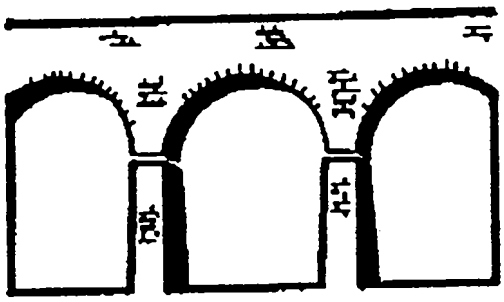
The Luxulyan Valley

Cornwall Archaeological Unit

An Archaeological and Historical Survey



LUXULYAN VALLEY PROJECT

Cornwall Archaeological Unit 1988

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FOREWORD

In the Spring of 1987, a group of young (and some not so young) people gathered together in the beautiful Luxulyan Valley. They had all responded to advertisements for personnel to undertake an archaeological and historical survey of the area; most of them had no experience whatsoever of surveying, historical research, or of interpreting the landscape in which they lived. Many, indeed, had no experience of paid professional employment at all, or of working as part of a team. Sixteen months later as I write this, those same people (who formed the Luxulyan Valley Project) can have the satisfaction of knowing that they completed a difficult and highly skilled task to a standard that reflects immense credit on them all. As I certainly had no right to demand or reasonably expect the high level of enthusiasm and commitment displayed by all the Team members, I can only now feel rather humble and more than grateful to them all for the wholehearted support they gave me.

In truth, the scheme rapidly became their Project; the success or failure of it was a matter of personal pride to the Team in a way which made the task of directing it merely one of encouragement and explanation, rather than admonishment or criticism. High standards were aimed for from the start, and each member of staff responded to that aim with a will and energy which allowed the completion of the Project to be made on schedule, despite the difficult nature of the densely vegetated and steep terrain.

In accordance with my belief that it is best to both work hard and play hard, the Project was also a great deal of fun; the social aspects of the scheme were every bit as important as the archaeological ones. As a result, I am sure that the material produced reflects a harmonious working relationship, and is all the better for it. In this respect, I must mention the unfailing and vital support of Derek Miller, whose contribution to the success of the scheme was inestimable, and also that of Nicholas Johnson, who had faith in my ability to carry out a project which had long been simply my idealistic dream, and who gave me the means and every encouragement to realise it.

In retrospect, there is no doubt in my mind that the Luxulyan Valley Project was exceptional in many respects; the results of it, stored in the archive at Truro, will be of permanent value for years to come to scholars and laymen alike. Beyond this, however, there is the bond forged between a fine team of men and women who will have enriched their memories and experience also; to them I can only convey my heartfelt thanks.

John R Smith
Sticker, August 1988

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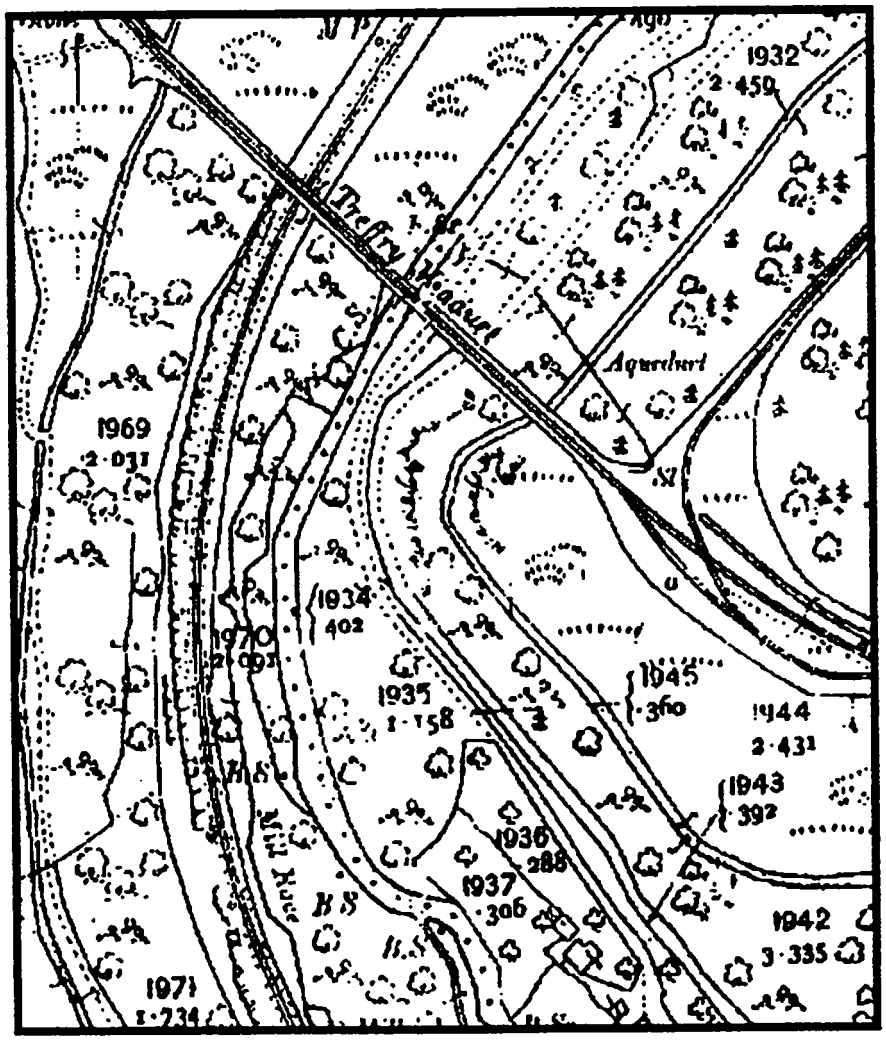
Section 1



Introduction

1) INTRODUCTION

This report describes the work of the Luxulyan Valley Project, a Community Programme Scheme run by the Co-Operative retail Services Agency at St Blazey and directed by the Cornwall Archaeological Unit, Truro. Sponsorship was provided by the Manpower Services Commission, English China Clays International, and English Heritage. The Scheme ran from April 1987 to July 1988 inclusive. During this period the Project undertook a detailed archaeological and historical survey of the Luxulyan Valley, the results of which are now in the Sites and Monuments Record of the Archaeological Unit at Truro.

The report is organised as follows:

Section 1 introduces the Project, defines the survey area and land ownership, and details the configuration and set-up of the Scheme.

Section 2 explains the methods and techniques of survey, and discusses the indexing and accession of the resulting data.

Section 3 outlines the history of the survey area, and discusses the results of the survey within this context.

Section 4 contains a detailed appraisal of the organisation and management of the Scheme itself.

Section 5 details proposals for future management of the Valley.

Appendices contain certain statistical material, maps and plans, bibliography and gazetteer.

1.1) The Luxulyan Valley

The Luxulyan Valley is situated in Mid-Cornwall, 4 miles north-east of St Austell and 2 miles north of Par Harbour. The Valley itself is generally regarded as extending from Ponts Mill (SX 0730 5620) to Bridges (SX 0480 5801), a distance of about 2 miles. Running into the Valley from its source on the Lavrean and Lestoon Moors to the north-west, the River Par has followed and deepened a line of weakness in the Hensbarrow granite on its way to the sea at Par Sands; this has resulted in a steep-sided and thickly wooded valley 100 metres deep. No major roads or trackways utilise the Valley as a routeway, and its precipitous slopes were unattractive to settlement and agriculture; until the early 19th century it was as a result little-known and largely disregarded. The growing success and importance of extractive industry in the area during the 1830s led to the development of

the Valley as a communications corridor for an extensive tramway system, linked to Par Harbour via a canal, and also encouraged the exploitation of the granite outcrops on a commercial basis. As a result, the Luxulyan Valley became better known in the County for its scenic beauty also, and after the abandonment of the tramways and other industries in the 20th century retained its function as a resource for local walkers and tourists. The remains of the 19th century industrial complex within the Valley are fortuitously well-preserved, and offer a rare opportunity to study a wide variety of industrial sites within a compact and accessible location.

1.2) Aims and Objectives of the Project

The Luxulyan Valley Survey was conceived in 1986 as part of an ongoing commitment by the Cornwall Archaeological Unit to the recording of large areas of landscape by means of detailed ground survey. The Unit had already amassed considerable expertise with a similar approach to field survey on Bodmin Moor and in West Penwith; the methods employed there were adapted to suit the nature of the topography within the Luxulyan Valley.

It was of course widely appreciated that the area was of considerable significance within the overall context of Cornish 19th century industrial history. The Treffry Viaduct is a well-known monument in the area, and the route of the early tramway system is used as a footpath by many local people as a convenient access way through the outstanding natural beauty of the Valley. There had been some study of the area by industrial archaeologists and local historians, but no detailed and comprehensive assessment had ever been attempted.

The aim of the Project was to record all the landscape features within the survey area, initially at a scale of 1:1000. Selected sites would be recorded in greater detail where appropriate, and elevations and plans would be drawn of individual buildings and structures. No distinction was to be made as to period; while it was envisaged that the majority of the activity in the Valley would relate to the 19th century, it was hoped that field evidence from all periods of history and pre-history would in fact be revealed by the survey process.

This material would then form part of the Cornwall and Isles of Scilly Sites and Monuments Record (SMR) at Truro, and would be entered into the archive as part of the ongoing scheme to computerise the Record. In addition, it was hoped that if the Survey could be undertaken as a Community Programme Project this would allow for additional work to be undertaken which is not normally part of the Unit's remit. This would include a detailed

study of documentary and archive material, interviews with local people (oral research), local community involvement with the Project, the production of interpretation material, and an ecological study to complement the archaeological and historical research.

It was not envisaged that the initial phase of the Project would include any full assessment or interpretation of the Survey material in finished form; neither was it intended that the Project should include any active management of the landscape. The material produced by the Survey would in fact provide the base resource for any future work to be undertaken in this respect.

In order to accommodate these further dimensions, which would be dependent on the results of the archaeological and historical survey, it was proposed at the outset that two further phases to the Luxulyan Valley Project should also be considered: Phase II would undertake the active management of the sites within the Valley under the direction of the ultimate custodian of the Valley and in accordance with the management strategy set out by the Phase I Team; Phase III would study and interpret the material gathered by Phase I, producing material for schools and publishing a guide to the Valley and its archaeology.

1.3) Survey Area

The area defined initially for survey is shown in fig 1. This was selected on the basis of:

* The extent of available knowledge regarding 19th century and earlier features.

* The inclusion of a sufficiently wide context to enable a full interpretation of the survey results at a later date.

* Realistic targets which would be achievable within the available time period by a team who at first would be largely unskilled.

Two areas were defined for the Project; a primary survey area which included only the Valley itself, and an expanded study area which was intended to satisfy the requirements of the wider context and also to provide an "overspill" area for the surveyors should they proceed more efficiently than anticipated.

Aerial photographs (APs) and ground reconnaissance showed that the area of archaeological interest was mainly confined to the

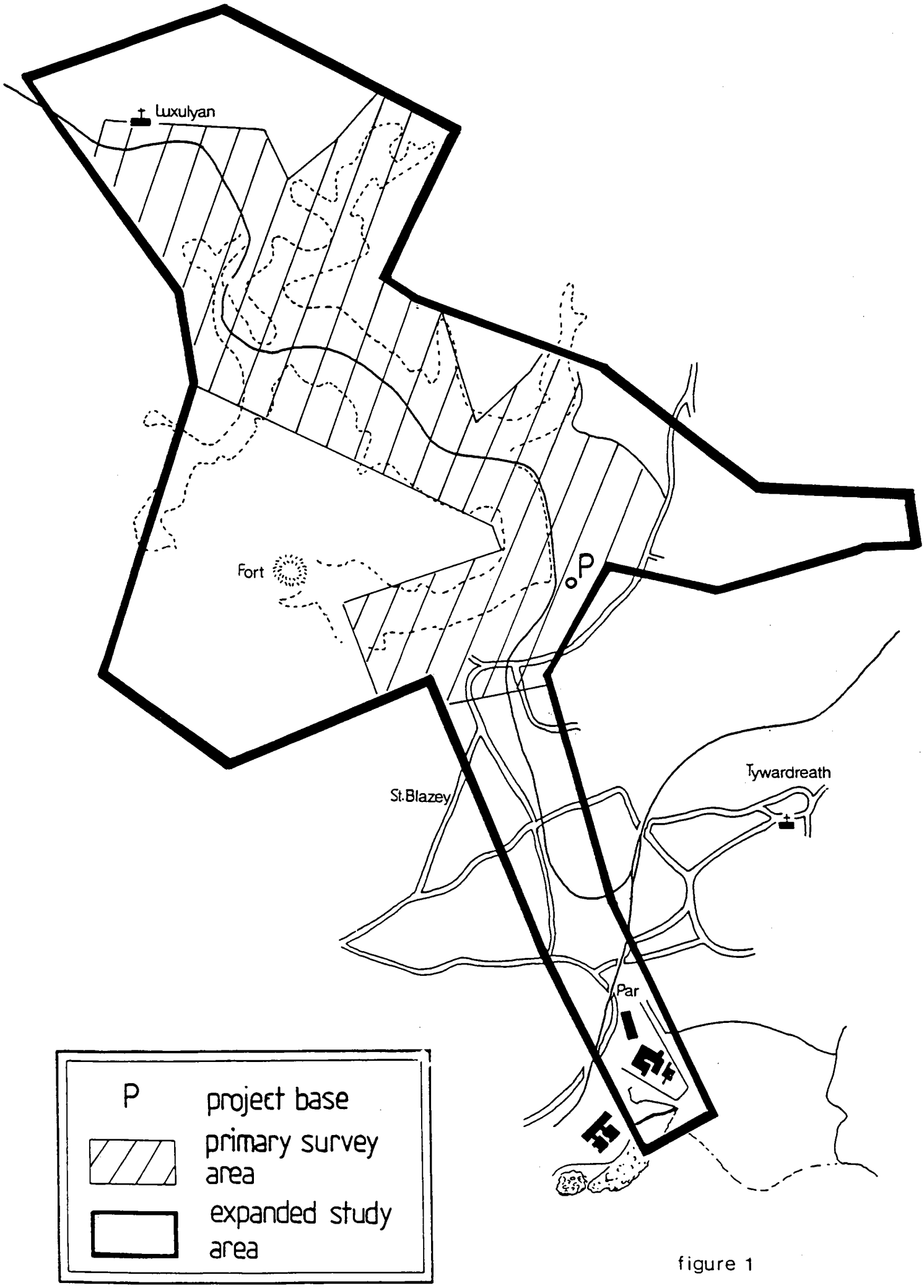

Luxulyan
Fort
P
St.Blazey
Tywardreath
Par
P project base
primary survey area
expanded study area

figure 1

Valley slopes and floor; above the tree-line (which coincides with the major break of slope) the cultivated and enclosed land is largely bereft of archaeological features. This initial assessment also demonstrated that the approach adopted on Bodmin Moor, where aerial photographs were used to enhance the survey and in some areas provided the basis of the survey itself, would be impossible in the Luxulyan Valley. Nothing was visible on the APs through the dense tree cover. Also clearly evident was the difficulty of surveying such steep and densely vegetated terrain.

1.4) Land Ownership

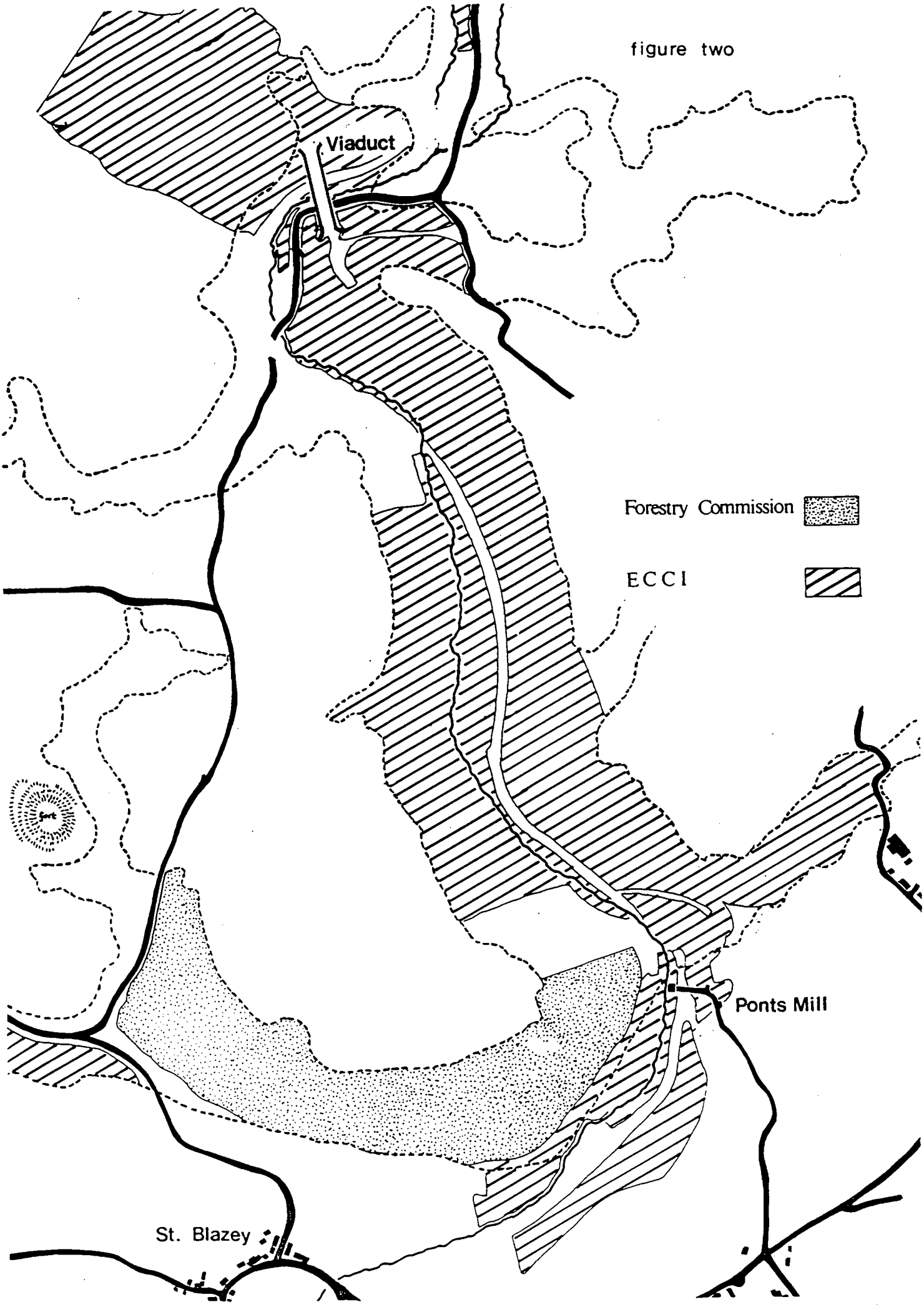
The Project was greatly aided by the fact that a large proportion of the survey area is in the hands of English China Clays International. This was to have a great effect on the configuration and funding of the scheme (see 1.5). Fig 2 shows the extent of ECCI ownership, which is the result of their acquiring much of the land associated with Treffry's development in the Valley. The Treffry Estate itself now only retains the Viaduct and some other smaller areas at the north end of the Valley.

The other major landowner within the survey area is the Forestry Commission, which owns Prideaux Wood and The Preserves. These two plantations are under active forestry management, and both contain significant remains relating to mineral extraction.
Various private landowners, including local farmers and householders, own the remainder of the property within the primary survey area; some of these holdings are substantial, others are comparatively small in extent. It rapidly became apparent, however, that the bulk of the survey could be completed given the consent of only three landlords (ECCI, Forestry Commission, and Treffry Estate). This greatly eased the often time-consuming process of locating landowners and obtaining permission to survey which normally is a major part of the process of landscape study.

1.5) Project Configuration

The initial proposals for the Luxulyan Valley Project envisaged a Community Programme Scheme managed by a local Agency but directed by a Field Officer from the Cornwall Archaeological Unit. This in itself was an innovative step for the Unit, and the intention was that a scheme so configured would have a greater chance of achieving the survey objectives than one with no professional expertise available. The alternative would have been a survey carried out directly by Unit Officers; while this might have been easier to administrate and configure, it would have lacked the

figure two



element of community involvement which is a vital part of CP. Approaches were made to the CRS Community Programme Agency at St Blazey and ECCI Ltd in July 1986, and discussions followed which finalised the configuration and funding for the Project. A full, detailed budget and costing for the Scheme was prepared by the Archaeological Unit, and this was submitted for approval to Manpower Services Commission by CRS. Funding for the Director was provided by sponsorship from MSC, ECCI, and English Heritage, and was to be for 14 months from March 1987 to the end of April 1988. The Scheme itself was to run for twelve months from 1st April 1987 to March 31st 1988. CRS would provide a Project Supervisor to manage the day-to-day running of the scheme in association with the Archaeological Director.

The Director and CRS Supervisor began recruitment and equipment acquisition in March 1987. One of the first tasks was to set up a suitable workbase. ECCI had generously offered the Project the use of a large building at Ponts Mill for equipment storage; this, however, was not suitable as office space. A large tarmac area beside the building was suitable for car parking, and it was initially proposed to site a Portakabin on this as the Project headquarters. A suitable Portakabin was located and purchased from the hiring company at a very competitive price, and arrangements were made to remove it from Wadebridge to Ponts Mill; it was then found that the Portakabin was too wide to pass down the narrow access lane to the site. After much reconsideration and negotiation, a solution to the problem was arrived at whereby Mr Hawke, a local farmer, allowed the project to site the Portakabin in his field adjacent to the ECCI site, and helped to transport it across the field and into position.

Services were quickly connected; water and electricity courtesy of ECCI, and telephone via British Telecom. The workbase was equipped and furnished by the Project Supervisor during March, whilst he and the Director began interviewing potential recruits for the Team. This first month allowed for setting up the Project proved in the event to be none too generous an allowance for the task, and should be regarded as an essential requirement for any future scheme of this sort.

Recruitment was initially slow, and in fact the Project was not fully staffed until August 1987. This was largely due to a determination on the part of both the Director and Supervisor that the staff recruited should be both potentially capable of carrying out their tasks and motivated by a strong desire to participate. Most of the Project team were recruited locally, and the greater proportion of them had little or no previous experience of archaeological work. Despite this, there was a gratifyingly high level of enthusiasm for the scheme, and training of employees proved to be less of a problem than was

initially anticipated; the Director and Supervisor feel that the decision to be extremely selective when recruiting was justified in the light of this experience. The loss rate during the Project was extremely low, and the retention throughout the period of almost the entire staff contributed greatly to the success of the Survey.

The Director, appointed by CAU and funded jointly by the sponsors, had under his control a team of 21 CP workers; the day to day running of the Scheme, including such aspects as pay, health and safety and equipment was managed by the Project Supervisor appointed by CRS. The workbase at Ponts Mill provided the Headquarters and accommodation for the staff. The full Team was made up as follows:

The Surveyors comprised three teams of four, twelve in total, each team having a Team Leader and three Surveyors. Also working in the field were the Ecologist, Oral Researcher, and Documentary Researcher. In the office were the Computer Operator, Graphic Artist, Draughtsman, Secretary and the Records Team Leader, whose task it was to collate, archive, transcribe and present the data input from the fieldworkers. In addition there was a Computer Clerk based in the CAU office at Truro, who provided the team with the base information already existing on the Project area.

This basic configuration was maintained throughout the duration of the Project, with some minor variations at various times. The Scheme was originally scheduled to finish on March 31st 1988; by this date the main survey of the Project Area was complete, but it was felt that as many of the staff had some time left to run of their 52 week contracts an extension to the Project would be beneficial from many points of view. The CRS Agency obtained agreement for this from MSC, and the Scheme was extended to finish on July 28th 1988.

1.6) Extent of Existing Information

The Luxulyan Valley had never before been the subject of a detailed archaeological survey. Although many works refer to the Valley and its industrial remains, there is no definitive text on the area. Many local historians and industrial archaeologists have had an interest in the Valley and there is in fact a pool of expertise which has never been synthesised into a coherent whole. Of the published works on the area, the Team found the following most helpful:

"The King of Mid-Cornwall", John Keast, 1982. A life of J T Treffry containing much useful material on the development of the Treffry industrial empire and the tramway system in the Valley.

"A History of the Railway", S C May, 1982. A study of the Par to Fowey railway system which includes detail of the post-tramway period in the Valley.

"Life of William West", ICS, 1973. This biography of the great Cornish engineer includes much useful material concerning his association with Treffry and William Pease.

The life of William Pease, Treffry's Land Steward, has sadly yet to be written. Undoubtedly his contribution to all the works in the Valley was most significant.

The Cornwall Trust for Nature Conservation had available a habitat survey for the Valley which was made in 1980-1981; this was in outline only, but provided a useful starting point for the Project Ecologist.

Many other books were consulted for various mentions of the Valley (usually relating to some specific aspect of the study area such as mineral extraction) and these are detailed in the Bibliography (Appendix C).

The CAU Sites and Monuments Record at Truro contained a complete description of the prehistoric sites within the area; this was revised and input to the main database by the Project Computer Clerk for the relevant 1:10000 map, and the results printed out for the Ponts Mill Team. The industrial and 19th century information for the area was in outline form only, with no detailed information available.

Also available to the Team were the 1880 and 1906 1:2500 Ordnance Survey maps of the Valley, which proved invaluable sources of information as to the extent and development of the sites concerned.

The total extent of published and readily available information on the Valley is thus relatively small; the Project was in most respects starting from scratch in the production of a full and detailed archaeological and historical survey of the area.

Section 2

Method

2) SURVEY LOGISTICS AND METHODOLOGY

Recording a large area of landscape to an intensive level of detail for any purpose is never easy; when the end result must be an accurate record of all visible human activity on the ground, the task becomes extremely demanding. This task is complicated by the requirement to interpret the landscape as the survey proceeds. Ground features must not only be recorded, but must be placed in an overall historical and sequential context; and in order to do this, they must first be recognised. Lest the foregoing appears to be self-evident, it must be pointed out that in an area such as the Luxulyan Valley merely moving about at all can present great difficulty, particularly in Summer when the steep slopes are covered in dense and usually hostile vegetation. As the Director had a certain amount of experience of surveying under similar conditions, he was well aware of the potential difficulty of the task when the Project was first mooted.

With these problems in mind, the survey techniques used were deliberately chosen to be easy to teach to inexperienced staff, and to require the minimum of basic equipment within the terms of a very limited budget. They do not represent the "state of the art" in any respect, but they were practical and usable in the field by previously untrained workers. In this regard, although more modern technology might have been a pleasant luxury, the methods used proved a great success.

2.1) Type and Scale of Survey

The initial aim of the Project Field Survey was to map at suitable scales as much as possible of the Primary Survey Area (see fig 1) and also to make detailed studies of individual sites where it was felt that they merited such treatment. As the Archaeology Unit had not previously been directly involved in a CP project, there was a degree of uncertainty as to the extent and accuracy of survey that would be possible with CP participants who had no previous experience of this work. In the event, only one of the surveyors recruited at the beginning of the Scheme had previous archaeological or surveying experience. The decision was therefore taken at an early stage to make the main survey of the Valley by means of a sketch-plot technique such as had been previously employed with a good degree of success on Bodmin Moor and in West Penwith; the advantage of this method would be that it required the minimum of formal training in surveying technique, and did not demand the use of sophisticated (and expensive) equipment.

The equipment available to the Project Surveyors was necessarily of a basic nature, given the constraints of a CP budget. Plane Tables and Alidades (with the option of borrowing a Microptic Alidade) were the most sophisticated items; the bulk of the work was done using drawing boards, 30 metre tapes, and a sopwith staff. All participants had an induction day, which consisted of a walk through the Project Area with the Director and an on-site discussion of the aims and objectives of the Scheme. The first two teams of Surveyors then had a training week; in order to introduce them to basic techniques, they were set the task of surveying the Portakabin and its immediate surroundings. Contrary to initial expectations, the progress made was so rapid that the two teams were quickly re-directed to make a survey of the Ponts Mill Canal Basin.

The main survey area assigned to the Teams was the Valley itself from St Blazey Bridge in the south, to Luxulyan Village in the north-west, Gatty's Bridge in the north, and Carbeans Quarry in the north-east (see fig 1). The landscape to be mapped was that below the tree-line, which coincides with the major break of slope; above this the cultivated land showed little evidence of archaeological features (apart from the hillfort at Warren Wood). As the survey progressed, the Teams rapidly developed their own individual methods and techniques to cope with the problems they encountered.

The nature of these problems was twofold: firstly, the steep and densely vegetated terrain, and secondly the identification and interpretation within this terrain of the archaeology itself. It should also be noted that clearance of vegetation and debris from sites was not permitted, part of the Project's brief being to keep environmental disturbance to a minimum. The physical problems of survey could only be overcome by a degree of determination and enthusiasm on the part of the Teams; fortunately, this was never in doubt. In addition to the basic equipment detailed above, the Team Leaders introduced sighting compasses as a means of obtaining accurate fixes for direction and location of features within the woodland, and this method proved most successful. As far as the interpretation of the archaeology was concerned, an empathy for this aspect of the work had to be developed by a constant process of on-site training, informal seminars and illustrated talks back at the Workbase. In this respect, the Director's time was very much at a premium, as there was also the process of training the Office staff to consider. Field trips to other sites and current CAU projects (see 4.3) were of considerable benefit as educational aids. By the completion of the Project, all the teams were capable of completing their tasks with minimal supervision.

2.2) Surveying Techniques

The 1969 1:2500 Ordnance Survey maps for the survey area were obtained and photo-expanded to 1:1000. Re-drawn onto drafting film, these formed the base plot for the landscape survey. The Valley was divided into sectors which represented a convenient size for the standard drawing board; each team was then allocated a sector to complete. Certain sectors naturally presented greater difficulty than others, due either to the nature of the terrain or the density of the archaeology, and due allowance was made for this in setting targets for the Surveyors.

Notwithstanding the original intention to use a sketch-plot technique for the 1:1000 survey, the method eventually employed was one of direct measurement from known fixed points combined with compass bearings to fix distance and direction where possible. The whole of the area has thus been accurately surveyed, albeit in rather unconventional fashion. It would seem that the relatively inexperienced Surveyors were in fact much more comfortable working in this way, where they had the opportunity to check back on their work at intervals, than simply trusting their judgement to fix features by eye. Although the area survey perhaps took rather longer than had been originally anticipated as a result of this more stringent approach, it is felt that the results certainly justify the effort involved, and are of a comparable quality to plane table survey.

Selected sites were surveyed at larger scales of 1:500, 1:200, and 1:50 by plane table and direct measurement using a plane alidade and 30 metre tape. After some time had elapsed, the Project was able to borrow two microptic alidades and once the teams had acclimatised themselves to this high-powered (!) technology they were put to good use on the remainder of the individual site surveys. These surveys range from small sites such as the engine house and wheelpit at New Fowey Consols to the large hill-fort at Warren Wood. Individual buildings and structures were also surveyed at a uniform scale of 1:50, providing plans and elevations; the method employed was direct measurement from a levelled datum using tapes and sopwith staff. These again ranged in size from small huts to the largest monument in the Valley: the Treffry Viaduct. A Dumpy Level was borrowed from the Archaeological Unit during the last two months of the Scheme and was used to prepare sections of several sites, and a section across the Valley itself.

2.3) Selection of Subjects for Survey

The priority for the Project Surveyors was the landscape survey at 1:1000 of the entire Valley. The completion of this would in itself effectively update the County Sites and Monuments Record to an acceptable degree of completeness and accuracy. It was assumed from the first month that this objective would in fact be achieved within the time period, and the Surveyor's schedules were planned to also incorporate detailed surveys of individual sites and structures within the Project Area.

The choice of these individual sites was made by the Project Director, in consultation with the CAU staff at Truro. A level of priority was assigned to those sites which had been identified either during the landscape survey or by previous ground reconnaissance; in general, sites were selected for survey to run concurrently with the 1:1000 survey in that area. The criteria for detailed survey were as follows:

* Sites of outstanding historic interest (eg Treffry Viaduct).

* Sites illustrative of the industrial processes and events within the Valley (eg mines, mills, kilns).

* Sites crucial to any future management strategy.

* Structures typical of the area's vernacular norm.

* Features which demonstrate applied technology in action (eg tramway granite setts, rail sections and chairs).

