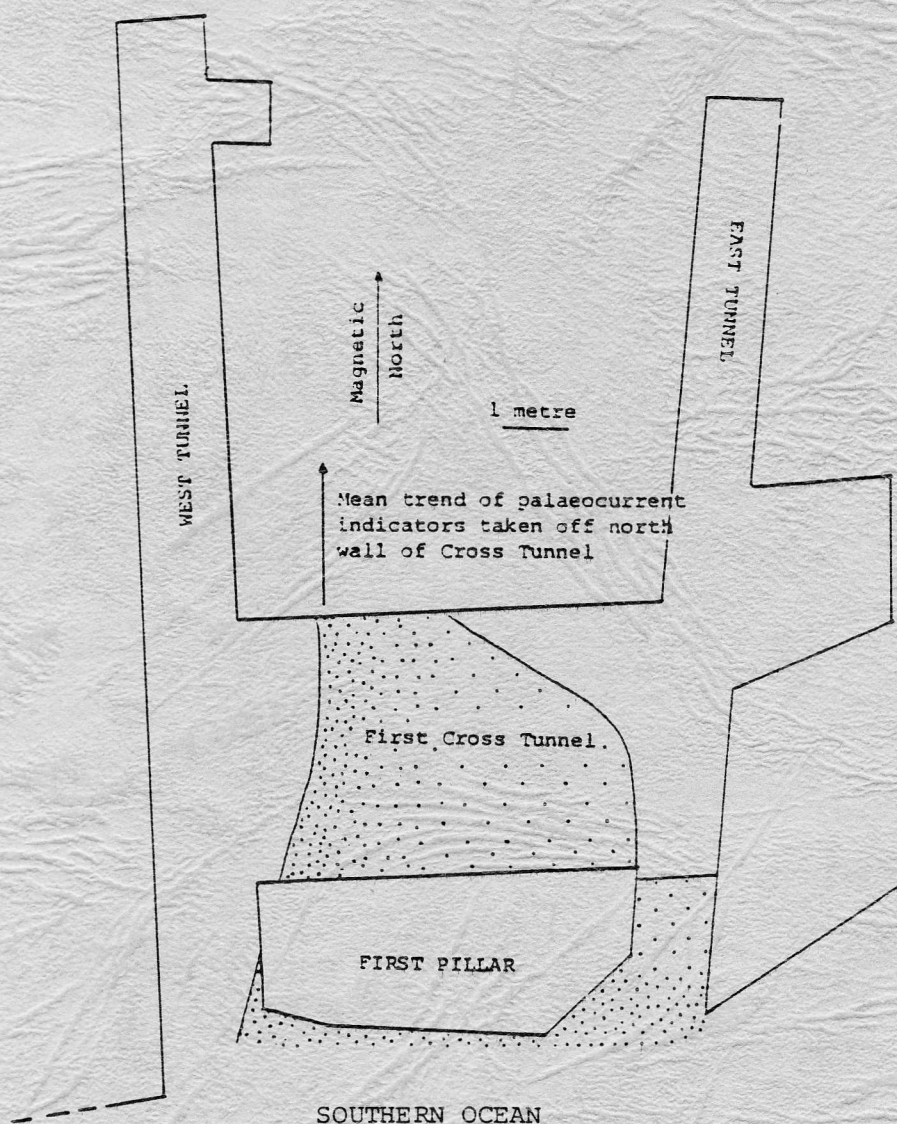


# DIG AT

# DINOSAUR COVE

# 1990

EXCAVATION AT SLIPPERY ROCK SITE, DINOSAUR COVE AS AT 27/3/1989



Stipled areas indicate where fossiliferous unit known. The denser the stipling, the thicker the unit. Maximum thickness 20 centimetres.

# Dig at Dinosaur Cove 1990

## Introduction

The state of knowledge at the Slippery Rock site in Dinosaur Cove, the principal fossil site there, at the end of the 1989 excavation is indicated on the cover. The First Pillar was known to be a likely source of fossils as specimens had been found on all sides of it, and two partial dinosaur skeletons had been found just north of it. Although both the East and West Tunnel had been extended for 10 metres beyond the First Cross Tunnel, there had been insufficient time to determine whether the fossil layer was present north of the latter.

After the excavation at Dinosaur Cove in 1989, the intention was not to have another one until 1991. The logistics of the work have become so great that a biannual effort is the normal schedule intended there for the foreseeable future. However, in attempting to plan the 1991 excavation, it soon became apparent that two quite different options were available.

