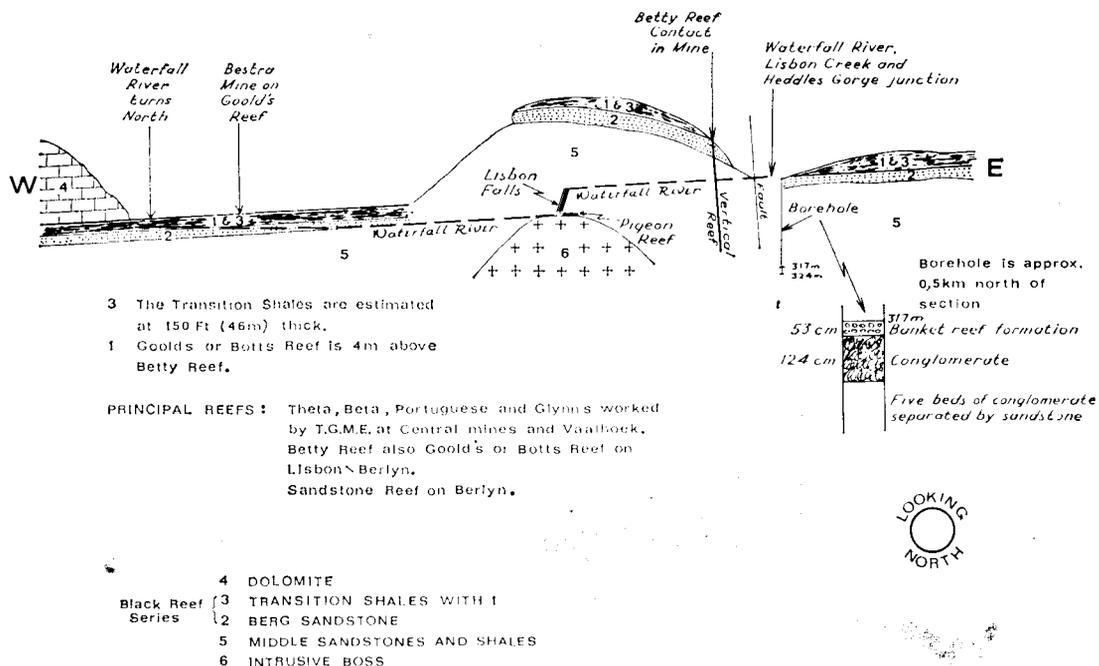


Fig. 2—Section west-east along the course of the Waterfall River

90s, gold was recovered by mercury-covered copper plates. The percentage recovery was therefore low in comparison with that obtained in modern practice.

The Pigeon or Westly Reef

When a Mr Westly shot a pigeon in the vicinity of the falls and climbed down into the gorge to retrieve the bird, he came across reef material with visible gold. This discovery led to the Lisbon-Berlyn Company winning gold by stoping in what was called the Pigeon or Westly Reef, which in those days was exposed on the face of the falls. At the time of the eruption, the granite boss on which the Pigeon Reef is located, was thrown up. This boss, dipping at a steep angle with the Pigeon or Westly Reef stope, can be seen in Plate II. In a report on the Pigeon or Westly Reef, Mr Archie Fraser is quoted² as follows:

The first ore mined was shipped direct to London and gave a marvellous return. Thereafter, the ore was hauled to the surface and treated in a ten-stamp mill. Rich pockets were bagged. On one occasion, a sugar pocket of ore yielded eight hundred ounces of amalgam which gave a 60 per cent recovery of gold—480 ounces [at 100 dollars per ounce, this is equivalent to R32 000]. No mining was carried out below the level of the pool, as the Company had no pumping plant.

The reef band in which copper was then present became pinched, and the stoping was abandoned. Thinning and widening of a reef is a common occurrence, particularly in this area.

The Lisbon-Berlyn Company was operating under very primitive conditions, which made gold recovery difficult. Had the Company operated with drilling machines, instead of with hand labour, mining would have been more extensive. Restricted to gold recovery by amalgamated copper plates, hand drilling, and no pumping equipment, the operations had to be severely curtailed. Under modern conditions, this would have been a very different story. The Company finally abandoned operations and transferred their interest to the farm Frankfort, some 12 km to the west.

Included in the activities of the Company was the sinking of a borehole to a depth of 334 m. The borehole was sunk on the farm

Berlyn in normal strata and slightly to the east of the disturbed area. It is situated west of Heddle's Gorge and north of the dam (the start of the Waterfall River). Banket reef formation, 53 cm wide, was intersected at a depth of 317 m. This was followed by a conglomerate bed, 124 cm in width, and by five further beds of conglomerate separated by bands of sandstone (Fig. 2).

