

**Langdale Erosion Research Programme  
Project Brief**

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## **Introduction**

On the slopes around the Langdale and Scafell Pikes are the remains of a large Neolithic axe factory, which used a narrow band of fine grained volcanic tuff as its source material. The factory was the most productive of all the British, prehistoric stone axe factories; its products have been found in large quantities all over Britain and even from the continent. The monuments are of international importance.

There are over 580 discrete production sites within 35 groups. The sites comprise large quantities of worked, waste flakes generally in association with quarries or working floors and have the characteristics of a fine mobile scree. As long as the waste material remains in situ, it can reveal much of the 4,500 year old production practices. However, many of the sites are on 45° slopes and are vulnerable to the forces of erosion; their survival to date has depended upon a thin layer of protective turf. At a significant number of the sites there has been observed a decline in the extent of this turf cover since the start of the present archaeological programme in 1984 and these monuments are now under threat.

## **Evidence of vegetation loss**

### **Explained Vegetation Loss**

The causes of vegetation decline at many sites are still uncertain, however there are some site groups where the reason for the erosion is self evident and of these the most severely disturbed is the South Scree group. Photographs published by Clare Fell in 1948 of the South Scree cave show the scree covered by Bilberry and heather vegetation, but as a result of visitors using the gully the vegetation was disturbed. Flash floods in the early 1950's were channelled by the gully and caused severe damage to the unprotected scree. Subsequent scree running down the gully contributed to the destruction and has resulted in a c.1.5m decrease in the level of scree from around the area of the cave (the main axe production area). The material has been redeposited in an artificial tongue near the foot of the hill side which comprises about 3000 metric tons of scree, of which 280 metric tons are neolithic waste flakes. This the largest of the axe production groups is largely destroyed.

A similar, though not so extreme, pattern of damage has been observed where the main footpaths pass through areas of axe production (Harrison Path and Thorn Crag groups). The combined effect of foot action and run-off erosion has cut narrow gullies through sites and exposed them only in section. Continued erosion has led to the expansion of the gullies and resulted in severe damage to the working sites.

At other sites the prime cause of erosion is attributable to misguided, amateur 'archaeologists', who in the past have excavated areas of monuments with the aim of finding rough-out axes. Excavations adjacent to the crag faces of sites 98 and 162, were not backfilled and the resultant turf exposures were expanded by natural erosion forces and a limited amount of visitor pressure. There is presently little turf cover over the sites, which are now in a deteriorating condition. Unfortunately these 'excavations' were unrecorded and there is little indication of the condition of the sites prior to the explorations.

### **Unexplained Vegetation Loss**

In contrast to the above there are some working sites which are progressively being exposed, but where there is no simple explanation for the primary turf decline. The prime examples of these are on a steep buttress on the face of Pike of Stickle (Top Buttress). Since the start of the present archaeological recording programme in 1984 there has been a differential decline of the bilberry/heather vegetation. Around the main sites (eg. 98, 94 & 92) there has been a limited amount of vegetation loss, but generally the vegetation defined extent of these sites has not changed since 1982 (Photograph taken from the band, R.Tarver - held by LUAU). However there has been a dramatic vegetation decrease around periphery areas exposing sites 111, 198, 204 & 207. In this instance visitor pressure does not appear to be as significant a factor, as in other erosion areas; Top Buttress is fairly inaccessible and in the course of recent surveys (1991/2) only occasional visitors have been observed on it. Although natural erosion forces are evidently now increasing the extent of the turf exposure, the primary cause of the exposure is not apparent.

## PROJECT AIMS

By virtue of its size and preservation, Top Buttress is probably the most important axe factory group and warrants preservation if possible. However, as the mechanics of the visible erosion are not understood, the success of any costly repair programme can not be guaranteed. The broad aim of the present environmental research programme is, therefore, to establish the range and effect of erosion forces upon the protective vegetation and to make recommendations for the repair of the monuments.

Documentary research will be undertaken to identify early photographic records of the monuments. This will be used in conjunction with present day general photographs and a monitoring programme (established 1989) in order to identify the rate of erosion and which areas have been most seriously affected. Analysis of flake patination will be undertaken to provide an estimate of how long the flakes have been exposed and therefore provide a guide as to the stability of the turf cover over the working sites.

In order to test the effectiveness and longevity of repair techniques, a sample area of site 162 (Harrison Stickle) has been partly covered by turfs cut from the immediate locality (Aug. 1992). The site will be monitored to determine the extent to which the new vegetation becomes established on the scree.