It was possible within the duration of the Project to complete all the site surveys which had originally been contemplated; as a result a conscious decision was made during the last three months to deploy the Survey Teams outside the immediate Project area in order to record sites which were of significance to those already surveyed within the Valley. This was in order to study at least some of the context for the area's pre-history and later (post 1870) industrial development which would otherwise have been lacking.

2.4) Documentary Research and Oral Research

One of the prime objectives for documentary research was to support the work of the surveyors in the field, by providing them with the base historical material required for a complete assessment of individual sites, and enabling a fuller interpretation to be made of the survey results. This aspect of the researcher's work proved most successful, and undoubtedly

enhanced the field work throughout the duration of the Project. A second objective was to provide a fuller understanding of the social and economic background against which the archaeology itself must be considered. Sites and monuments, whether they be large upstanding structures such as mine engine houses or features such as ancient field boundaries, cannot be understood or properly assessed within a vacuum; as man-made landscape features they are a product of their time and the society which in some sense regarded their construction as a necessity.

There were certain unavoidable constraints which to a degree hampered the progress of the documentary research. As a prime source for this material, it was unfortunate that the County Record Office in Truro was closed for building works from September 1987 to April 1988; this severely reduced the time available for study. It was also unfortunate that the documentary researcher left the Scheme in November 1987. As it proved difficult to find a replacement of suitable calibre, the post remained unfilled to the end of the Project; consequently the excellent work produced by the researcher was not continued into 1988.

Sources consulted included material in the County Record Office (CRO), Redruth Local Studies Library, The Royal Institution of Cornwall library (RIC), Truro, and the Truro Public Library. The researcher was based at Truro and was supervised by visits from the Project Director on an occasional basis; at intervals the material collected was indexed and added to the archive in the workbase at Ponts Mill. The methodology for the studies was originally mapped out by the Director, with certain specific aims and targets in mind. As time went on, the researcher began to initiate her own lines of research and required minimal direct supervision.

The brief for the Oral Historian had a complementary, but necessarily distinct emphasis from the directive for Documentary research. At the outset, it was decided that the Oral researcher would be responsible for locating and collecting photographic material relevant to the Survey; this was to be combined with the main task of interviewing local people in order to gain an insight into the Valley as a living and working entity spanning several generations. The overall aim was to enhance the work of the Project Team by amassing background material relevant to specific sites and their method and dates of operation, and also to assess the way in which the Valley's past has been absorbed into local folklore.

Initially, the Oral Historian was given a list of local contacts kindly provided by the Fowey Old Cornwall Society. The interview method used was to tape the proceedings using a mini-cassette

recorder; the interviews were later transcribed and typed for storage at Ponts Mill. It was felt that the use of a recorder was less intrusive than the taking of written notes during the conversation. A great deal of information was also gleaned from numerous less formal encounters in and around the Valley.

The original contact list was continually expanded as the Project progressed; over 60 local contacts had been approached for information by the end of the Scheme, from a total of 80 listed. Only a limited number of those had in fact any relevant information specific to the objectives of the Survey; this was more than compensated for by the degree of interest and courtesy shown by those contacted.

The original role of the Oral Historian expanded considerably during the Scheme to encompass a wider-ranging remit; this included the contacting of landowners for permission to survey sites on their property, liaising with local societies, and managing the Project's exhibitions and Open Day.

2.5) Ecological Survey (Paul Mason)

In addition to its historic and archaeological interest, the Luxulyan Valley also contains a varied and notable ecology. The sheltered south facing valley provides the environment for a number of habitats each of which plays host to its own particular species of trees and flowering plants, which in turn attract a whole range of animal life.

Set up in liaison with the Cornwall Trust for Nature Conservation, the ecological survey took place concurrently with the archaeological survey, the objective being to produce an accurate and up-to-date picture of the habitats and ecological content of the Luxulyan Valley. This will provide a base-line to assist in formulating future management proposals for the area and enable change to be monitored and assessed.

The ecological survey area mirrors to a degree the archaeological survey area, and differs only in that it takes into account the agricultural usage of adjacent land, particularly where it is of special ecological interest; eg wet meadows, herb rich pasture, and gorse or blackthorn scrub.

Figure 3 shows the extent of the ecological survey area and is keyed to the various habitats identified within it. In this context it is worth noting that ecological habitats may range in size enormously, from the circumference of one large oak tree or small patch of boggy ground , to a whole woodland or stretch of river. For this reason the habitats shown in figure 3 are not

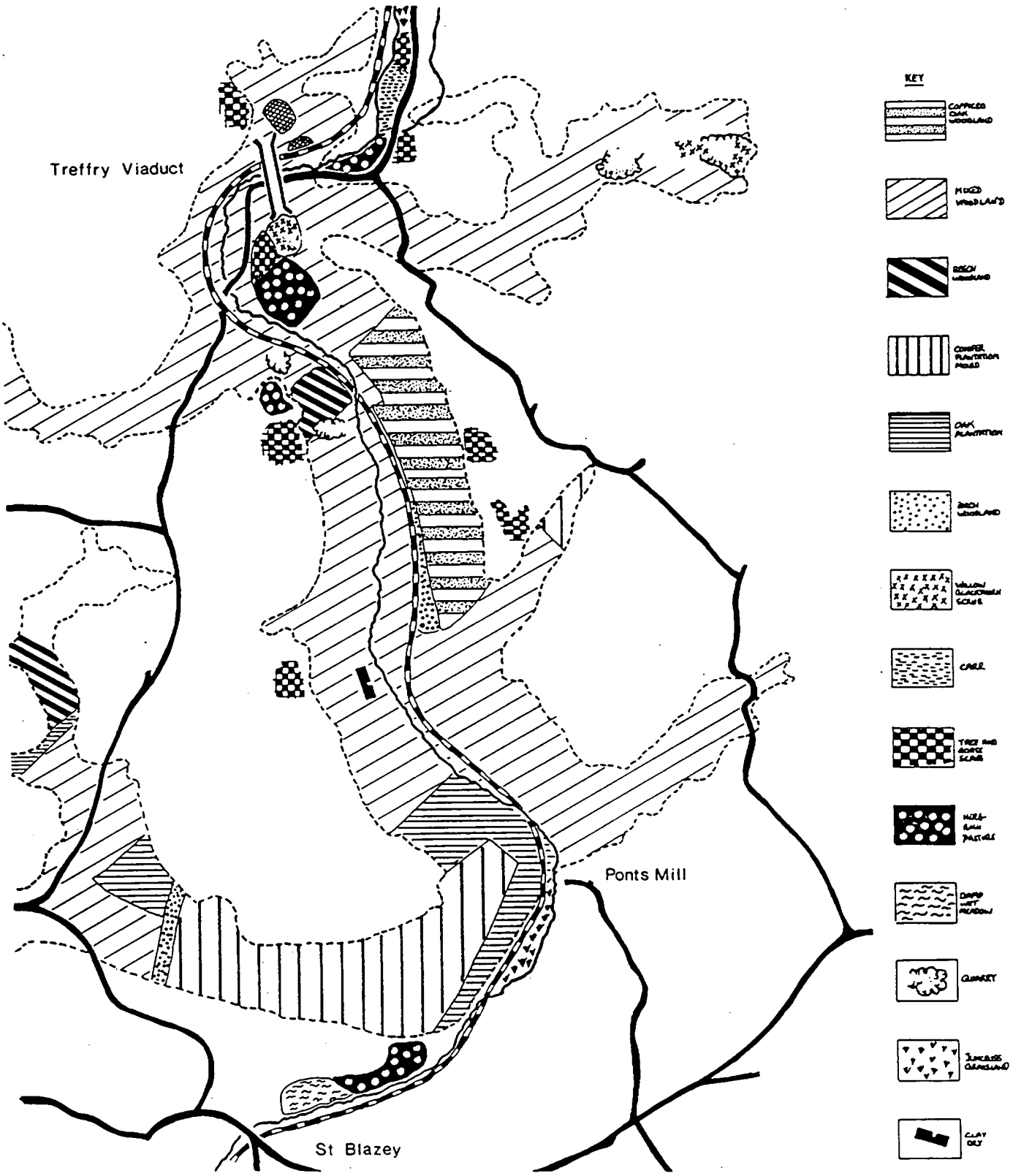


figure 3 Habitat Survey

intended to be definitive, but are more of a general guide to the major habitats to be found within the Luxulyan Valley. A more comprehensive habitat survey would have to be undertaken on a larger scale and in more detail. It would also require more time and expertise than was available to the project.

The survey area covers roughly 250 hectares and to simplify the assessment it was broken down into nine sectors. The boundaries of the individual sectors do not necessarily represent habitat changes, although this is sometimes the case, but are also natural or manmade features that are easily identifiable. The southern boundary of sector 1 (Carmears North), for example, is the southern limit of the coppiced oak woodland in Carmears Wood and is also a habitat change between this and the northern limit of the mixed broad-leaved woodland in sector 2, Carmears South. The northern limit of sector one is the public highway from the Luxulyan Valley to Trethevey, known as Black Hill, and does not represent a habitat change as the mixed broad-leaved woodland continues across the road for some distance.

Having divided the area into more manageable units it was then possible to survey them in more detail in order to establish the number and types of habitats in each sector. A habitat is defined by its flora, since it is the plant species which dictate the nature and amount of refuge and food available to animal species. Therefore the habitat survey began by recording the dominant plant species in each sector, be they woodland, heathland or grassland. This was done by walking throughout each sector with a map (Ordnance Survey 1906 edition 1:2500) and sketching in areas of oak woodland, mixed broad-leaved woodland, conifer plantation, willow carr, herb rich pasture and other habitat types.

Dividing an area into habitat types is not a straight forward and clear-cut process. Although there are objective factors which can be used, such as the dominant species method outlined above, there is inevitably a degree of uncertainty as habitats quite often have no definite boundaries and one habitat can merge gradually into another. For example the boundary between a mixed broad-leaved woodland and a herb rich pasture can be clearly defined at the edge of the tree line / pasture interface, whereas the boundary between a Beech woodland and a mixed broad-leaved woodland can be harder to define as the two will always overlap. The boundary of a Wet meadow can also fluctuate seasonally depending upon the amount of rainfall which can expand or contract the habitat area.

Once the sectors had been divided into areas of general habitat type the survey could continue in more detail. The Project Ecologist worked four days a week surveying and recording

ecological information. Help was given by visiting ecologists from the Cornwall Trust for Nature Conservation (CTNC) and from other members of the Project Team, particularly the Surveyors who reported sightings of plants, animals, and fungi which they encountered during the course of their fieldwork. Otherwise surveying was carried out by identifying particular habitats and carefully walking through all parts of the selected area noting down, and sketching on the maps where appropriate, the plant species present. Field guide books were used to identify as accurately as possible the plant species discovered.

Plants are most easily identifiable by their flowers, and so it was necessary to visit all areas of the Valley continually throughout the year in order to record the spring, summer and autumn flowering species. Many plants can go un-noticed among a mass of green foliage until their flowering season.

Non-flowering plants such as lichens, mosses and ferns were also noted where they could be accurately identified, though positive identification of these species is notoriously difficult for the inexperienced recorder and there are many more varieties of non-flowering plants than were recorded in this survey.

Fungi also came under examination and despite the difficulty in arriving at positive identifications over fifty species were recorded, half of which resulted from a special 'fungus day' in the autumn when visiting ecologists from CTNC lent their expertise.

The results of the habitat survey, complete with maps, will become part of the greater survey of the County of Cornwall which is being carried out by CTNC, and will be held at their head-quarters at Dairy Cottage, Trelissick, Truro. That report is not incorporated within the present document, as the level of detail involved would be inappropriate; a brief summary of the Ecologist's findings is included in section 3.7 (page 114).

2.6) Indexing and Accession of Data (Ruth Banyard)

The role of the Records Team Leader was to coordinate the collection of data from the field workers and researchers, and to collate, index, transcribe, and maintain an archive of that data.

The nature of the material to be processed was as follows:

* Field Survey Drawings
* Context Records from the Field Survey Drawings
* Historical Maps
* Documentary and Oral Research notes
* Photographic Material

The prime objective for the Project was the completion of the 1:1000 survey of the Valley, which would update the County Sites and Monuments Record; documentary research would enable a more complete interpretation to be made of the survey results.

The 1:1000 field drawings were completed in sectors, unrelated to the National Grid for convenience in the field, which were then drawn up to conform to the OS Grid Reference system. This resulted in more than one sector being drawn up onto a single 500x500 metre grid. To avoid confusion on the context overlay, a prefix was added to the context number; the context descriptions were then typed up and filed in an A4 folder to make them easily accessible.

As the material was to form part of the County Sites and Monuments Record, established standards and guidelines were available for indexing and storage of the results of the Field Survey. The completed 1:1000 grids were drawn up, hung in a plan frame and marked with the appropriate Grid Reference. A context overlay was produced for each Grid where each context number represents a feature of the landscape, and the attached description characterises the form of this feature in terms of its type and physical dimensions.

These context descriptions form the basis for the updating of the County Sites and Monuments Record. A pre-printed computer data input form (SMR 7) was completed for each individual site and lists features within that site. Deciding which features were worth recording at this level of detail involved studying the 1:1000 Survey and comparing it to the 1840 Tithe Map, the 1880 OS 1:2500 and the 1907 OS 1:2500. Any documentary research material relating to the landscape features was also consulted. The features to be entered into the Record had to be of notable archaeological importance; in the event, it was found that most of the features contexted during the survey were eligible for inclusion. This resulted in the completion of approximately 1000

forms; each separate form had to be allocated a unique Primary Record Number (PRN), which came from an allocated block of numbers between 9000 and 9999 as defined by CAU. Each major site was given a rounded figure ie 9000, 9050 etc. Where more than one sheet was required for the same site, the subsequent sheets formed a subdivision of the number on the top form eg 9000.01.

References from the documentary research were included in the form of a bibliography. Also included were a list of all the photographs taken by the project photographer of the site or features described on the form. Building Surveys or Site Surveys relating to the subject on the SMR7 were listed under Site History. Once the SMR7 forms were completed, they were entered onto the computer database in the office at Ponts Mill; this was running a version of the Superfile software in use at Truro. At regular intervals, the data was transferred to Truro on floppy disk, and added to the main Sites and Monuments Record.

All the Field Survey Maps and the Documentary Research Maps and Plans were indexed with a card index system, which was again compatible with the CAU method. At the end of the Project all the maps and plans were taken to the CAU at Truro and integrated directly into the main archive. The method of indexing involves categorising the different types of maps and plans: eg Tithe maps, Land releases, 1:1000 survey grids etc. A prefix of GRH (Graphic Hanging Record) is applied to all maps hanging in the plan frame; the groups are then subdivided numerically:

GRH 97 - 97 is the number allocated to the Luxulyan Valley Project.
GRH 97/1 - Refers to the first group of maps i.e Tithe Maps.
GRH 97/1/1 - Refers to the first map in the first group.

This index was continually updated as new material was added.

The Photographs taken by the Graphic Artist were indexed to conform to the CAU system. The types of photographs taken were colour slides and black and white prints (stored as contact sheets and negatives). Indexing involves the allocation of a three letter prefix -

GCS - Ground Colour Slides
GBP - Ground Black and White Prints

The photographs were stored in plastic storage sheets together with the index forms.

Large amounts of material were gathered by the Documentary Researcher which required a proper indexing system to make the

information accessible. This in turn would allow further study of the data to enable a more detailed appraisal of the survey results. A card index was chosen to organise this material; the method of indexing was to read through each page and note any headings, features or topics that would need to be referred to and put each topic onto a separate card.

To refer back to the original document it was necessary to identify the typed manuscript pages. The information was divided into subject groups (eg Mines and Mining, Quarrying, Treffry Family) and each page in the group was given a two letter prefix and a page number:

MM 50 - refers to Mines and Mining page 50.

As new information was gathered so the Card Index was updated and new subject cards were added.

The consistent and concurrent storage and indexing of the survey data was regarded as a high priority for the success of the Project. Data collected in the field is of little practical value unless it can readily be accessed and retrieved; adhering to established conventions and methods for presentation and indexing should enable the Project data to be readily absorbed into the Sites and Monuments Record at Truro.

Section 3

Results

3) DESCRIPTION AND RESULTS OF SURVEY

It was not expected, nor was it possible given the time-scale of the operation, that the Project would be able to thoroughly assess and interpret the material produced by the researchers and surveyors. Indeed, the Scheme was deliberately conceived as an information gathering exercise whose purpose was to maximise the available time by covering the greatest possible amount of ground both literally, in the field, and metaphorically, in the County's archives. So much new material has been added to the corpus of available knowledge regarding the Valley that there is certainly potential for a lengthy academic re-examination of the implications; such a degree of introspection was a luxury not afforded to the Project Director, who of necessity was embroiled for much of his time in the administration of this complex and demanding Scheme.

Consequently, the results of the Survey as presented here are in the nature of an interim assessment; the broad outline of historic developments in the Valley is clear, but close study of the detail will be required before the full picture is available. Where the work of the Project has broken fresh ground or altered current preconceptions our interpretation of the evidence is, at this stage, subject to such confirmation as later study will allow.

3.1) Historical Background before 1800

The Project researchers, within the constraints of the limited time available to them, chose to concentrate on the period post-1800 for their studies; the documentary evidence relating to earlier times has not been closely examined. Consequently, while it is possible to derive some general conclusions regarding the development of the Valley pre-1800, more detailed studies of the available material would undoubtedly be productive.

The earliest evidence for human habitation within the Project area is the defended hilltop site above Warren Wood (Prideaux Hill Fort). This belongs to the Iron Age period (500 BC to 40 AD), but as the site has never been the subject of excavation the precise time-span of occupation is unknown. The site was surveyed by the Project Team (see fig 4). There is then a long period with no identifiable ground evidence for occupation, although it is probable that the area continued to be inhabited during the Roman period (to ca 400 AD) and throughout the following period of unrest, fragmented tribal rule, and the subsequent Norman conquest.

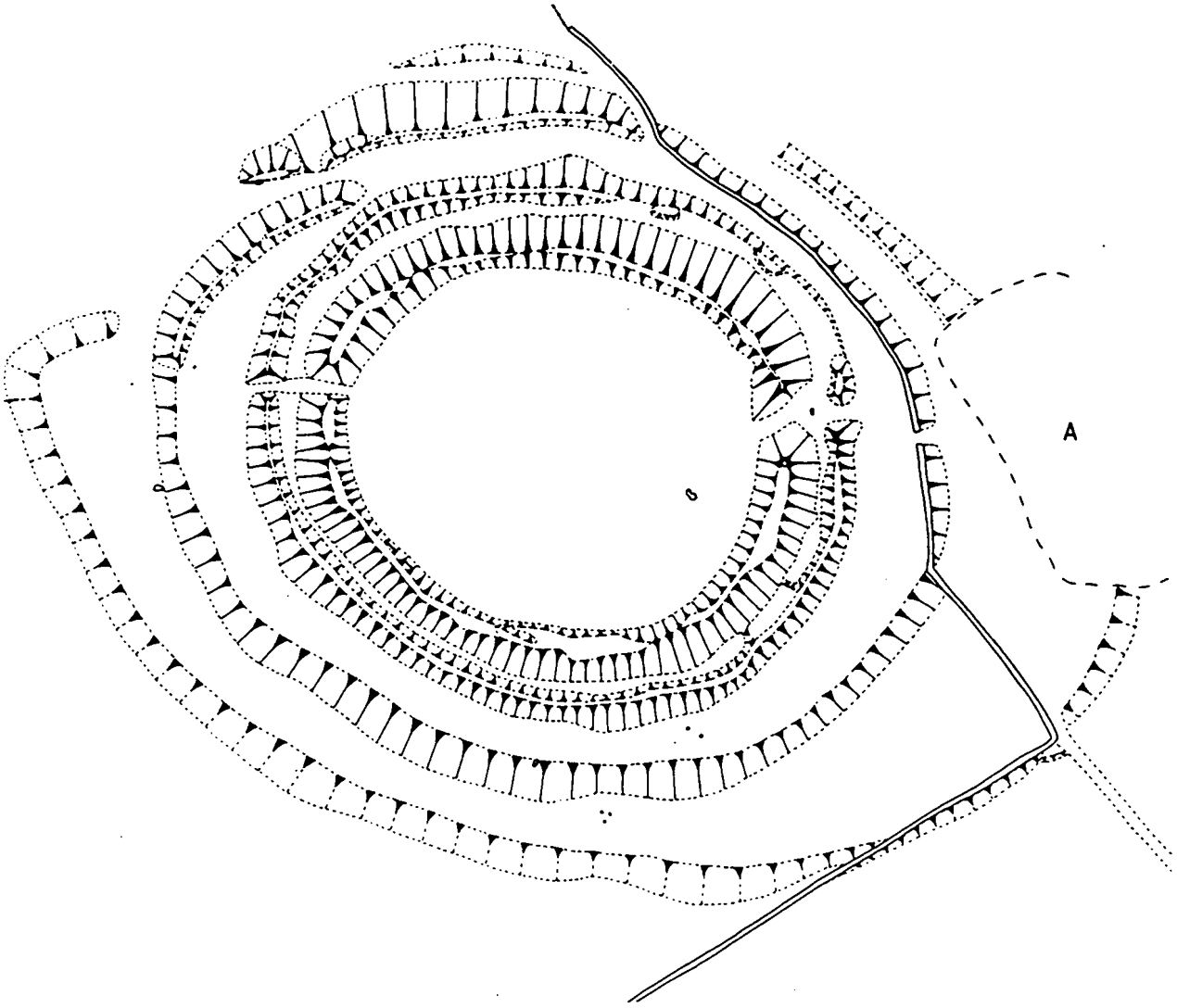


Fig 4 **Prideaux Hillfort**

Of settlements local to the survey area, only Bodiggo, Lanescot and Tywardreath are mentioned in the Domesday Book for Cornwall (1086 AD). These pre-date 1066, and may represent core celtic settlements in the area from the period before the Norman Conquest; however, as Domesday is a record of Manors rather than settlements, it is very probable that a number of places recorded in later medieval documents were already in existence at this time.

The first evidence available for Ponts Mill as a settlement comes in documents from the 12th century. The Priory at Tywardreath, which played a significant part in the medieval history of the

Valley, had by this time (1187) established a corn mill at Ponts Mill and constructed a bridge across the Par River known as Baldwins Bridge. As the first crossing point of the Par Estuary, this bridge and the approach roads on either side would have been of great importance as a local route focus, and it would be natural for a small hamlet to grow up around it. The other settlement within the Valley is also centered around a corn mill, at Rock Mill; no date has been established for this site.

During the medieval period the Valley was utilised as a woodland area for fuel and building materials, its water power another major resource for the grinding of corn. Ponts Mill would have existed throughout as a small port serving its hinterland from the limit of navigation on the Par estuary (see fig 5). As late as 1720 it was possible for vessels of 80 tons to reach Ponts Mill; but by the beginning of the 19th century Ponts Mill had ceased to be accessible by sea, and in 1835 when the basin for the Par Canal was being dug, 25 feet of alluvial deposit covered the early medieval bridges.

Luxulyan Parish was a very important producer of stream tin during the Tudor and later periods (see Gerrard, 1986). This was primarily in the area to the north-west of Luxulyan Village, on Lavrean and Lestoon Moors, and is thus outside the Project Area; its main effect on the Valley itself would have been to silt the lower reaches of the river and render the Par Estuary progressively less navigable. There was undoubtedly some extraction of stream tin within the Valley as is demonstrated by the field evidence (see 3.4.5). Whether this was a re-working of material deposited from the workings higher up is not known; if so, it may belong to a considerably later period than the Blackmore streamworks themselves. It is certain that there were two blowing houses for smelting tin within the Valley, one at Ponts Mill and the other at Gattys Bridge. The evidence for this is in the form of field names on the Tithe Map for the parishes concerned, and is thus undatable, other than that it relates to a period pre-1840.

The smelting of tin required large amounts of charcoal, and there is evidence of charcoal burning within the Valley at Prideaux where trial excavation of circular platforms on the hillside revealed a layer of charcoal at depths of 0.4 to 0.7 metres. Woodland management during the pre-1800 period is probably also represented by various internal boundaries, some of which are not shown on the Tithe Map and appear to be of much greater antiquity. In some cases these are quite massive earth banks, others are now eroded to a height of only 0.3 metres. At some time pre-1840 attempts were made to enclose and cultivate part of the Valley floor where there was sufficient flat ground (see Fig 3.4.1).

figure 5


Impression of Par estuary
CIRCA 1500
LUXULYAN VALLEY
PONTS MILL
ST. BLAZEY
TYWARDREATH
PRIORY

Although most of the deep mining in the Valley belongs to the post-1800 period, the shallow workings in Prideaux Wood, and possibly the gunnises at South Prideaux and Lady Rashleigh may well date from much earlier times. Documentary evidence from the period when these mines were re-worked in the 1880s would suggest that both sites were locally regarded as being of some antiquity.

Exploitation of the Valley's resources had thus continued on a small scale throughout the post-medieval period, but by 1800 the impact on the landscape was small; at the beginning of the 19th century the survey area would have looked little different from the Valley of Baldwin in the mid-1100s. It was for the entrepreneurs of the 19th century to re-mould the topography to the intricate complex of features we see today.

3.2) Development within the Valley post 1800

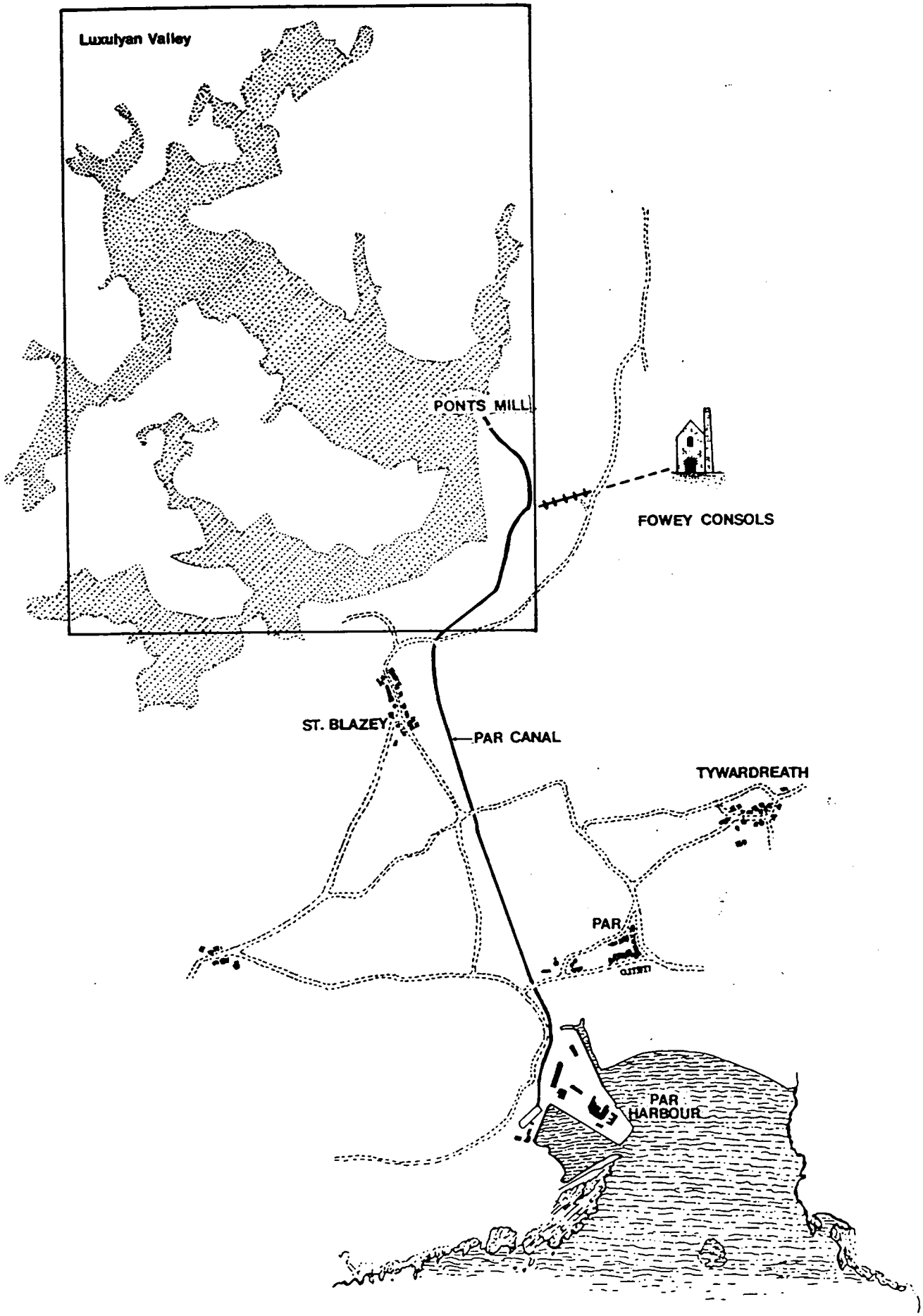
Amidst its breathtaking scenery, the Luxulyan valley hides a unique legacy. Deep amongst the thickly wooded terrain is a concentration of early 19th century industrial remains unparalleled elsewhere in the South-West. These represent the physical monuments to the imagination and enterprise of Joseph Austen, better known in his later guise of Joseph T Treffry of Place, Fowey. In a very real sense they are his only monument as, surprisingly for a man of such stature, there is no great memorial to his place of burial. The ruined buildings, overgrown bridges, and impressive Viaduct also represent the tangible evidence for a tremendous upsurge of activity in the area during the period 1825 to 1850; linked to the extractive industries (copper, tin, granite and china-clay), this upsurge resulted in a comprehensive re-shaping of the Valley which at the time must have seemed the wonder of the age.

Joseph Treffry was the inheritor of an extensive but relatively poor family estate. Not one to simply bewail his fate, he determined to revive the fortunes of Place House not merely by introducing more efficient methods of agriculture on his farms and plantations, but also by diversifying his interests into industry and commerce. One of his first acquisitions was a controlling interest in a disregarded copper mine at Lanescot, which was to become Fowey Consols as it absorbed other nearby mining setts. As the mine prospered, so the difficulty of transporting copper ore to Fowey for shipment (over roads suited only for pack-mules) threatened to choke this new and promising venture. Only a radical solution could make the mine truly profitable; and Treffry was the man to provide it.

INDUSTRIAL DEVELOPMENT

1835

figure 6



Copper and Coal; time and again this theme recurs in the study of Cornwall's early 19th century development. Once the smelters at Hayle had ceased operation in the 1800s, there was nowhere in the County to process the ore being raised to grass in vast quantities. Equally, there was no coal in Cornwall to power the great pumping engines increasingly required to drain ever-deepening mines. South Wales could provide both needs; and the urgent requirement was for good harbours and efficient transportation to link the mines with their Welsh counterparts. The ports of Portreath, Hayle, Devoran, Looe, and Par were all products of the same period and the same demand. The methods of implementation varied, but always the goal was the same: to fuel the engine of Cornwall's industrial revival, at this time irrevocably committed to copper. As the roads of the early 19th century were in the main appalling, save for the major turnpikes, there was little option but to turn to canals or the largely untried new railways for a solution.

Treffry's first intention was to construct a tramway from Fowey itself to Fowey Consols; this would have terminated at Fowey Pill high above the harbour, and a system of shutes was proposed to feed the copper ore to the ships waiting below. A plan was prepared for this tramway in 1824 (CRO DDX 484/1-2), but the line was never constructed as it proved impossible to arrange for the purchase of all the land required. It was natural enough for Treffry to look first at Fowey harbour as an outlet for his copper. The family seat was in the town, and the Treffrys had a long and historic association with the port and borough of Fowey. Despite these natural benefits in favour of the development of Fowey as the principal focus for his empire, Treffry was forced by circumstance to look elsewhere. The subsequent events can only be outlined within this Report; for a fuller description, the reader is directed to John Keast's excellent "The King of Mid-Cornwall".

Almost by chance, therefore, arose an extraordinary complex of early 19th century industrial enterprise in the hitherto quiet Luxulyan Valley. Fowey Consols mine overlooked the silted Par estuary, the small straggling village of St Blazey and the sandy beach at Par itself. Ponts Mill, choked by debris from Hensbarrow, had ceased to have any significance as a port. In modern parlance, the area was ripe for development. All that was required was for Treffry to turn his head from Fowey, and face west; and as he did so he must have intuitively grasped the possibilities of the valley below.

