DEPARTMENT OF MINERALS AND ENERGY

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD 1974/20

ALLUVIAL GOLD OF THE MOROBE GOLDFIELD

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Introduction

The Morobe Goldfield as finally defined pre-war comprised practically all of the District of Morobe of the former Territory of New Guinea south of the Markham River, extending from the headwaters of the Ramu River - the area around Kainantu - to the eastern extremity of the Territory - the Waria River area. Alluvial gold has been worked at many localities in the Morobe Goldifled, but the main source of gold is the Edie Creek - Wau area, and the main area of accumulation the flats of the lower Bulolo River above and to a lesser extent below its junction with the Watut River.

Production was small prior to 1922 when gold was discovered by W. Park in Koranga Creek and was still quite modest until the rich alluvials of the Upper Edie Creek area were found in 1926. Before 1930 records are incomplete but production in 1931-32 amounted to 48,518 fine oz (see Table 1) and in the following year was more than doubled by the initiation of dredging at Bulolo. From then on the returns from dredging continued to dominate gold production in the Territory of New Guinea and in the peak year, 1939-40, comprised 180,857 oz out of a total production for the Morobe District of 271,575 fine oz. Dredging was resumed after the war in 1946-47 and for a few years gold won by dredging predominated even more, as many of the smaller alluvial properties could not be worked economically under post-war conditions. However the dredging areas were progressively worked out during the late 50's and early 60's and dredging ceased during 1964-65. Since then alluvial gold production from the Morobe Goldfield has been of the order of 9000 fine oz per year. Total production from the Morobe Goldfield, making allowance for the unrecorded production in the latter half of 1941, is probably of the order of 3,700,000 fine oz, of which dredging contributed about 2,100,000 and other alluvial operations a little over 1,100,000 fine oz.

Distribution and Source of the Gold

In the Wau-Edie Creek area (Figure 1), whence most of the gold mined in the Morobe Goldifled has been derived, the source of the gold appears to have been mainly small rich stringers and veinlets scattered sporadically throughout locally mineralized areas in the neighbourhood of intrusive porphyies or centres of former volcanism. Some lodes have been worked at Edie Creek, and in the Golden Ridges area where open-cut mining on a small scale is still in progress, but, as a measure of their importance, they contributed only about 10 per cent of the pre-war production of the field, and 15 per cent of total production to June 30, 1973.

The richest alluvials were found in Upper Edie Creek, in an area of comparatively gentle stream gradient above a rock bar formed by the contact zone of an intrusive porphyry. Deep weathering, facilitated by the hydrothermal alteration of the Upper Edie porphyry and adjacent metamorphics, had resulted in the removal of a considerable volume of host rock and the concentration of its gold content in the gravels. The richest alluvials occurred over a length of about 5 km of Edie Creek and 2 km of its right-hand branch the Merri, and in their terraces and minor tributaries.

Most of the Bulolo flats area was dredged twice, first by the No 1 and 2 dredges, digging to about 12 metres depth, later by Nos 5 and 7 dredges which operated to a total depth of about 36 metres. A considerable quantity of gold-bearing alluvials therefore still remains in the deeper parts of the area. During the testing of the Bulolo flats, a 'false bottom' was found which probably represents an ash-fall from volcanic activity in the Golden Ridges crater.

The gravels appear to have been fairly uniform in character, consisting of a mixture of pebbles and cobbles with interstitial finer material. Coarser material is found near the mouths of river gorges at the upstream ends of the flats or of tributary streams. Thickness of overburden - soil and silt - ranged up to 5 metres thickness or more in places.

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Below this part Edie Creek runs mainly in a gorge and most of the gold carried over the falls at the head of it had eventually found its way down to the alluvial flats of the lower Bulolo, except for some fairly productive river flats and terraces e.g. Cliffside, near the mount of Edie Creek.

The main area of the Bulolo flats was about 10 km long, up to 22 km wide and as much as 70 m deep. Another considerable area of dredgeable flats occurred lower down the river, extending 4 km upstream along the Bulolo from the Bulolo-Watut Junction, 3 km up the Watut and 6 km down below the junction to Sunshire, near the junction with the Snake River and the beginning of long series of gorges in the Lower Watut River.

The alluvials of Koranga, an important producing area on the outskirts of Wau, are derived from or contained in conglomerate beds, which are mainly near-shore conglomerates of the Otibanda formation, laid down in a large lake which occupied the Bulolo-Watut valleys in Plio-Pleistocene times, and also to a lesser extent in fanglomerates spread across the surface of the lake beds during the rejuvenation of the topography which accompanied the draining of the lake. The gold is derived from former courses of Edie Creek and from local sources associated with volcanism and porphyry intrusion in the Golden Ridges area.

Above the mouth of Edie Creek the flats of the Bulolo River and its tributary Wau Creek were also dredged for gold, partly contributed from the Edie Creek area via Little Wau Creek, partly by Koranga Creek and partly by various tributaries bringing into the Bulolo River gold associated with intrusive porphyries, with the Morobe granodiorite batholith, and from gold-bearing marginal conglomerates of the Otibanda formation which are exposed at several places around the valley.

