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1981/33. Geological inspection of the Back Creek slate mine

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Abstract

The Back Creek slate mine has an apparently established market in Brisbane for 32.8 t per week of 10 mm thick, randomly shaped, white rimmed grey slate tiles.

There appears to be plentiful slate on the lease of the type that is presently being sold.

Slate in the face behind level 2 in the main quarry and surface slate in adjacent cleared areas is easily extractable, as is slate from spoil dumps related to the previous working of the deposit.

There would be a handling advantage in tiles of rectangular shape and uniform size, and a production advantage if large slabs of slate can be cut to rectangular shape before resplitting.

INTRODUCTION

In response to a request from the Chief Geologist, the Back Creek slate mine was visited on 2 June 1981. The mine is situated about 400 m south-west of Turquoise Bluff [EQ048562], which is about 6 km north of Pipers River in northern Tasmania. The geology of the region is shown in Marshall *et al.* (1965) and what is known of the history of previous slate extraction is summarised by Noldart (*in* Marshall, 1970).

Both the mine and the area to the south-east were inspected in the company of the owner, G.E. Johnson. The objective of the inspection was to form a general appreciation of the nature of the slate deposit and the work that has been done by Mr Johnson. The visit was made as a consequence of an application by Mr Johnson to the Department of Mines for funds to enable him to construct a diamond saw for cutting slate.

DESCRIPTION OF SLATE TILES

The following brief description is of tiles that were seen packed on pallets ready for transport. An example has been lodged with the Department of Mines Mineralogist and Petrologist.

The slate tiles are approximately 10 mm thick and of irregular shape and variable size. They range up to about 450 mm long and about 300 mm wide, but the average dimensions are about 50-66% of these values.

The bulk of the surface area of each slate tile is uniformly medium-grey in colour, and there is a partial or complete rim of white ranging from 5 mm to 15 mm in width. The tiles are quite hard and tough and have a distinctive ringing sound when struck. Many slates show a slight amount of curvature. There is a slight relief texture on tile surfaces.

OCCURRENCE OF SLATE

Regional

The slate mine is situated in a zone of slate about 600 m wide (Marshall *et al.*, 1965) that is part of the Mathinna Beds (Williams, 1979)
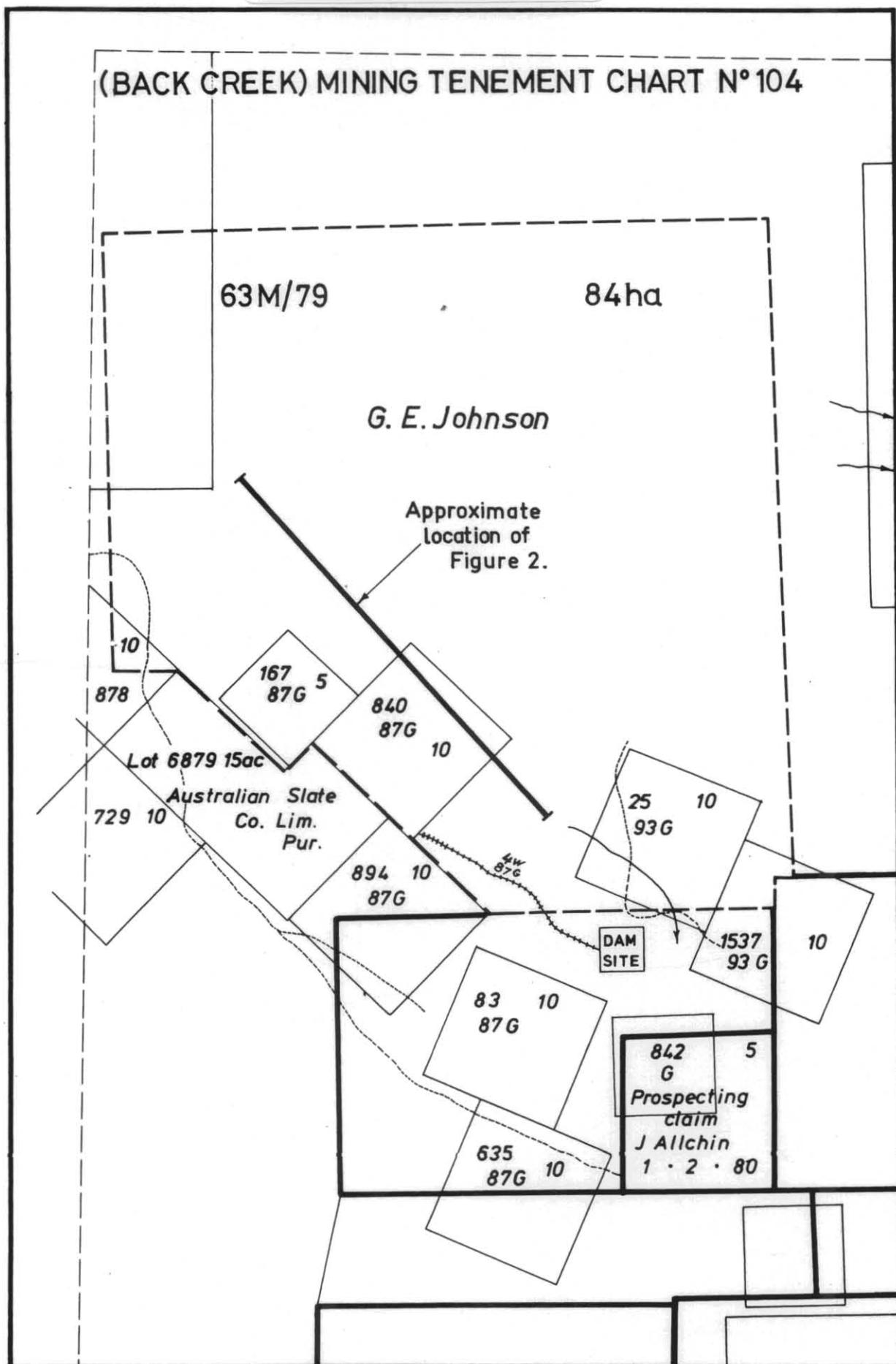
Figure 1. *Location of mining lease.*