A potentially easier route to the coast from Fowey consols was down the Par Valley: however, there were no facilities at Par itself for the berthing of large vessels. Commencing in 1829,

Treffry constructed an entirely new harbour at the western end of Par Beach, and connected this with Ponts Mill by a canal which followed the original route of the river. An inclined plane from the mine on the hill above allowed copper ore to be shipped out from the canal terminus in the valley below, and coal to be brought in from the ships docked at Par. By 1835 this scheme was in working order, if not entirely complete. Stated in this way, the bald facts belie an effort of physical and mental labour which gives us pause today, living as we do in an age which is used to mechanical aids of every kind for large civil engineering projects. Not only did a substantial breakwater and harbour have to be constructed at Par on a dangerous and exposed shore, involving the quarrying and transport of thousands of tons of rock, but basins and reservoirs had to be excavated for the canal, the river had to be diverted into an entirely new and artificial course, three locks had to be built, the canal deepened and lined on the course of the old river bed, and a lengthy inclined plane laid up the hillside to Fowey consols, for much of its route in a granite-lined tunnel.

It is inconceivable that works of such magnitude and extent could be set in motion without powerful commercial incentive. In this case, the spur was undoubtedly the burgeoning success of the Fowey Consols mine, where technology was being stretched to new limits in the pursuit of underground wealth. This for the first time directly affected the Luxulyan Valley when a leat was constructed from an extraction point just south of Gattys Bridge to provide power on the surface of the mine; in itself a major undertaking, it involved the building of a wooden aqueduct around the front of the precipitous Carmears Rocks. At about the same time, in 1834-35, a young engineer named William West was supervising the erection of a new 80 inch Cornish engine from Harvey's Foundry on the main shaft at Fowey Consols. This (Austen's Engine) and more particularly its fame in the trials of 1835 when it produced the best performance of any engine in the County, gave West a prominence in the area which enabled him to establish his own foundry in St Blazey. West rapidly became a close associate of Treffry, and together with William Pease (Treffry's Land Steward) was a major architect of all the subsequent works in the Valley.

Having established an efficient communication infrastructure for his mine, Treffry might well have been content. If, however, his intentions had been limited in 1825, they certainly were not so now. All contemporary accounts stress the man's extraordinary and (to others) disturbing energy; he could not long be satisfied with one project, but had soon to be planning greater things. In this respect he resembles the engineer Isambard Kingdom Brunel, with whom he corresponded and who he must have met in his

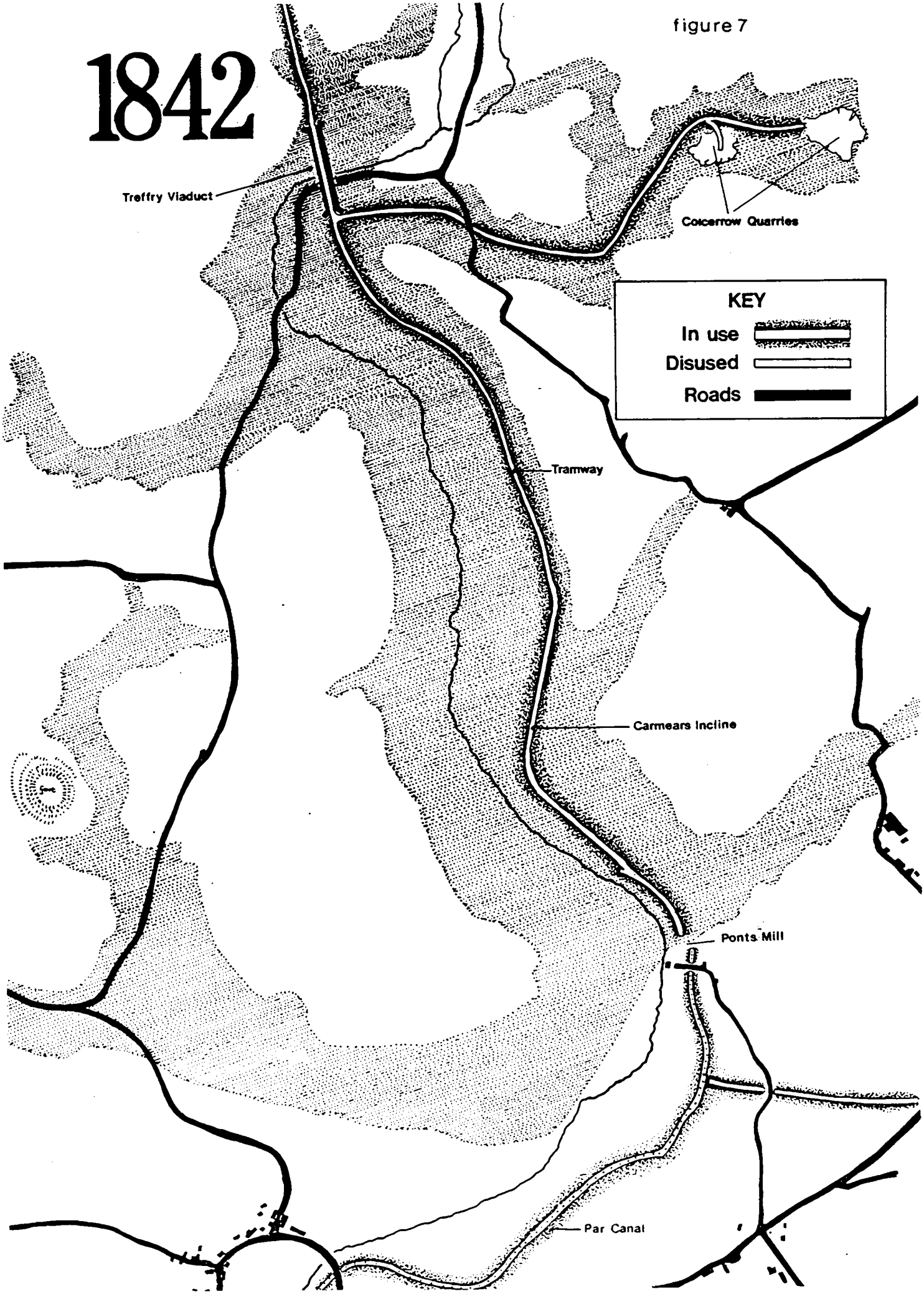
capacity as a director of the Cornwall Railway. Treffry became increasingly involved in the groundswell of Cornwall's 19th century industrial revolution; change was rushing through the County, sweeping aside the old semi-feudal patterns of rural life and bringing in its wake a social upheaval which few could comprehend or foresee. As advocate and evangelist of this change, Treffry won himself few friends amongst the old guard of County squires.

He bought (or acquired major interests in) Par Consols mine above the harbour; shipping based in Fowey and Par; granite quarries in the upper Luxulyan Valley; and clayworks on Hensbarrow itself. Par would be not simply a port, but a major industrial centre for Mid-Cornwall, with granite cutting and polishing works, a timber yard, coal and ore floors, a lead-smelter, and lime-kilns. In many respects it was the precursor of that 20th century notion, the Industrial Estate. Beyond Cornwall, Treffry was looking to improve communications with the rest of Britain: through the Cornwall Railway, which was to connect the County to London via the South Devon Railway, and also through a new road link involving a massive bridge across the Fowey estuary. Grand visions such as these found concrete expression in the one scheme where Treffry had total control; with no shareholders to satisfy or pander to, he set about the building of a trans-peninsular route across the County.

Treffry's ambition reflected that of several other schemes proposed during the century. The sea passage from South Wales to the Cornish ports along the south coast involved a hazardous journey around Land's End, graveyard of many a good vessel. If Par could be connected with a port on Cornwall's north coast, then copper and coal could be shipped in a far more direct and potentially less dangerous fashion. Whether this concept arrived full-blown in Treffry's mind sometime in 1835, or whether it gradually evolved as the work proceeded in the Valley for more prosaic aims, is unknown; what is certain is that Treffry purchased the tiny fishing village of Newquay in 1838 and set about to convert it into yet another outlet for his industrial empire. The idea of connecting it with Par could not have been far away.

In 1835 contracts were drawn up for the construction of a horse-drawn tramway through the Luxulyan valley, to connect the canal terminus (extended from the foot of the Fowey consols incline plane to Ponts Mill) with Luxulyan village and Bugle. Land was purchased and the works commenced. The main purpose of this enterprise could only have been to tap the hinterland of the Hensbarrow region for Treffry's port at Par, and ultimately,

figure 7


1842
Treffry Viaduct
Coicerrow Quarries
KEY
In use
Disused
Roads
Tramway
Carmears Incline
Ponts Mill
Par Canal

beyond. This was not the tramway with which we are familiar today, for the contractors failed dismally in their efforts and after eighteen months the project was abandoned. An episode which has had little recognition or examination until now, it remains an enigma. The plans, on the face of it, appear sound enough. The route was to follow a steep but continuous gradient from Ponts Mill to Luxulyan, crossing the river twice; such a line would have allowed simple conversion from horse to locomotive traction at a later date. Whether Treffry had over-reached himself and set the builders an impossible task, or whether the contractors themselves were simply incompetent is uncertain. At this time Treffry was also heavily involved with development of Fowey Consols and Par, and it may be that he was indeed overstretched. William Pease was called in to help plan and specify a new route, and he personally supervised its construction.

This second scheme was bold and typical of the era. A massive inclined plane rose 300 feet from the depot at Ponts Mill to a point high on the eastern side of the Valley. Powered by a large waterwheel, it was of single track only; although this (the Carmears Incline) at one stroke gained all the height required for access to the moors beyond Luxulyan, it forever precluded the use of the line by locomotive traction. When completed in 1841, Treffry was extremely proud of the new plane, and set about inviting guests to view his latest marvel. The continuation of the line up the Valley and to the granite outcrops of Colcerrow (the immediate target) speedily followed, since all this could now be built on a level shelf high on the Valley side. To continue the tramway to Luxulyan and beyond, however, required a tremendous feat of engineering skill: the Valley had to be bridged at a high level (100 feet) just north of Rock Mill. The result was the most famous monument in the area, the Treffry Viaduct.

At this time in Cornwall there was no comparable major civil engineering work. Such railways as already existed had been planned to avoid confrontation with the landscape, and although with the great canal era of the 18th century and now the booming railway age similar structures were common in other parts of Britain, for Cornwall this was a first. Once again it seems that the design and execution of the Viaduct belongs to Treffry and Pease. It was built during the period 1839 to 1842, apparently from surface stone (moorstone), and was completed on schedule within a very restricted budget. Not only did it carry the tramway across the Valley to Cam Bridges and Luxulyan, but it served a double purpose as an aqueduct, conveying a new leat across the Valley to power the Carmears Wheel and thereafter amplify the power of the Fowey Consols Leat. The Viaduct rapidly

became an attraction for visitors and local artists, representing as it did the spirit of a New Age; Treffry was seen and lauded by many as a public benefactor, ushering social and economic improvement in the wake of his entrepreneurial vision. The local squirearchy were grudgingly forced to acknowledge his enterprise, though praise from this quarter was usually tempered by a thorough dislike of Mr Treffry's attitude and methods.

By 1845 this extraordinary industrial complex was fully operational. Inwards traffic from Par included lime for agriculture and coal for the mines and clayworks of Hensbarrow; outwards traffic was the china-clay, granite from the Valley, and lead ore from the mines of Newlyn Downs for the smelter at Par. To ease the problems of transhipment to the canal barges at Ponts Mill, containers were used which could easily be craned from the tramway waggons to the barges at the canal basin. The continuation of the tramway to Newquay was well under way. Treffry's health, however, was failing him; the schemes and proposals for new ventures continued unabated, but there was a dissipation of his energy and the line to Newquay was not complete when he died in 1850.

In retrospect, the achievements of the period 1828 to 1842 are little short of stupendous, given the limited capital available to Treffry and the fact that it was in essence the work of one man, rather than a great company. It should also be recognised that there was nothing particularly new or revolutionary in the technology applied to the problems he faced; rather the methods used were all tried and tested elsewhere in Britain. This conservative approach paid dividends, in that an existing technology could be refined to a level of reliability which ensured a profitable return. The future of Par, St Blazey, and the Luxulyan Valley was irrevocably directed away from that of rural slumber; the area was now a centre for commerce and extractive industry, with a complete, if basic, transportation system. Treffry was missing centre stage, but others would step into the breach.

3.3) Industries and Communications from 1850

Treffry's successor to the estate, although a man of very different character, completed the tramway to Newquay. The system continued to function, albeit with very little further investment or expansion apart from the replacement of the Par canal in the 1850s by an extension of the tramway through to Par harbour. By the 1860s the great copper mines of the area were in steep decline, and the focus for this mineral moved further east to Caradon and the Tamar Valley. Money for further ventures was therefore in short supply, had the new occupant of Place House wished to expand his inherited empire.

There was, however, one significant development in the Valley during this period (1850-1860). The Kendall family, who had their seat at Pelyn near Lostwithiel and who owned the eastern side of the Luxulyan Valley, built an extraordinary private estate road or carriageway from Pelyn which entered the Valley above Penpell, and swept around the entire length of the woodland before returning via Colcerrow. The purpose of this full-width roadway with its fine bridges and spectacular hairpin bends above Carmears is largely conjectural; it is presumed that it was an outward expression of the Kendalls' desire to impress neighbouring squires. When it became disused for wheeled traffic in the 1900s it acquired the local name of the "Velvet Path".

As the copper mines were abandoned and allowed to flood, so local mining adventurers began to look with renewed interest at the older tin workings in the area, and during the period 1870 to 1910 there was much speculative prospecting in the Valley. Old mines such as South Prideaux Wood and Lady Rashleigh were actively re-worked, and entirely new ventures of which Prideaux Wood and New Fowey Consols are examples were also tried. None of these was greatly successful, although South Prideaux Wood was extensively developed; the Valley, although undoubtedly mineralised to a degree, did not contain quantities of ore sufficient to revive mining fortunes in the area. The fluctuating price of tin was in any case a barrier to much serious interest, despite the vehement protestations of Captain Puckey and other local mining gurus as to the untapped wealth of the locality.

An industry which did enjoy commercial success at this time was the stone trade; the Luxulyan granite is of a particularly fine quality, and the working of the hillside outcrops and surface stone had by now developed into true quarrying in depth. A renowned variety of the local stone is a granite composed entirely of pink feldspar and black tourmaline, known as Luxulyanite. Never found in large quantities, a large block of

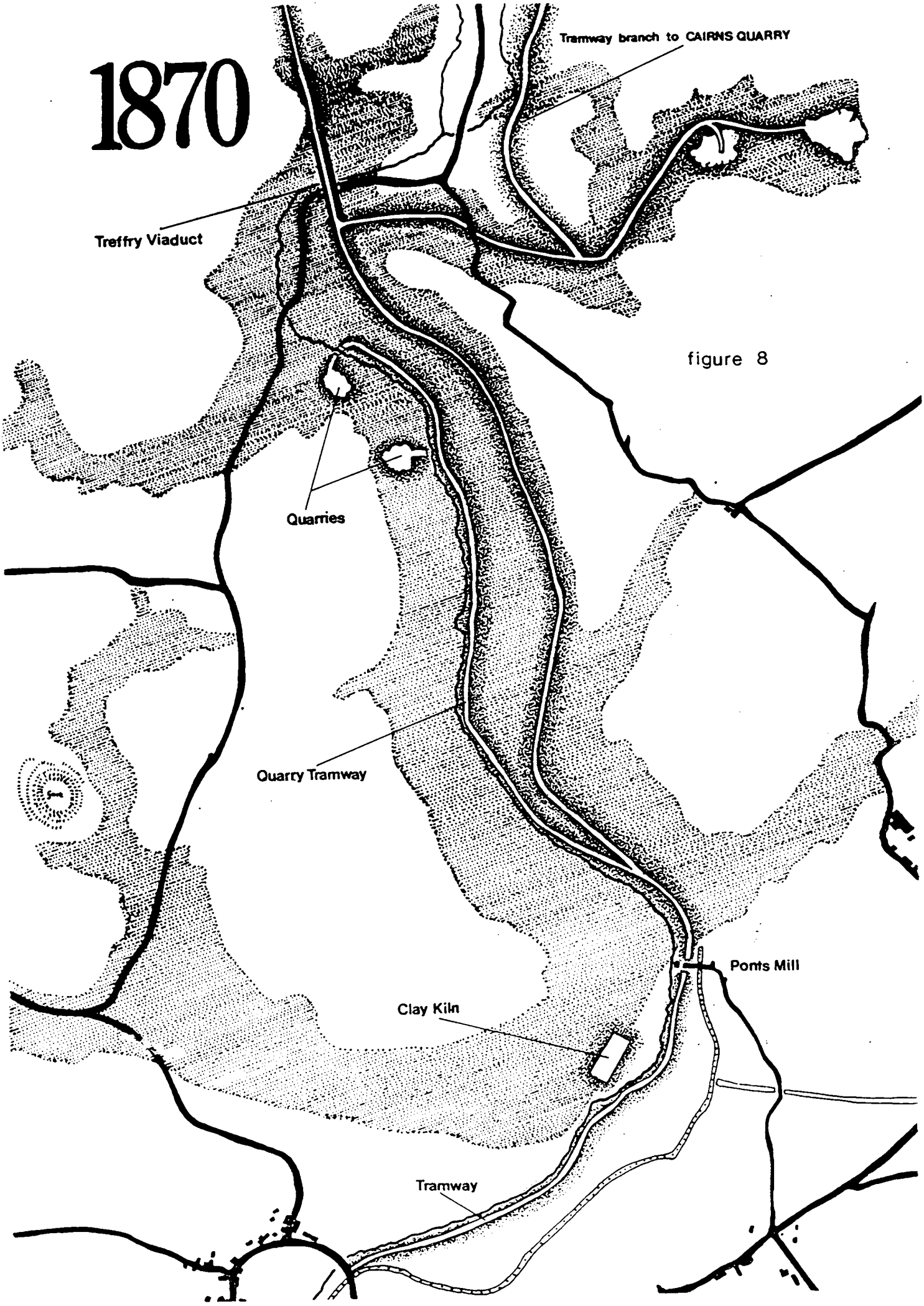

1870
Tramway branch to CAIRNS QUARRY
Treffry Viaduct
Quarries
Quarry Tramway
Ponts Mill
Clay Kiln
Tramway

figure 8

this material was used for the making of the Duke of Wellington's sarcophagus in the 1850s; it is in St Paul's Cathedral, London. Until ca 1900 the granite trade enjoyed a strong home market for quality stone. As a result, extensions to the tramway system were built to serve the quarries. The first of these was a branch from the Colcerrow quarry line, built circa 1855 and running north past Gatty's Bridge to Cairns. The quarries here were little more than shallow workings on the hillslope, and appear to have never been developed: by 1880 this line was disused. Another extension of the horse-drawn tramway was a branch from Ponts Mill along the floor of the Valley to two quarries near Rock Mill. This was built in 1868-1870, and included an inclined plane to the southernmost quarry. Circa 1900, the Luxulyan granite quarries were acquired by the Penryn company of John Freeman; as the trade declined in the early years of this century, so fewer men were employed in the traditional industry which had given Luxulyan a measure of national fame at its peak. Colcerrow continued to produce a little stone, most probably re-worked from waste material, until the 1930s.

By 1870 the Treffry Tramway system through the Valley was one of only two surviving entirely horse-drawn systems in the County, the other being the Pentewan Railway (which was to convert both its gauge and its traction shortly thereafter). As such, the Luxulyan Valley lines were now distinctly archaic, and a great hindrance to the development of efficient communications in the area. There was no possibility of converting the existing system to locomotives as had been done elsewhere, as the Carmears Incline effectively debarred steam traction from the Valley. This situation was further complicated by the Cornwall Railway's adoption of the broad gauge (7ft 0.25ins) for its main line from Plymouth to Truro, opened in 1859. This was a requirement for through communications to London, but as a result made it impossible for the existing standard gauge (4ft 8.5ins) lines in Cornwall to link into the main system; the Bodmin and Wadebridge, Liskeard and Caradon, and the Treffry Tramways were all similarly isolated. It was nonetheless readily apparent to engineers that the broad gauge was doomed in the long term. The Brunel-designed lines which used it, all now part of the Great Western Railway, were themselves isolated in a country where other companies had built their lines to the standard gauge; it could not be long before the Great Western was forced to comply with the majority.

The stimulus which re-awoke the route through the Valley was provided by a speculator called Roebuck. Forming a company with local businessmen, he purchased the tramway system in its entirety, and during the period 1872 to 1874 set about converting it into a modern railway system. Built to the standard gauge, the Cornwall Minerals Railway (CMR) followed the basic route from

Par to Newquay, and expanded considerably on it, with lengthy branches into the china-clay district and an extension from Par to Fowey. The purpose of this line was to tap the vast reserves of iron ore on the Great Perran Iron Lode in the north, and also to provide an efficient route to the coast for the rapidly expanding china-clay industry.

The line was constructed to a standard which was exceptional for a local mineral system. William West provided the ironwork for many of the bridges and other works, and with his old colleague William Pease helped plan a new route through the Luxulyan Valley. From Ponts Mill to Luxulyan it was necessary to build a completely new line, which although steeply graded and involving deep cuttings, a viaduct and a tunnel, avoided the Carmears Incline and passed below Treffry's Viaduct which had served its intended purpose for little more than thirty years. The centrepiece of the new system was the headquarters at St Blazey, where Sir Morton Petoe built a locomotive depot and works for the line which surpassed anything previously constructed in Cornwall.

The Cornwall Minerals Railway, although soon in financial difficulty and worked by the Great Western from 1877, revolutionised the transport system of the area, allowing the china-clay producers of Hensbarrow to despatch their produce to Par and Fowey in larger high-capacity wagons and in train loads impossible for horses to draw. Its impact on the Luxulyan Valley was largely to destroy its short-lived prominence as an industrial centre. Traffic now passed through, and did not stop for transhipment, loading or checking down the incline; the stabling and shoeing of horses had been replaced by different rituals in the lofty sheds at St Blazey. The Carmears Incline was no longer required, and the only parts of the tramway system in regular use were the quarry branch to Colcerrow (where horses drew wagons from Luxulyan Station across the Viaduct until the 1930s), and the quarry branch in the bottom of the Valley. As the trade in granite diminished, so did these relics of the horse-drawn era. This decline in the importance of the Valley from its zenith during the copper boom of Treffry's day is highlighted by population figures for Ponts Mill from the Census Returns; a population of 80 in 1841 had fallen to just 11 by 1881.

Despite this, development in the Valley had not ceased, although the industries which were again to reshape the landscape were not this time indigenous. Nonetheless, they were once more dependent on the complex infrastructure which Treffry had created. If the upper reaches of the Valley had returned to a rustic calm, Ponts Mill was to enjoy something of a revival.

In 1874 William Pease suggested to his friend T Medland Stocker (of the West of England China-Clay and Stone Company) that the water now going to waste in the Carmears and Fowey Consols leats could be harnessed for the purpose of grinding china-stone. Although the nearest source for this material was several miles away in the Hensbarrow quarries, the availability of water power was the overriding factor in selecting the site for processing. A set of mills was built at Ponts Mill near the foot of the Incline, and first went into production in 1875, powered by water-turbines; these were fed from the truncated Fowey Consols Leat 300ft above through a large diameter iron pipe. China-stone was brought in by the new Minerals Railway via Nanpean and St Dennis Junction; the mills were gradually expanded during the early twentieth century until they became the largest complex of stone mills in Britain.

The now redundant water wheel at the head of the Carmears Incline was also tempting to the West of England Company, and in the 1890s it too was converted to drive a pair of stone mills constructed on each side of the wheel pit. A pipeline laid down the side of the incline carried the china-stone slurry for drying at the lower mills. The Wheelpit Mill, as it was known, did not work beyond the 1914-18 War; it was hampered by the necessity of bringing in the china-stone along the old tramway from Luxulyan Station.

Pipelines were now to become a major new feature of the Valley's communication system. China clay production was booming on Hensbarrow, and was seen by many as the salvation of an area which could no longer depend on tin and copper for its economic mainspring. The development of the coal-fired pan-kiln in the 1850s had radically improved the production of the clay works, but with a product of such low intrinsic value the cost of transport was a major factor to the St Austell clay barons. This in fact had been a lifeline for the Cornwall Minerals Railway when faced with total loss of traffic from the iron mines: the china-clay and stone industry required cheap and efficient movers of its wares. Where the clayworks themselves were distant from the railway, it made good economic sense to pipe the clay to a railhead and process it there, rather than at the pit itself.

The first clay pan-kiln to be built in the Valley was the Prideaux Wood Works at Ponts Mill in the 1870s, served by a private siding from the CMR and with its clay piped down from the pit on the Hensbarrow Moors. This example was followed in the 1920s by two more kilns, one at Ponts Mill on the old tramway route and the other, the Central Cornwall Dry, fed from a speculative claywork on Starrick Moor. This latter was built in the middle of the Valley and the quarry tramway diverted onto the

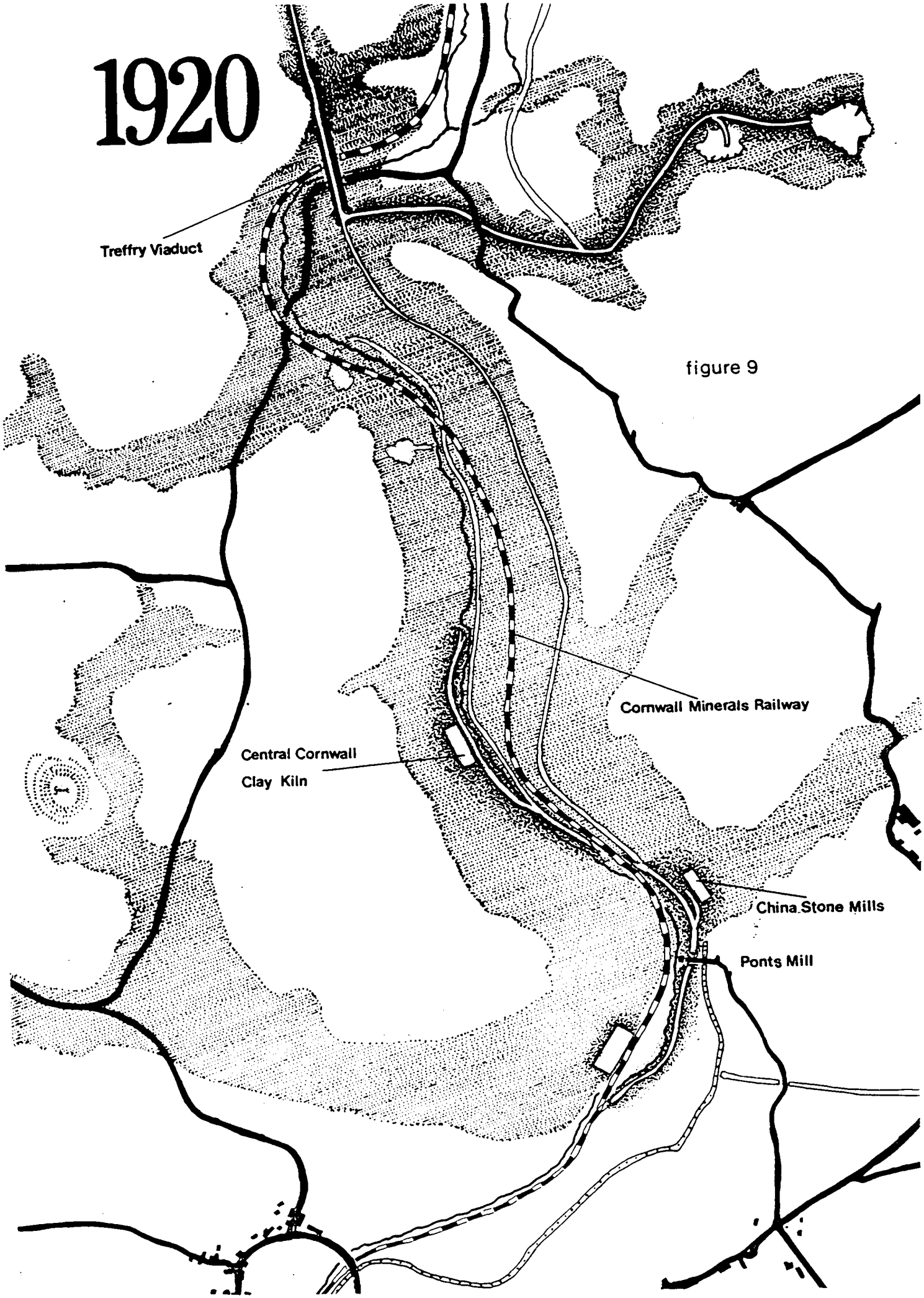

1920
Treffry Viaduct
Cornwall Minerals Railway
Central Cornwall
Clay Kiln
China Stone Mills
Ponts Mill

figure 9

opposite side of the river to connect it to the CMR at Ponts Mill. Thus for a time the lower half of the Tramway system was revived, not now for horses, however, but for a diminutive petrol locomotive named "Bessie". All three kilns were eventually absorbed by the new china-clay conglomerate, ECLP (now English China Clays International), and worked until the 1960s when they and the stone mills were shut down. The main Ponts Mill kiln was then converted to a modern oil-fired drier, and is the only industry now active in the Valley. The stone mills were demolished in the 1960s and there is scant evidence of this little-known and peculiarly Cornish industry. One short section of the original tramway is still in use, as a spur into the Ponts Mill clayworks; and the Fowey Consols and Carmears Leats still run, maintained by ECCI, powering until recent months a small hydro-electric plant at Ponts Mill.

The Valley today hides its past; apart from the well-trodden main tramway routes and the spectacular Viaduct, encroaching vegetation serves to mask and soften the remains of 150 years of intensive development. Treffry would be pleased, however, that his enterprise was ultimately pivotal in the development of the china-clay industry, merely an infant during his time but one in which he rightly foresaw great potential. For Par harbour continues to serve the clay companies well, as does the tramway to Newquay in its new guise as an important freight route for British Rail. The evolution of his Viaduct from a utilitarian structure into the symbol of an heroic age is also a fitting tribute to one of Cornwall's most impressive sons.

3.4) The Field Evidence Today

The main preoccupation of the press and public during the Survey was for spectacular discoveries; time and again, the Project staff were faced with the question "and what have you found?". Sadly, the Director was unable to conjure up at short notice any relic sufficiently sensational to satisfy this hunger; ancient tombs filled with gold or Aztec temples are not one of the more obvious features of the Luxulyan Valley. The broad outline and distribution of the remains was already well known, and in consequence it was unlikely in the extreme that the Surveyors would be able to identify totally new and previously unrecognised sites within the Project area. The objective for the Survey was rather to enhance the pre-existing knowledge base for the Valley, and to study the landscape in greater detail than ever before; as a result, it would then be possible to analyse and interpret the archaeology in a new light.

Despite this more prosaic but realistic approach, there were in fact new discoveries to be made; several features were found and recorded which had previously been unknown to experts in the field, and most probably were unrecognised even by those familiar with the Valley. As with many significant archaeological discoveries, the remains were in themselves unspectacular and easily overlooked. They are, however, potentially of great consequence for a new assessment of the Valley and its industrial development, and there is little doubt that our understanding of the archaeology will be considerably enhanced as a result. Beyond this, the Survey resulted in the collection of a vast quantity of data on hundreds of individual sites and landscape features. The analysis of this material would, fairly, be the subject of months of study; it cannot be done justice within the scope of this Report, the purpose of which is rather to present an overview of the Project in its implementation and achievements.

The majority of site-types in the Project area are industrial in nature and of 19th century origin. Many relate directly to the Treffry tramway system and the industries which it supported, or are of a later date but dependent on the infrastructure created by Treffry. There are also features of somewhat earlier date which are not directly attributable to industry, but little evidence for prehistoric or even early medieval occupation within the confines of the Valley itself. Considering the steep and heavily wooded nature of the terrain, this is not surprising.