Alluvial mining other than dredging was carried out with varying success at many places within the Bulolo and Watut Valleys, from Hidden Valley Creek at the head of the Watut down to Maralinan where the Watut River opens out onto wide flats contiguous with those of the Markham River, a total distance of more than 100 km. The most productive areas were, of course, Edie Creek itself, Koranga, the Bulolo for about one km below the mouth of Edie Creek, and the Upper Watut river and the lower parts of its tributary streams, where the gold was derived mainly from the conglomerates of the Otibanda Formation.

Outside the Bulolo-Watut system, gold was worked in the Black Cat Creek and Bitoi River just over the divide 13 km north of Wau, at Kela near Salamaua, in tributaries of the Wampit and Waim rivers, and in Yonki Creek, Efontera Creek, Ornapmka Creek and other tributaries of the Upper Ramu River near Kainantu; also in the Waria River near Garaina and its southern tributary, the Ono.

Gold was a wide range in fineness according to the geological conditions under which it was deposited. Gold from epithermal deposits may contain equal quantities of gold and silver (fineness: 500) and fineness increases generally with temperature and depth of formation so that gold associated with granodiorites usually has a fineness in excess of 850. Alluvial gold in New Guinea bears the imprint of the igneous source or sources with which its deposition was associated, that with near surface intrusives and volcanics is of low fineness, generally 500-600, with deeper seated porphyries 700-750 and with granodiorites 850-900. Gold that has spent a long time in alluvials being worked and reworked becomes higher in fineness because of surface refining effect due to comparative loss of silver

and this becomes more marked the smaller the size of the gold particles, which generally corresponds to the distance they have travelled. Much of the alluvial gold in New Guinea is reworked gold that was first deposited in fluviatile or lacustrine conglomerates and subsequently concentrated in the present day streams as these conglomerates were eroded.

In Table 2 a summary is presented of the gold fineness and geological associations of the alluvial gold at selected localities on the Morobe Goldfield.

TABLE 1

Gold production in the Morobe goldfield: Kg fine gold

Year	Alluvial Kg	Dredging Kg	Lode Kg	Total Kg
Prior to 30/6/30	6,155.3			6,155.3
1930-31	927.6		1.1	928.7
1931-32	1,509.1	291.3	174.2	1,974.6
1932-33	1,438.0	1,948.2	405.7	3,791.9
1933-34	1,460.9	2,850.7	801.2	5,112.8
1934-35	1,281.0	3,878.0	924.9	6,083.9
1935-36	1,332.0	3,848.0	714.9	5,894.9
1936-37	1,526.5	4,257.0	937.8	6,721.3
1937-38	1,843.8	4,154.0	620.9	6,618.7
1938-39	1,499.6	4,969.4	660.3	7,129.3
1939-40	1,967.8	5,625.3	853.8	8,446.9
1940-41	1,969.8	5,406.8	587.0	7,963.6
1941-46	War years, production not recorded, small except for last six months of 1941.			
1946-47	68.0	507.0	-	575.0
1947-48	205.0	2,338.0	18.7	2,561.7
1948-49	504.2	2,247.0	-	2,751.2
1949-50	407.9	2,134.4	8.5	2,550.8
1950-51	550.5	2,081.4	26.5	2,658.4
1951-52	526.0	2,632.7	202.2	3,360.9
1952-53	560.0	3,478.2	205.3	4,243.5
1953-54	435.9	1,925.6	405.5	2,767.0
1954-55	684.3	1,500.1	417.0	2,601.4
1955-56	551.6	1,148.3	456.9	2,156.8
1956-57	486.0	1,484.7	390.9	2,361.6
1957-58	431.1	666.2	364.7	1,462.0
1958-59	443.8	508.8	360.7	1,313.3
1959-60	371.9	551.1	404.4	1,327.4
1960-61	375.5	470.2	414.5	1,260.2
1961-62	390.7	498.8	328.6	1,218.1
1962-63	404.2	507.0	318.1	1,229.3
1963-64	389.9	469.7	355.1	1,214.7
1964-65	395.7	200.9	358.4	955.0
1965-66	343.0	15.6	485.1	843.7
1966-67	322.0	0.5	466.3	788.8