The first was to continue following the known fossiliferous unit northward from the First Cross Tunnel. However, as that chamber was about as wide as considered safe, this could be done with the least amount of effort if a continuation of the fossiliferous unit could be found so that a Second Pillar could be left between the First Cross Tunnel and the area where a new chamber would be excavated.

The second course of action was to build a wall in the First Cross Tunnel and remove the First Pillar as fossils had been found on all sides of it.

Given the capabilities of the volunteers normally available for the excavation at Dinosaur Cove, the first course of action seemed the best, if the fossiliferous layer did in fact persist north of where it was known. However, it seemed quite rash to commit the project for three months to the necessity of finding such a northward continuation of the fossiliferous layer. If it could not be found after a month's effort, in the middle of a season it would have been most difficult to gear up for the construction of a wall approximately 8 metres long, 2 metres wide and 2.5 metres high.

In light of these considerations, it was decided to have a small-scale operation in 1990 to determine whether or not a northward extension of the fossiliferous layer could be found. Therefore, the plan of action for 1990 was to take up the floors of the East and West Tunnels and to link them with a Second Cross Tunnel to see if the fossiliferous layer continued or pinched out.

## The Excavation

The crew arrived on 6 January and the process of putting in started the next morning. As it was not intended to collect vast quantities of fossiliferous rock, which is the common course of events at Dinosaur Cove but merely to search for it, the decision was taken not to set up the flying fox. This saved considerable effort, but it did mean that the crew had to struggle with getting all the mining equipment down to the site manually at the beginning of the excavation and carry it up the same steep track to retrieve it at the end.

Fortunately, the water and air lines that had been left in place after the 1989 excavation were still intact.

At the beginning of the second week, excavation of the Second Cross Tunnel began. Six metres of tunnel were cut in as many days. The only difficulties encountered during this phase all related to the water supply. The inadvertent use of only one instead of two layers of plastic for lining the above ground pool that is used as a water reservoir resulted in losing the bulk of the first load of water supplied by the local CFA. A nest of wasps that had been in the water lines eventually found its way down the pipes and into the rock drill, temporarily reducing the supply so that a drill steel became inextricable from a rock face. Finally, there was so much moisture in the exhaust air of the rock drill that at times the workers underground could see less than half a metre. This latter difficulty was never overcome and was the most serious of the three water supply problems. Nothing like it had ever occurred in earlier years.

Most of the next fortnight was devoted to lowering the floor of the East and West Tunnels north of the First Cross Tunnel as well as lowering that of the Second Cross Tunnel. No fossiliferous rock was found in the East Tunnel and only a tiny lense 70 centimetres wide with a maximum thickness of 3 centimetres occurred in the Second Cross Tunnel. However, in the West Tunnel, a well-defined fossiliferous unit extended for 7 metres. It was ironic that in drilling a core in 1989 at the northern end of the West Tunnel, the fossiliferous unit was missed by less than 30 centimetres and in digging in the West Tunnel opposite the First Cross Tunnel that year, the southern extremity of this same fossiliferous layer was missed by even less.

While the work was going on in Dinosaur Cove, there was much activity back in camp as well. Together with the usual support work that has to always take place when such an operation is underway, an addition was made to a storage shed to accommodate a third caravan. Furthermore, extra shelving was put into the shed to better accommodate the equipment.

During the course of the excavation, Lt. Ian Watson of the 21st Construction Squadron, Australian Army, Puckapunyal, visited the operation to make an assessment of a possible future role for his unit. On the final day of the

work, 4 February, Lt. Kerry Marshall from the same unit and Messrs. Duncan Bell, George White, and David Scheffield from Western Mining visited the site for the same purpose. A number of people experienced with the project over the years were on hand to answer questions from this latter group concerning technical aspects of the work that were beyond our competence to handle: Rebecca Norton, John Herman, Ian Jesser, William Loads, and Patrick O'Neill.

Takeout operations began as soon as the tunnelling phase was completed. Equipment not needed further was gradually removed as the crew left the site each night. The bulk of the takeout, however, was accomplished during the last three days, a period which was marked by torrential rains.

#### Assistance

All the volunteers during this excavation were persons with one or more seasons experience at Dinosaur Cove. This made for a particularly smooth running operation.

