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A GEOLOGICAL RECONNAISSANCE OF THE NAMBAYET CREEK AREA,

FINISTERRE RANGE, NEW GUINEA.

by

G. SIEDNER.



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SUMMARY

1. Area mapped located on southern flank of Finisterre Range; drains into Leron River; 2,600 feet a.s.l.
2. Lower Miocene sediments comprising conglomerates, greywackes, siltstones, shales and limestones intruded by basic igneous rocks. Sediments strongly disturbed and extensively veined with calcite.
3. Prospecting by box-sluicing, costeaning, dish showed no indications of gold. No sign of quartz-gold mineralisation found. Chances of economic gold deposits being found, not hopeful.

INTRODUCTION

The area covered in the course of the investigations lies approximately $1\frac{1}{2}$ hours walk South-East of ASINDAN village and is referred to in this report as the "NAMBAYAT CREEK AREA". It is drained by several tributary creeks of NASIN Creek, an eastern tributary of the LERON River near its junction with the WANTOAT River.

The purpose of the reconnaissance was to investigate a gold find by two ASINDAN natives - WASANG and KWAIKINANTAKA - who reported the discovery and submitted the two gold-quartz specimens to Patrol Officer C. Death at Wantoat Patrol Post. The gold was allegedly found in Nambayat Creek after a recent landslip and a good chance existed, therefore, that its lode source might be exposed and available for testing. Determination of the existence and extent of alluvial or lode deposits of gold and the demonstration of ground sluicing technique to the natives were the main objectives of the reconnaissance.

The investigations comprised ground-sluicing, costeaning, geological mapping and systematic testing of alluvium by prospecting dish in the creeks mapped.

The Nambayat Creek area was entered from Wantoat Patrol Post via Bum-Bum, Bungam and Asindan; total walking time $9\frac{1}{2}$ hours. A period of 10 days was spent on investigations in the locality. The outward journey followed the track passing Asindan, Nambadagan, Sukurum, Wongat, Sumagurum and ending at Kaiapit; total walking time 19 hours.

PHYSIOGRAPHY

The region under consideration lies on the southward draining slopes of the Finisterre Range. It is almost completely covered in dense rain-forest, except on the lower slopes bordering on the Markham Valley, where kunai grass and low scrub are predominant. The elevation at the junction of Nambayat and Yonel Creeks is 2,600 feet above sea level.

The range shows abundant evidence of tectonic instability. The deeply incised V-shaped valleys with many landslips in the upper reaches, and the strongly braided courses of the major streams cutting through the remnant terraces suggest that tilting of the mountain block is currently taking place, with a consequent rejuvenation of the topography.

One outstanding feature of even the heavily braided rivers is the steepness of their sides. In the more youthful tributary creeks, this is particularly noticeable and is enhanced by the virtual absence of terraces. The nature of the topography and heavy seasonal floods combine to remove vast quantities of surface material and this environment is not conducive to the formation of significant gold-placers, which generally require prolonged sorting under relatively stable conditions.

PROSPECTING

The gold-quartz specimens, referred to previously were found at location S1 (see map) near the mouth of Nambayat Creek, in an undercut portion of the bank. The site was pointed out by WASANG -- one of the finders.

In all the creeks investigated, numerous landslips had occurred (seven were counted in Nambayat Creek alone) and were occurring during the current wet season, but owing to deep weathering and the fractured nature of the rocks, no exposures were revealed by the slips.

It should be recorded at the outset that the net result of the prospecting was practically 100% negative, with respect to gold. Only one sample of rock showed a trace of gold on assaying.

(a) SLUICING :

The alluvial deposits in the creeks investigated, is of the most transient nature owing to the frequent floods scouring away accumulated gravel -- frequently overnight. The material sluice tested, is therefore, of significance only insofar as it is representative of the creek gravel.

A sluice-box made of pit-sawn timber -- 6 feet long, 15 inches wide and 10 inches deep -- equipped with a cane riffle board, was used. The box was placed in the immediate vicinity of the gravel to be tested which was shovelled directly into it. It was regular practice to clean out the box every night and to place it on the bank, out of reach of the nightly floods.