Up to ten specialists, from a broad range of related scientific viewpoints will be approached to undertake a brief environmental assessment of the upland equilibrium. These specialist perspectives include:

Botanical analysis

Geomorphological analysis (soil mechanics)

Social Geography (animal erosion and visitor pressure)

Climatical analysis (water/run-off erosion)

Landscape management (land consolidation)

On the basis of one or two site visits and any records held by LUAU, they will be required to produce a short written report on their findings. These, along with the results of the trial repair and documentary research, will be assimilated into a final environmental evaluation report that will make recommendations for the future management of the sites. The report will need to be completed in advance of a meeting of the National Trust Langdale Advisory Committee in June 1993, which will assess the results of the research programme.

The results of the research programme will be assessed by the

It is not proposed to undertake more detailed ecological research during this initial phase of the programme.

The assessments will attempt to resolve the following questions:

1. What erosion factors are affecting the vegetational equilibrium on Top Buttress and Harrison Stickle and which of these is the most significant.
2. What proportion of Top Buttress has stable vegetation cover

and which areas are most seriously affected by erosion.

3. To what extent is the condition of the underlying scree deteriorating once the protective turf cover has been lost.
4. What action can be undertaken to limit the effects of erosion.
5. What methods can be employed to repair and reconsolidate the the vegetation cover over the sites. What are the long term prospects for the success of any repair programme.



Pl. 3 General view of Pike of Stickle, showing Top Buttress and South Scree Axe factory groups



Pl. 4 General view of Harrison Stickle group





**Pl. 5    Sites 162 (Harrison Stickle) prior to repair**



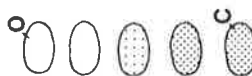
**Pl.6    Site 162 (Harrison Stickle) after repair**