Michelle Colwell  
Lucinda Hann  
Graeme Hird  
Robert Hodge  
Ian Jesser  
Graham King  
Lesley Kool  
Michael Marmach

Pauline Schockman  
Natalie Schroeder  
Gordon Spark  
Nicholas van Klavern  
Noel Watkins  
Helen Wilson  
John Wilson  
Corrie Williams

Other people, although not formally members of the field crew, were important contributors to the success of the work

John Angel  
David Denney  
Winsome Denney  
Arnis Heislars  
Spencer Herd  
John Herman  
Trevor Hird  
Bob Jones  
William Loads  
Jack Mackenzie

James Milnes  
Rebecca Norton  
Patrick O'Neill  
Guy Royce  
John Rutherford  
Katherine Smith  
Elizabeth Thompson  
Chris Wilkinson  
Joy Wilkinson  
Robert Wilson

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SLIPPERY ROCK SITE, DINOSAUR COVE

Tunnels as at 4/2/1990



Figure 1

## Interpretation of Results of 1991 Excavation

The tunnels at the Slippery Rock site as they exist at the present writing are shown in fig. 1. The stippled areas are those regions within the tunnels and immediately adjacent to their entrances where the fossiliferous unit is known. The fossiliferous unit is a sandstone containing a preponderance of clay gull clasts, plus a lesser amount of carbonised plant material and, more rarely, fossil bones and teeth. Typically but not always, it is greenish in colour. It overlies a massive, structureless black claystone.

Evidently, the black claystone represents a phase when the local hydrological situation was one of extremely low energy, incapable of transporting objects even as large as fine sand grains. Perhaps this phase was a quiet lake. This was followed by a sudden pulse in energy that brought in the sand, clay gull mixture that is the fossiliferous unit. This increased rate of water flow, perhaps owing to a flood, resulted in the scouring of the local countryside, removing dried up bits of clay, pieces of wood, and the rarer bones and teeth, finally depositing them in the channel of a small stream.

In a sense the term 'fossiliferous unit' is a misnomer for immediately overlying it and extending upwards another 30 centimetres are black and white laminated sandstones and claystones that yield the occasional partial skeletons of dinosaurs and fish. However, this higher unit is not separable in a hand specimen from non-fossiliferous rock still higher in the section as well as lateral to it. The only difference between the two is the presence of the rare skeletons in the former. This difference in the respective presence and absence of fossils between the two has been established by extensive empirical sampling.

In the West Tunnel the fossiliferous layer was found from the First to the Second Cross Tunnels. It is thickest at its southern end, being at least 8 centimetres there. Together with the fact that the fossiliferous unit is unknown in the East Tunnel north of the First Cross Tunnel and is all but unknown in the Second Cross Tunnel, two hypotheses come to mind to explain the distribution of the fossiliferous unit.

Figure 2 represents one interpretation. If the channel which is known in the First Cross Tunnel and underlies the First Pillar turned abruptly west, all the fossiliferous unit known from the Slippery Rock site represents a single episode of deposition. If this is so, it is peculiar that the deepest part of the channel in the bend from the First Cross Tunnel into the West Tunnel should remain on the concave side of the turn. One would expect the deepest part of the channel to have crossed over to the convex side of the bend by the section of the channel represented in the West Tunnel.

This difficulty suggested an alternative represented in Figure 3. Here the fossil layer encountered in the West

Hypothesis 1 for course of a single palaeostream channel

Hypothesised boundary of palaeostream channel: —?—?—?