The natural landscape is one of oak and beech woodland established on thin soils over granite; the granite outcrops at surface in massive form at several points, and elsewhere the

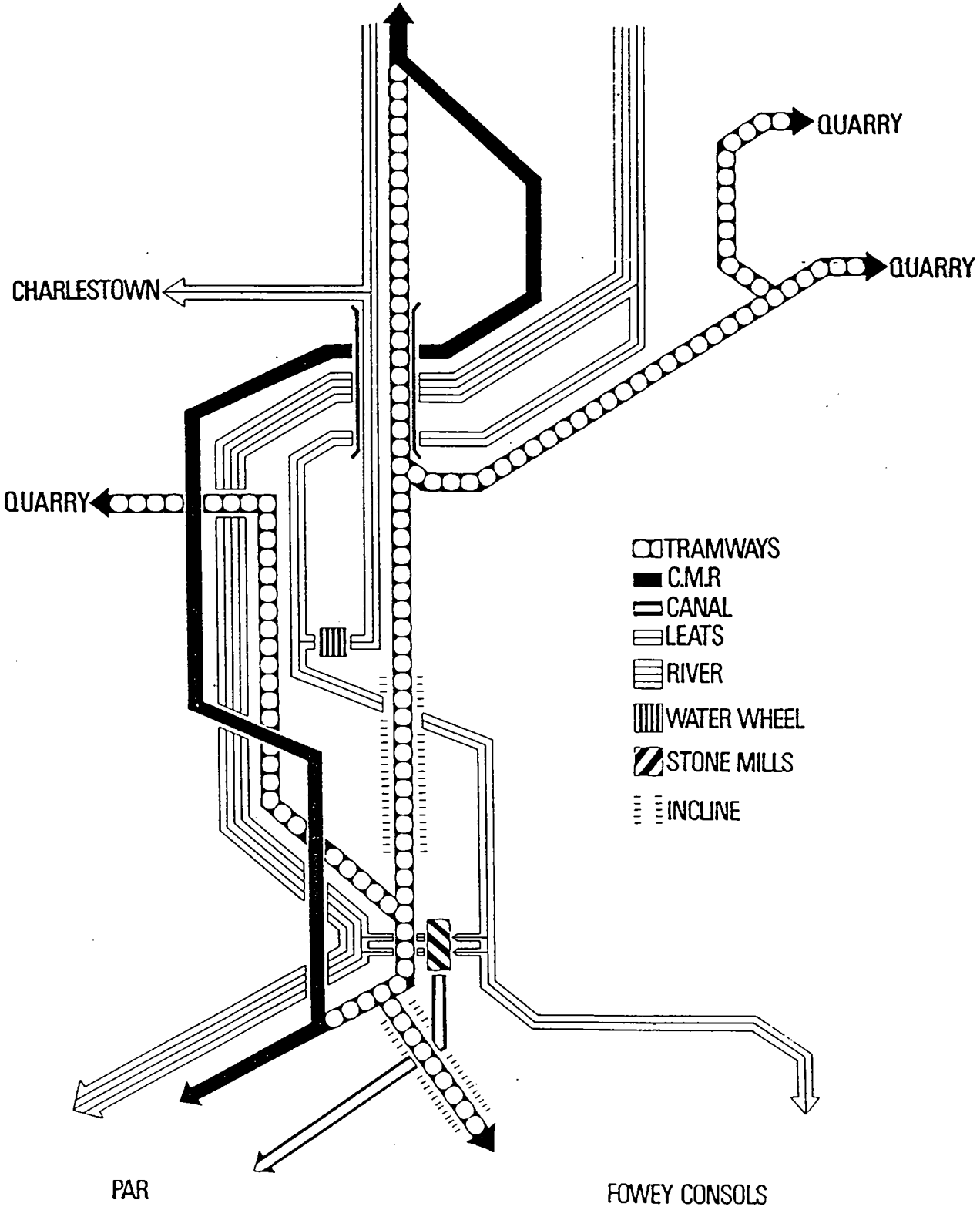

QUARRY
QUARRY
CHARLESTOWN
QUARRY
TRAMWAYS
C.M.R
CANAL
LEATS
RIVER
WATER WHEEL
STONE MILLS
INCLINE
PAR
FOWEY CONSOLS

figure 10

hillslopes are characterised by the presence of many detached granite boulders, or "stranded whales". These provided a convenient and seemingly inexhaustible supply of stone for buildings in the area, and the same granite was also used for all the industrial structures in the Valley. The fast-flowing and frequently flood-swollen river in the bottom of the Valley was unsuited to navigation, running as it does over an uneven and rock-strewn bed, but was a power-source having great potential for industry. The Valley sides rise to a height of over 100 metres above the old estuary at Ponts Mill, and effectively restrict communications and industries to this narrow corridor. The topography and character of the landscape, while offering opportunities for mineral extraction and water-power, was also a major obstacle to the exploitation of the area; the field evidence today reflects the ingenuity of those pioneers who opened up the Valley to commerce and communications.

The following discussion of the field evidence and Survey results should be studied in conjunction with the copies of the 1:1000 Survey plans (Appendix E), which have been reduced to a scale of 1:2500 for reproduction here. The 1:1000 survey area is shown in figure 11. Only those sites within the 1:1000 Survey area are considered in sections 3.4.1 to 3.4.8; sites outside this are dealt with in section 3.4.9.

3.4.1) Field Evidence Pre-1800 (E prefix illustration numbers)

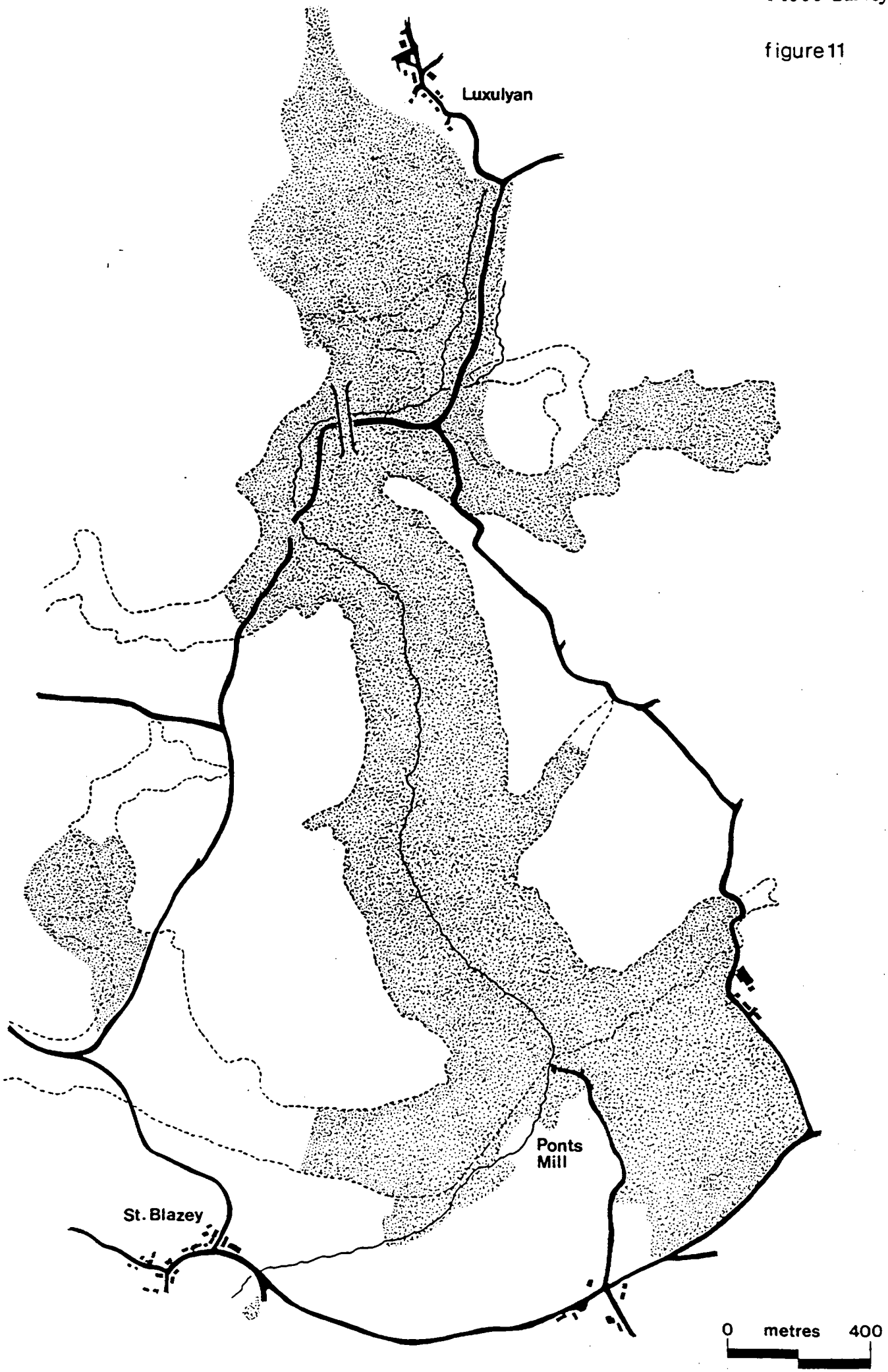
There are many features within the Valley which can be attributed to an earlier period than the industrial development post-1825. The problem lies not with the identification of these features, but rather with establishing the exact period to which they belong. Many of the remains are cut through or slighted by leats, tramways, or paths which are definitely of 19th century date and thus their earlier origin is undoubted; with little documentary evidence for the period pre-1800, however, there is no sure way of dating many of the sites in the absence of study by excavation.

Prideaux Wood (Plan 1)

Virtually the entire ground surface of this part of Prideaux Wood has been disturbed by mining activity. Much of this is relatively shallow, and may belong to pre-1800 periods of prospecting and exploitation. The only documentary evidence available for these sites relates to a period post-1880; however, there is some indication that the workings were by that date regarded as "ancient". Also within this area of woodland, now planted with conifers but until 1960 deciduous, are levelled and roughly circular platforms on the hillslope which do not appear

1:1000 Survey area

figure 11



to be associated with the mining activity (E0). Although they could possibly be interpreted as horse-whim plats (see 3.4.5) trial excavation revealed a layer of charcoal at a depth of 0.3 to 0.5 metres; this would seem to imply that they are in fact charcoal-burning platforms. If so, this would strengthen the case for intensive woodland management during the medieval and post-medieval period.

Ponts Mill (Plan 2)

At Ponts Mill, there is no sign of the medieval bridge, which was replaced by the canal bridge of 1835 (P1, Plan 2). The steep and narrow trackway leading down to the river crossing on the west (E1) may possibly be part of the medieval route from St Austell to Fowey via this first land crossing of the Par Estuary, and if so will be of 12th century date. A ruined settlement above Ponts Mill (E2) was occupied in 1840 (Tithe Map and Census Returns), when it housed two families; another group of buildings on the opposite side of the trackway was destroyed by the construction of the Cornwall Minerals Railway (CMR) in 1873. The present day remains were the subject of an individual site survey at a scale of 1:50 (fig 12). This revealed the ground plan of two small cottages, one of which was clearly an addition to the main structure, and a yard with outbuildings on the upslope side. Other than being certain of their pre-1840 origin, it is impossible to firmly date these houses.

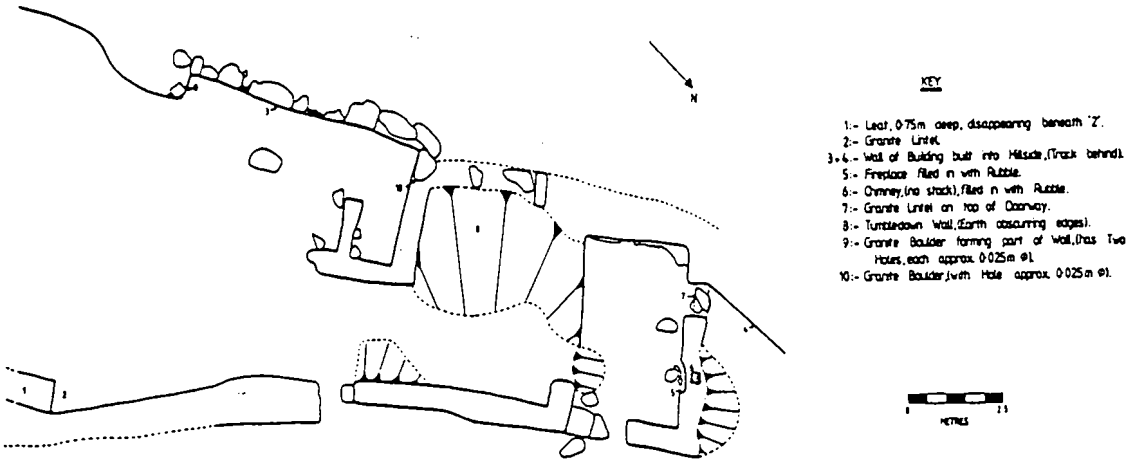


Fig 12 Ponts Mill Cottages

The same conclusions also apply to the other domestic structures at Ponts Mill, which are all present on the Tithe Map of 1840. A close study of the Rashleigh Papers in the CRO might well reveal some evidence for the dates of the construction of these (E5, E6, E7). It is known that the present day cottage (E6) was at one time a public house (the Rashleigh Arms). The Mill and miller's cottage (E3) have recently undergone an extensive refurbishment, and there are no remains of or indeed evidence for the original machinery, save the location of the wheelpit. Whether this structure is on the site of the medieval mill owned by the Tywardreath Priory is unknown; the leat which served it (L1) is traceable for a long distance up the Valley, and this in all probability does represent the original medieval leat. The leat has been cut through and destroyed by the CMR, and thus could not have been in use after 1873.

On the basis of the Tithe Map evidence, there would appear to have been no expansion of Ponts Mill as a settlement after 1840, only a decline in the number of dwellings and population. This conclusion is also borne out by the figures from the Census Returns. This is puzzling when during the same period, the neighbouring settlements of Tywardreath Highway and St Blazey were growing rapidly; Ponts Mill must also have continued to be busy throughout the 1850s and 1860s, with the canal, tramway, and Fowey Consols Mine all active. A steady growth in population would be expected, with the addition of a chapel and worker's cottages, until about 1865 when copper mining ceased. That the reverse is in fact the case may point to some negative influence exerted by the Rashleigh family, or it may reflect the settlement's natural disadvantage in terms of its cul-de-sac position.

Carmears and Trethevey (Plans 5,6)

Throughout the woodland in the Valley are the remains of substantial banks or boundaries; in general these are not stone-faced Cornish Hedges, but are earth banks with traces of a stone core in places. They do not relate to any present-day usage of the woodland, and in certain instances are not shown on the relevant portion of the Tithe Map; some are of undoubted relative antiquity. They are of two broad classes: those that follow the contours of the hillslope (E10, E11), and those which run against the slope of the hill from top to bottom (E8, E9, E12). Their present day condition varies from banks 2 metres high and 2 wide (E8) to minimal remains with a height of only 0.3 metres (E12). They may belong to a period of medieval or post-medieval woodland management when this natural resource was exploited in relatively small parcels; they are unlikely in any event to form stock-proof boundaries, as the steep slopes would be unsuited to the grazing

of animals. The banks therefore probably represent property boundaries for the purposes of woodland management.

The area of tin-streaming activity (M6) on plan 5 is also of unknown date, but has many features typical of streamworks elsewhere in Cornwall (river diversion, tinner's shelters). The river diversion is shown on the Tithe Map, and the streamworks is therefore certainly pre-1840. Other streamworks in the Valley are equally difficult to date in the absence of documentary or other supporting evidence for their inception.

In the bottom of the Valley an attempt has been made to enclose and cultivate the more level river margins (E13). These three small meadows are shown on the Lanlivery Tithe Map, with access provided by a trackway from Ponts Mill (E14); they would appear to have been in use until relatively recent times, judging from the small size of the trees which are now reclaiming this area.

Rock Mill (Plan 9)

The Survey Team did not find any documentary evidence to date Rock Mill as a corn mill (E15) or settlement; undoubtedly it was in existence pre-1840. The group of abandoned houses (E16) has many interesting elements; there are at least three cottages, one with a very substantial granite-linteled hearth. The Tithe Map for 1840 shows no crossing of the river at this point, thus the river bridge, despite appearances, must be of later date.

Many field boundaries throughout the remainder of the 1:1000 survey area are undoubtedly also of a period well before 1800. In the absence of secure dating evidence, it is impossible to be more specific about these, and the other trackways which might well qualify for inclusion in this section.

Field Evidence Post-1800

3.4.2) The Par Canal (P prefix illustration numbers)

The only portion of the Par Canal included in the 1:1000 Survey area was the Canal Terminus itself at Ponts Mill (Plan 2). This was surveyed in detail at a scale of 1:200. The original terminus and wharf for the Canal was at the lower end of the Fowey Consols Incline Plane, some distance to the south; when the tramway was constructed through the Valley during the period 1835 to 1842, the Canal was extended north to a new terminus at Ponts Mill.

This consists of a lower basin (P2) and upper basin (P3) linked by a narrow channel under the road bridge (P1). The basins are

both heavily silted, and have been further disguised by the dumping of debris from the stonemills when they were demolished in the 1960s; many of the original features are now obscured as a result. Dense vegetation covers the area. It is now very difficult to imagine 60 ton barges moored up and being discharged in this muddy stream-bed, until the bridge is examined from below. This structure is then revealed as an imposing three-centred arch, with granite masonry of the highest standard; a very full specification for the bridge exists in Pease's Diaries for 1836 (January 5th). This indicates that the original intention was for a tramway underneath the bridge and alongside the wharf; this would fit with the original Tramway route of 1835 (see 3.4.3). On the northern side of the bridge, granite corbels support a launder which returns water from the Fowey Consols Leat to the River.

Above the upper basin and now almost completely obscured by the later stonemill tanks and modern debris, is the Reservoir for the Canal (P4); a revetment is visible at the southern edge and the structure at this point retains a depth of 3 metres. Originally, this must have been supplied in some fashion by the River, but later developments have obscured any evidence for this.

The Canal became disused relatively early (in the 1850s) and as a result has suffered more than many of the industrial monuments in the Valley from natural decay and later re-development. There is now little to distinguish the route of the Canal from any other small stream in the area; the most imposing feature remaining is the bridge, which retains a certain grandiose solidity.

A feature intimately associated with the construction of the Canal which remains in use to this day is the Par River (P5); in order to build the Canal, which is in the original river bed, the River had to be physically re-located. Its course at this point and on to Par is therefore completely artificial and dates from the 1830s. For some distance it runs in a deep cutting through the granite hillslope, and in the winter rains is an impressive spectacle.

3.4.3) The Tramway System (T prefix illustration numbers)

The Tramway of 1835

Treffry's speech as reported in the West Briton for March 15th 1839 (the occasion being the laying of the foundation stone for the Viaduct) mentions the difficulties encountered with the construction of the Tramway in the Valley. It implies that there was an attempt to build an earlier line than the one of 1838-

1842 which included the Carmears Incline, but this was abandoned as a result of the extremely hard nature of the rock and the incompetence of the contractors. Before the Project commenced, there had been little mention of this episode by historians other than Keast, who notes it briefly but inaccurately (Keast, 1982, p 100). The Project Researcher found a map in the Treffry Papers showing the original plan for the line, and also a series of contracts for its construction drawn up in 1835 to 1836.

This documentary evidence was in the event supported by corresponding features discovered during the 1:1000 Survey. Below Carmears in the valley bottom is an abandoned cutting (T1, Plan 5). This is a substantial feature, ca 70 metres long and over 8 metres deep at the eastern end. A waste dump (T2) is probably associated with it and may be intended to form an embankment as part of a river crossing; the cutting appears to have been abandoned when work was in progress on the eastern face. On the other side of the River and some way upstream (Plan 8) is another but much smaller cutting (T3) which has the same overall width in the bottom but has been abandoned at an earlier stage. Despite careful analysis of all the Survey results, it has not been possible to identify any other features in the upper Valley as belonging to this phase of the Tramway construction. This would seem to imply that very little work was in fact done during the period 1835 to 1838, or that the bulk of the effort was concentrated on the lower sections of the route, where if any ground evidence had remained it would most probably have been destroyed during the building of the Cornwall Minerals Railway in 1872-1874.

One feature which may possibly be associated with the early Tramway is the bridge at the foot of the Carmears Incline (T4, Plan 2). This is again a very substantial structure whose purpose is to carry the Incline over an obstacle of some importance. It has so far been impossible to establish if this was a road or trackway from Ponts Mill up the Valley, or whether it was in fact the line of the early Tramway, preserved for some intended future use.

The Tramway of 1838

The Tramway planned and begun in 1835 was never completed, although it is possible that the lower portion beside the Canal basin may have been laid. The ground evidence now remaining is that of the later route, dating from 1838. At Ponts Mill (plan 2) the Tramway route from the Canal basin is clearly visible (T5), and is in regular use as a footpath. There is no trace here of the original trackbed or granite setts, as the route was later re-used by the railway to the Trevanny Clay Kiln.

Carmears Incline

The foot of the Carmears Incline has been partly destroyed by later re-use of this area, but remains impressive with the granite-faced embankment and bridge (T4) already discussed. The Incline itself (T6) has the majority of its granite setts still in situ, although the surface of the trackbed is severely eroded in places. There are also the supporting granite blocks for the rollers which acted as guides for the wire rope (see fig 13). Further up the incline, which rises 100 metres at an average gradient of 1 in 8, the Tramway runs through a deep rock cutting (T7, Plan 5) before emerging onto a high stone-revetted embankment (T8, Plan 6). Both of these engineering features must have required skill and effort from the contractors of the highest order, at least the equal of those planned for the original route; that they were accomplished here but failed in the lower Valley is a mystery which cannot be resolved from the evidence available.

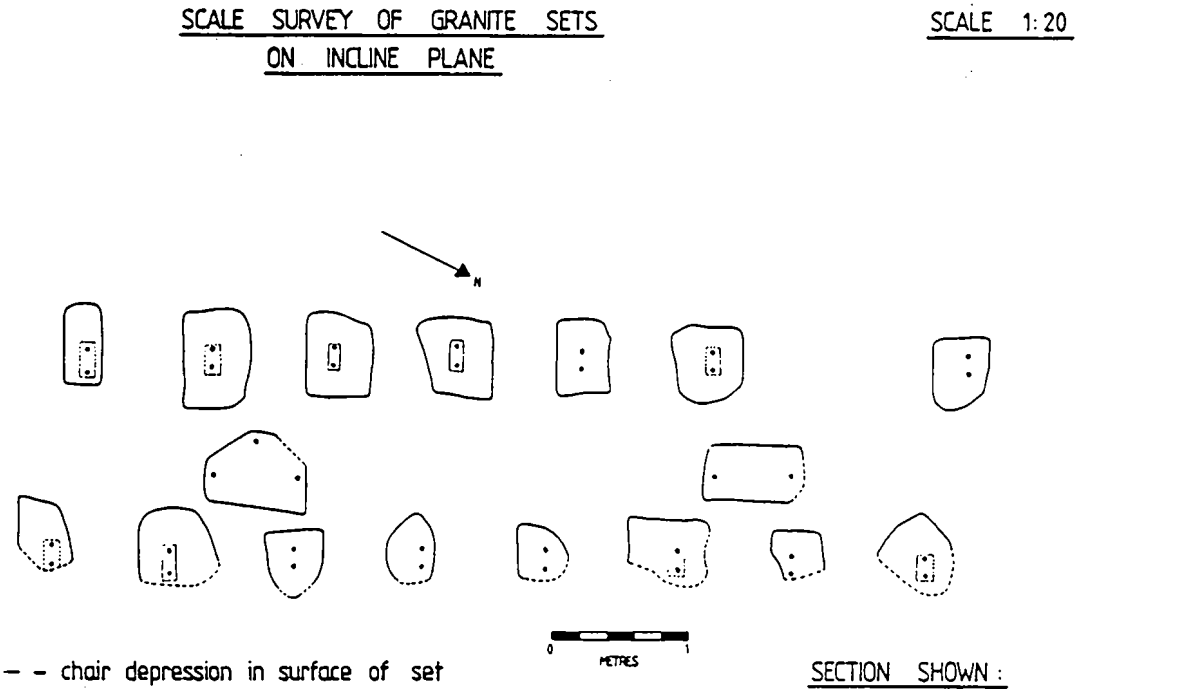


Fig 13 **Granite Setts**

The Tramway crosses the Fowey Consols Leat by means of a granite-linteled bridge (T9) to arrive at the Incline Head Depot. Here is a small building with a ridge roof and hearth (T10), which is probably a checker's cabin for the Incline; a larger structure which is evidently a forge or smithy (T11); and the wheel pit itself which powered the Incline (T12). This was built large enough to accommodate a fifty-foot wheel, but in the event a thirty-foot wheel was installed. Outside the smithy lies a coil of wire rope (T13), left in situ when the Incline was abandoned in the 1870s. A massive granite plinth (T14) reveals the position of the pulley which transferred the drive from the water-wheel through an angle of more than 90 degrees to align with the top of the Plane. No evidence has been found for the means of communication between the top and bottom of the Incline, and this, in the days before the electric telegraph, would have been some mechanical device.

There are few granite setts visible on the level section of the Tramway in the Middle Valley (T15, Plan 8), as upcast from the adjoining leat has raised the ground level and obscured much detail. At one point rail is visible, supported in the original chair, which gives rise to the hope that more may exist, buried, in this area. The line runs again through a deep cutting (T16, Plan 10) before entering a wider area of levelled ground immediately before the Viaduct. Here there was a yard (T17) with sidings and a loop for transfer traffic from the Colcerrow Branch; in later years there was a timber-mast crane. A small structure (T18) is of unknown purpose, but is visible in a photograph of 1895.

The use of major civil engineering features to maintain a good grade and alignment is more typical of a line intended for locomotive haulage than for a horse-drawn tramway, where with small waggons and loads curvature would be of less account. It is intriguing to speculate whether Treffry may have had greater things in mind for his Tramway in the long term, perhaps in the nature of an extension to Fowey through Carmears and Penpillick; this, though posing severe challenges, would have been technically feasible. The most splendid of all the structures on the Tramway is of course the Viaduct itself (T19).

Treffry Viaduct

This was surveyed in detail at scales of 1:200 and 1:50 (see figs 14 and 15). Built entirely of dressed granite, there are ten arches in a length of 200 metres; the River is crossed at a height of 27 metres. The rails were laid here not on individual granite setts, but on full-length granite cross-sleepers, which also formed lintels to carry the Tramway over the Carmears Leat

35_5062

TROFFEY VIADUCT

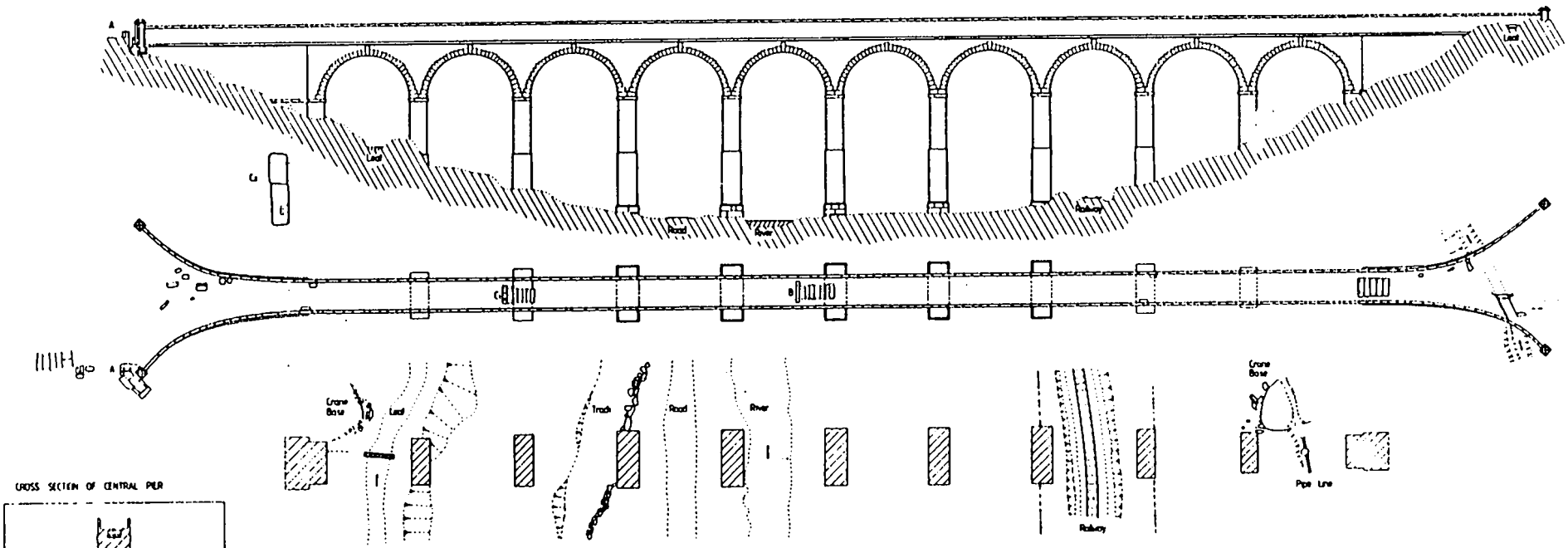
KEY

A - Sluice Gate and Channel

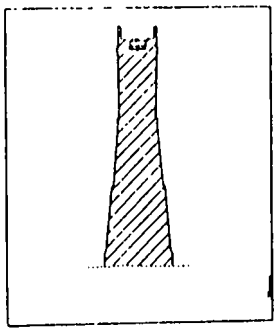
B - Depression in Surface of Granite Sets

C - Granite Set Showing Depressions Made for Iron Rail and Chair

C - 150 Scale Drawing of C



CROSS SECTION OF CENTRAL PIER



running below. The Viaduct thus has a dual function of via/aqueduct. As imposing now as when it was first built, the quality of the stonework is an eloquent tribute to the skill of the local masons; splayed parapet walls at either end terminate in massive pillars of solid granite. On the northern centre of the Viaduct is the Treffry coat of arms; the southern side has a shield which is blank. At either end of the Viaduct on the southern side are two semi-circular platforms which have been interpreted as crane platforms, used during the construction phase of 1839-1842; the one on the Luxulyan bank is the more massive, revetted to a height of 3 metres.

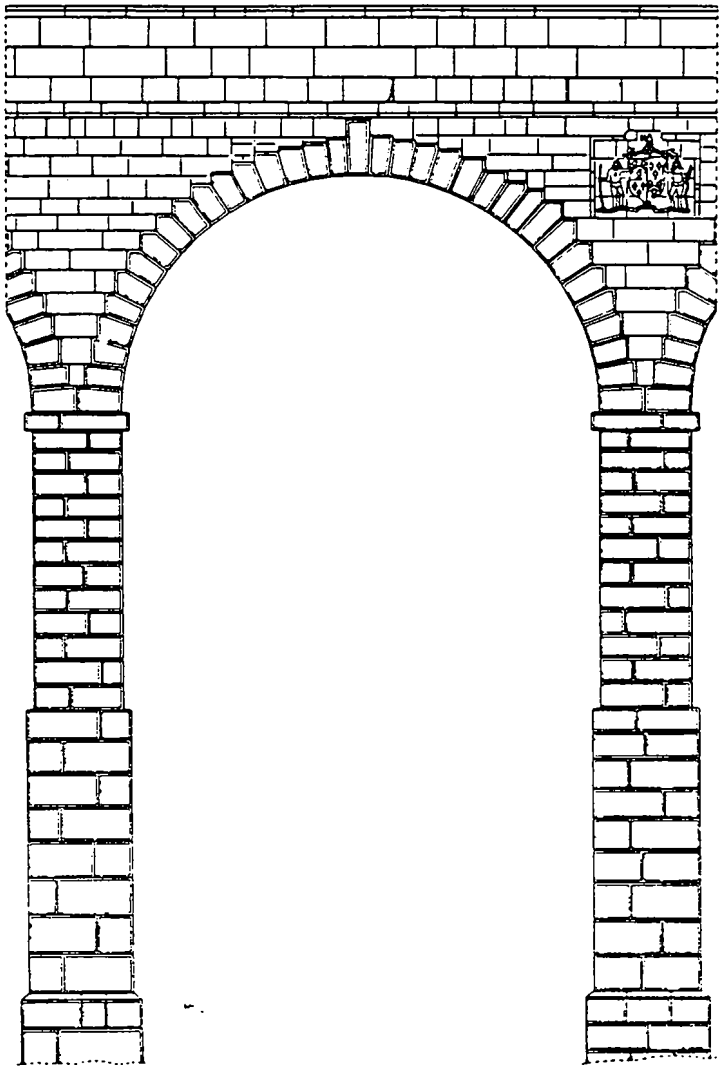


Fig 15 Treffry Viaduct

Also apparently associated with the construction of the Viaduct is a Tramway which was effectively "discovered" by the Survey Team. This runs from a point level with the top of the Viaduct but some distance to the north down an incline plane to the Valley below (T21); granite setts on the plane itself and on the northward continuation of the route prove that this is indeed a tramway rather than a road. The line crosses the River at (T22) but there is now no trace of a bridge. Beside the route are the remains of a small structure which may be associated with it (T24), and the tramway then runs on level ground (T23) to a rock outcrop or tor to the north. This has been worked for stone and to a degree quarried back into the hillslope; there are the remains of a small wharf or loading bank (T25, Plan 11), and scattered in this area are shaped granite blocks of similar dimensions to those incorporated in the Viaduct. It would seem that this quarried outcrop and tramway were used only to provide stone for the Viaduct's construction, and became redundant thereafter. These features would appear to have never been previously recognised or documented; one reason for this may well be the very dense vegetation in the Valley floor at this point.