# Key to Survey Plans

Flake concentrations  
flakes/Sq.m

- 0 - 15
- 16 - 120
- 121 - 500
- 501 - 2000
- 2001 -



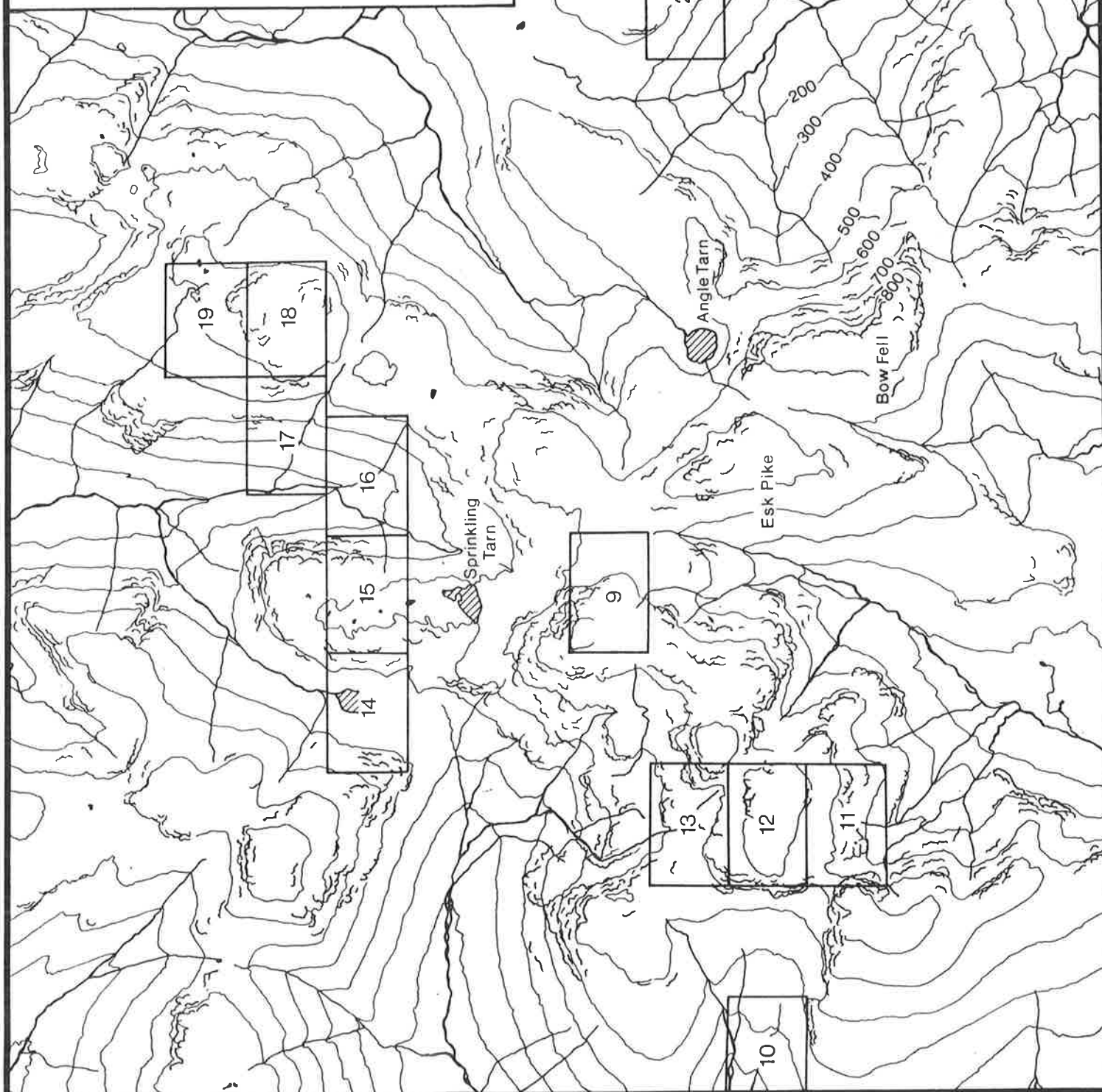
Crags from the OS

Surveyed crags

Vegetation cover

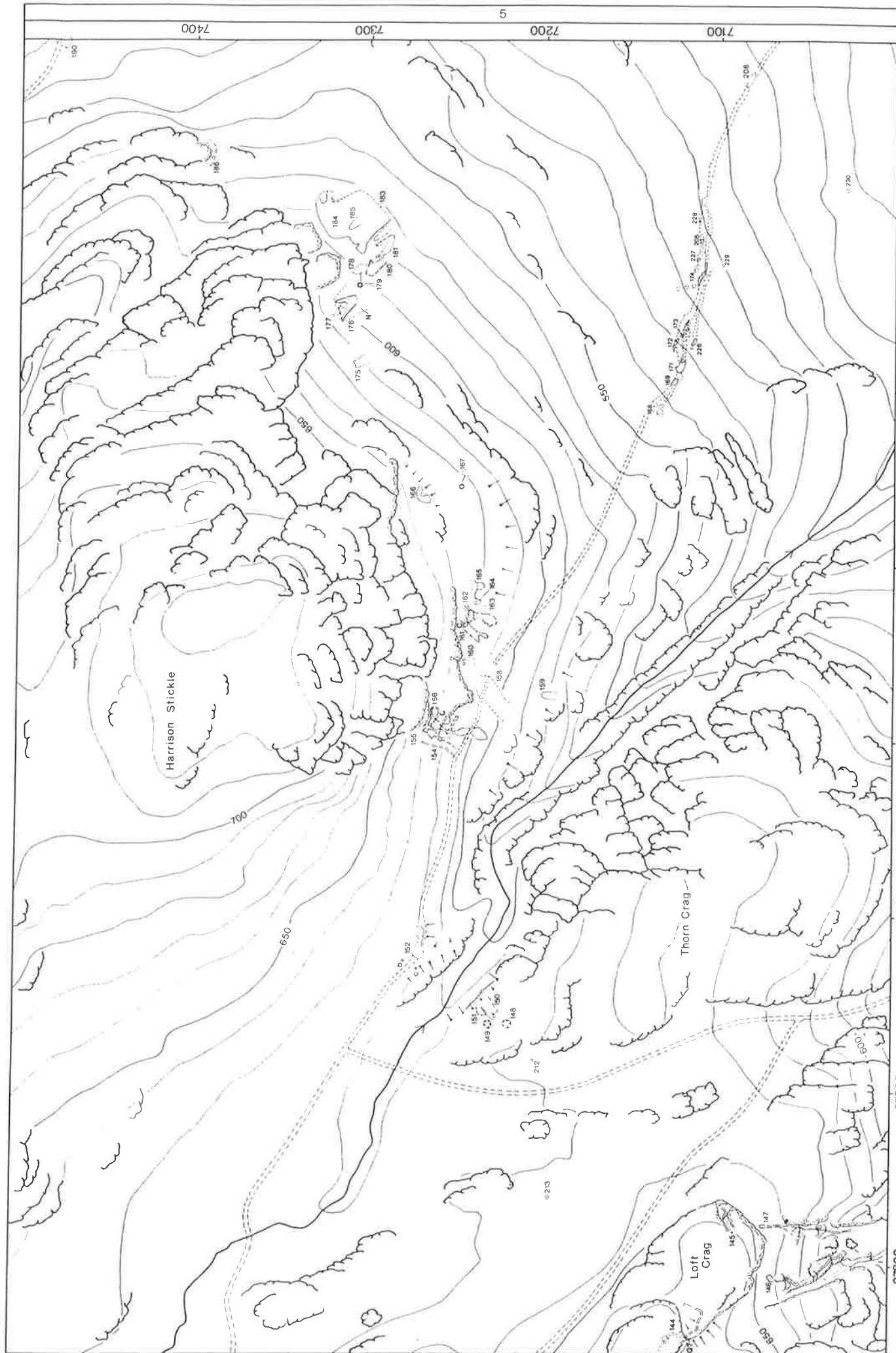
Natural scree

Cave

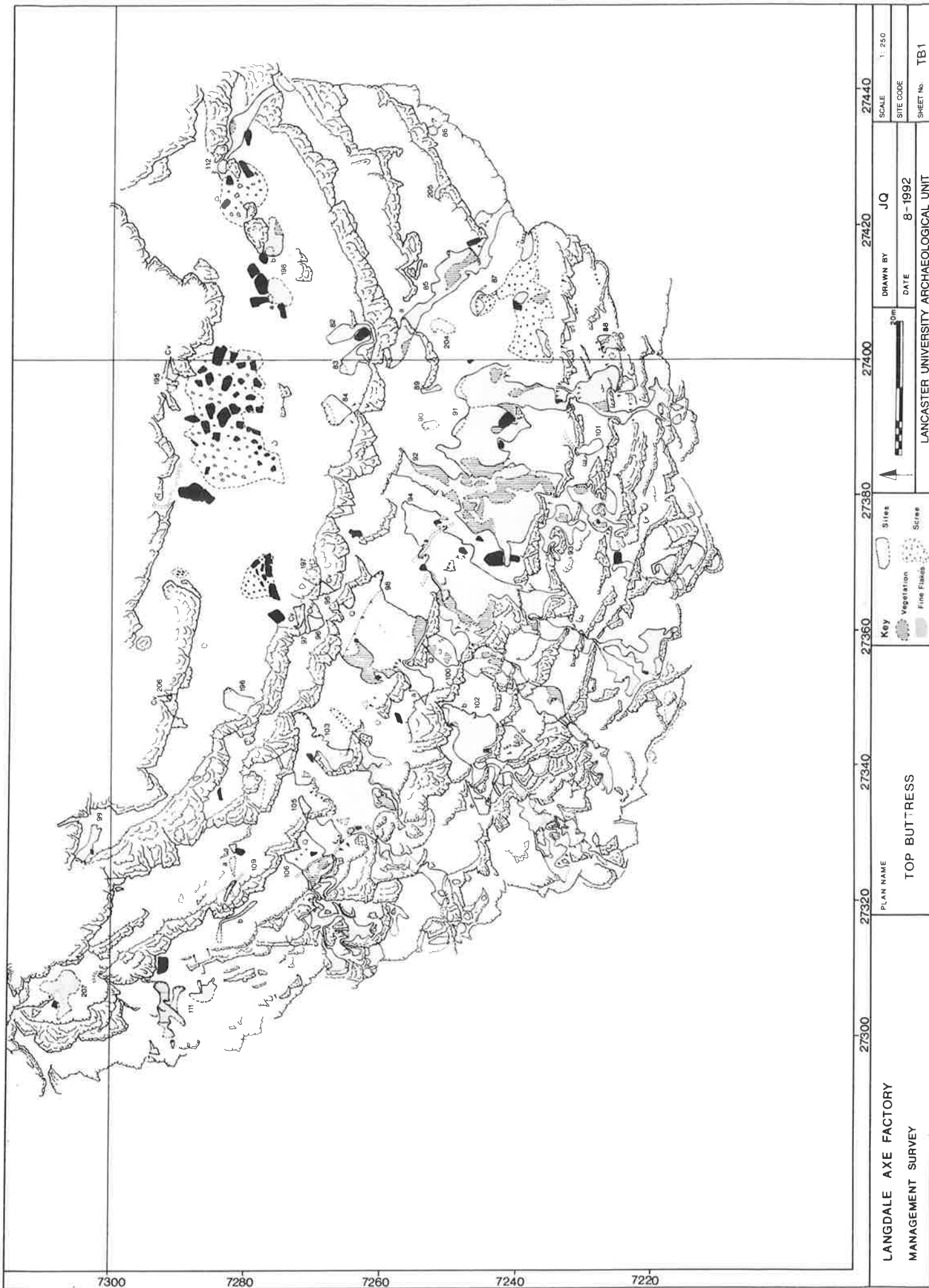