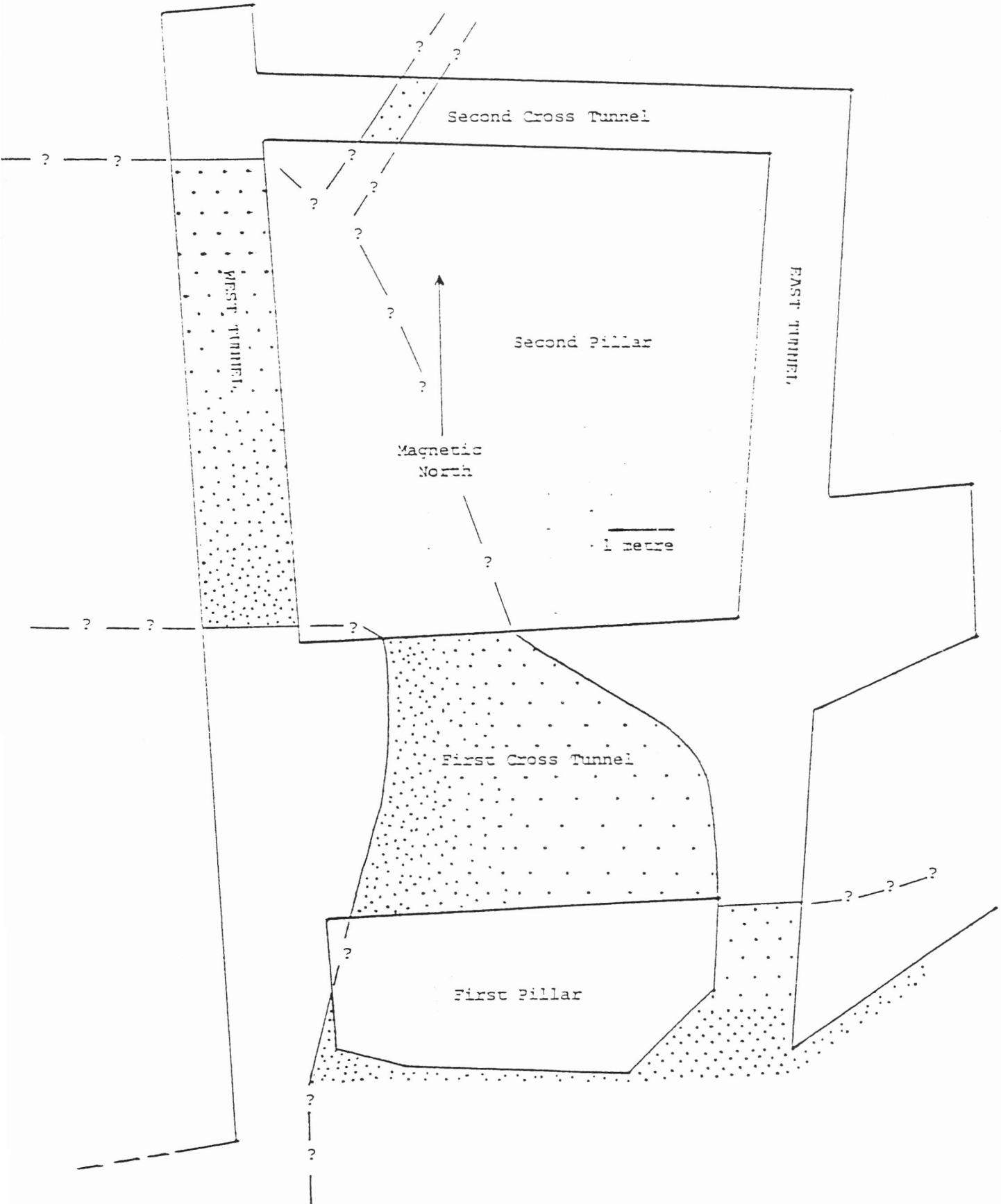


Figure 2

Tunnels as at 4/2/1990

Hypothesis 2 for existence of two separate stream channels

Hypothesised boundary of palaeostream channel: — ? — ? — ?