which at Back Creek are of Ordovician age (Banks and Smith, 1968). This zone is within a belt of predominantly slaty and phyllitic Mathinna Beds that extends 24 km SSE to the Bangor district where there are two other abandoned slate quarries (Bangor and Just's).

The splitting surface in the slate is the slaty, axial-surface cleavage of the early phase of Middle Devonian folds that are ubiquitous in the Mathinna Beds.

Local

The mine is near the north-west end of a strike ridge of slate that extends for over one kilometre (fig. 2). There is good exposure in and about the main old quarry and in a minor, old quarry near the south-east end of the ridge. One exploratory costean has been dug by Mr Johnson on the crest of the ridge about 300 m south-east of the main quarry. There is float and sparse natural outcrop in intervening areas.

Judging from the available exposures, the ridge is underlain entirely by well-cleaved, pelitic rocks which are well-bedded with bed thicknesses ranging from about 100 mm to unusually thick beds in excess of one metre thick. The beds dip ENE at 40-60° and the cleavage dips ENE-NNE at generally 5-15°. Refraction of cleavage occurs at bed interfaces; its effects are generally least evident within thick beds.

Little evidence was found of secondary splitting surfaces related to the late crenulation cleavage described by Marshall (1970, p. 81). Jointing is common and fairly irregular in spacing and orientation. The white rim on the slate tiles results from leaching adjacent to joint surfaces. The dominant and most regular joint set is near-vertical and trends ENE at about 90° to the strike of the bedding. This joint set and bedding are the main surfaces utilised in quarrying the slate.

In undeveloped areas there is a surficial layer one to two metres thick consisting of soil and decomposed rock.

Turquoise is common as smears on joint surfaces, particularly in the area of new work south-east of the main quarry, but nothing of commercial significance has been found.

PRESENT EXTRACTION

Slate is being extracted from:

(1)   The face at the back of level 2 in the main old quarry (figs. 2, 3).

(2)   Recently cleared areas along strike either side of the main quarry (figs. 2, 3). This is primarily surface material with minor excavation in the area south-east of the quarry.

(3)   Old spoil dumps near the main quarry (fig. 2).

There has been no extraction from the old workings at the south-east end of the ridge, nor from along the ridge. There is no access track past the main quarry environs.