The fourth edition of *Mineral Resources of South Africa* reports on the outcrop of a system corresponding to the Witwatersrand and Dominion Reef Systems and appearing along the eastern (Transvaal) escarpment of the Drakensberg. As the escarpment is approximately 5 km east of the Lisbon borehole, it is possible that the borehole disclosures relate to the Witwatersrand and Dominion Reef Systems. The collar of the borehole was re-discovered in July 1966.

SUBSEQUENT DEVELOPMENTS

In 1898, the Lisbon-Berlyn Company was resuscitated under the name of the New Lisbon-Berlyn Company Limited. The South African War commenced a year later in 1899, but, when hostilities ceased, the Company did not resume operations, and the farms Lisbon and Berlyn fell open to diggers and small workers. For the past seventy years, the mining of gold has been in the hands of small mining concerns (lone owners or syndicates operating small crushing plants) and the diggers. The work done by the diggers consisted mostly in mining the gold from alluvial operations and penetrating into previous workings as far as their limited financial resources allowed and to a very great extent without explosives.

CLAIMS OWNERSHIP

The three main claim holdings are the Hob Mining Company, the Bestra Mine, and the Lisbon Leaders and Alluvial. The largest concern, the Hob Mining Company, has extensive mineral interests over Lisbon and Berlyn, including the Vertical Reef and the Gem Mine. The Bestra Mine is situated on the south side of the Waterfall River, 1 km west of the falls. The interests of the Lisbon

Leaders and Alluvial constitute an area of forty-eight claims, equivalent to 67 acres (27 ha), along the Waterfall River, Lions Creek, and Heddle's Gorge—a total length of 1.6 miles (2.6 km)—and include the pool at the bottom of the Lisbon Falls.

Towards the end of August 1933, Captain van Delden of ship-salvage fame approached the owners of the mineral rights of the pool below the falls. He wished to divert the river into the water-race, pump out the pool, and recover the gold. The owners stated that a venture of this nature should be undertaken only during the dry months, April to September. He insisted, however, and made rapid progress down to the gravel at 6 m (20 ft), from which the majority of the nuggets shown in Plate III were collected. Before a thorough exploitation of the area could be undertaken, rain brought operations to a close in October. Captain van Delden had never had any intention of switching from salvaging to mining, but the gamble had attracted him. (He returned to his life's love, but regrettably was killed attempting to salvage the 'City of Lincoln', which went aground at Quoin Point, between Cape Town and Cape Agulhas.)

OTHER WORKINGS

Other workings were situated on Ledouphine, London, and the eastern boundary of Berlyn (Fig. 1).

Ledouphine

In the New Chum Mine, a sketch plan showed ten leaders, approximately 30 m (100 ft) apart, over which a total of 1500 m (4900 ft) of development was carried out. The leaders averaged 5 to 7.5 cm (2 to 3 in) in width, but the mine was very rich. On one level, the yield was 60 ounces to the ton.

Huyer's Claims were small workings but were very rich, containing as much gold as they did gangue, which was mostly calcite.

Wither's Claims are believed to be the extension of what was formerly known as Tucker's Leader, from which gold worth £13 000 was taken.