Cam Bridges and Luxulyan

On leaving the Viaduct the Tramway enters another cutting through the shoulder of Tregonning Hill (T26), and then emerges onto a raised embankment with stone facing (T27, Plan 12); this continues for several hundred metres, and is probably intended to provide a degree of protection against flooding. The River is crossed by means of a low but substantial bridge with granite corbels (T28). A cutting is again necessary (T29, Plan 13) before the Tramway runs on level ground between stone hedges (T30) to the hamlet of Bridges; here the CMR rejoins the Tramway route and overlays it. This section of the original Tramway is little used as a footpath and consequently is much overgrown; granite setts are visible in only a few places.

Colcerrow Quarry Branch

The branch to the Colcerrow and Carbeans quarries leaves the south-eastern end of the Viaduct at a 90 degree angle, and the curvature involved here would certainly have limited the use of the branch to short waggons only. The route follows the contour of the hillslope between stone walls (T31, Plan 10) and crosses the public road on the level (T32). The climb up the valley to Colcerrow is steep but well-graded, and the Tramway here is walled again (T33, Plan 14) implying that a stock-proof barrier was required in this section. The line passes over the Velvet Path by means of a granite-lintelled bridge (T34), and is then joined by another branch tramway which ran north to Gatty's

bridge and Cairns Quarry. This crosses the valley on a substantial granite embankment (T35); the project was sadly unable to survey the remainder of the Cairns Branch as permission could not be obtained.

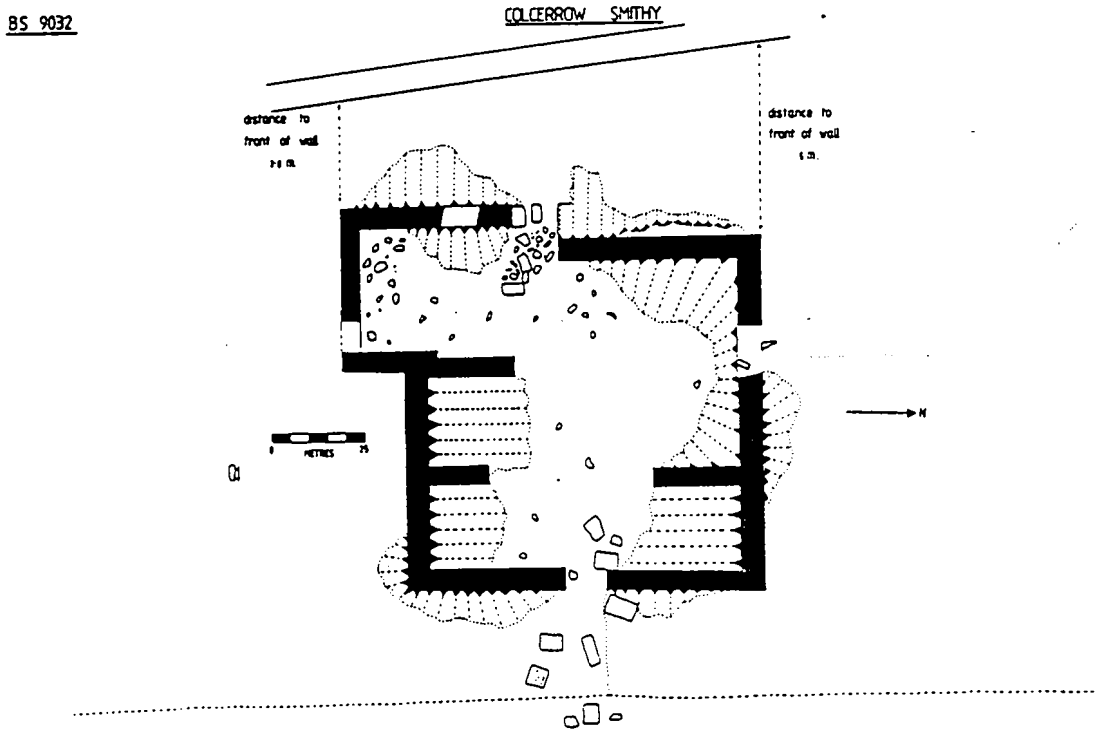


Fig 27 **Colcerrow Smithy**

At this junction there was a loop (T36), clearly shown on the 1880 OS 1:2500 map. Also evident is a small loading bank (T37), which was used to load stone from the small quarry higher upslope. The Tramway now runs due north, and in this area (Plan 15) are several unique features. The granite setts on this section have mostly been removed, and the track re-laid on wooden cross-sleepers, with the rail spiked directly to them (it should be noted that very little rail now remains in situ in the Valley, most having been removed for scrap; comments as to the nature of the rail fixings are made on the basis of the fastenings still visible). A small structure (T37) on the west of the line has so far not been positively identified, but may be the site of Freeman's sawmills (information from P Stanier, August 1988).

Further north, a larger structure (T39) is a smithy; this was surveyed in detail at a scale of 1:50 (fig 27). There is an excellent photograph of this building in the John Pollard Collection dating from 1895. From the smithy to the Carbeans Quarry entrance (T42) the cross-sleepers are no longer evident. The track is instead made up of longitudinal baulks of timber, separated at intervals by cross-transoms and tie-bars; near the Carbeans gate there is a well preserved point or turnout, constructed in the same fashion. There would appear to have been another loop here, perhaps to store empty stock or to allow trains to pass.

The longitudinal timbered track was recorded in detail at a scale of 1:20 (see fig 16), and was found to conform precisely to drawings of Great Western Railway track of the broad-gauge period (pre-1892). It would seem likely that a quantity of this track was purchased second-hand sometime after the gauge conversion in Cornwall, and used to replace the original rails on this section of the tramway; its survival has largely been the result of an extremely wet environment, which has preserved the wood. This was an exciting find for the Director, as there is very little track of this type still extant in Britain.

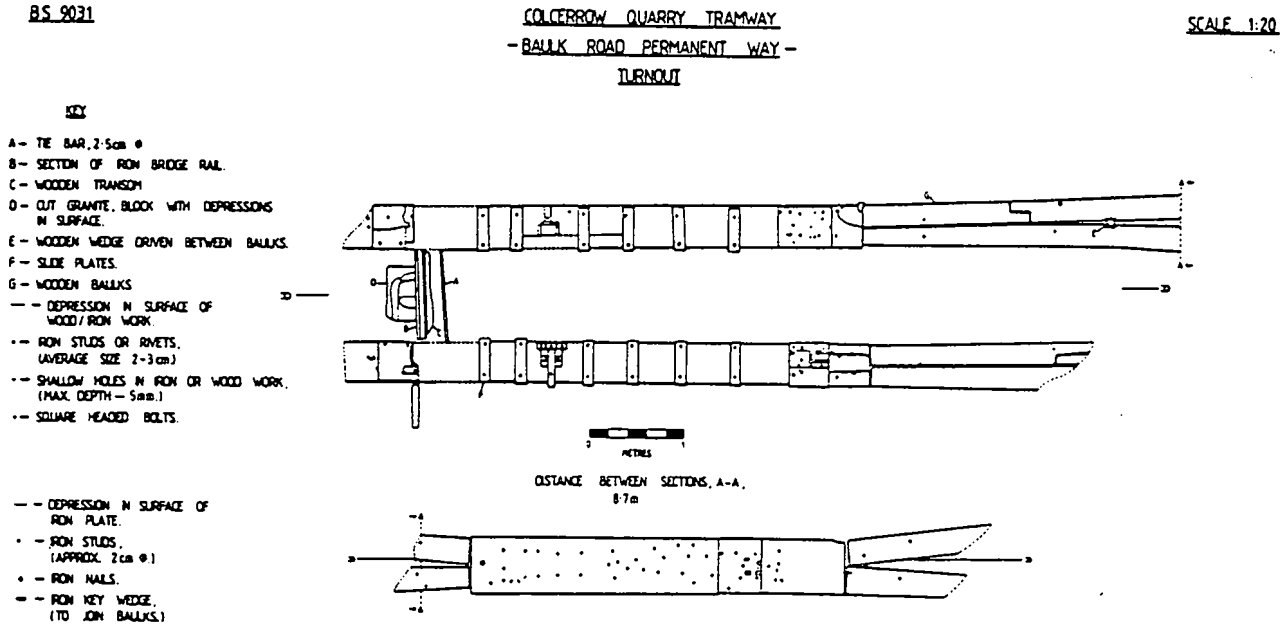


Fig 16 Baulk Road Permanent Way

The branch runs on into Carbeans, overshadowed on both sides by massive dumps of waste rock (T40); its course is then lost, but on the 1880 survey is clearly seen to continue into the quarry. A short branch into the Colcerrow Quarry (T41) is still visible as a shallow cutting.

Rock Mill Quarry Tramway

This tramway was a later addition to the system in the Valley, and was built by the South Cornwall Granite Company in 1867-1870 to access Orchard and Rock Mill Quarries. The original specification of works survives in the CRO (Treffry Papers TF 3109). The line diverges from the original Tramway at the foot of the Carmears incline and runs along the Valley floor (T42, Plan 2); the later railway to the Central Cornwall clay kiln used the same route as far as the river bridge (T43, Plan 5), and thus no trace remains of the Tramway setts or original roadbed. Beyond the river bridge the original route survives; the Tramway runs between the River and a stone hedge constructed of a single row of upright granite slabs (T44), which separates it from the small fields mentioned in section 3.4.1 (feature E13). Throughout this part of the line there are clear indentations in the ground where granite setts have been removed; a few still remain in situ or are cast aside. On leaving the walled section, the line runs into an area of shallow mining activity and the route is now hard to trace; it is defined only as a slightly raised platform.

In the Middle Valley (Plan 8) the Tramway is now little more than a narrow footpath with a gravel base, much eroded by surface water (T45). There was a spur to the Orchard granite quarry which crossed the river on a simple granite slab bridge (T46) and then ran up a short but steep inclined plane (T47) to the quarry workings higher up the hillslope. The remains of the incline are still clearly evident, but no power source for it can be seen. At the base of the incline beside the river two tramway waggon wheels were found and recorded (see fig 17). The line now passes under the CMR Viaduct and runs up a steep gradient (T48). In this section the granite setts are clearly visible and all apparently in situ. The tramway turns south and crosses the river on a granite bridge (T49, Plan 9) to run into Rock Mill Quarry on the level (T50).

Ponts Mill Railway

After the building of the Cornwall Minerals Railway in 1872 the lower part of the tramway system was re-used to provide access to the West of England Company's china stone mills; from the 1920s this was worked by a small petrol locomotive which transferred

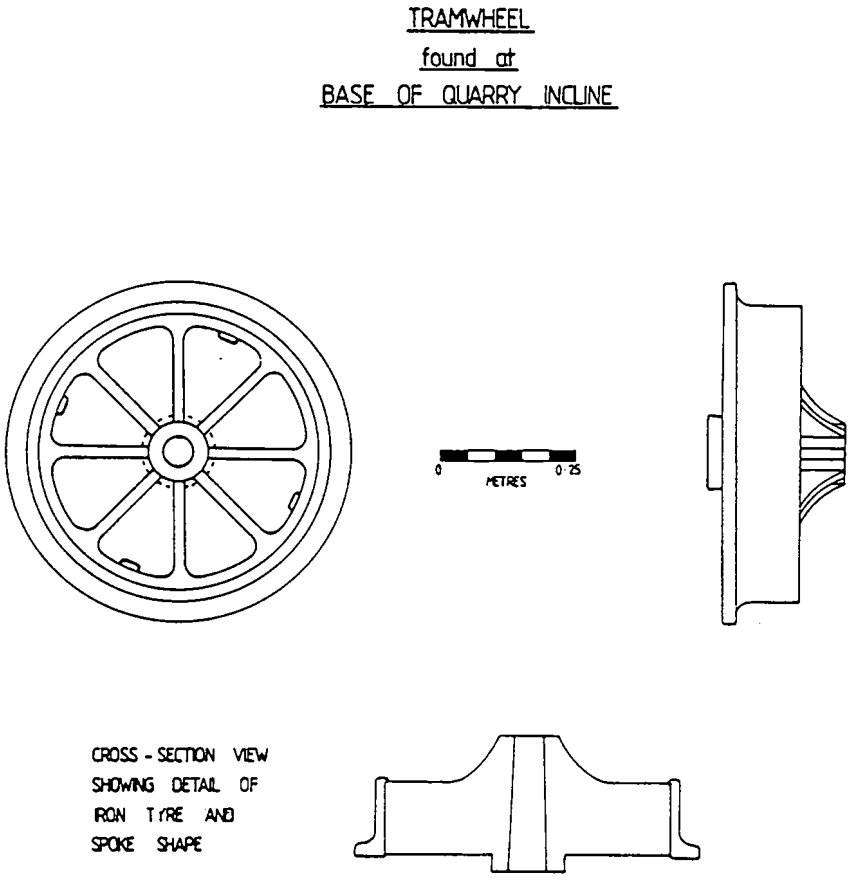


Fig 17 **Tramway Waggon Wheel**

wagons to the GWR locomotives from St Blazey, and also ran up the Valley to the Central Cornwall kiln. Much of this re-laid tramway route remained in use until the 1960s. The only portion now surviving is the truncated spur into the present Ponts Mill works (T51, Plan 2). A siding into the stone mills kiln, deeply cut into the hillslope, is still evident though overgrown and partially flooded (T52). Near the foot of the Carmears Incline is a loading bank (T53), used to load wagons from lorries after the railway up the Valley was abandoned; the end of the loop here also survives with rail and sleepers intact (T54). The line to the Central Cornwall Kiln followed the Tramway route as far as the river bridge (T43, Plan 5), where it crosses the river and runs along the front of the linhay (T55). There was also a spur back into the northern end of the kiln for loading coal (T56). The rails continue north to a second river bridge (T57, Plan 8), and were certainly laid as far as this; the intention seems to have been that the railway should link back to the Rock Mill Quarry Tramway higher up. Why this should be the case is unclear, as it is unlikely that the quarries were active by this

date (ca 1925). All the track on this later railway in the Valley appears to have been laid in flat-bottom or vignoles rail, spiked directly to wooden cross-sleepers.

Prideaux Wood Kiln Tramway

The Prideaux Wood china clay works was originally served by a short siding from the CMR; at some later date, a narrow gauge tramway was built from the kiln linhay (T58, Plan 1) to a loading bank or wharf on the Ponts Mill siding (T59). On the wharf the rails survive in situ, and are laid to a gauge of 2 feet (0.6 metres). The tramway passes under the CMR through a brick bridge with granite detailing (T60) and crosses the river on a simple timber and steel structure (T61); there is no record of any locomotive power having been used on this short line.

Tramway Rails and Chairs

The Project was fortunate in finding many examples of the rails and rail fastenings used on the tramway system, despite the removal of the majority for scrap. Drawings were made of each type found (see fig 18). The rail was laid on granite setts, and there would appear to have been only one basic type of rail fastening: the simple saddle or chair, held down to the sett with two spikes (E). The spikes were driven into holes drilled in the sett, which were themselves plugged with wood. There is no evidence in the Valley for the rails having been spiked directly to the setts, as has been found elsewhere in Cornwall. The rail was held into the chair by means of a steel wedge (J). Rail joints were made in the chair, and there is otherwise no special provision for extra support at this point.

The rails used on the original tramways were all of T-Head section, typical of early lines designed for light loadings and short train lengths; they are of wrought-iron rather than steel. The section and weight of the rail found varies considerably, from the very light (A), and medium weight (C), to heavy (D). The chair patterns also vary to accommodate the different rail sections (F, G, I, K). Chairs and bar rail of a very primitive type were also found in the Colcerrow Quarries (rail B and chairs E and H). At present no chronology has been established for the various types, but some of the material must date from the early 1840s and is thus of considerable value for further research.

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TREFFRY TRAMWAY SYSTEM
RAIL SECTIONS AND CHAIRS

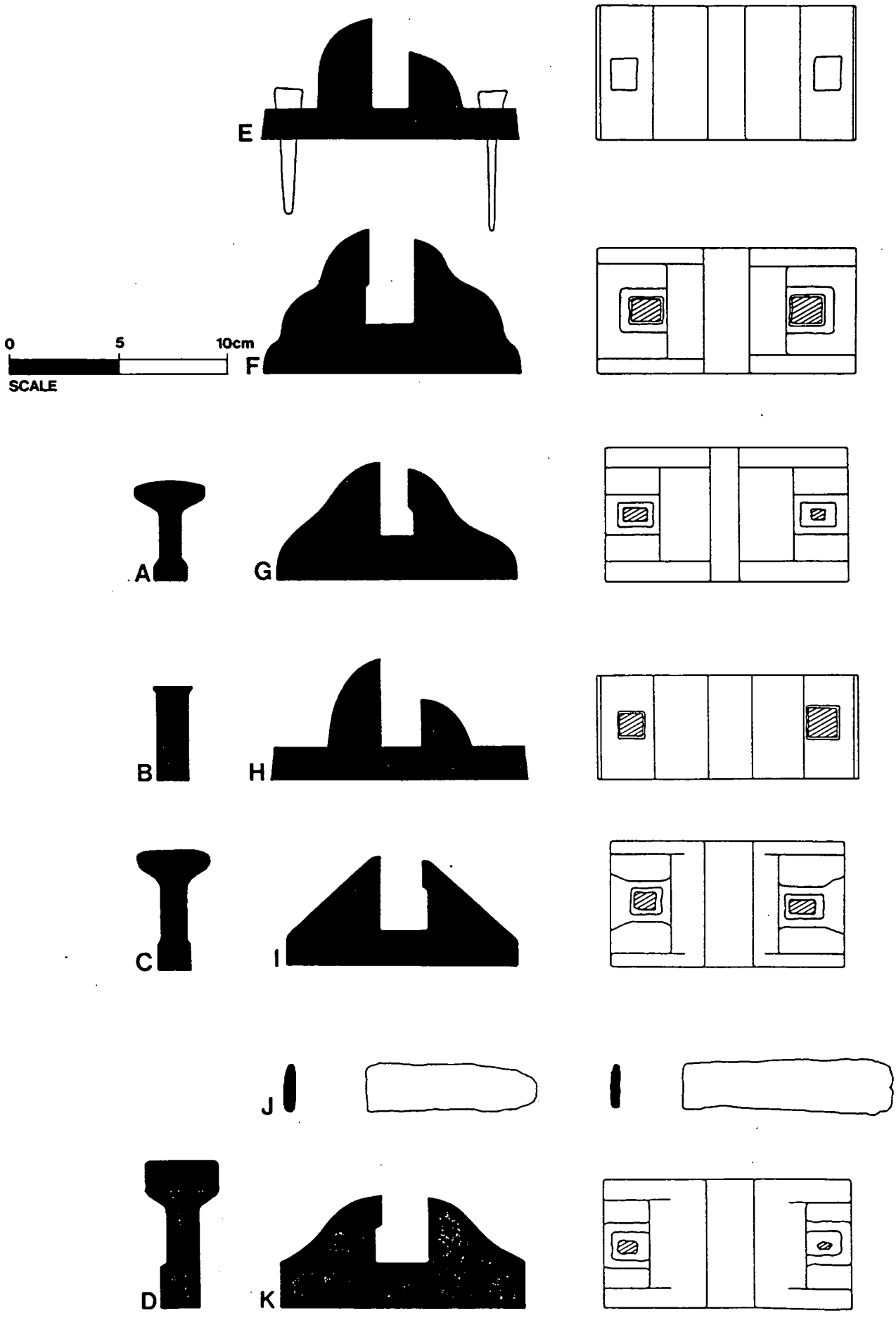


figure 18

3.4.4) The Leat System (L prefix illustration numbers)

Mill Leats (L1,L2,L3,L4)

The fast flowing Par River provided great opportunities for the development of water-powered industry in the Valley, and advantage was taken of this natural resource from the medieval period onwards for the grinding of corn and also (according to documentary evidence) for the smelting of tin. The earliest leat in the Survey area is probably the Ponts Mill Leat (L1, Plans 2, 5, and 8) which is still traceable to its source in the Middle Valley (L1/S). This provided power for the Ponts Mill corn mill, and the basic course is perhaps that of the 12th century original.

The Rock Mill Leat is also of some antiquity. No investigation was made by the Project Team into the history of the various corn mills in the Valley as there was insufficient time available in the CRO; however, they are all present on the Tithe Maps of 1840, and it can be assumed will have an origin well before that date. Rock Mill (E15, Plan 9) is fed by a short leat (L2, Plan 10) which is shallow and distinguished only by a dam which provided the necessary head of water (L2/D). There is also a leat running down the valley from Rock Cottage (L3, Plan 9) which has no obvious function; it runs north in the general direction of the mill but is then cut through and obscured by the trackway and later railway. Another dam across the stream in the valley formed a reservoir (L3/D) for this leat.

The leat to the Wood Mill corn mill has its source high in the Valley (L4/S, Plan 8). This leat follows the contours of the hillside (L4) throughout the length of the Valley (Plans 7, 5, 2), before turning south through Prideaux Wood. Here the leat has been re-channeled at a higher level (L4/2, Plan 1) to serve the South Prideaux Mine; the original leat runs just above the field boundary to the mill (outside the 1:1000 Survey area).

No evidence was found during the Survey for the blowing-house known to have at one time existed at Ponts Mill, although a careful watch was kept for tin slag and mortar or mouldstones in the area; such a blowing-house would have required a leat for its water-wheel, but it may well be that this has been obscured by later developments on the site.

Charlestown Leat (L5)

The leats so far discussed have so far been of the type serving rural industry with a localised and limited requirement for power; as such, their modest nature reflects the purpose for

which they were built. Other leats in the Valley were constructed to serve the needs of major industries, and are characterised by a much larger cross-section and correspondingly impressive civil engineering features along their route. The first of these is the Charlestown Leat, built by Charles Rashleigh in the late 1790s to provide a water supply for his new harbour at Charlestown.

The leat has its source at Cam Bridges; this was later the subject of a dispute with Treffry (see the section on the Carmears Leat). It contours around the shoulder of the hillslope (Plan 10) and passes through the north-west end of the Viaduct on a complex multi-level junction with the Tramway and the Carmears Leat (L5/1). Flowing south at a high level above the Valley, the leat is heavily embanked in places to a height of 2 metres and more (plan 9). The remainder of the route, although outside the Survey area, is of interest in that it includes a tunnel underneath Wheal Par, an aqueduct and several more underground sections in its circuitous course to the sea at Charlestown, some 6 miles distant.

Fowey Consols Leat (L6)

This is the first civil engineering work completed in the Valley by Treffry, and was built to carry water to the expanding and greatly successful Fowey Consols copper mine on Penpillick Hill during the 1820s. Constructed to an extremely high standard throughout, averaging two metres in width and with stone-faced inner banks in many places, this leat like the Carmears Leat running above is capable of carrying large quantities of water at high speed. Its source is in the north near Gatty's Bridge (L6/S, Plan 11) and the leat then follows the public road south for some distance. As the Valley steepens, so the leat follows the contours of the slope, passing underneath the Viaduct and cutting through a rock outcrop (L6/2, Plan 10); its course can be followed as L6 on Plans 8 and 9. Below the Carmears Wheelpit the leat receives the outfall of the Carmears Leat (L6/3, Plan 6) and thus reinforced flows under the Incline (L6/4) before crossing the shallow valley below Trethevey on an embankment (L6/4/1). All the bridges on this leat system are simple structures with massive flat granite lintels.

Originally the leat ran around the front of the Carmears Rocks in a wooden aqueduct, supported high above the Valley floor by this renowned and surprisingly long-lived structure. The aqueduct was replaced by a tunnel bored through the rock in the late 1940s, and the leat now disappears underground at L6/5 (plan 5) to re-emerge some 200 metres distant (L6/6). The watercourse is truncated at the extraction point above Ponts Mill (L6/7, Plan 2)

where the flow is piped downslope; this fed the china-stone mills, and in later years a small hydro-electric plant. Beyond this point the bed of the leat is now dry (L6/8) but clear on the ground as it runs north towards Penpell (L6/9, Plan 4). As it turns west to leave the woodland the leat has been destroyed in the cultivated land (L6/10) and can no longer be followed.

Carmears Leat (L7)

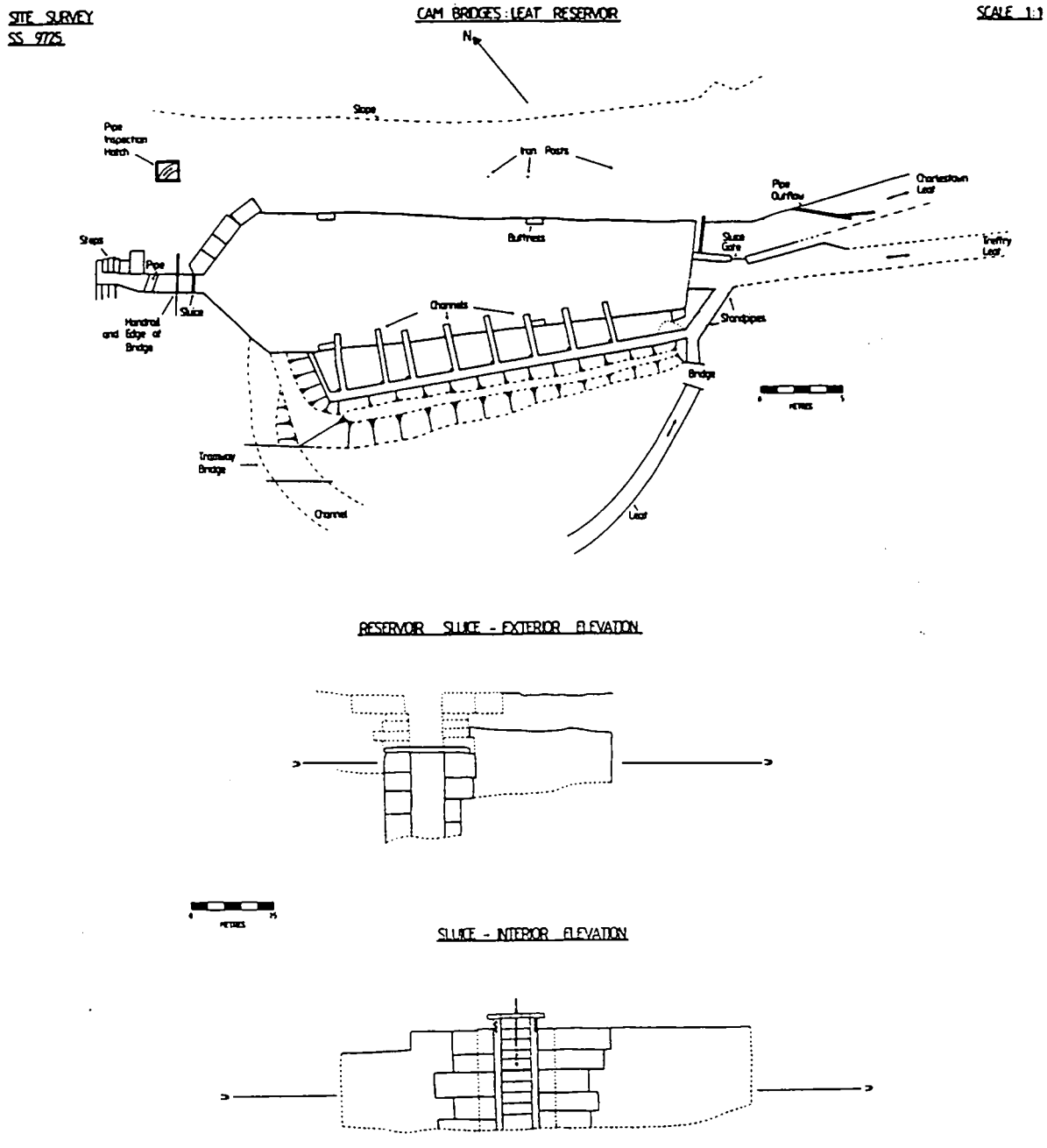
This shares with the Charlestown Leat a common source at Cam Bridges (L7/S, Plan 12). When Treffry was building the Viaduct he came into conflict with Rashleigh over this water source, both men requiring the same supply for their separate enterprises. The dispute was resolved in an amicable fashion by channeling the water to a large granite-lined reservoir where the water was divided equally, half for Rashleigh's Charlestown Leat and half for Treffry's Carmears Leat.

The water is taken from the River and runs first to a normal surface reservoir pond (L7/1); there is a spillway back to the River to take off excess water, and sluices to control the flow. The feeder leat then flows through the quarry area, and underneath the waste dumps which bridge it on granite lintels (L7/2). The granite reservoir of the 1830s (L7/R) was surveyed in detail at a scale of 1:100 (see fig 19), and remains an impressive structure though now dry. The Carmears Leat, unlike Rashleigh's, is able to take advantage of the tramway cutting to run directly to the head of the Viaduct (L7/3) and passes under the Charlestown Leat at L5/1; across the Viaduct the water runs below the Tramway in its own stone-lined trough. On emerging at the far end of the Viaduct the leat generally follows the line of the Tramway along the Valley, passing underneath it at intervals (L7, Plan 8) before turning across the Carmears Wheelpit (T12, Plan 6). The sole purpose of this leat is to provide power for the incline plane, and as the Viaduct upon which it depends was not complete until 1842 so a date is also set for the first use of the Carmears Incline.

Clayworks Leat (L8)

This leat serves the clayworks at Wheal Rashleigh in the valley leading up to Bodelva (outside the 1:1000 Survey area) and parallels the Wood Mill Leat at a higher level; there are thus two major leat systems on each side of the Luxulyan Valley. No documentary evidence has been found for the construction of this leat, but it does not appear on the Tithe Map; it is however shown on the 1880 OS 1:2500, and so lies within the period 1840 to 1880. The source is near Rock Mill Cottage, and is not taken from the main River (L8/S, Plan 9) but from the Trevanny stream.

Fig 19 **Cam Bridges Leat Reservoir**



The leat flows in front of Rock Mill Quarry and bridges the Tramway (L8/1), before flowing south past Orchard Quarry where it was originally carried in a wooden launder through the dumps. The course of the leat is easily traced through the Middle Valley (L8, Plans 8,7,5), and is of similar physical character to the Wood Mill Leat below: still distinct on the ground, but less substantial than the Treffry leats L6 and L7. Turning south through Prideaux Wood (Plan 1) the leat takes a circuitous route through the mine workings before passing out of the Survey area.

3.4.5) Mining (M prefix illustration numbers)

It is probable that tin streaming and shallow mining represents an early use of the Valley's resources. The documentary evidence for a blowing house at Ponts Mill is undatable, but smelting at this site was likely to have been treating some ore from the Valley itself, perhaps from streaming operations along the river margins. While there is plentiful evidence for streamworks at various locations within the Survey area, again there are no features by which to establish a firm date for them. The written record for mining in the area is of 19th century date, and even with the benefit of this it is often difficult to reconcile the ground features with the documentation. Unlike more successful mining sites elsewhere in Cornwall, the mines in the Valley attracted scant interest from speculators or writers of the time, and have as a result left little material for the historian. The Project is deeply indebted to Justin Brooke for many of the documentary sources referred to in this section.