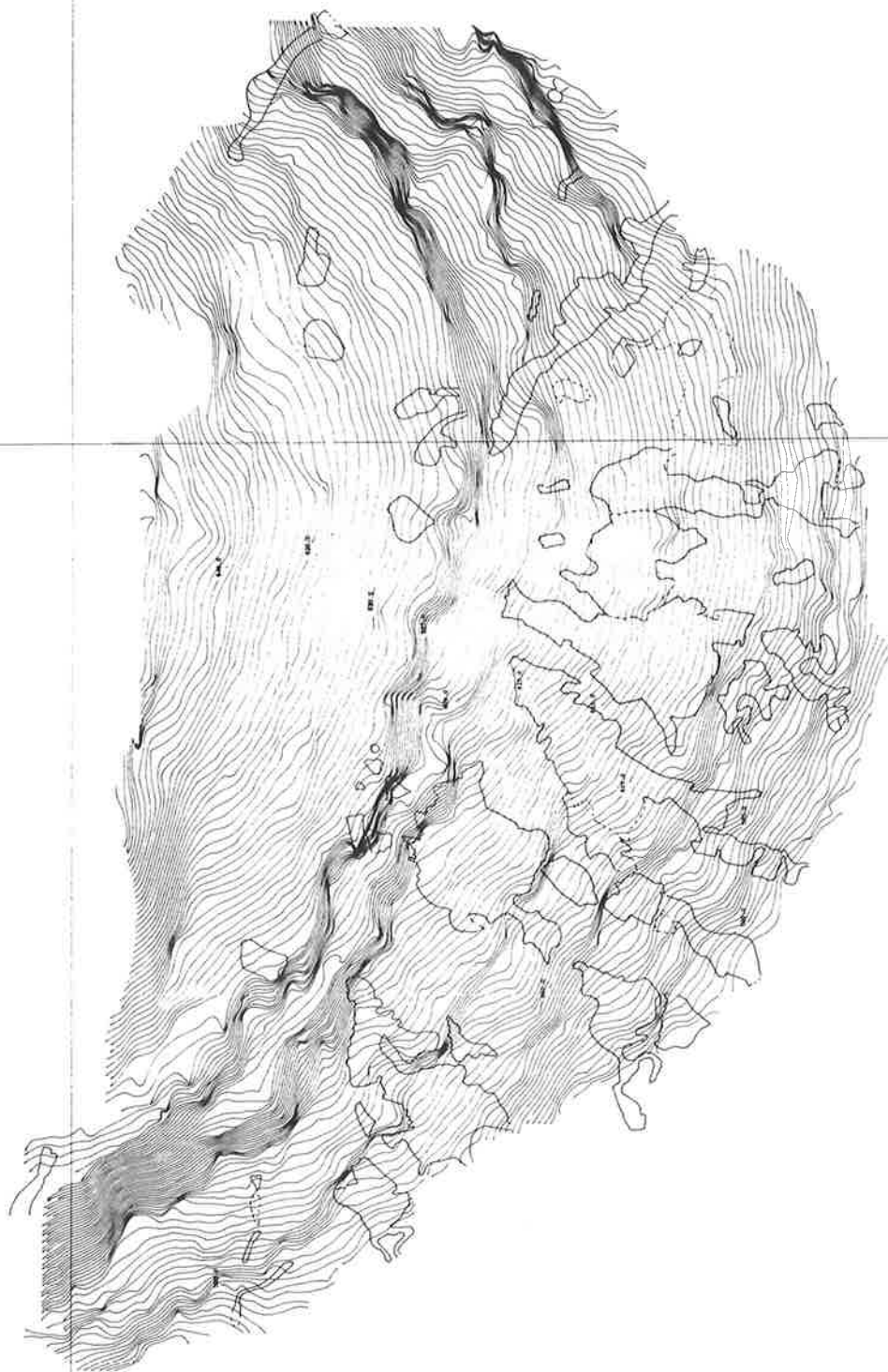






<p>CUMBRIA &amp; LANCASHIRE ARCHAEOLOGICAL UNIT</p> <p>THE NATIONAL TRUST</p>	<p>27800</p>	<p>27900</p>	<p>28000</p>	<p>28100</p>	<p>28200</p>	<p>28300</p>	<p>28400</p>
<p>LANGDALE/SCAFELL PIKE AXE FACTORY SURVEY</p>	<p>PLAN No. 5</p>	<p>PLAN NAME HARRISON STICKLE</p>	