Site B1: was a shallow sand bank on the outside of a bend in Nambayat Creek, almost immediately below a low sloping cliff. The bank was excavated to a depth of about 5 feet, at which level a "bottom" of igneous material (probably weathered gabbroic rock) was encountered. An estimated total of two cubic yards from this site was sluiced through the box. Results with respect to gold : negative.

Site B2 : an island in the creek was traversed by a trench approximately 4 feet wide, depth varying from 2 to 4 feet. About three cubic yards were sluiced but bottom could not be reached due to large boulders and flooding of the pit. Result with respect to gold : negative.

Site B3 : an island in Yonel Creek, which is a larger and faster flowing creek than Nambayat Creek. The island was traversed by a trench which, however, did not extend to bedrock owing, again, to large boulders and flooding. Approximately five cubic yards were extracted and sluiced. Result with respect to gold : negative.

Site B4 : was a 15 foot high terrace (the only one seen in the area) into which a costean, 8 feet high and 3 feet wide, was dug from the bedrock up. About four cubic yards were extracted from this site. Results with respect to gold : negative.

The sites for test-sluicing were selected as near as possible to the mouths of the creeks and were also the most open portions of the creeks. The negative results from the test sluicing, as well as the basically unfavourable conditions for the accumulation of gold-bearing deposits indicate that the chances of finding gold-placers of economic dimensions in the drainage area above the Yonel-Arik Creek junction, are remote.

While working in the area, I was told by the local natives of a European prospector who visited the area shortly after the last war (probably during 1946). It is alleged that he spent about one month, unsuccessfully, test-sluicing in the creeks.

(b) COSTEANING :

Owing to the paucity of outcrops outside the creeks, it was found desirable to dig trenches at the sites of recent landslips and where mineralization of the country rock was suspected. The ground excavated was tested periodically for gold by prospecting dish and the rock examined for traces of quartz-gold mineralization. On the whole, the costeaning was disappointing - partly because no trace of gold mineralization was revealed, and partly because the great depth of weathering and fracturing of the rock hindered penetration to the unweathered bed-rock.

Costean C1 : In a landslip, immediately above location S1 (the site of the gold find). The trench was approximately 5 feet deep, 3 feet wide and 8 feet long. The rock - deeply fractured - was a dark green, calcareous argillite intensively veined with thin calcite stringers. No structure was observed. Considerable difficulty was experienced with the overburden which was mobilised by the seasonal rains and repeatedly slid back into the trench. No quartz or gold mineralization was seen and regular testing by prospecting dish revealed no traces of gold.

Costean C2 : In a landslip, about 20 feet above Nambayat Creek. Excavating conditions and results, with respect to gold, were the same as in C1. Here the rock was a black siltstone, deeply fragmented.

Costean C3 : In a landslip, about 50 feet above Yonel Creek. The rock here was a fractured black shale. Unfragmented rock was encountered at the bottom of the 6 foot deep costean, but no evidence of quartz and/or gold mineralization.

Costean C4 : In the bank, about 15 feet above Yonel Creek. After penetrating about 5 feet of overburden, bedrock was encountered. This consisted of strongly contorted micaceous shales, dark-grey and brown in colour with no traces of quartz veining.

(c) GENERAL PROSPECTING

The creeks investigated are shown on the accompanying map. During the course of geological mapping, alluvium in the creeks was tested systematically by prospecting dish without, however, finding even a trace of gold.

GEOLOGY

The geological mapping of the Nambayat Creek area, adjunctive to the prospecting operations, was carried out on a regional scale of 2 inches = 1 mile. A map of the area concerned was made by enlarging the military 1 mile map.

(a) SEDIMENTS :

The sediments of the Nambayat Creek area are probably of Miocene age and comprise conglomerates, greywackes, siltstones, shales and limestones. They are intruded by basic igneous rock. Calculated on an average dip of 45° , the sediments mapped have a true thickness of approximately 4,700 feet.