London

The Hepta Syndicate, during 1923, produced 228 ounces of gold from

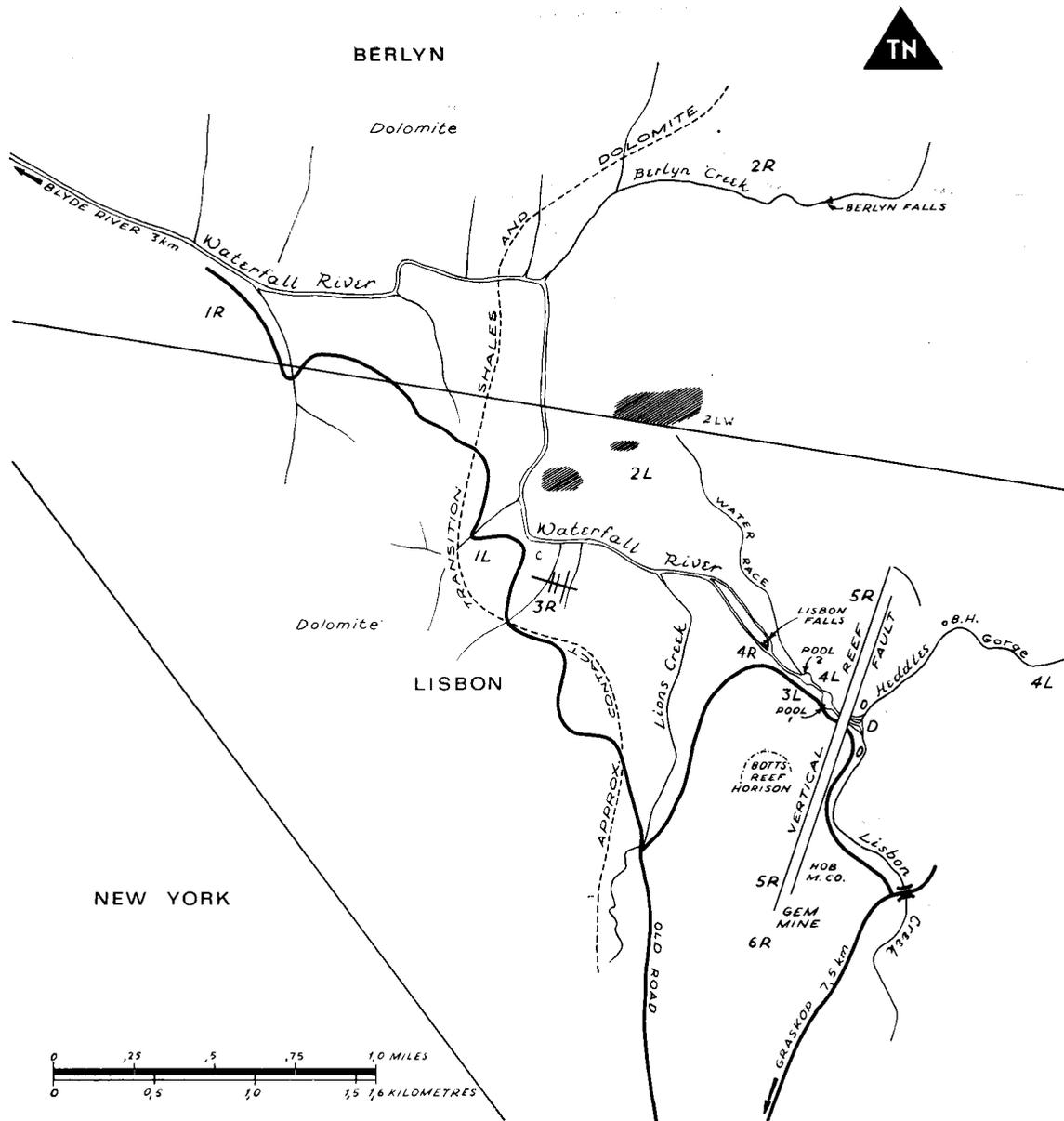


Fig. 3—Map showing miscellaneous gold occurrences

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| <p>1R Records show that adits in one of the gulleys on the south side of the Waterfall River disclosed reef outcrop. Probably either the Glynn's Reef or Willemsoord Reef (Lower Glynn's).</p> <p>2R A patch of sandstone reef below the contact of the Transition Shales and Big Sandstone was worked in the vicinity of Berlyn Creek. It was reported to be very rich.</p> <p>3R Bestra Mine.</p> <p>4R Pigeon or Westly Reef at base of Lisbon Falls. As the reef disappeared below the level of the water it was thin but assayed 16 dwt.</p> <p>5R The large leader called Vertical Reef. Development on the incline for a short distance below the first level on the south side of the Waterfall River disclosed encouraging values.</p> <p>6R Gem Mine.</p> <p>1L Wet Leader. A rich discovery.</p> <p>2L Large belt of leaders.</p> | <p>3L A trench approximately 300 feet long and 6 feet deep was dug between the two pools to lower the water in the eastern pool. When the trench was finally cleaned up a quantity of nuggets was recovered. This would account for leaders intersecting the sandstone above the falls.</p> <p>4L Approximate locality of a recently discovered leader.</p> <p>BH Borehole.</p> <p>D Dam and weir at intersection of Lisbon Creek, Heddles Gorge, and Waterfall River.</p> <p>O Opencast workings. Work carried out in the early days by Billy Davies.</p> <p>C Davies fortified cave.</p> <p>2LW Wall of Gold. Gold, with its associates limonite and concentrates, lies anywhere and everywhere.</p> |
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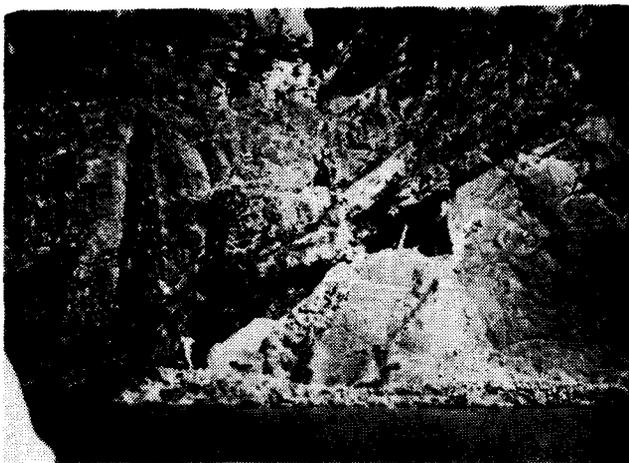