SKETCH MAP OF BACK CREEK SLATE MINE
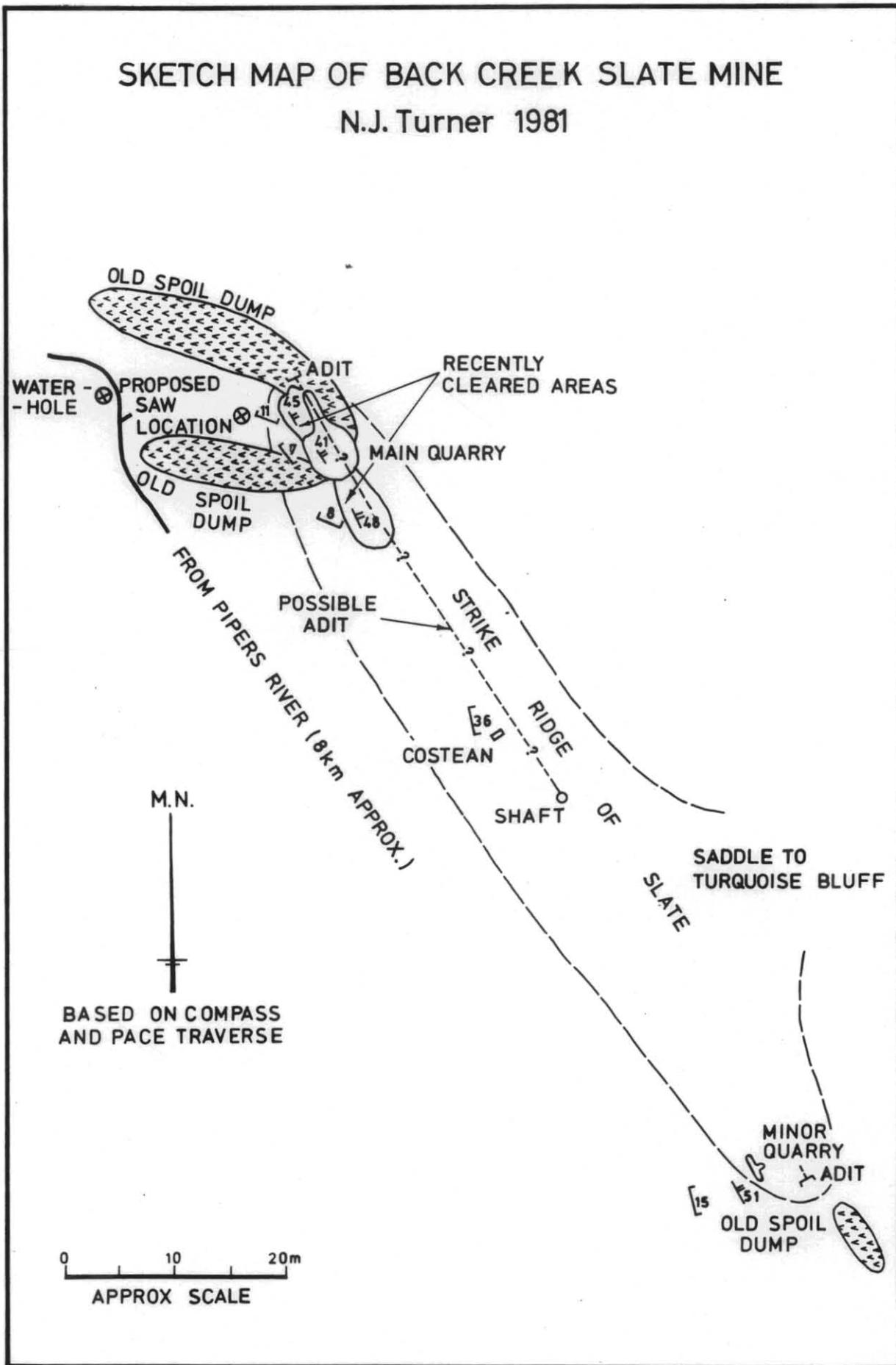## N.J. Turner 1981

OLD SPOIL DUMP

ADIT

RECENTLY
CLEARED AREAS

WATER-
-HOLE

PROPOSED
SAW
LOCATION

45

11

MAIN QUARRY

47

9

OLD
SPOIL
DUMP

8

48

FROM PIPERS RIVER (8km APPROX.)

POSSIBLE
ADIT

STRIKE

?

?

RIDGE

M.N.

36

COSTEAN

?