The downward sequence is as follows :-

(a) Dark-green greywacke, brown upon weathering; contains grains of quartz and mica in a clayey matrix; signs of extensive shearing; thin ($< \frac{1}{8}$ inch) irregular calcite veins throughout. Type locality : S21; thickness unknown.

(b) Conglomerate, consisting of rounded to sub-angular boulders and pebbles, maximum size about 18 inch diameter. The unweathered rock is hard and consolidated but its disposition was not discernible. The components of the conglomerate include most of the underlying rocks mapped in the area. The estimated thickness of this formation is 345 feet and the type locality is at S 20.

(c) Brown siltstone, extensively sheared and calcite-veined; very similar in appearance to greywacke in (a); no bedding observed. Estimated thickness about 500 feet, type locality at S19.

(d) Black shale. In Yonel Creek, at site S7, the shale contains abundant mica which is rare to absent at Site 18. Calcite veining is noticeably absent from this component. No Bedding was observable but strong secondary foliation involving the mica is present. Estimated thickness ca.330 feet.

(e) Green limestone weathering black; extensively fractured; no structure discernible; Calcite veining rare. Type locality: S 6; estimated thickness ca.224 feet.

(f) Black Siltstone. The texture of this unit is generally that of a siltstone but it contains local components varying in grain-size and texture from shale (at S4), to siltstone (at S17), to greywacke (at S10). The rock has been subjected to intense shearing and the serpentine developed on the shear faces, gives it a characteristically greenish hue. Calcite veining is very sparse. Estimated thickness approximately 820 feet.

(g) Green limestone, almost black, weathers to an olive-buff; very fine grained; fracturing intense. The rock shows a dense network of calcite veins with a maximum observed thickness of $\frac{1}{4}$ inch. Type locality at S 1; estimated thickness 528 feet. It should be added that a large (ca.80 cubic yards) boulder consisting mainly of coarsely crystalline calcite with inclusions of shale and greywacke, was found in the creek at S 22, after a landslide. A sample of the calcite was assayed but showed only a trace of gold.

(h) Black Siltstone: This unit varies from a homogeneous siltstone at S 11 to a greywacke at S 15 Estimated minimum thickness approximately 1980 feet.

(i) Numerous boulders of agglomerate were found in Nambayat Creek. A specimen taken from one such boulder at location S17 has angular to sub-rounded fragments of argillite and calcareous sediments in a calcareous matrix. The fragments range in size from ca. 4 cm. to 1 mm and less, the majority of fragments being less than 1 cm. in diameter. There is good reason to believe that this rock is the Finisterre agglomerate, basal to the Tertiary sediments in the Finisterre - Saruwaged Ranges.

(b) INTRUSIVE ROCKS AND MINERALISATION :

A body of gabbroic rock outcrops along the west bank of Nambayat Creek and Yonel Creek up to, at least, the latter's junction with Arik Creek. Where it intrudes the green limestone in Nambayat Creek, the gabbro has undergone considerable contamination and re-crystallisation, generally giving a positive reaction with acid.

A specimen of the apparently unaltered intrusive (from location S13) shows idiomorphic crystals of a prismatic mineral, green-gray in colour (possibly hornblende) associated with irregular blebs of white, feldspathic material. No free quartz was observed in the specimen.

Calcite veining is fairly common in the area surveyed - being more common in the limestones. In the immediate vicinity of the gabbro intrusion in Nambayat Creek, the limestone is strongly veined by calcite. The adjacent siltstones, however, show a negligible degree of calcite veining. The overlying sediments are similarly differentiated. This pattern indicates that the calcite did not emanate from the gabbro but, more likely, represents material dissolved out of the limestone and re-deposited in fissures - the process having been promoted by the thermal effects of the intrusion.

Green copper oxide staining was found in several specimens of gabbro at sites S2 and S9.

No signs of quartz mineralization were observed in the area investigated.

(c) STRUCTURE AND AGE

The sediments mapped have a regional dip of between 35° and 50° to the North-East. They are strongly disturbed in the vicinity of their contact with the gabbro - the siltstones having responded by intense local folding and the limestones by fracturing. Generally the dip of the beds is not discernible owing, mainly, to lack of bedding in the limestones and the predominance of secondary foliation in the argillites.