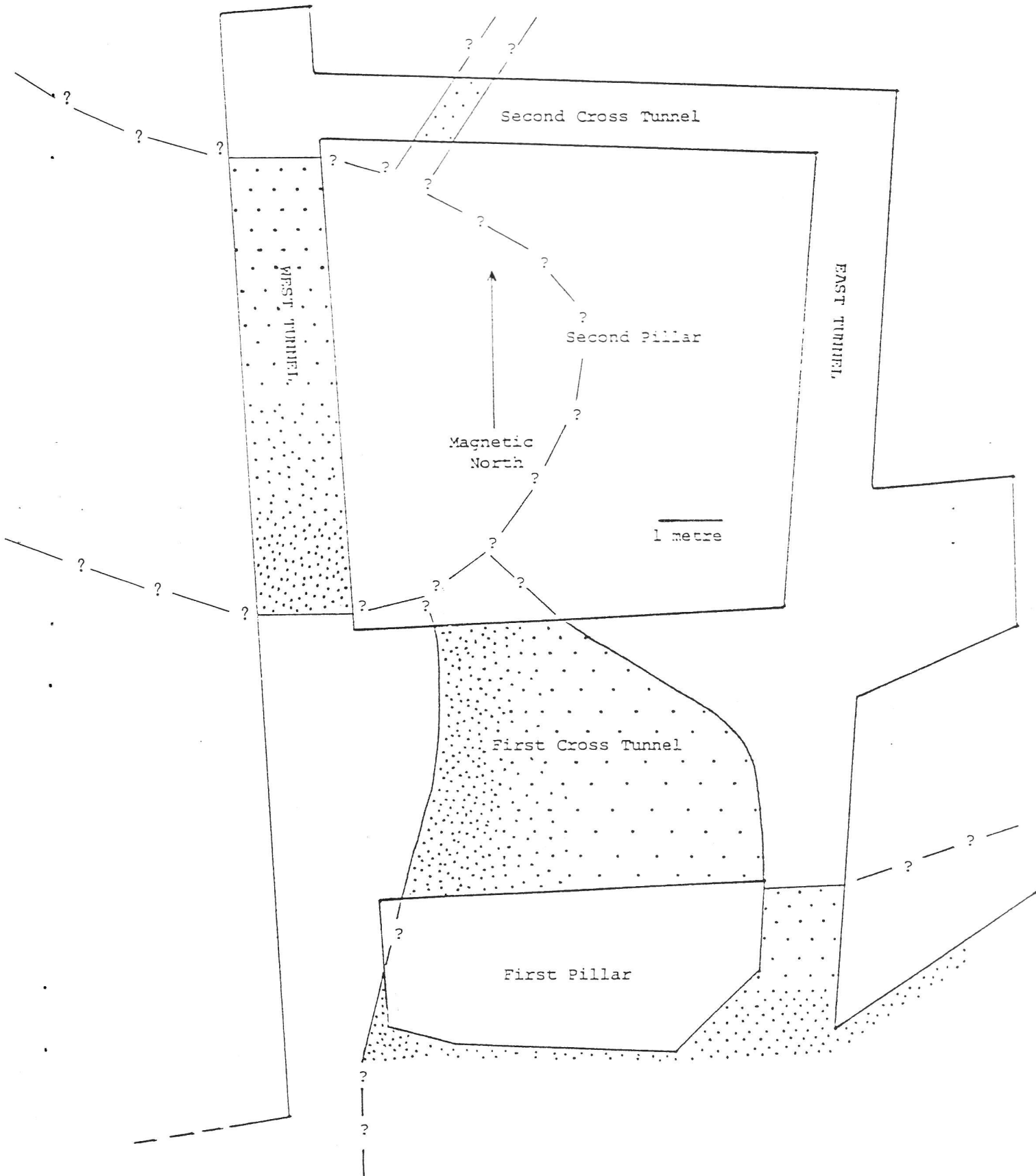


Figure 3



Tunnel is interpreted as a second oxbow deposit that was laid down at a slightly different time from the one known around the First Pillar.

#### Proposal for 1991 Excavations in Dinosaur Cove

The presence of a 7 metre-wide exposure of the fossiliferous unit in the West Tunnel of the Slippery Rock site within Dinosaur Cove strongly suggests following it to both the east and west. Fortunately the same course of action is indicated under both hypotheses 1 (fig. 2) and 2 (fig. 3). Digging westward will be the first step because it will not entail diminishing a critical support pillar (The Second Pillar) in size. In addition, there is a clear limit on the eastward extent of the unit as it was not found in the East Tunnel north of the First Cross Tunnel and only a tiny lense was found in the Second Cross Tunnel. An eastward extension is therefore something to be done, if ever, after 1991.

To follow the fossiliferous unit westward in the West Tunnel, the overburden will be removed along the entire known 7 metre extent of the unit in the tunnel to a distance westward of 6 metres from the existing western wall (see fig. 4). This amount is a compromise between the competing criteria of mining efficiency once the tunnelling operation has begun and a desire not to excavate barren ground unnecessarily.

A second programme at the Slippery Rock site will be to build a wall adjacent to and immediately north of the First Pillar. This will serve the twin purposes of holding up the roof in order that the First Pillar can be subsequently removed and ultimately, act as part of a barrier to prevent access to the tunnels once the excavations at Dinosaur Cove are shut down permanently as far as the present generation of workers are concerned.