Plate II—Pigeon or Westly stope overlying a granite boss at the bottom of the Lisbon Falls (taken in 1890)

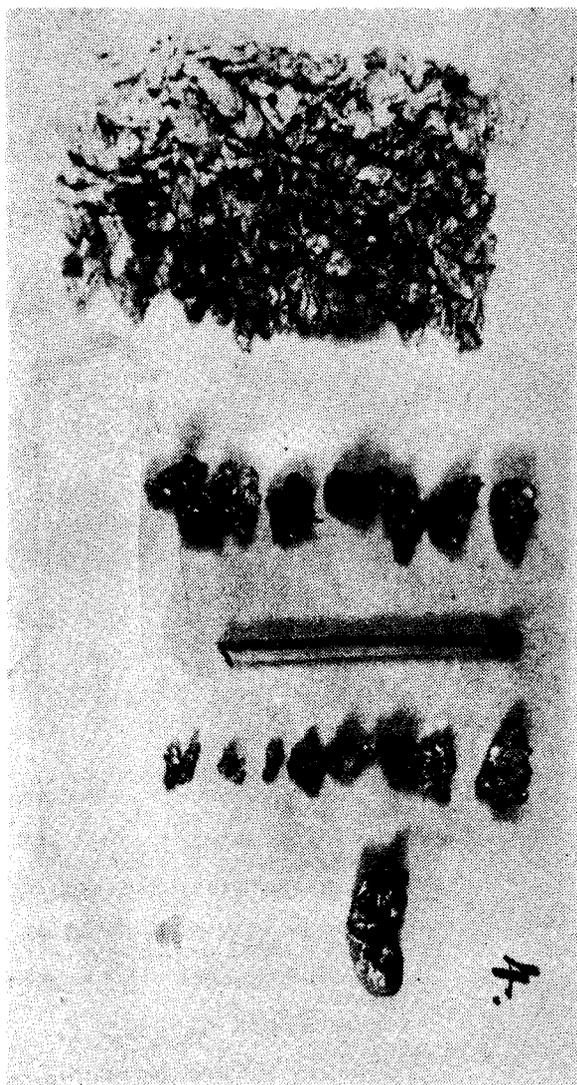


Plate III—Nuggets recovered above and below the Lisbon Falls

670 tons of ore. A single panful sometimes yielded 20 ounces of gold.

East Berlyn

Dreyer's Claims were 14 quartz leaders 30 to 60 cm (12 to 24 in) wide over a width of approximately 30 m (100 ft) on the eastern boundary of Berlyn. Because the gold was coated with iron, amalgamation was difficult, but concentrates of black sands assaying 70 ounces per ton were obtained.

FUTURE PROSPECTS

And what of the gold on the surface and below ground extending over this huge area? As stated earlier by two of the mining engineers, alluvial ground was estimated as extending over 3000 to 5000 acres (1250 to 2100 ha). Mr Archie Fraser told the author that nuggets had been found at Heddle's Gorge, some 4 km east of the falls, and the author has panned out nuggets 3 km down the river below the falls. Add to these the finds of Captain van Delden.

On one occasion, Dr Reinecke accompanied the author to Lisbon. Taking a pan, he panned out some gravel from the side of the river near the weir and exclaimed, 'I've seen big companies started on less than this', referring to the nugget in the pan. The gold scattered over this wide area is the result of the denudation and wearing away of reefs and leaders. The efforts of the small worker and the diggers have not extended to any large-scale operations, the work done and the gold won being infinitesimal compared with the area of the mining field. Mining and development on the Vertical Reef, or large leader cutting across the river west of the dam, has been restricted to the first level for a distance of 1824 m (6000 ft). At some distance north of the river, where the Vertical Reef intersects the Betty Reef dipping from the west, payable values were encountered at the Gem Mine, situated 1 km to the south of the river. Whilst the Gem was previously considered an extension of the Vertical Reef, it appears that the enrichment is of an alluvial nature. The area was discovered and initially worked by a Mr Botts, and very rich values were disclosed. The

author once saw gold particles 'loop the loop' right round a prospecting pan.