The sediments encountered in the Nambayat Creek area were not mapped to their contact with rocks of known age, nor were fossiliferous formations found. Their lithology, however, suggests that the sediments are part of the Mebu Series. M. Ongley ("Review of the Geology of the Central and Eastern Part of Permit 2, T.N.G.", Island Exploration Co., Aug. 1939) describes the Mebu Series - Lower Miocene, East Indian "E" stage - as consisting of:

"Dark greywackes, cherty greywackes, cherty argillites and conglomerates, highly disturbed, shattered and calcite veined and intruded by basic igneous rocks. Marine at least in places. Includes limestones with volcanic ejectamenta" (p.p.5).

The Mena Series - Upper Miocene, East Indian "F" stage - is described by Ongley as :

"Alternating, well-bedded marine, generally micaceous grey sandstone, shales, silts and conglomerates. Part passes into limestone facies (Gowop limestone) in Finisterre Range. Highly disturbed in places." (op.cit.p.5).

Since there is no single distinguishing feature which would enable definite correlation of the sediments mapped in the Nambayat Creek area with either the Mebu or Mena Series, this issue must remain open until further evidence is revealed. The present writer considers, however, that, according to their general lithological features, the sediments in question are more conveniently correlated with the Mebu than the Mena Series.

CONCLUSIONS

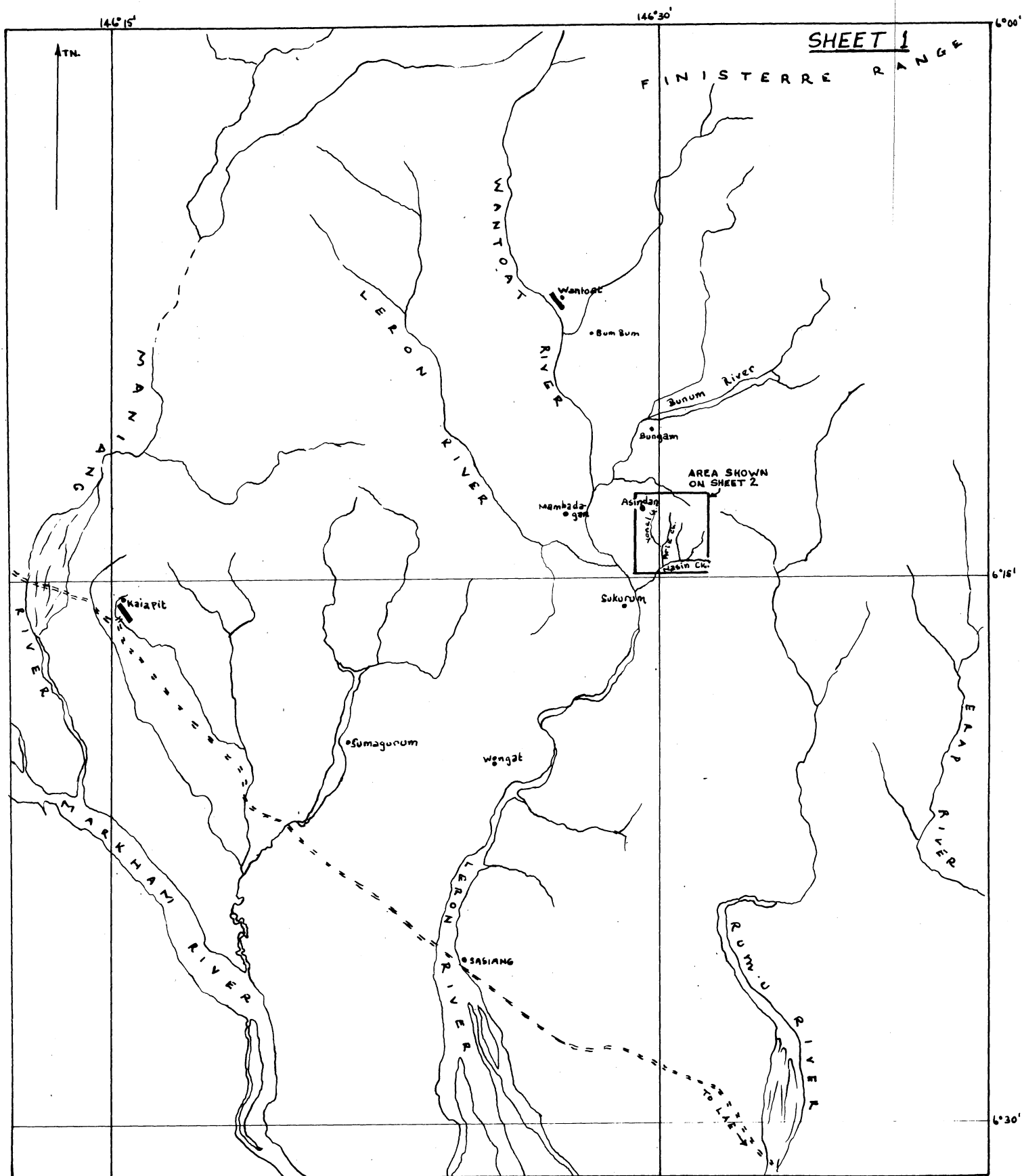
The generally negative results of the test-sluicing bear out the earlier contention - based on physiographic grounds - that there is little likelihood of economic gold placers being found in the deeply dissected area investigated.