There were of course several very successful and famous mines within the general Project area, such as Fowey Consols and Par Consols, both actively promoted by Treffry. These however lie outside the 1:1000 Survey area, and were not examined in detail by the Team; it was felt that there was already plentiful documentation for both of these sites, and that as the surface remains at both locations are minimal little would be added to the record by including them. A considered decision was therefore made to concentrate on the more obscure and little-known sites within the Valley itself.

Prideaux Wood (Plan 1)

One of the great surprises for the Director and Project Staff was the extent of the workings in Prideaux Wood. All the mining here was for tin, and the remains are not immediately obvious because the hillside is now a dense and dark conifer plantation; before 1960 this was deciduous woodland and had been coppiced since 1840 at least. The mining is characterised by the high density of

prospecting pits, lode-back pits and shallow shafts, more typical of upland areas such as Bodmin Moor than lowland Cornwall. In places the shafts and pits run close together as they follow the lode and form shallow gunnises (M1, M2); from this surface evidence the general trend of the lodes would seem to be north-east to south-west. The distribution and density of the workings throughout the hillside is in general remarkably even, but at two locations closer grouping of shafts and other features indicate that the site may be considered a discrete entity.

The first of these is above the present Ponts Mill Works (M3), and consists of a group of shafts, an adit, waste dumps, and a structure which may be a store or office. No positive identification has been made for this site, but it may represent the location of East Eliza (Symons 1881), or possibly Fowey and Par United. The second of these sites was the subject of a detailed site survey at a scale of 1:200, and has in this instance been positively identified as South Prideaux Wood Mine.

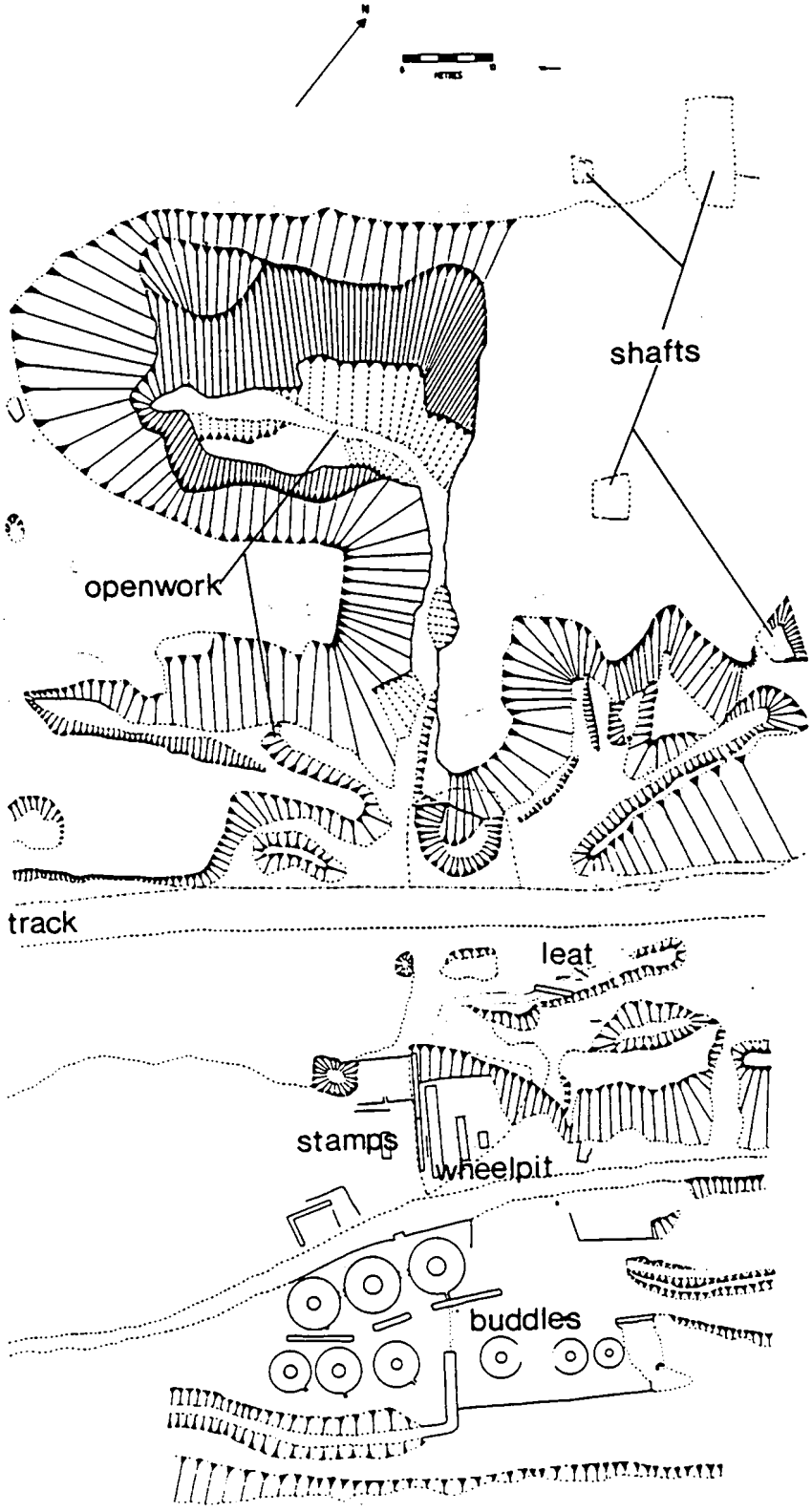
South Prideaux Wood Mine (fig 20)

This mine consists of a large openwork or gunnis driven into the hillside, with shafts and levels running from it on the line of the lode; the underground portion is far more extensive than is apparent from surface indications. Some members of the Project Team were able to go underground here thanks to the kind generosity of a local mining expert, Edgar Sutton. The openwork is connected via a narrow tramming road to the process area downslope, where the Wood Mill leat is diverted to power an overshot waterwheel, of which the open pit remains. This wheel drove a set of stamps on the western side; the crushed ore was then fed through a series of six circular convex buddles, which are concrete-lined and in an excellent state of preservation. There are also the very ruinous remains of a small structure which was probably a calciner. The period of working for which there is some documentation is ca 1880 to the early 1900s; undoubtedly the openwork is far older, though perhaps not as old as Robert Symons estimated:

"The open excavations in the coppice wood in which the sett is situated are enormous, if not unparalleled, partly done by the ancients - probably the Phoenicians - and partly by the moderns. The lodes are so numerous and the tinstone so thoroughly combined with the containing killas that the whole of it is fit for the stamps." (Symons, 1881)

In 1892 the machinery on the mine consisted of a thirty-foot wheel, 24 head of stamps, tramroads, buddles and slime pits (RIC X 116/24).

Fig 20



Carmears Wood (Plans 2,4)

The mine in Carmears Wood above Ponts Mill has been identified from mine plans in the CRO as Prideaux Wood Mine (M4); this extremely confusing nomenclature cannot be rationally explained, but after a great deal of heart-searching the Director was reluctantly forced to concede it as the only one which fits the ground evidence. The mine workings are not extensive, and are situated on a steep hillslope; there appears to be only one shaft (M4/1), with an adit at a lower level (M4/5). Waste dumps (M4/6) are flat-topped and would appear to have been trammed out from the shaft, which was therefore used for winding and pumping, as until recently the end of the wooden pump-rod was still visible in the shaft. A puzzling feature of this site is that there is no process area for treating the ore; it may be that the higher-grade material was hand-picked and taken elsewhere for treatment. Near the shaft are three structures: M4/2 resembles a balance-bob pit, on the edge of the shaft; M4/3 is a long building with gable ends and few window openings, which is interpreted as a boiler house (fig 22); and M4/4 is a circular platform cut back into the hillslope, which has a sunken stone-lined pit in its centre. This, although it could be interpreted as a horse-whim plat, is more probably the site of a capstan for raising the pit-work in the shaft. Above the mine is a substantial reservoir pond (M4/7, plan 4) which was fed from the Fowey Consols Leat (L6); a granite-lined sluice (M4/7/1) may well have supplied water to the mine via a wooden launder as there is no trace of a leat. Some distance downslope and to the north is a small structure which was surveyed in detail at a scale of 1:50 (see fig 21). This is probably associated with the mine and appears to have housed a horizontal steam-engine, mounted on granite bed-stones, with a small boiler-house adjacent.

Further up the valley leading to Penpell is another shaft (M4/9) with a circular platform beside it which seems definitely to be a horse-whim. Below Penpell there is a substantial adit, now collapsed; this runs north and is more likely to be associated with the North Fowey Consols Mine. The valley floor has been intensively worked for minerals, but is now very overgrown and it is difficult to establish any pattern in the disturbed ground (M4/11).

The identification of this site as Prideaux Wood Mine rests on a number of pieces of documentary evidence. Most important of these is a plan of the North Fowey Consols Mine in the CRO (MRO 13232) which shows the area in question as being that of the Prideaux Wood sett. The biography of William West states that in 1851 West erected a water-pressure engine at Prideaux Wood (Worth, 1880, p 40). West was very keen to promote the virtues

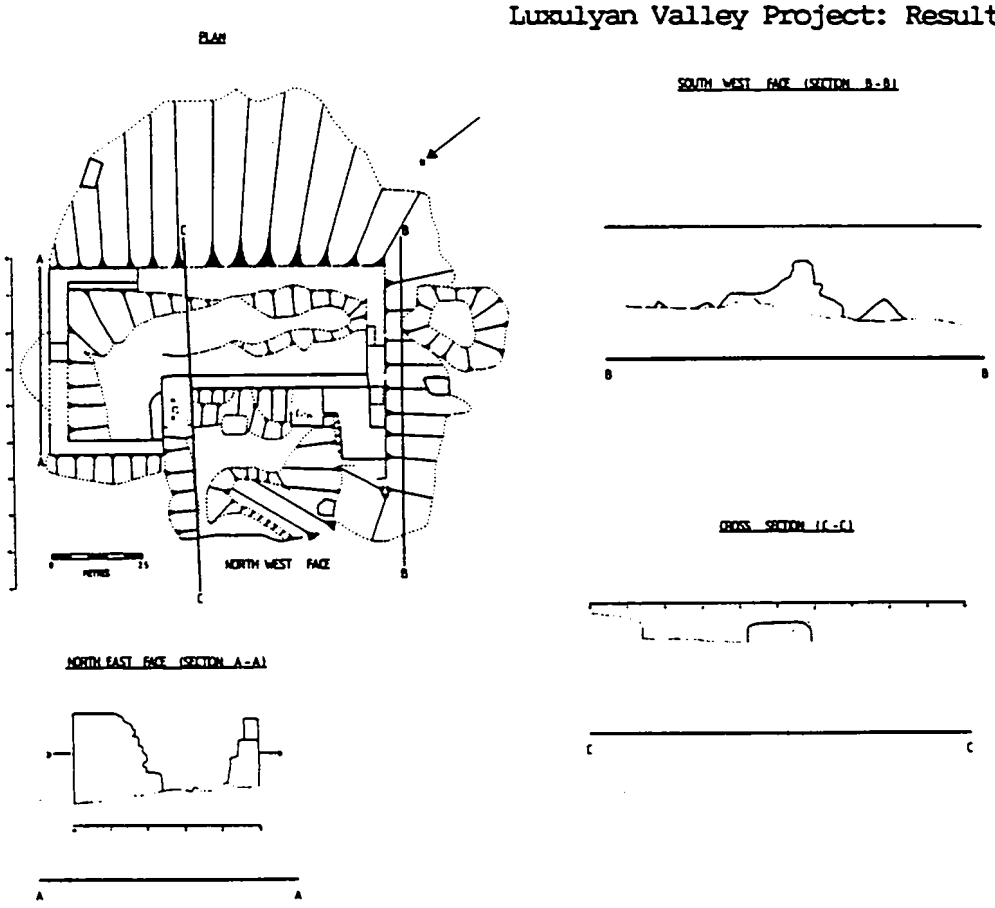


Fig 21 Prideaux Wood Mine Engine House

of these hydraulic engines, which could effect considerable savings in cost as compared with steam where a plentiful supply of water was available. The large reservoir above the mine would have been ideally suited to supply such an engine. References to the mine in the Mining Journal from 1849 to 1864 when the property was put up for sale give returns for copper and tin, and list the equipment on the mine as follows: a 21 inch hydraulic engine, a 10 inch horizontal steam winder, boiler, pumps, ladders and pitwork. No mention is made of stamps or other process equipment. An attempt was made to re-open the mine in 1872, when it was stated that ore had previously been hauled a mile to the stamps, and thus no tinstuff had been taken away of less than 28lb to the ton. This is also in accord with the lack of ground evidence for processing operations on the site.

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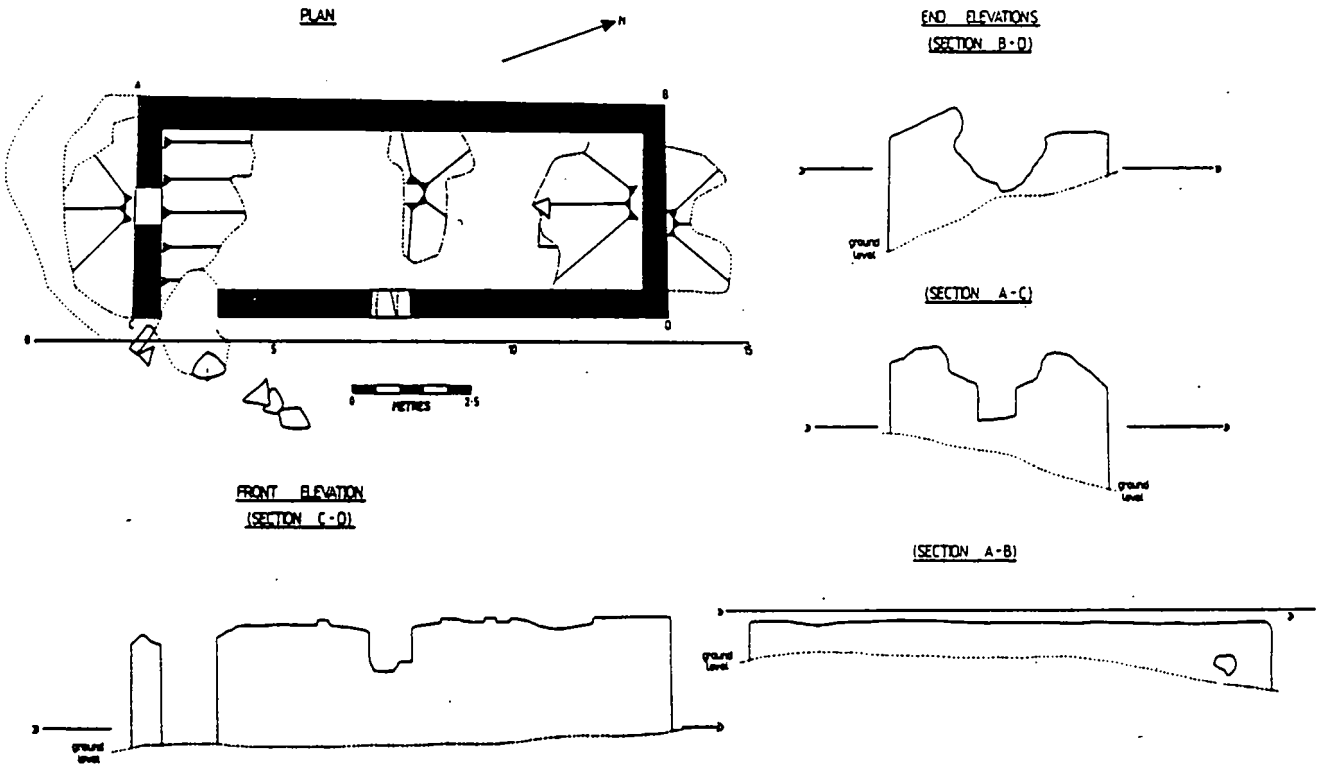
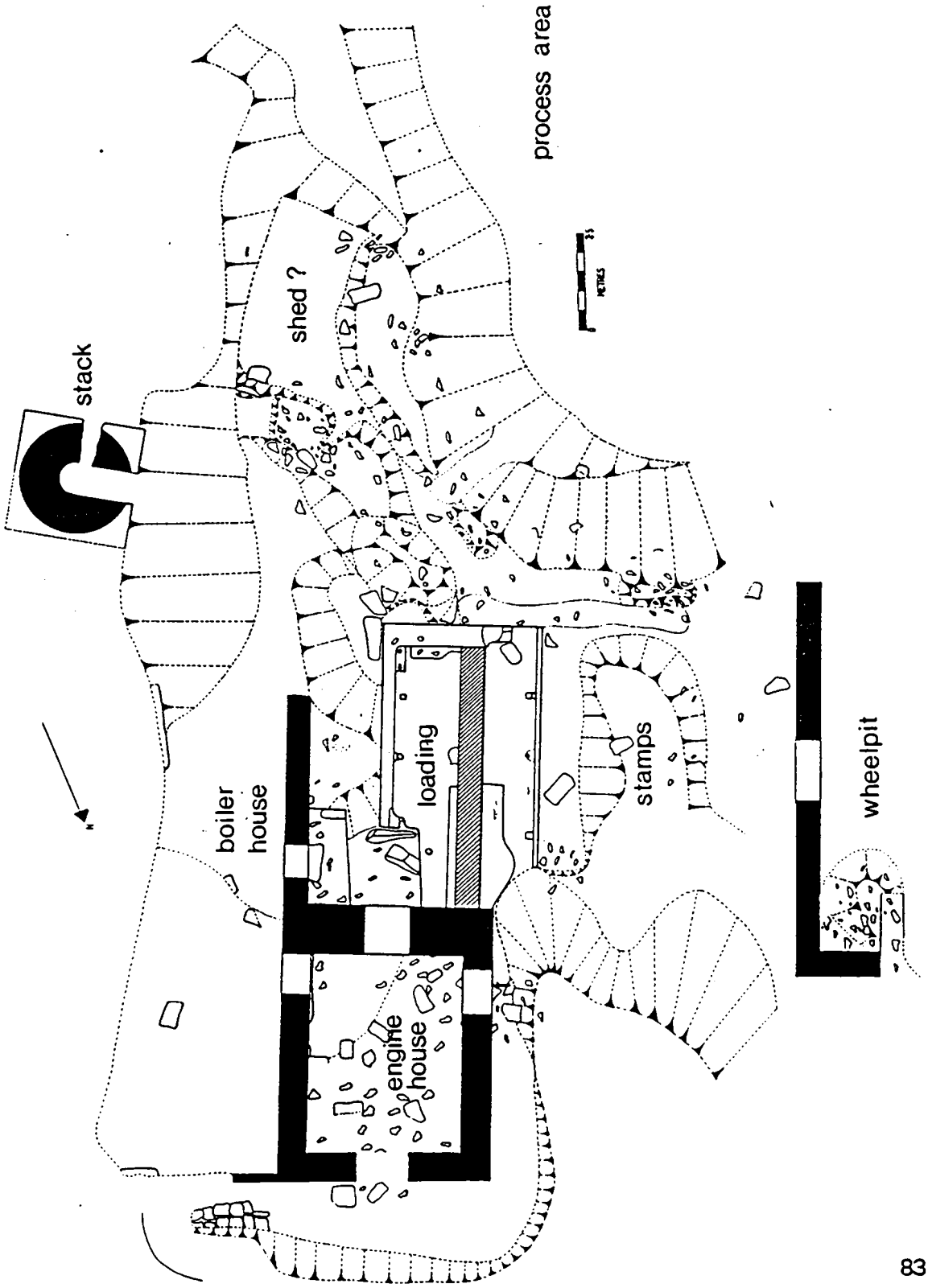


Fig 22 **Prideaux Wood Mine Boiler House**

New Fowey Consols (M5, Plan 3)

This very compact site, known locally as Broadmoor, is isolated from the main Valley and lies in a wood below Penpillick Hill. It was recorded as part of the 1:1000 Survey, and the engine house and immediate surroundings were the subject of a detailed survey at 1:50 (see figs 23 and 24). According to documentary sources, the mine was worked chiefly for tin from 1873 to 1889 when the materials were sold. The main shaft lies at the top of the mine (M5/1) and is still open; below this are extensive dumps of waste rock. The engine house (M5/2), which is the only beam engine house within the 1:1000 Survey area, lies downslope and is small but largely intact with an attractive dutch gable and brick detailing on the window openings. This housed a small rotative engine, and the loading for the flywheels and crank is evident at the front of the house. The boiler-house was on the eastern side but has been reduced to one wall; the stack (M5/3) survives to near full-height. To the west of the engine house is a levelled area which is probably the site of a set of stamps, driven by the

Fig 23


process area
shed ?
stack
boiler house
loading
stamps
wheelpit
engine house
METRES

engine which wound from the shaft and perhaps was also responsible for pumping by means of flat-rods. Adjacent to the stamps is a wall which formed one side of a water-wheel pit (M5/5). The hub of this wheel is aligned with the drive from the engine, and it is presumed could augment the power of the beam-engine when sufficient water was available; the stream in the valley is very small, and it seems unlikely that water power could have been of much significance on the site. Below the stamps is a levelled area (M5/6) which normally would be the site of the process floor. This is now, however, silted to a depth of 1.5 metres with a fluid mud; the buddles may well survive below, but this would be a matter for excavation to decide. At the bottom end of the site are some shallow tanks and channels (M5/7), and the base of a small building (M5/4) which was evidently of a temporary nature.

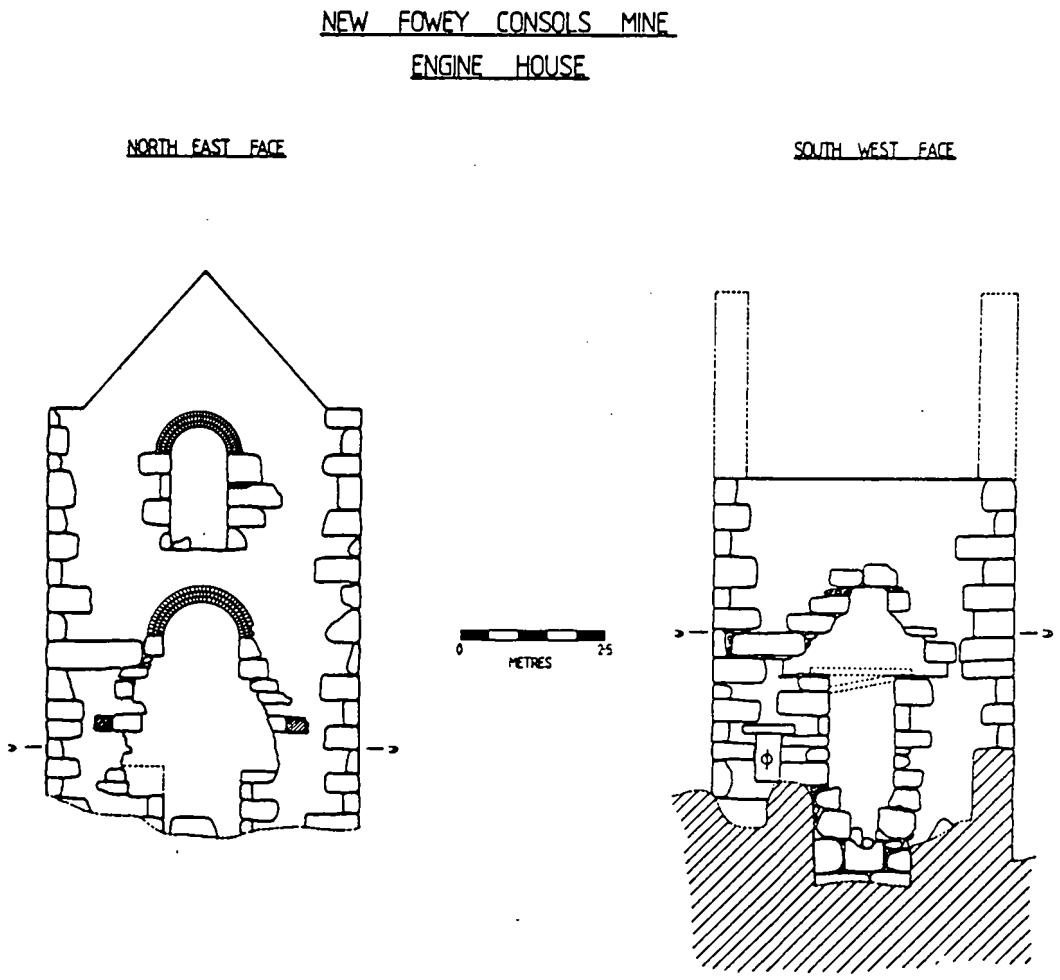


Fig 24 New Fowey Consols Engine House

To the east of the site in the cultivated land are a shaft (M5/9) and an adit with some small dumps (M5/10) which may be part of the sett. North of the main shaft is the remains of a small circular structure with a beaten earth floor (M5/8) which is probably a powder magazine. Some distance to the west, and further upslope, is an area of disturbed ground and small dumps; it is not known whether this is also part of New Fowey Consols.

The mine was the subject of continual promotion during the 1880s, with wildly exaggerated claims made as to the quality of the lodes, but produced little ore and employed only ten men at best. Materials on the mine in 1884 included a 30 inch rotary steam engine, fly-wheel, 12 head of stamps, a boiler, a 25 foot water-wheel, kieves, tramway rails, and a wooden tin-house.

North Hill Wood (Plan 5)

Beside the major mining sites in the Valley, there are many areas of prospecting and small-scale activity where trials have been made to test the ground. The Valley is crossed by a number of tin-lodes trending north-east to south-west; in some cases it is possible to trace development on both sides of the River. Typical of these are the lines of small pits and adits which run up the slope at M7 and M8 in North Hill Wood; they may be associated with the more extensive streamworks in the Valley floor below (M6). Here the river has been diverted (M6/1) to allow the alluvial deposits to be reached. The area is densely covered with Laurel, but it was possible to survey and record some of the dumps and two tinner's shelters dug back into the slope (M6/2).

Lady Rashleigh Consols (M9, Plans 7,8)

One of these cross-Valley lodes has been intensively developed, as Lady Rashleigh Consols. The survey of this area was completed before identification of the site was made from a plan in the CRO of 1881 (MRO R 31313/L7); the layout of the shafts and other surface features was found to be an exact match, which was a great relief to the Director and a tribute to the skill of the Survey Team. The mine has been opened initially by an adit from the Valley floor (M9/1), which is then accessed by a series of shafts running up the hillside (M9/2, M9/3). Above the Clayworks Leat these shafts merge into a gunnis where the ore has been removed at surface (M9/4); another shaft terminates the sett at the top end (M9/5). Two structures are associated with the mine, and are identified from the CRO plan as an office (M9/6) and saw-pit (M9/7); these were both recorded at a scale of 1:50 (see fig 25).

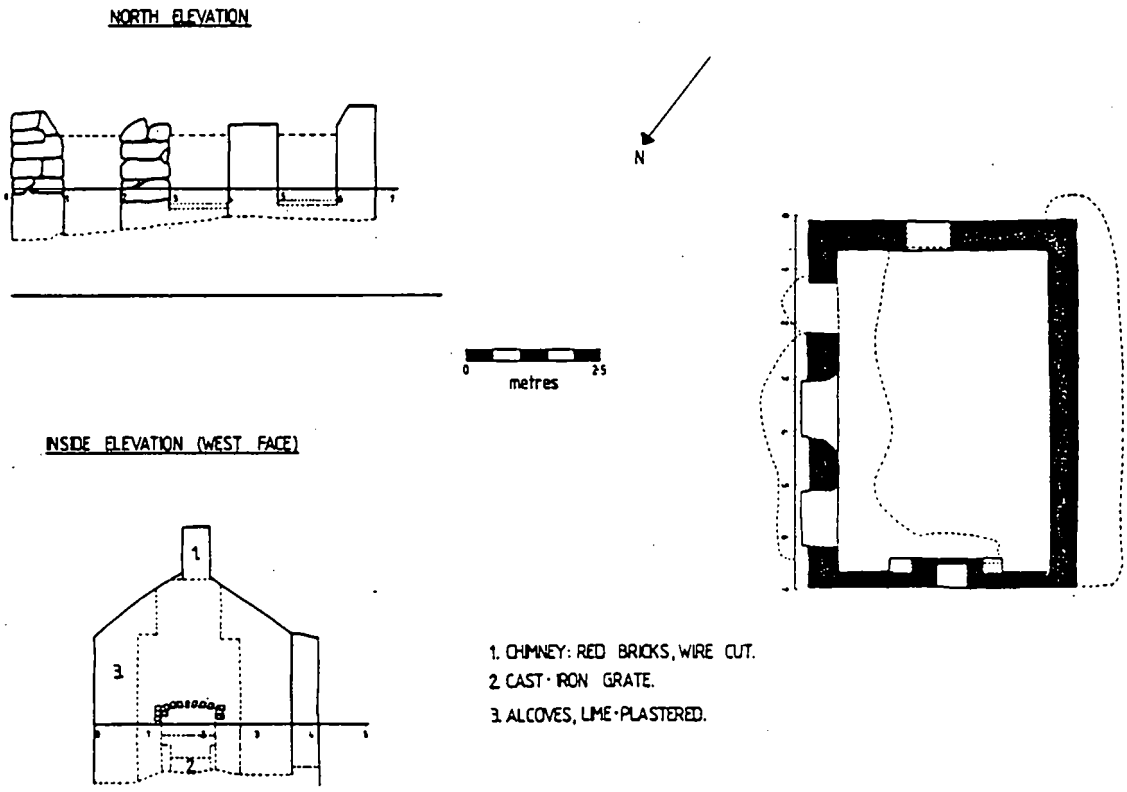


Fig 25 **Lady Rashleigh Consols Mine Office**

The plan of 1881 suggests that it refers to a re-working of the mine, and shows three large water-wheels which were apparently never installed, as there is no ground evidence for them. Although little success attended the venture, the size of the dumps beside the River (M9/8) would indicate serious underground development. Also of interest are references to the gunnis or openwork which was then regarded as "ancient"; it was claimed in the Mining Journal for 1881 that the mine had originally been worked in the 1500s by Germans.

Rock Mill (M10, Plan 9)

The Valley floor below Rock Mill Quarry has been worked for tin, and the ground here is characterised by a series of dumps and shallow workings (M10/1). Running up the hill behind the smithy is a series of pits and shafts (M10/2), and the valley leading up to Tregonning has also been worked over for its alluvial deposits

(M10/3). These small-scale workings are typical of many others in the Valley, and cannot readily be identified by mine or site name; neither can they be dated in the present state of knowledge. The location, nature, and extent of all mining remains was recorded by the 1:1000 Survey, and it is to be hoped that future research will enable a more complete assessment to be made.

3.4.6) Quarrying (Q prefix illustration numbers)

The working of granite has long been a major occupation in the Luxulyan Valley. For many hundreds of years the plentiful surface stone was split from scattered boulders on the hillsides, shaped and carted away for building works of all kinds. While there was no quarrying in the accepted sense of deep extraction, in reality the Valley itself was the quarry. The granite, although of excellent quality, supplied only local needs as the difficulties of transport restricted any wider use of the stone. Treffry was well aware of the potential of this resource, and undoubtedly had this in mind as a major objective for his transport schemes in the Valley.

The Tithe Map of 1840 shows none of the quarries visible today, and it was not until the new Tramway through the Valley gave access to the sea at Par for the worked stone that it became possible to expand the industry. It is notable that all the major quarries in the Valley save one have direct connection to the Tramway system. The history of deep quarrying for granite in the Valley therefore belongs to the period ca 1845 to the early 1900s, when the demand for high-quality local stone was eroded by cheaper imports from Scandinavia. The Luxulyan quarries were renowned not only for the quality of their stone, but also for the size of the blocks which they were capable of producing; the jointing of the granite in this area is such that it was possible to heave large quantities of stone from the working face with relatively small quantities of powder. They were thus in a position to supply the needs of large-scale building and civil engineering works throughout the country.

Orchard Quarry (Q1, Plan 8)

Orchard Quarry is connected to the Rock Mill Quarry Tramway by means of the incline plane already noted (T47). The quarry is situated well upslope, and is easily overlooked in a casual inspection of the Valley; the working face (Q1/1) is sheer and the waste dumps below (Q1/2) indicate development over a period of some years. At the entrance to the quarry are two worked stones which were evidently intended for some large building. There is road access via the trackway (Q1/3). The quarry is at

present being infilled from above with earth and stone, and many features will be obscured if this process continues.