<p>DATE</p>	<p>6 1984</p>	<p>0 50m</p>	<p>0 50m</p>	<p>0 50m</p>
<p>Topographic detail is based upon the Ordnance Survey 1:10,000 map with permission of the copyright owner, the Ordnance Survey, which is reproduced by permission of the Ordnance Survey, Crown copyright reserved. Copyright of the archaeological data rests with CLAU &amp; NT and may not be republished without permission from the authors.</p>	<p>0 50m</p>	<p>0 50m</p>	<p>0 50m</p>	<p>0 50m</p>	<p>0 50m</p>	<p>0 50m</p>	<p>0 50m</p>



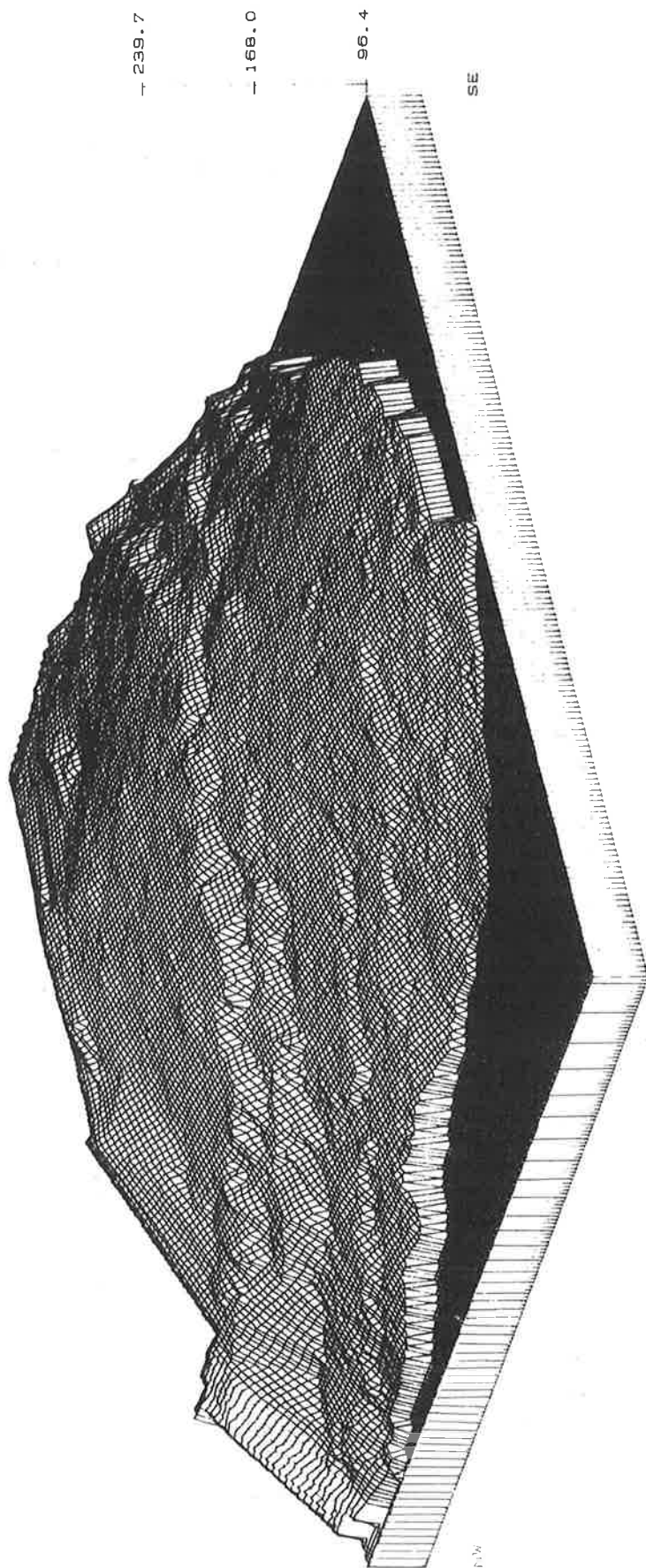


TOP BUTTRESS  
Axe Factory Contour Survey 1:250

1:250

1:250





TOP BUTTRESS