The third programme for 1991 will take place at the Dinosaur Cove East site, the point where the original discovery of fossil bones was made in Dinosaur Cove in 1980. There a short tunnel will be driven over the fossil deposit that is known to be present to facilitate further collecting there.

With the assistance of Western Mining and the Army, all three objectives will be attained in 1991. Without them, a somewhat curtailed programme one will be the single goal that year.

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OBJECTIVES for 1991

SLIPPERY ROCK SITE, DINOSAUR COVE

Tunnels as at 4/2/1990

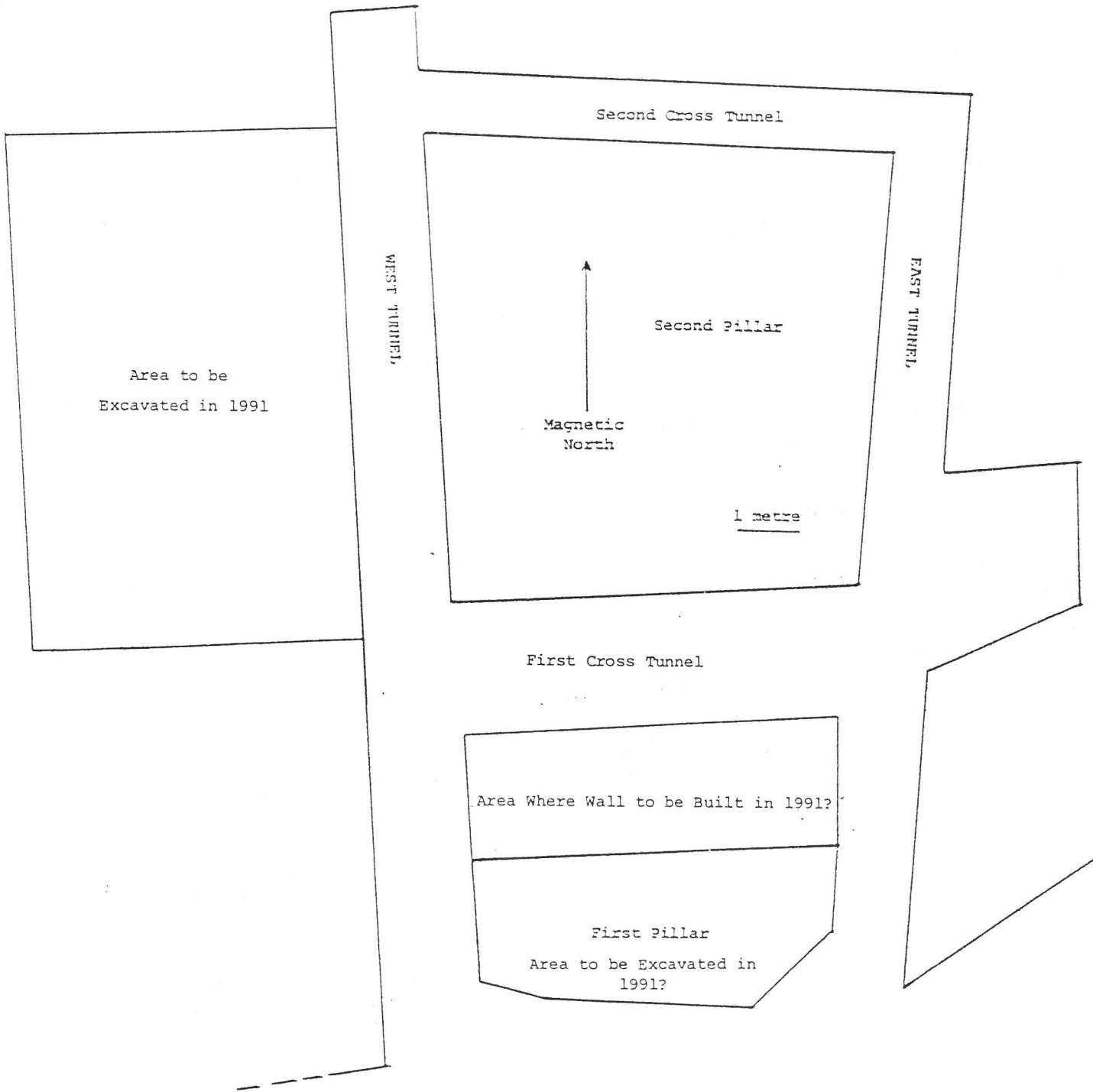


Figure 4