Rock Mill Quarry (Q2, Plan 9)

Also known as Lower Bottoms, or Cottage quarry. The quarry face (Q2/1) is higher than that of Orchard Quarry and exhibits a particularly clean profile. There are a number of overburden dumps on the north-east side (Q2/2) but the dumps of waste rock below are small in extent, perhaps indicating that they have been re-worked at a later date. A large smithy and office for the quarry stands beside the public road (Q2/3); this was the subject of a detailed survey at 1:50 (see fig 26).

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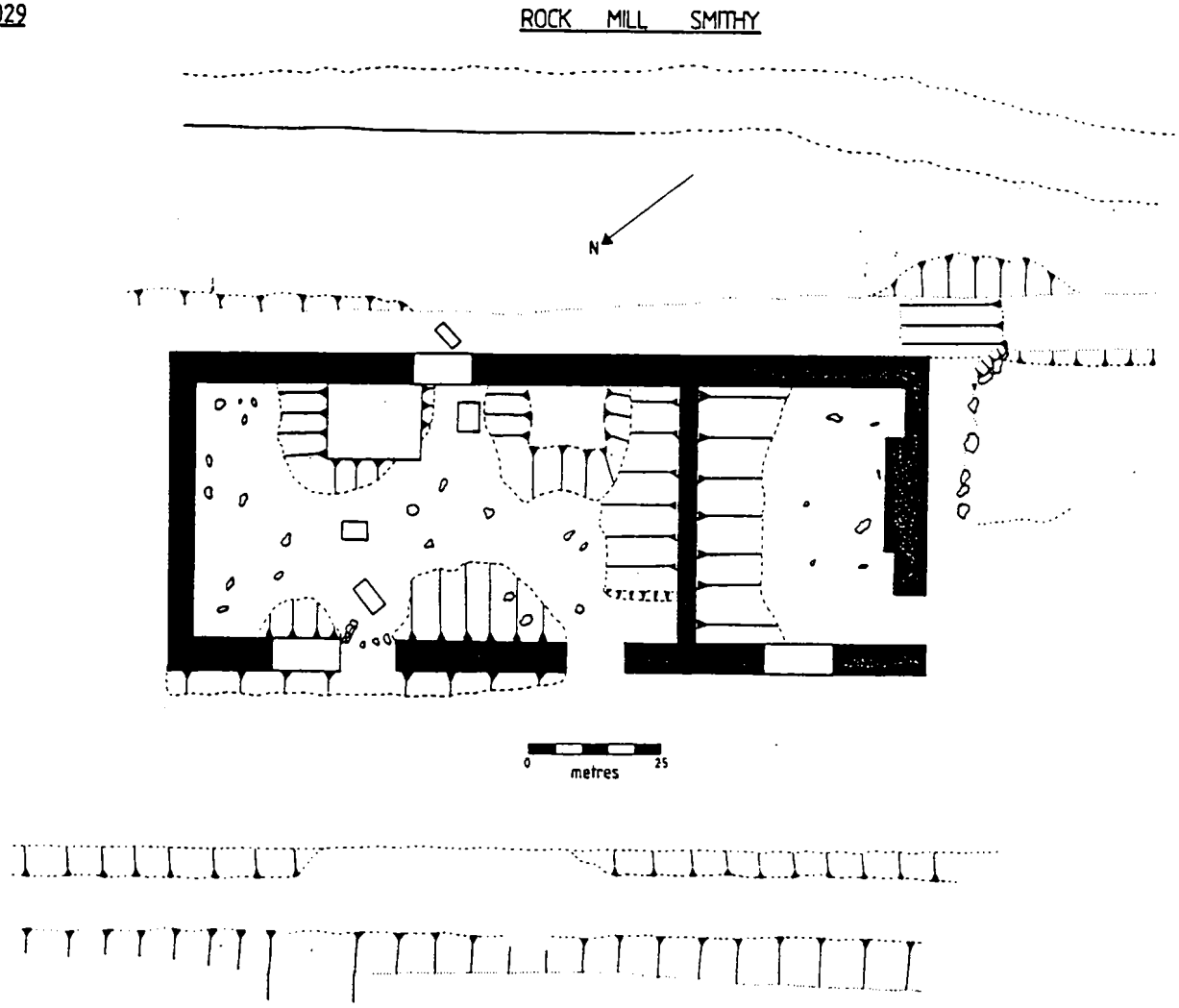


Fig 26 **Rock Mill Smithy**

Cam Bridges Quarry (Q3, Plan 12)

The Project Team was unable to identify this quarry with the documentation available, and so the name given is purely for convenience within this Report. The quarry area is comparatively shallow but has a clear floor, now being colonised by willow and other small trees. The dumps of waste rock are of particular interest, being a perfectly preserved example of flat-topped finger dumps (Q3/1), which run downslope from the quarry entrance and bridge the leat (L7) at several points. Associated with the quarry are two small structures (Q3/2,Q3/3) which are probably shelters and stores. A stone-faced embankment across the quarry mouth (Q3/4) is a puzzling feature, as it effectively blocks the quarry entrance and is therefore a later addition; it is apparently the continuation of a road or trackway from Cam Bridges to Rock Mill, but at this point the surface is no more than 1 metre in width. There would also seem to be no direct access from the quarry to the Tramway below.

Colcerrow Quarry (Q4, Plan 15)

The quarries so far discussed, while undoubtedly of some local importance, do not represent the main centre for granite working in the area. This was located to the north-east in the area below Colcerrow Farm, and was the first of the granite tors or outcrops in the Valley to be developed on a commercial basis, in this instance by Treffry himself. There are two quarries, Colcerrow and Carbeans, both directly served by the Tramway system; Colcerrow, the southernmost of these, is the smaller and was abandoned at an earlier date.

Here there are a multiplicity of working faces, stepped back up the hillslope. It is presumed that the ones nearest the Tramway (Q4/1) are the earlier, and that as the quarry was developed it was enlarged not by deepening or extending the existing work but by commencing a new face further upslope (Q4/2); in this respect it does not resemble the other quarries so far discussed. Large dumps of waste rock are spread below the second face (Q4/3), and areas where stone has been extracted in the quarry floor are now flooded (Q4/4). To the south, other working faces have been opened in the hillside, but are smaller in extent (Q4/5). The smithy (T38) already mentioned in the tramway section would have served this area.

Carbeans Quarry (Q5, Plans 15,16)

This is the largest quarry in the Survey area, and is the only one for which any photographic evidence has been found showing the quarry at work. Carbeans would also seem to have worked for

a longer period than the others, and stone was removed from this location up to the 1930s; this long period of use is reflected in the complex nature of the site. The working face (Q5/1) is extensive, and encloses a quarry floor covered in piles of waste rock, and deep sinks (Q5/5) which are now flooded; the area is heavily overgrown with small trees. Photographs of the 1890s show a clear working area in the floor of the quarry, with tramway spurs serving the working face; the contrast with the present state of the site is remarkable, and must indicate a period of later re-working having little regard to the long-term viability of the quarry. Carbeans was also unusual in that it provided many artefacts for the Team to study; there are the remains of two large timber-mast cranes, a winch, and the supporting chains for the cranes still attached to the quarry face. Overburden dumps (Q5/2) flank both sides of the excavation, and waste rock has been trammed out onto a series of finger dumps (Q5/3,Q5/4) on either side of the Tramway; rail and chairs were found in several places on the surface of these.

Minor Quarries

Granite has been worked at many other locations in the Valley; while in some cases this has involved no more than the splitting of surface stone with plug and feathers, elsewhere a true quarry has been made in the hillslope. It would seem that these were either intended to supply a localised demand for stone (in some instances for the construction of a bridge or building) or were ventures which failed on a commercial basis. Many hundreds of tons of stone must have been required for the building of the Tramway system itself, not only for the civil engineering works *en route* but also for the thousands of granite setts laid to support the rail. Surface stone will have doubtless supplied many of these requirements, but the smaller quarries may well also be interpreted as the result of this demand.

3.4.7) The Velvet Path (V prefix illustration numbers)

This remarkable carriageway was built by Nicholas Kendall of Pelyn between 1840 and 1860, and was known in the Kendall family as "The Long Drive". The Drive runs from Pelyn and through the eastern side of the Valley; its total length is eight miles. It is entirely self-contained and does not make use of the public roads, but bridges them where necessary. The Velvet Path, as it became known in later years, is constructed to a high standard and averages 3 metres in width.

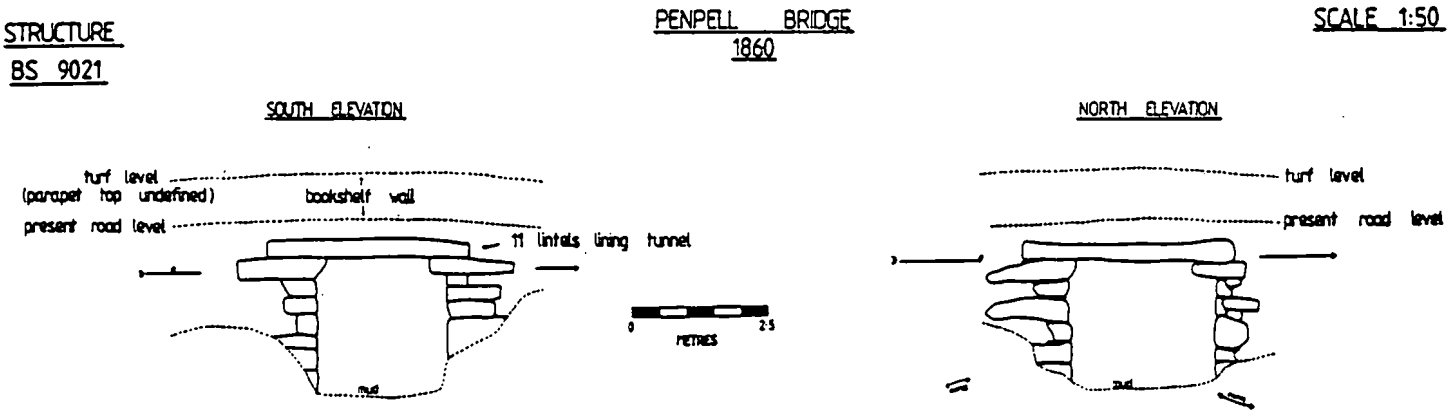


Fig 28 **Penpell Bridge**

It enters the 1:1000 Survey area at Penpell (Plan 4) and passes underneath the public road through a granite-slab bridge (V1, see fig 28). The Path describes a circuitous route through the Penpell Valley (V2) and runs south to Ponts Mill (V3). Here it turns west to follow the Valley side ((V4 and V5, Plan 2); a separate branch turns up the hillside to take a scenic route over the Carmears Rocks (V6). This ascends the steep slope in a spectacular series of hairpin bends (V7, Plan 5) which in places have been blasted through rock outcrops; before the area was as thickly wooded as it is today, this section of the Path would have afforded fine views of the Par Valley and Bay. The lower route (V9) crosses the Carmears Incline on a granite-built arch bridge (V10, see fig 29) before continuing along the hillside towards the Viaduct (V11, Plan 6, V13, Plan 8). This section is now very overgrown and is rapidly being re-colonised by self-seeded trees. From the bridge the Path also forks north up the Trethevey Valley to join the route from Carmears (V12, Plan 6). At Rock Mill the Path is again easy to follow (V14, Plan 9) and runs parallel with the public road beneath the Viaduct (V15, V16, Plan 10). It then turns east up the Colcerrow Valley (V17), passing below the Tramway (T34, Plan 14) and running north above the quarries (V19) (V20, V21, Plan 15) before passing out of the Survey area.

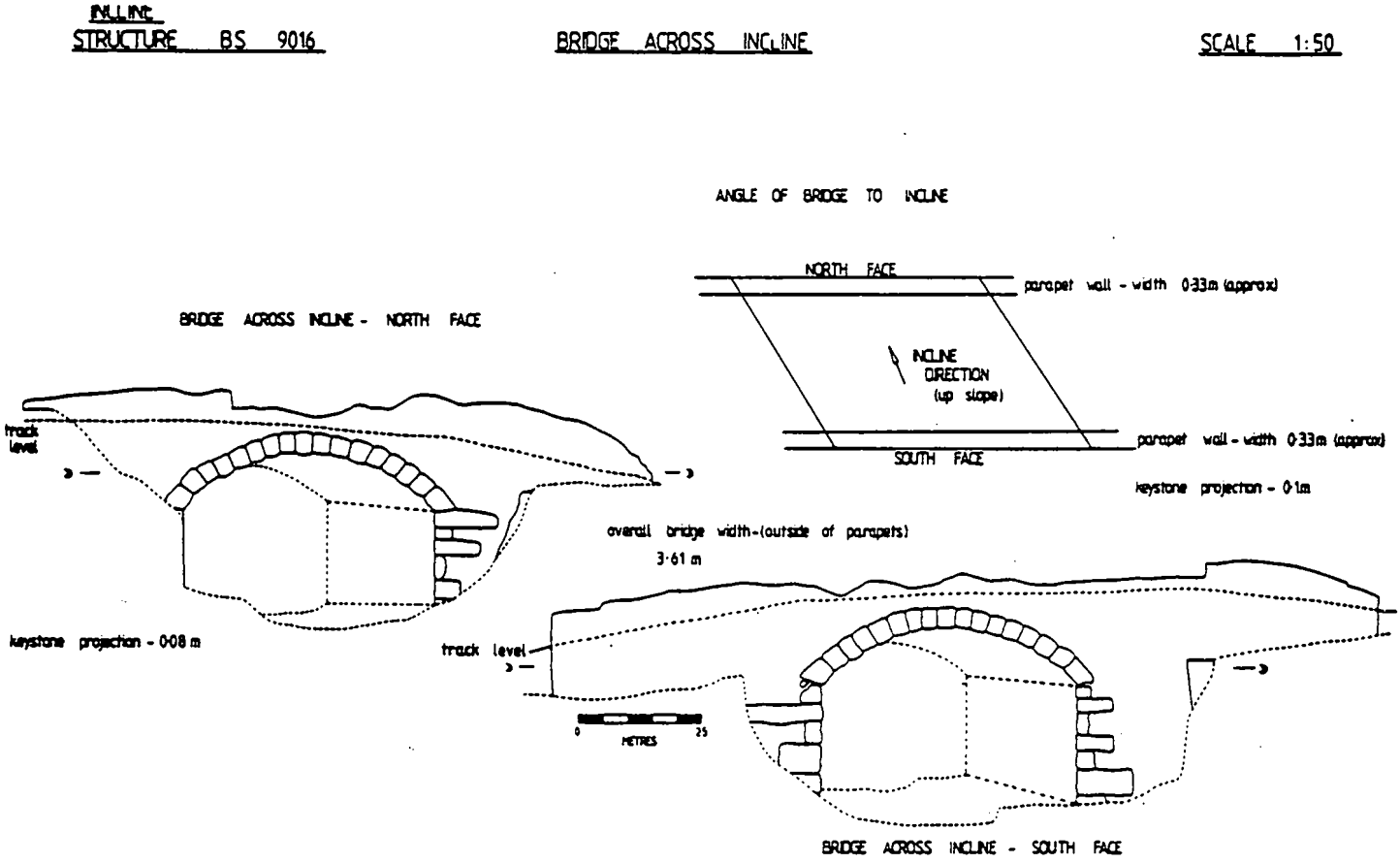


Fig 29 Carmears Incline Overbridge

In order to maintain an even gradient and the full width suitable for horse-drawn carriages, it has been necessary to bridge several streams and provide embanked sections along the route. The construction of the Path, even for wealthy landowners such as the Kendall family, would have been a major undertaking. Although it would seem that the initial impetus for the building of the drive was the marriage of Mary Ann Kendall to Sir Coleman Rashleigh of Prideaux, with a corresponding desire to promote a physical link between the two great houses, the Path in its final form has gone far beyond this to become a scenic carriageway throughout the eastern side of the Valley. It may well be that further extensions were planned but not completed, as a fire at Pelyn in 1862 necessitated the re-building of much of the house and put a great strain on the family finances.

3.4.8) China-Clay and China-Stone (C prefix illustration numbers)

The China-clay and Stone industries are relative latecomers to the Valley. Although the Tramway carried china-clay as soon as the line across the Viaduct to Bridges and Molinnis was complete, the industry was physically located on the Hensbarrow *massif* and there was no reason for the trains of clay to pause on their way to Par Harbour. The granite in the Valley has not been kaolinised, and thus there is no china-clay or stone within the Survey area. By the 1870s, however, it became possible for those clayworks which were not conveniently located close to a railway to despatch their clay elsewhere for processing in pipelines; this became commonplace in the cornish clay-producing districts, and the pipes were often (as on Bodmin Moor) several miles in length from the clay-pit to the process area.

Several china-clay companies took advantage of the convenient proximity of the Luxulyan Valley and its revitalised transport system (the Cornwall Minerals Railway), and from the 1870s re-located their processing works in the lower reaches of the Valley where land was cheap and the railway close by.

Prideaux Wood Works (C1, Plan 1)

The first of these was the Prideaux Wood Kiln, south of Ponts Mill, and built during the 1870s. The kiln itself was demolished by ECCI after the works closed, but the settling tanks at the rear survive, stepped down the hillside; these are of early form with granite blocks bedded in sand and rounded inside corners. These are all in an excellent state of preservation, and it was possible to record the various feeder channels and pipes which distributed the clay and surface water in the 1:1000 Survey. The kiln was served initially by a siding from the CMR of which there is no trace, and later by a narrow-gauge tramway to a loading wharf on the Ponts Mill spur; this survives intact with the rails still in situ although partially buried by earth.

Central Cornwall Kiln (C2, Plan 5)

This was also known locally as the Trevanny Dry, and was built by the Central Cornwall Company in the 1920s. The site was the subject of a detailed survey at a scale of 1:200 (see fig 30). It is a conventional coal-fired pan-kiln, built in granite with later concrete-block additions, and is intact apart from the slate roof which was removed in the 1970s. The pan and linhay (C1/1) face onto the railway at the front, and are served by a series of rectangular settling tanks at the rear (C2/2); a filter-press house has been added at a later date (C2/3). The furnace room and coal-store still has the fire-doors in situ, and

these were the subject of a detailed drawing. The stack at the eastern end (C2/4) is, unusually, of all-brick construction and survives to full height. A series of dumps (C2/5) appear to be the result of excavation into the hillside when the kiln was built, and still have tramway rails and a skip hidden amongst the laurels which cover this area.

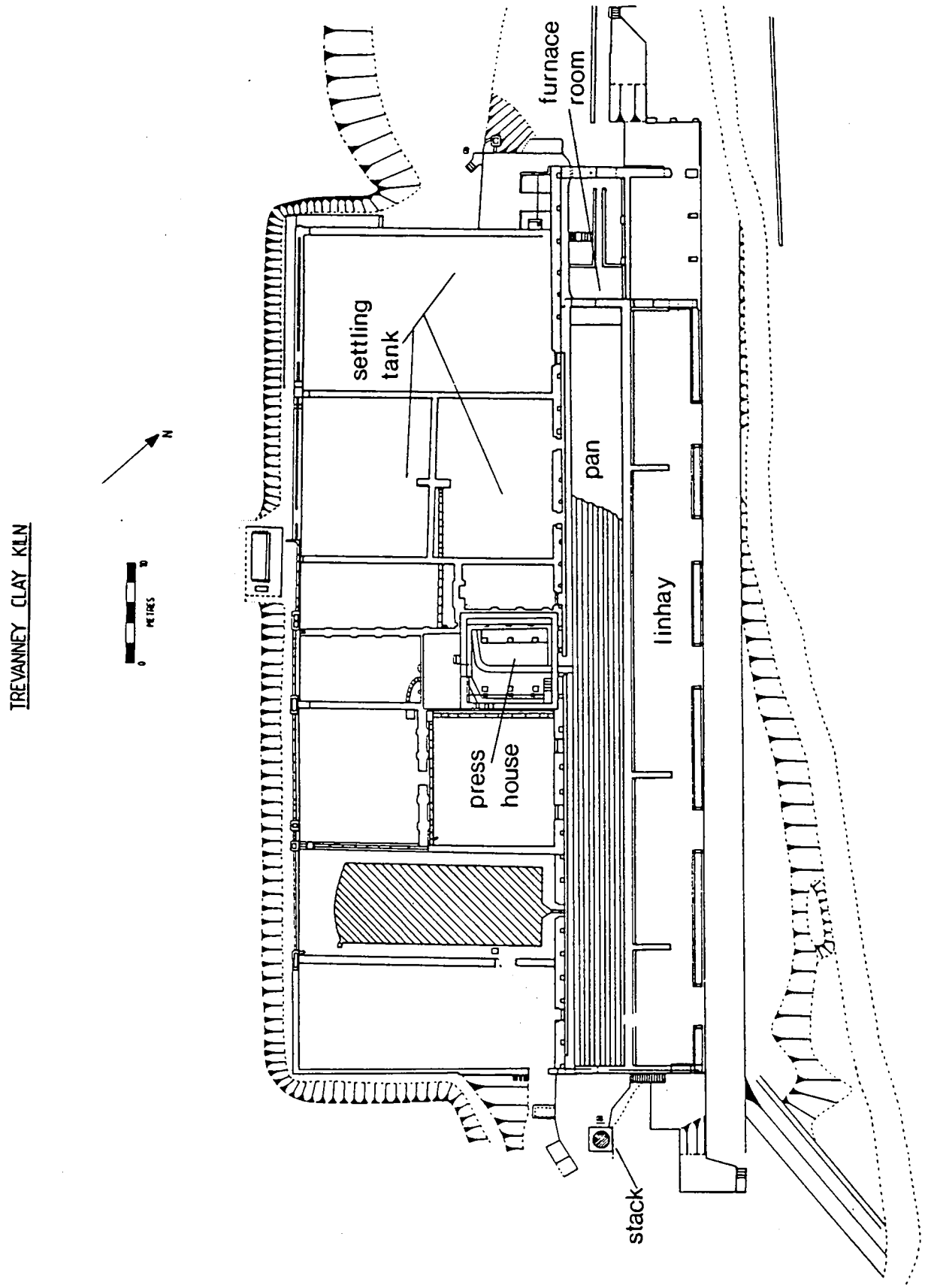
Wheelpit Mill (C3, Plan 5)

This is a china-stone mill built by the West of England Company on the site of the Carmears Incline wheel. It thus represents a re-use of the site at a period after the Tramway up the incline had ceased to function, ca 1890. A detailed survey was made at a scale of 1:100 (see fig 31). A new wheel of 40 feet in diameter was installed in the pit, and this drove a pair of grinding pans on either side by means of horizontal shafting and bevel gears; it was thus, unusually for Cornwall, an overdrift mill.

The mill buildings were simple structures with a masonry base, wooden upper walls, and a corrugated iron roof. A water reservoir for the pans was located upslope, and the china stone was brought in along the old Tramway from Luxulyan Station and loaded into the mill by means of wooden shutes at the rear. Inside the mill the pans, most of the shafting, and iron gears survive, as does the hub of the water-wheel; outside are some runner stones from the grinding pans. There is no facility for drying the crushed stone as this was despatched in a pipeline laid beside the Incline Plane to the works at Ponts Mill.

There is for this site a particularly complete photographic record of its original appearance (ECCI Collection and CRO). It is therefore possible to make a very accurate interpretation of the remains if this should be required at a later stage. (For a full description of the china-stone milling process, see "Chapel Mill", Sharpe and Smith, CAU 1985).

Fig 30


TREVANNEY CLAY KILN
N
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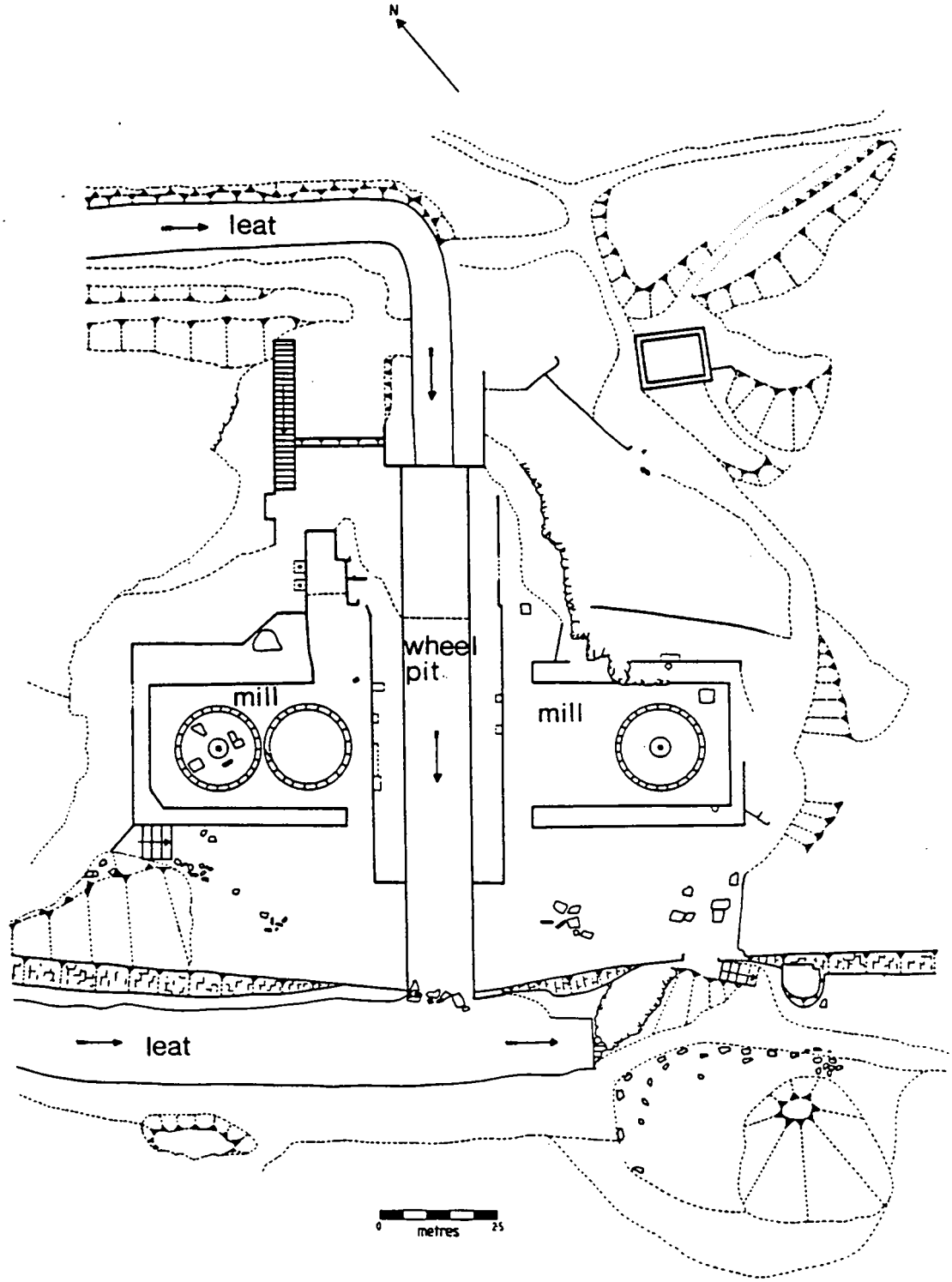
pan
linhay
press house
stack

Fig 31 WHEEL PIT STONE MILL SCALE 1:100



Ponts Mill Stone Mills (C4, Plan 2)

The greater part of this site was destroyed by ECCI during the 1960s; had the works closed in more recent times, there is little doubt that it would have been considered worthy of preservation as an outstanding example of the Cornish stone-mill. All that remains today is the base of the turbine-house at the foot of the pipeline (C4/1), and the pan-kiln for drying the crushed stone (C4/2) which is still roofed and has been modified internally for other purposes. At the rear are a series of settling tanks (C4/3); a filter-press house has been added (C4/4) and is not part of the original structure. A great deal of debris from the stone mill site was found by the Team in the Canal Basin, including the iron bands from the kiln chimney stack.

3.4.9) The Wider Context

Several sites outside the 1:1000 Survey Area were also the subject of study by the Project Team. These were initially selected on the basis of their relevance to the industrial developments in the Valley, but as it became apparent that the Team would easily complete the Primary Survey objectives within the time-span of the Project, additional sites were recorded purely on the basis of their importance to the St Austell area. Many of these sites are in themselves of great interest to the wider study of Cornish history and pre-history.

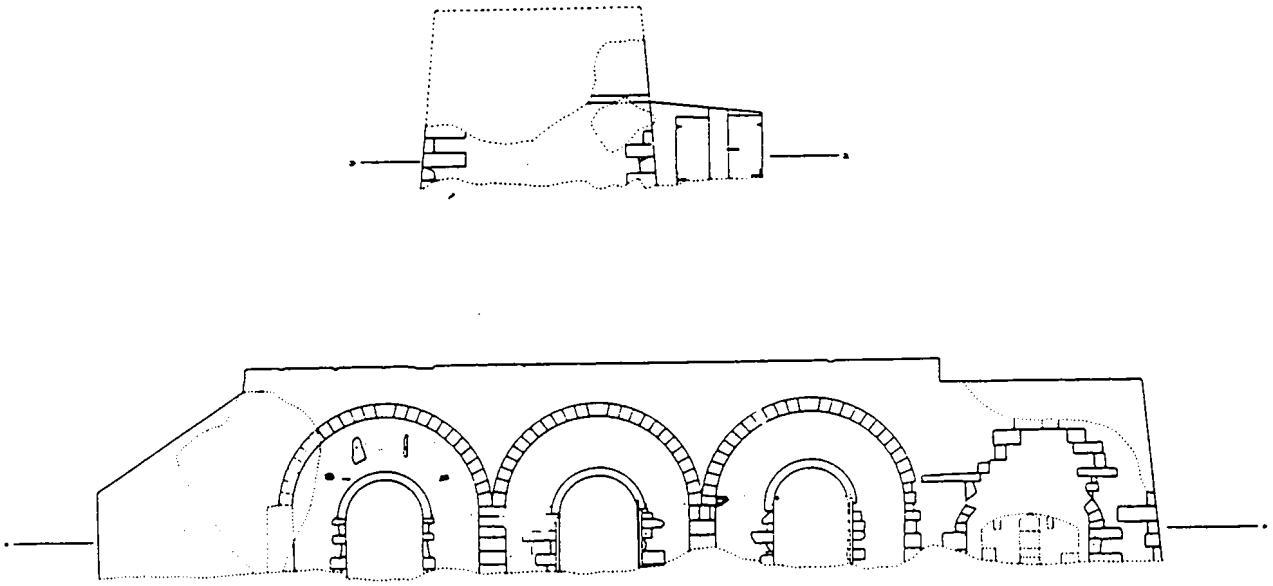


Fig 33 St Blazey Bridge Lime Kilns

St Blazey Bridge Lime Kilns (SX 0710 5510)

These lime kilns stand on the Par Canal Wharf at St Blazey Bridge, and thus belong to the Canal era, but are probably post 1840 as they are not shown on the Tithe Map. The buildings were surveyed at a scale of 1:100 and elevations drawn at 1:50 (see figs 32 and 33). The site is unusual in that it consists of a conventional pair of well-kilns at the southern end, which are attached to a massive stone-arched structure which has no obvious function. The three arches are open to the Canal side, but have been partially closed at some later date with smaller brick-faced openings. In the roof of each chamber is a rectangular opening which has iron bolts or fixings at the periphery. The original purpose of the arches is not known; latterly they have been used as workshops and stores. A thorough search of the available documentation failed to throw any further light on the problem. The lime kilns were fed by a stone faced ramp from the road at the rear, which gives access for carts to the top of the wells. The Canal Wharf itself has been destroyed by widening of the Canal for the Par Flood Prevention Scheme, but one side of the Canal Bridge carrying the road is extant and is of the same pattern as the bridge at Ponts Mill.