SHAFT

OF

SADDLE TO
TURQUOISE BLUFF

SLATE

BASED ON COMPASS
AND PACE TRAVERSE

MINOR
QUARRY
ADIT

15

51

OLD SPOIL
DUMP

0   10   20m

APPROX SCALE

Figure 2.

5 cm

SKETCH MAP OF BACK CREEK SLATE MINE
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SURFACE
CLEARED

TRACK

FLOOR OF
QUARRY

ADIT SYSTEM

LEVEL 2

M.N.

LEVEL 1

NEW SPOIL

TRACK

SURFACE
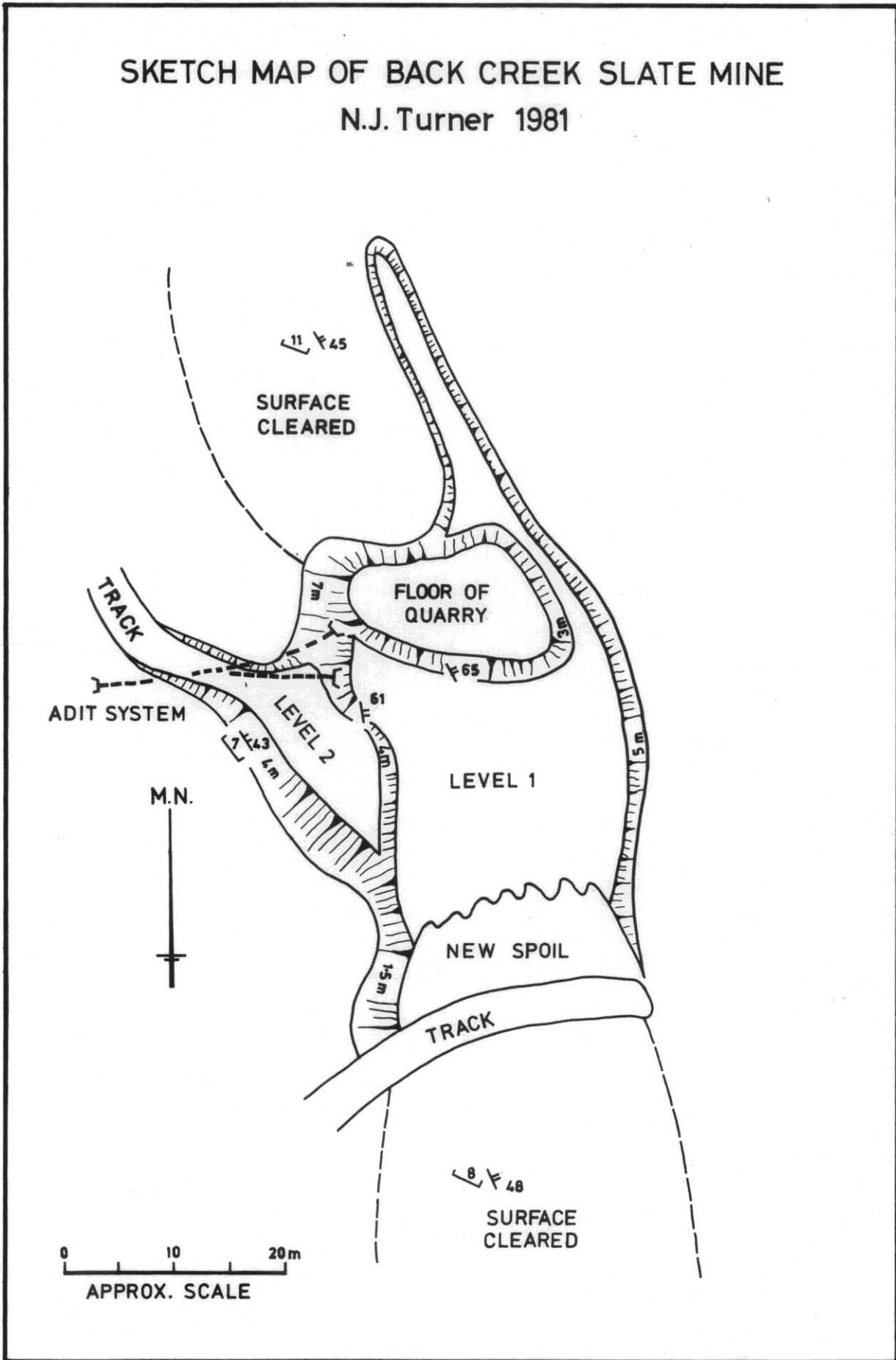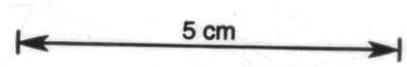CLEARED

0   10   20 m

APPROX. SCALE

Figure 3.