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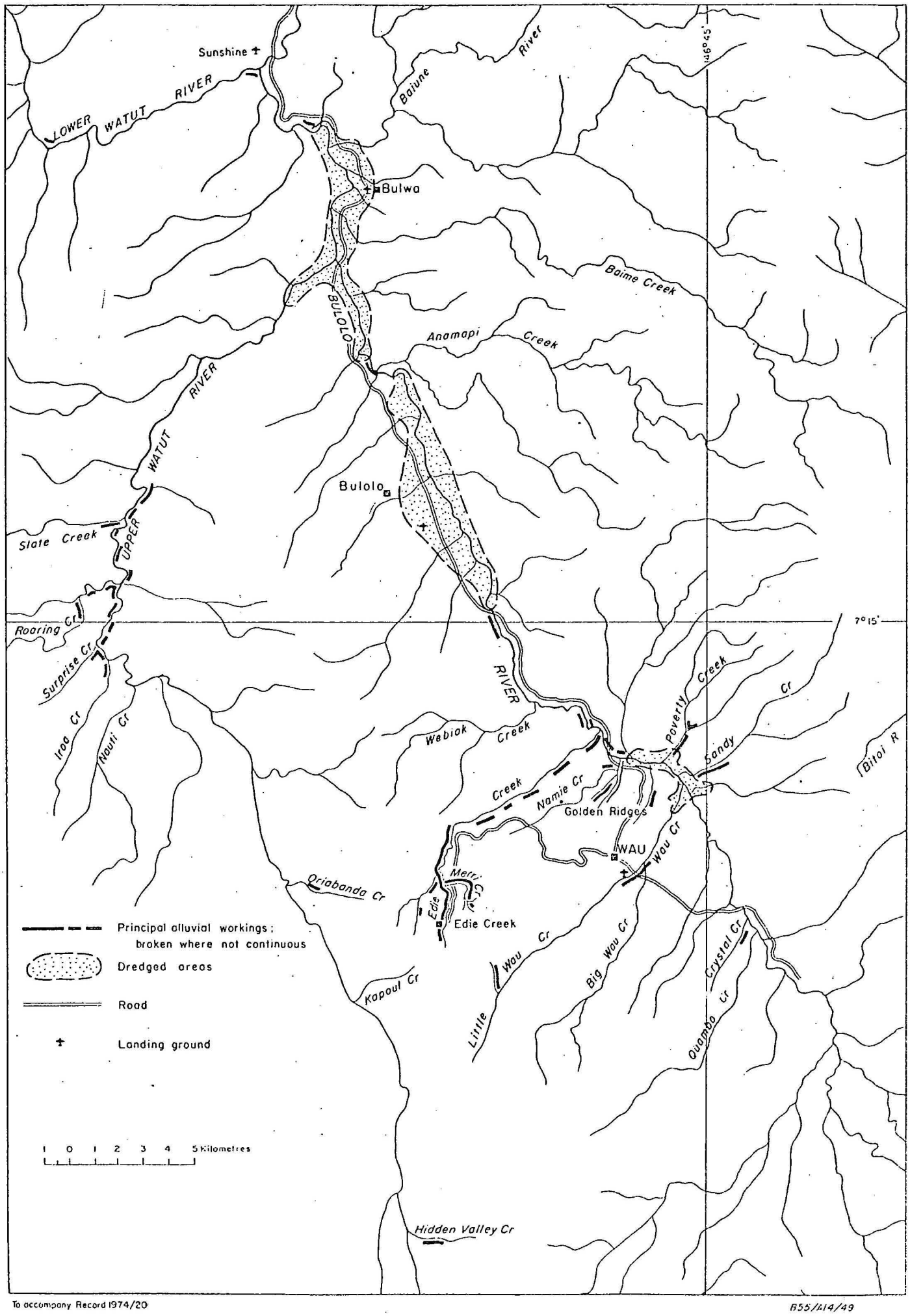
Year	Alluvial Kg	Dredging Kg	Lode Kg	Total Kg
1967-68	264.9	-	480.7	745.6
1968-69	244.4	-	479.3	723.7
1969-70	232.8	-	478.1	710.9
1970-71	292.8	-	407.3	700.1
1971-72	250.3	-	486.0	736.3
1972-73		-		650.8

TABLE 2

Name of area or deposit	Location relative to Wau	Fineness of gold	Geological associations and origin of alluvial gold
Edie Creek	8 km W.S.W.	520-555	Quartz-porphyry intrusives
Koranga	1.5 km N.W.	558-611	Volcanics, high-level porphyries; lake beds
Little Wau Creek	1 km S.E.	562-662	Mainly from Edie Creek area
No. 6 Dredge	4 km N.N.E.	687-792	Various: Koranga, Sandy Creek and Wau Creek
Bulolo main dredging area	18 km N.W.	640-680	From Edie Creek - Koranga area, also upper Bulolo granodiorite association
Bulolo River above Watut Junction	25 km N.W.	682-730	Similar, but possibly some U.Watut granodioritic gold
Lower Watut River, below Bulolo junction	28 km N.W.	725-749	Mixture Bulolo and U. Watut river gold
Upper Watut River	22 km W.N.W.	850-890	Lake beds; Morobe granodiorite contact zone.
Sandy Creek	5 km N.E.	843-877	Contact zone granodiorite; Lake beds
Black Cat Creek - Bitoi R	15 km E.N.E.	852-887	Contact zone granodiorite;
Wampit and Waim River	65 km N.	859-935	Veins (?) in metamorphics
Kela	45 km N.E.	661-901	Granodiorite contact zone (in part)
Waria River	75 km S.E.	738-787	Porphyritic and dioritic intrusives
Kainantu	150 km N.W.	736-924	Various intrusives; conglomerates; lake beds



To accompany Record 1974/20

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