As to the wide belt of leaders to the north-west of the falls, the Lisbon-Berlyn Company removed only the surface loam and soil by 'hydraulicking'. The diggers then picked their way as far as they could into the hard ground without the use of explosives. They tunnelled here and there, and their efforts were frequently rewarded by the winning of visible gold—in some cases very rich. As previously stated, 41 ounces of nuggets were recovered from one prospecting pan from one of Davies' adits. In some cases the diggers found it necessary to place locked gates at the adit entrances to prevent the theft of visible gold. It is to be expected that a large tonnage of payable leader ore remains to be worked. The leaders may even extend across the river to the south side, where there is a very rich leader known as the Wet Leader.

THE BESTRA MINE

A reef horizon, the Betty Reef, occurs in the Transition Shales, which underly the dolomites. The Betty Reef horizon is of wide-spread occurrence throughout the Pilgrims Rest and Sabie districts.

At Lisbon-Berlyn and situated 3,7 m (12 ft) above the Betty Reef is Goold's Reef, named after the late Mr F. P. Goold, who spent 28 years at Lisbon-Berlyn. When he died in 1956, he left his claim holdings on Lisbon and Berlyn to Mr G. A. Marshall, who reports the existence of pigments on his claims (yellow ochre and unlimited quantities of umber) and seams of aluminium oxide. The workings at the Bestra Mine are on the Goold's Reef horizon. Recent information is that Goold's

Reef was originally discovered above the falls and was known as Bott's Reef.

Goold carried out development with financial aid from what was termed 'The claim-holders assistance', and in 1937 the development was sampled throughout by an official of the Government Mine Survey Department. The assay plan is available. At the commencement of the war in 1939, financial assistance to claim-holders was withdrawn.

On account of payable values in advance development, Mr Goold was granted an area of 42 claims (61 acres or 25 ha) across the boundary into what is now the forestry area. Owing to the limited capital available to the owner, the area covered by development and mining is not extensive. Payable values were encountered at some distance in from the surface, along a dyke striking east-west. Payable values along east-west dykes have also occurred in the workings of the Transvaal Gold Mining Estates. In this connection, it must be noted that, although outcrops may appear unpayable, payable values are possible some distance in from the surface. Payable values can be expected by further development along the east-west dyke, and southwards into the Forestry area.

THE ALLUVIAL AND THE LEADERS

There have been no extensive operations in which alluvial gold has been won at depth throughout the river and the adjoining flats. The gold has been won only from the upper gravels. According to Ion Idris³, an Australian mining man.

Not only must the upper gravels be worked, but the bed of the streams must be broken up to win the gold

cemented into the cracks. In carrying out the alluvial operations, the leaders cutting through the river from south to north will be disclosed. It will then be possible to investigate them both on the river bed and outwards on both sides of the river. The Dykes, which are a catchment for nuggets, will also be disclosed.

Alluvial operations also commenced at Pilgrims Rest, approximately 11 km south-west of Lisbon, about 1873, and over the following eight years a large number of diggers were mining gold from Pilgrims Creek and the Blyde River Valley. Some of the nuggets were 48, 84, 119, 208, and 300 ounces each. There is every possibility of large nuggets being found at Lisbon when alluvial operations are carried out in depth. Efficient recovery of gold from this extensive area calls for operations by a major mining concern, and the advantage of recovering gold at relatively shallow depths will off-set the initial cost.

CONCLUSION

As one stands on the face of the Lisbon Falls and looks to the south-west, where mining operations have ceased at Pilgrims Rest and Sabie after 99 years, the ground there says, 'I have given to them what they could afford to get'. The ground below one says, 'So little have I given over a hundred years! Come and get what I have still got to give'.

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SECOND INTERNATIONAL CONGRESS OF ENGINEERING GEOLOGY

The above congress is to be held in Sao Paulo, Brazil, from 18th to 24th August, 1974. It will concern the presentation, comparison, and

discussion of research, results, information, ideas, and experience obtained in the field of Engineering Geology, attaining in this way the general aims of the International Association of Engineering Geology: '... to encourage research, training and dissemination of knowledge by

developing international co-operation in the field of Engineering Geology'.

All enquiries should be directed to Guido Guidicini, Secrétaire-General II Congrès IAEG, Instituto de Pesquisas Tecnológicas, Caixa Postal 7141, Sao Paulo—SP, Brasil.