5 cm

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DISTRIBUTION OF COMMERCIAL STONE AND RESERVES

White rimmed slate is being extracted from each of the above areas. Judging from float and the costean, the white rim persists as a feature of the slate from the present workings to at least 80 m past the costean. This gives an overall strike length of at least 450 m. The width in any one place probably does not exceed 50 m but has not been ascertained.

Since material in the old adits is uniformly grey and does not show the white leaching effect, the reserve of slate tiles of the type described has a depth cut-off. Presumably this is in the order of 10-20 m.

Because of curvature due to cleavage refraction and because of a commonly higher degree of weathering, thin beds yield a poor return of useable slate. Beds with thickness in excess of about 250-300 mm give the best return.

It is impossible to gauge the reserves of the type of slate presently being sold because:

(1) No systematic costeaning has been carried out to determine the proportion of thicker beds.

(2) The depth cut-off of the white weathering effect is unknown.

(3) The percentage yield of individual beds is unknown.

(4) The old spoil dumps contain a mixture of uniform and white-rimmed slate. The ratio is unknown but presumably favours the former, since much of the slate came from depth.

However, the following assessment is offered:

(1) Suitable slate occurs over a strike length of at least 450 m.

(2) It looks like the slate will generally be easy to recover, although careful thought will need to be given to development to ensure that recovery remains easy in the long term.

(3) In part of the easily workable face behind level 2 in the main quarry there is an estimated volume of material of 20 m (length) x 3 m (height) x 8 m (stratigraphic thickness). About six metres thickness of this is useable beds giving a volume of 20 m x 3 m x 6 m = 360 m^3. Say 50% of this is recoverable (*i.e.* 180 m^3), then at a density of 2.7 t/m^3 and a selling price of \$3200 per container (16.4 t) the monetary value is \$95 040. I emphasise that this figure is a 'guesstimate' and provides only a vague guide as to the overall value of the deposit.

(4) When the face on level 2 has been worked out it should be possible to easily work the face underneath it behind level 1 and the high face north on level 2. This will require construction of an access track down to level 1.

MARKETING

Mr Johnson has a contract for two containers of slate tiles per week with a Brisbane agent. At 2 June he was producing at a rate of one container

per four days.

Mr Johnson has arranged with Montile to act as Tasmanian agent for an initial period of twelve months. There was a sample pallet of slate in Montile's Launceston store on 5 June but none of the slate was on display. The pallet had been there only a day or so. I understand that Montile have sent sample pallets to their Hobart and north-west coast branches.

From conversation with Mr A. Montauban of Montile I understand:

(1) That the Back Creek slate tiles are in competition with imported Italian (uniform grey) and Indian (multicolour) slate tiles.

(2) That the Indian slate is slightly better priced.

(3) That variably coloured slate such as the Indian and Back Creek material sells better at present than uniformly coloured slate.

(4) That slates with uniform dimensions are more attractive to retailers than random shapes, since retailers sell by the square metre and Trade Practices Regulations relate to area squared.

DIAMOND SAW

Mr Johnson wishes to construct a diamond saw so that he can cut large slabs of slate down to 300 x 300 mm. He will hand split the resultant squares to a 10 mm thick product. This should be less wasteful than splitting down large slabs by hand.

Mr Johnson proposes to set up two saw blades in parallel at 300 mm spacing, using second-hand blades from the Pontville stone works. Design specifications have not yet been established for the saw apparatus.

To prove availability of water for the diamond saw a 3.5 x 2.5 m waterhole has been dug in clayey alluvial material in a gully about 100 m from and 10-20 m below the proposed site of the plant (fig. 2). The hole was full when inspected. Mr Johnson said it had filled by natural seepage. The rate of seepage was not ascertained.

Large slabs of slate about 1.0 x 0.8 x 0.3 m in size were seen in the workings, but the proportion of excavated material that is in this form is not known. It seems that use of a diamond saw would be advantageous in reducing these slabs to tiles. However, the colour distribution in the resultant tiles is unpredictable. Mr Johnson did not have any cut samples on site and I am not sure that he has actually tested the method.

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[15 June 1981]