General evidence indicates that the calcite veining in the sediments is due mainly to redeposited material from the limestones. In spite of the fact that one such sample showed a trace of gold upon assaying, the chances of this source providing gold lodes of any significance are not hopeful.

No signs whatever were found in the area of the existence of quartz mineralization such as may have shed the gold-quartz specimens allegedly found by WASANG in Nambayat Creek. Moreover, the basic character of the intrusive rocks in this and nearby areas, makes it improbable that they could have generated quartz-veins. The possibility that underlying siliceous sediments - under the action of the intrusion - gave rise to the formation of quartz veins, cannot be discounted; but no evidence pointing in this direction was observed anywhere in the area.

APPENDIX

The results of the investigation introduced serious doubts as to the veracity of WASANG'S claim to have found the gold-quartz specimens at the site indicated. Accordingly, I questioned him several times about his find, but failed to note any variations in his story, which was that he accidentally found the two specimens at location S1 in Nambayat Creek; not knowing what their significance was, he showed them to a friend in PUK PUK Village, who had worked in Bulolo and who identified them as gold; whereupon he took the specimens to the Patrol Officer at Wantoat, hoping for a reward. In reply (dated 16th January, 1958) to a request for an enquiry into the antecedents of WASANG and other members of his village, ASINDAN, the Patrol Officer at Wantoat informed me that he is satisfied that neither WASANG nor any other living men of his village have ever worked in Bulolo or Wau. However, the question about the precise origin of the gold-quartz specimens is better left open until further evidence is made available.



Location MAP. accompanying Geological Reconnaissance Map
of the Nambayat Creek Area. Dec. 1957.

Scale: 1 inch = 4 miles

ASINDAN

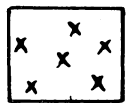
T.N.

SHEET 2.

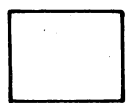
GEOLOGICAL RECONNAISSANCE MAP OF THE NAMBAYAT CK. AREA, FINISTERRE RANGE.

SCALE: 4 ins. = 1 mile.

KEY TO SYMBOLS

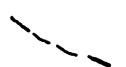


INTRUSIVE - GABBRO

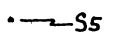


CONGLOMERATE
GREYWACKE
SILTSTONE
SHALE
LIMESTONE

MEBU SERIES (?)
LOWER MIOCENE



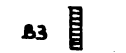
GEOLOGICAL BOUNDARY.



LOCATION SYMBOL



WATERFALL



SITE OF TEST SLUICING



COSTEAN