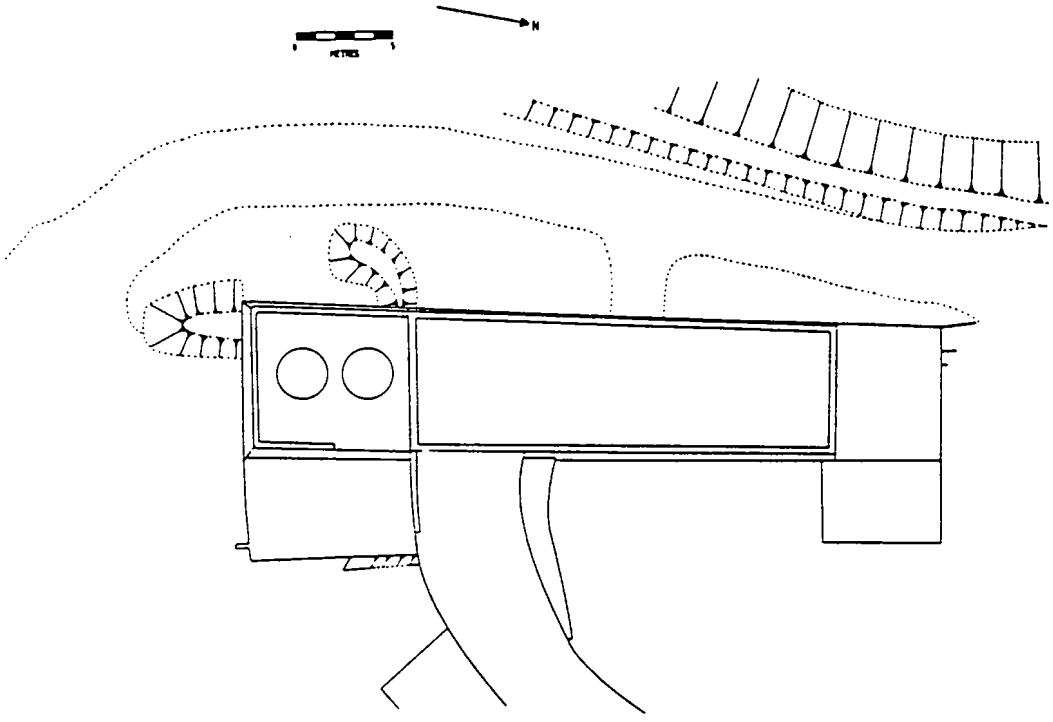


Fig 32 **St Blazey Bridge Lime Kilns**

Fowey Consols (Austen's Engine) (SX 0830 5605)

One of the most famous engine-houses in the County, Austen's stands on Penpillick Hill high above the Valley. Built in 1834 to house the 80 inch engine from Harvey's of Hayle which was to achieve a lasting place in history as the first to exceed a duty rate of 125 millions, the house is a prominent landmark in the St Blazey area. The engine was erected by William West for Treffry and it was here that he was able to put into practice his advanced ideas for improving the thermal efficiency of the Cornish Engine; boiler lagging, feed-water heating and super-heating were all used on this site for the first time in an integrated fashion on a Cornish mine.

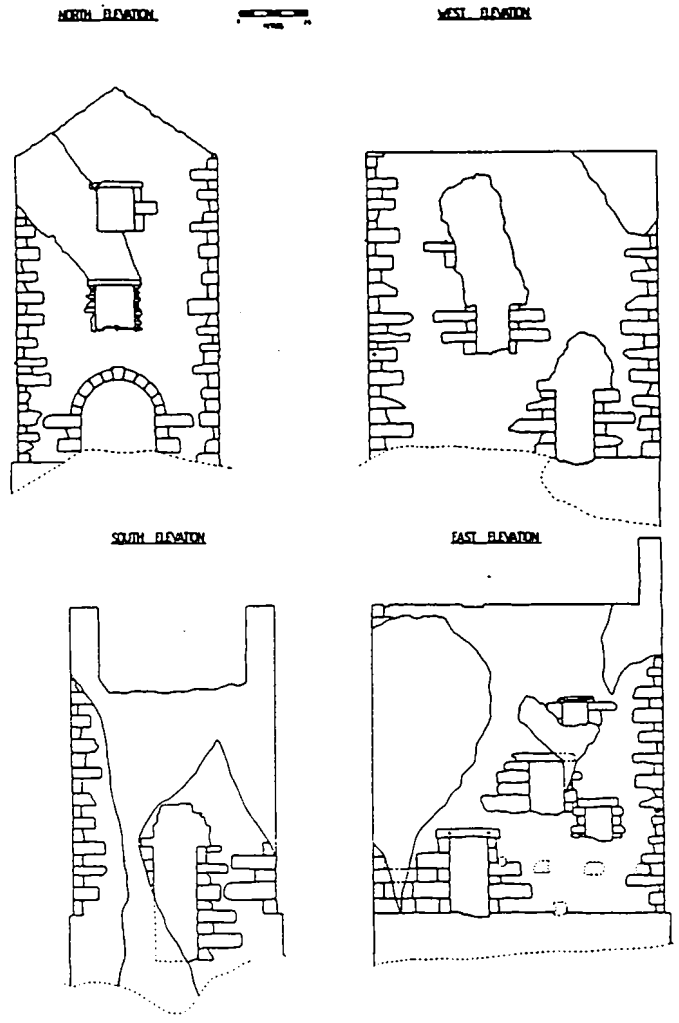


Fig 35 **Austen's Engine House**

The site today consists of the substantial remains of the engine-house, roofless but otherwise intact. The building was surveyed and elevations drawn at a scale of 1:50 (see fig 35); it is conventional in all respects. The remainder of the mine was examined by the Team, but of the intricate complex of surface structures shown on the original plans little remains apart from large areas of waste dumps which have been re-worked over the past century for building and road-stone.

Wheal Treffry Iron Mine (SX 0560 5540)

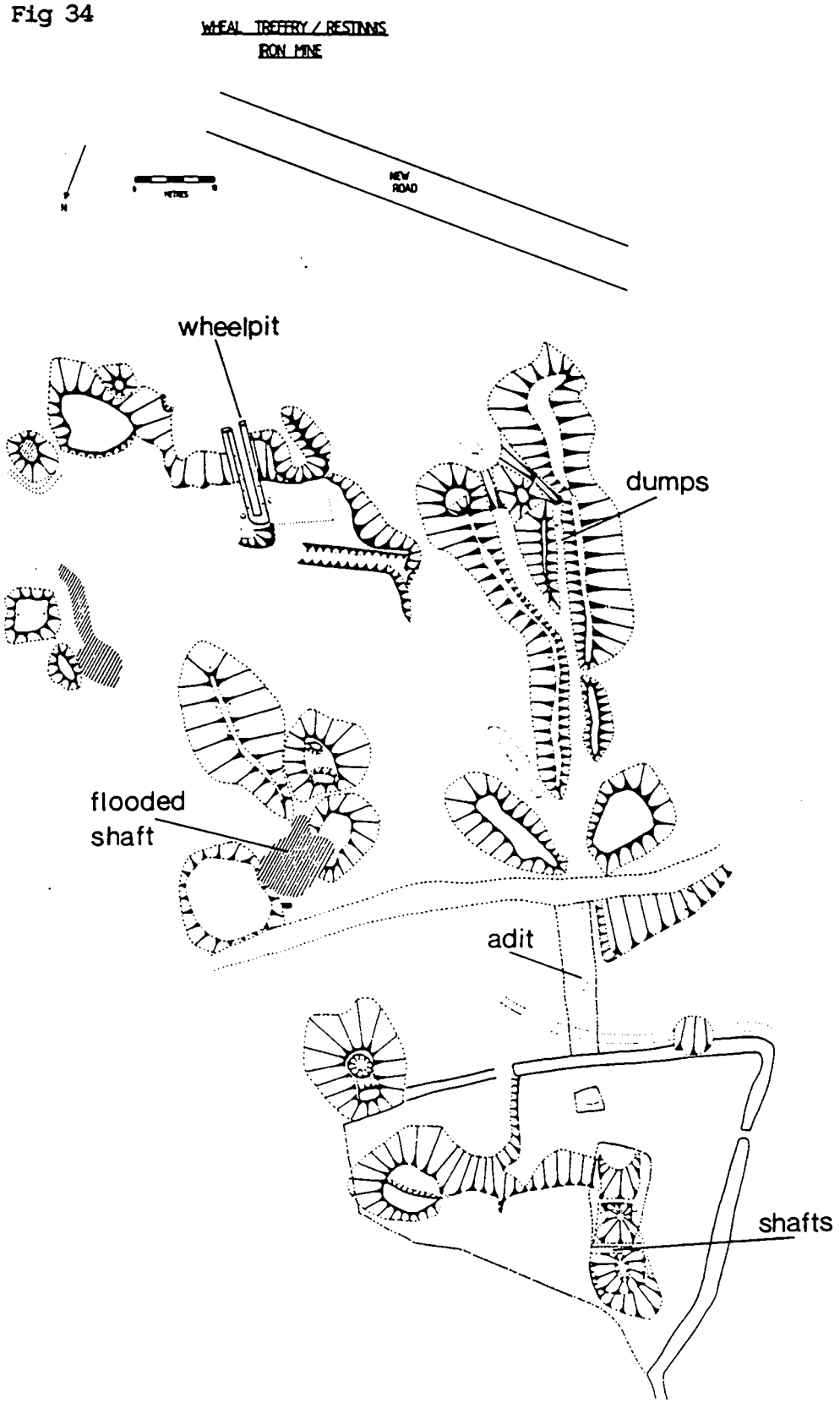
This small iron mine near Bodelva was surveyed at a scale of 1:200 (see fig 34), and was also known as Restinnis Mine. Records of working extend from 1862 to 1877. The site is now hidden amongst a dark Forestry Commission plantation, and it may be that some ground features have been destroyed when the present trees were planted. Evident on the ground is a main adit running west into the hill, with a series of shafts above this and other flooded shafts immediately below; there are substantial dumps of waste rock which extend to the public road. The only other feature of note is a stone-built wheelpit which would have provided power for pumping and winding. There is no evidence for any processing equipment such as stamps or crushers as would be expected if tin or copper were the target mineral.

St Blazey Locomotive Depot (SX 0735 5370)

The depot was built between 1872 and 1874 (of Plymouth bricks) as the Headquarters of the Cornwall Minerals Railway by the contractor for the line, Sir Morton Petoe. It was designed on a grand scale unprecedented for an independent railway company anywhere in the South-West, and was the more unusual in utilising the round-house principle where a central turntable gave access to a series of tracks leading into a curved shed; such an arrangement, although common in continental Europe and the United States, remains relatively rare in Britain. After the demise of the CMR, the depot passed to the Great Western Railway and eventually British Railways on nationalisation. It was for long the principal works and running shed west of Plymouth, and was in use until 1986. As the successor to the Tramway system in the Valley, this monument to 19th century railway enterprise was a legitimate target for the Survey Teams and faced them with one of their greatest challenges, for the structure is truly massive.

Fortunately an excellent site plan of ca 1900 was made available by British Rail, and when enlarged to a scale of 1:200 and re-drawn this was felt to be entirely adequate as a ground survey. The main objective, however, was a full set of elevations at a scale of 1:50, and it is a tribute to the Survey Team that this

Fig 34


WHEAL TREFFRY / RESTRONGUET IRON MINE
SCALE 1:200
NEW ROAD
wheelpit
dumps
flooded shaft
adit
shafts

was accomplished to a very high standard (see figs. 36, 37 and 38 for example plans). The depot today consists of a fan-shaped running shed with nine tracks, which are accessed from the turntable in front; the erecting and repair shops to the rear; the smithy, stationary engine house and stack; office accommodation; and the Company boardroom above the repair shops. A model of the depot was made from the elevation plans for display at the Project's Open Day, and proved to be a most popular exhibit.

Additional Site Surveys

Six other sites were surveyed by the Project Team which, although falling within the St Austell and Fowey area, are not directly relevant to the study of the Luxulyan Valley and its history; they were felt to be of interest and significance for the wider archaeological study of the district. As such, they are not included within the scope of this report, but the information recorded is available for study in the Truro offices of the Archaeological Unit. They are as follows:

Warren Wood Hillfort (SX 0590 5570)
An iron-age defended hill-top site, with well defined multiple ramparts; a Scheduled Ancient Monument.

Castle Dore Hillfort (SX 1045 5480)
An iron-age defended hill-top site, partially excavated in the 1930s; a Scheduled Ancient Monument.

Carvear Clay Kiln, Bodelva (SX 0530 5435)
A china-clay pan-kiln, probably of the 1870s. It exhibits evidence of a multi-phase usage and includes a full set of circular settling-pits within the site.

St Catherine's Castle, Fowey (SX 1186 5090)
A very small Tudor fort, built by Thomas Treffry in the 1540s to defend the entrance to Fowey Harbour. It has a central keep and curtain walls; a mid-19th century gun emplacement has been added below. A Scheduled Ancient Monument.

Menacuddle Well, St Austell (SX 0120 5335)
A medieval holy well, much restored in the 19th century and now overshadowed by road-widening. A Scheduled Ancient Monument.

Pentewan Harbour (SX 0190 4720)
Built in the 1820s by Sir Christopher Hawkins as a port for the china-clay industry to the north; linked by a tramway to St Austell, later converted to locomotive traction. Now choked by sand and derelict.

~~MEVAGISSEY RAILWAY~~

ST. BLAZEY

LOCOMOTIVE RUNNING SHED AND WORKS

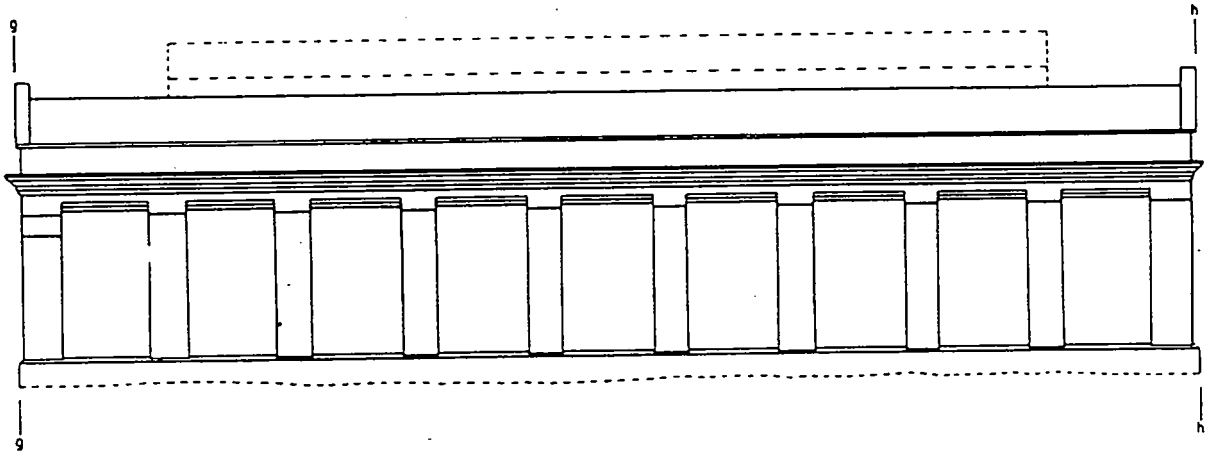
1910

SCALE 1:200

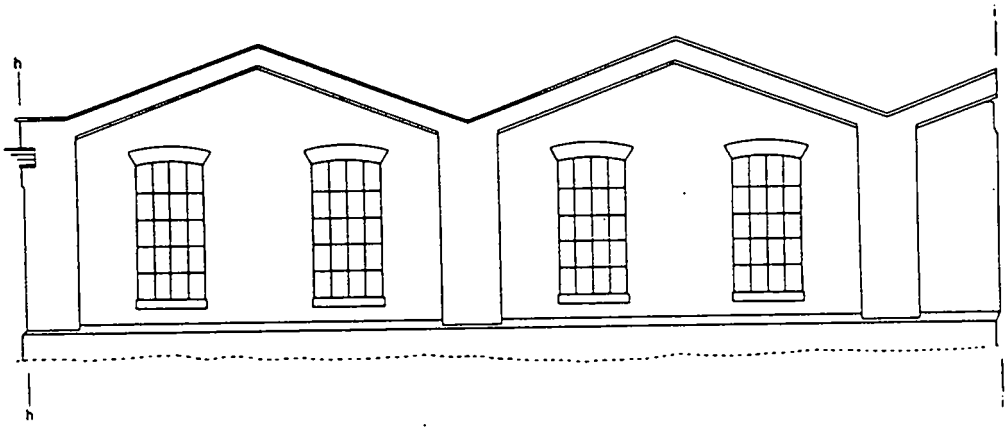
CORNWALL MINERALS RAILWAY

ST BLAZEY LOCOMOTIVE WORKS

ELEVATION 6



ELEVATION 7

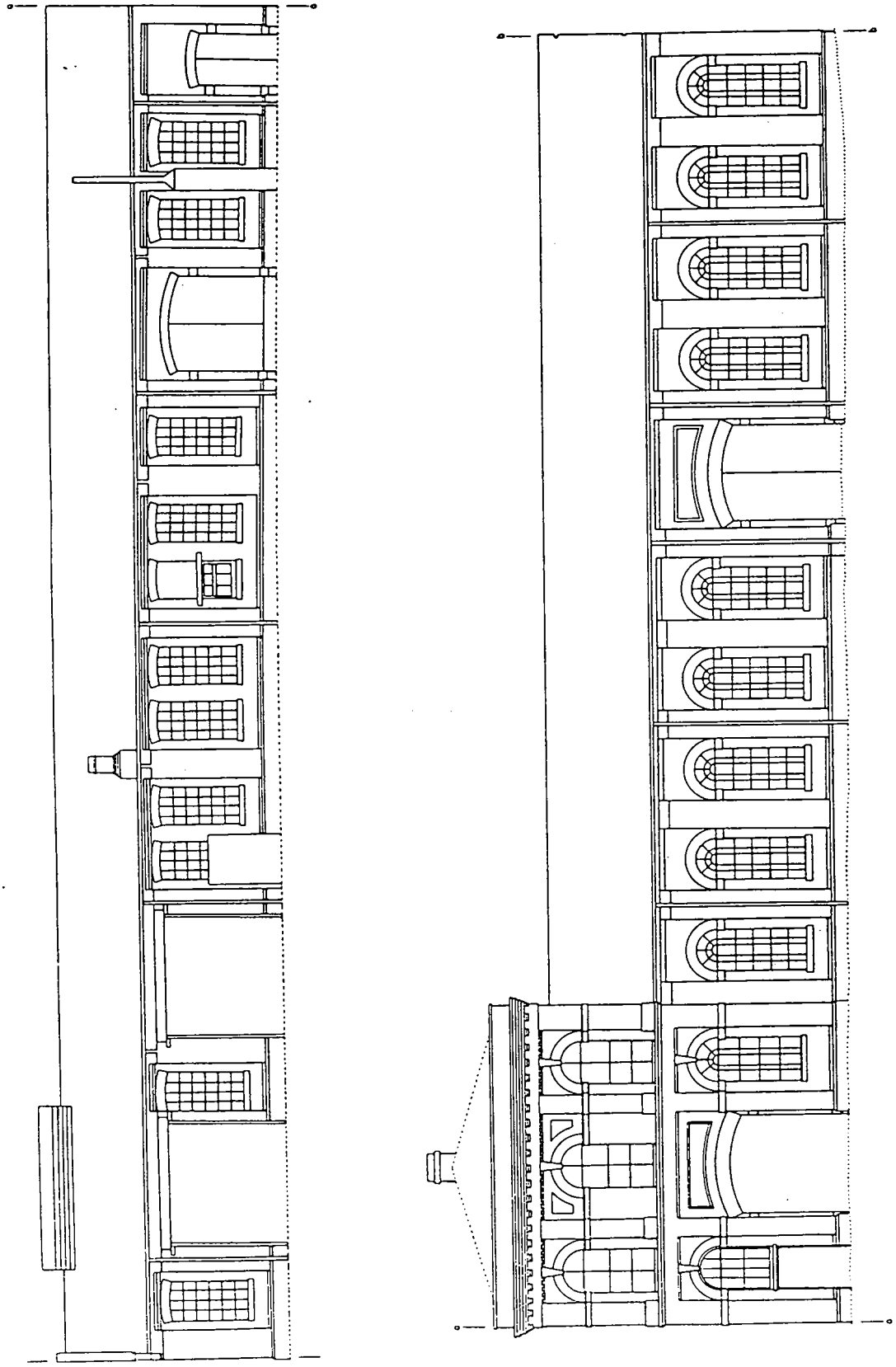


ELEVATION 8

20473

CORNWALL MINERALS RAILWAY
ST BLAZEY LOCOMOTIVE WORKS
ELEVATION 1

SCALE 1:50



3.5) Documentary Evidence and its Relationship to the Survey

The first task for the documentary researcher was to examine and make copies of the Tithe Maps in the CRO for the parishes within the Project Area: Luxulyan, Lanlivery, St Blazey and Tywardreath. The relevant sections of the Apportionments (with the landowners, occupiers, and land use) were also copied. These maps are particularly vital to any landscape study as they provide the earliest (ca 1840) large-scale record of the County; the original Ordnance Survey one-inch to the mile maps are earlier (ca 1810) but did not show enough detail for the purposes of the Project.

The Tithe Maps provide an excellent base reference for topography, land use, and (combined with the Census Returns) population distribution. Insofar as the Project was concerned, they were of great value both to the indoor researchers and to the Surveyors in the field; when compared with the first edition OS 1:2500 survey (1880) they enable an assessment to be made of the development in the Valley during the key years of the mid-19th century. The fact that the Valley lies for the most part across two maps (Lanlivery and Luxulyan, with the River as the parish boundary) makes the interpretation rather difficult, as does the variation in the quality of the original survey between the two parishes.

Another vital cartographic source was the maps and plans accompanying various deeds, releases and assigns in the Treffry Papers (CRO). These, dating from and relating to the original construction of the canal and tramway system, are extremely valuable not only for their detailed rendition of the original form of these features, but also for the light they shed on those which were proposed but never built. These latter include the proposed tramway from Fowey to Fowey Consols, a proposed branch from the Tramway near Cam Bridges (destination unknown), and the original route proposed for the Tramway from Ponts Mill through the Valley itself. In this instance the surveyors had already discovered mystifying ground features (abandoned cuttings and earthworks) which only made sense when the connection was made to this documentary evidence.

Early photographs and postcards provided supplementary information for the Project Team, and were often the only means of reconstructing the original appearance and function of certain sites. Photographic sources consulted included the Royal Institution of Cornwall collection, Truro; the Local Studies Library, Redruth; Wheal Martyn Museum, Carthew; and the photographic department of ECCI, St Austell. Local sources were generally of greater use to the Project; for example, Derek

Reynolds' collection from the Luxulyan Village Museum, containing many useful views of the Valley from circa 1910. Particularly exciting was the private collection generously loaned to the Project by John Pollard. This set of glass slides from circa 1895 were of great value for their record of the Colcerrow area. Notwithstanding these gems, the search for photographic material relating to the Valley itself was disappointing for its scant reward; very few photographs of industry within the Valley were discovered, and none at all of the Tramway system in action.

From the tremendous range of documentary material discovered in the archives of the County it may seem invidious to select only a few items for example here; nonetheless, it would require a separate Report to do justice to this collection. The Census Returns, as previously mentioned, are fascinating for the human and social dimension they give to the otherwise bare facts of history, and well reward careful study; here is Sir Colman Rashleigh's household at Prideaux in 1881:

"Mark Lockyer, age 35, Butler; William Geach, 40, Coachman; Alice Fell, 26, Upper Housemaid; Rose Coppen, 20, Under Housemaid; Emma Batten, 21, Kitchen Maid; William Greet, 14, Page."

Whereas at Ponts Mill at the same date are:

"Joseph Best, 41, China Stone Miller; William Bray, 35, Turbine Driver; John Williams, 67, Farmer of 4 acres; Philip Reynolds, 60, Engineer."

When analysed, the bald statistics well reflect the change in parts of Cornwall from a semi-feudal agricultural society to an industrial one during the 19th century. If the Returns are combined with the information from the Tithe Apportionments, it is possible to build a complete picture of the occupations and status of the inhabitants of the area from 1841 to 1881.

The original contracts for the building of the Treffry Tramway were a great find for the Project; not only did they explain a little known episode in the Valley, they also contain a great deal of useful information as to the exact method used to build the line:

"June 13th 1835

A line of road to form for a railway from Ponts Mill to near Rock Mill.

The line shall be at least 9 feet wide. All banks in the line shall be cut down and all pits filled, to procure a uniform ascent but where that is impracticable the ascent may vary from 1

in 30 to 1 in 60 to be nowhere greater than the former.

All rocks met with in forming the line may be cleaved into blocks of 2 feet by 1ft 6ins and from 9 and a half ins to 12 inches thick except every 5th block which shall be 2 feet square for which the takers shall receive the same price as paid for all other blocks which may be required for the line. The blocks shall be well bedded and the bed for the saddle shall be parallel with the bed of the block, two holes to be bored each five inches deep."

The diaries of William Pease in the CRO are a fascinating source not only for the technical detail which they contain (for Pease was a meticulous man, forever calculating material costs and producing specifications - the Viaduct was thoroughly costed in this way in 1836, three years before work commenced) but also for the occasional illumination of major events:

"1842 January 18th.

This morning went to Place where I met Mr West by appointment to determine where the water wheel for working the inclined plane at Caffa Mill should be placed. On our return home Mr West asked if I would like to take part with him, Capt P and Capt D in a Foundry at Par, provided Mr Treffry would grant a piece of ground for the purpose."

Thus began the great foundry of William West at St Blazey. Mining is a well documented subject, and some material was discovered which related to the relatively obscure mines within the Valley. Several reports were made on the Lady Rashleigh Consols Mine when its re-opening was promoted during the 1880s, this one from a particularly revered figure:

"The sett is situated to the west of the celebrated Fowey Consols Mine which was formerly very rich for copper; it is upwards of 200 fathoms in length on the course of the lode. Fowey Consols and other rich copper mines in the vicinity were in killas, but Lady Rashleigh is in granite which is a most favourable rock for producing tin. One of the lodes has been worked on very extensively by the Ancients by open cuttings from the surface for about 100 fathoms in length on the side of a hill, which rises rapidly and which at the western end of the working is upwards of 30 fathoms high. Some of these ancient workings have been partially cleared....."
(Captain Josiah Thomas of Dolcoath Mine)

Newspapers and Journals were also an excellent source of material, and are particularly useful for the light they shed on contemporary attitudes to events of the time. An extract from

the Stone Trades Journal for 1911 gives a detailed and eloquent picture of the depression in the Luxulyan granite industry at this time:

"Never has there been in the memory of the oldest living granite workers such a period of depression in that trade as there has been during the past seven years. They have been seven lean years in very truth. Here and there in the beautiful valley of Luxulyan the hillsides are scarred deep, where, in the years that are gone, the men in this part of the country were kept busily employed in getting out and working the hard grey blocks of stone, which today form some of England's mightiest sea bulwarks, as well as many of the most beautiful works of architecture. In the old days the quarries teemed with life and activity. Today, except for the few lonely workers, whose blows resound through the empty place, the quarries lie in silence, and the vast store of some of the finest stone in the world lies disregarded and uncalled for. As one enters one is struck with the same empty, desolate feeling, felt on entering an empty house; the huge grey cranes stand erect, with their supporting chains, like giant cobwebs over all.

"The other day I visited these quarries at Luxulyan. I looked down into the echoing depths of Colgarrow, and clambered about in Golden Point, Tregarden. Among the older inhabitants I spoke to were Mr Joseph Turner and Mr William Saunders, both of whom toiled since their boyhood days at the granite cliffs of Luxulyan.

"Mr Saunders is now well on the way to 70 years of age. He told me he went to work first as a tool-boy in Colgarrow, under old Captain Turner, who has long since passed away. This quarry, he said, belonged to the Treffry Estate, but the well known firm of Freeman have worked it for the last thirty years. Golden Point quarry was opened up by Messrs Sennett and Co, but Messrs Freeman took it over eventually. The stone here proved to be of the best possible quality, almost everlasting, of the kind from which the old Cornish Crosses were hewn, and which have stood for centuries.

"Just before the Great Western Railway built the broad line near here the South Cornwall Quarry was opened, and found employment for many men. No., Mr Saunders did not think the trade was much benefited by the advent of the railway. Speaking of accidents, he had seen lots of minor ones; only one was of a fatal character as far as he remembered. That was in about 1886, when a lad named William Varcoe was crushed to death during blasting operations. As a rule, he added, they stuck to the old black powder for blasting, as the new-fangled explosives broke up the stone to a

much greater extent. Their stone, he proudly asserted, had been used in many parts of the world, as in the building of the Dock at Malta.

"Mr Joseph Turner, a son of the Captain Turner spoken of by Mr Saunders, is now 79 years of age, and he worked in the quarries for sixty years. He spoke in mournful tones of the decay of the trade, which during the last seven years had been gradually going, until it was almost gone. All the same, he takes an optimistic view, and hopes the tide will turn again before long. He remembers the foundation stone being laid of that great viaduct-aqueduct, which spans the Luxulyan Valley, built to carry both water and the freight from the mines. Great hopes were entertained from that enterprise which have never been fully realised. The cost of the undertaking, he believed, was £7,800, but he added that it was built from surface-stone, and if it were built today it would cost twice or thrice that sum. He remembered, though only about seven years of age at the time, that when the tops of the arches were being filled in that a man named Westlake fell from that terrible height, and was instantly killed. He saw the stone quarried in Callgarrow that was used in the building of the harbours at Newquay and Par, and remembers the time when Luxulyan was a thriving little township. Though 79 years of age, he hopes to see a return of this prosperity, for, as he remarked, the demand for granite is as great or even greater than ever it was, but English granite - the best, Mr Turner proudly asserted - is not in the demand it should be.

"I passed a solitary workman enjoying his mid-day meal as I went through the gate into Golden Point. Four of us work here, he said. Better times in the past? Well yes! There used to be thirty masons here and forty labourers, but those days are gone. On entering the Quarry I saw a block of stone six feet either way, hollowed out for a water trough. What a waste of splendid material! The stone here is undisturbed by strata, and blocks of almost any size may be obtained. Not long ago a block was turned out ready dressed, which weighed over fourteen tons. In those days, when the work was in full swing, the blasts were well worth watching from a safe distance, for it was quite a usual thing to bring down 400 or 500 tons.

"Nowadays many of these blocks of stone, blocks which would make a builder long to build according to his fancy, are being broken up for road metal.In these quarries where once hundreds of men toiled, today only a handful may be seen. Truly the lean years have come upon Luxulyan."

It is of course not often that research will result in the discovery of a gem such as this, which contains much fascinating

detail not only on the quarries and the stone industry but also direct personal recollections of the building of the Treffry Viaduct. When such an item surfaces, it rewards the long hours of often fruitless labour that are the Researcher's lot.

3.6) The Valley in Oral Tradition (David Fern)

From the recollections of the local people interviewed by the Oral Historian an impression of the Valley emerged which illustrated its importance as a resource for employment and recreation. Direct personal memory was of course confined to the 20th century, but through the rich tradition of folklore and local legend it was possible on occasion to reach further back to memories passed on from older relatives.

One of the first people contacted was Arthur Anstis, a retired railwayman who had worked at Luxulyan and Par Docks. His working life in the area spans more than 60 years. The interviews with Mr Anstis were particularly interesting not only for his experience of the transport system within the area, but also for his personal enthusiasm for the history of the Tramway system, backed by considerable research.

"When this was first done it must have looked like the entrance to a Roman City with all the granite: they tell 'ee if you pick this granite right up and turn it around he'd fit the other way."
(Arthur Anstis, referring to the Treffry Viaduct)

Dr John Rowe and Constance Rowe of Rock Mill were very helpful to the Project. Mrs Rowe lived at Ponts Mill and members of her family were employed in the china stone mills.

"Well I once heard my mother say that before the First World War it was so beautiful it was just like velvet, and they always called it 'the Velvet Path'. My grandmother would say she would have to curtsey if Lady Rashleigh passed by. The woods were cut during the War and that was when it was spoiled."
(Constance Rowe, referring to the Pelyn Estate Carriageway)

Mrs Rowe led a walk along the overgrown route of the Path for members of the Team. The Rowes also supplied many contacts for the Oral Historian, which were followed up during the course of the year.

Mrs I Littleton's late husband had been Captain at the Ponts Mill Stone Mills, and he had made detailed notes regarding the history of the works; Mrs Littleton kindly loaned these to the Project. This information proved to be a finely detailed technical history

of the stone mills and their equipment, from their opening to closure in the 1960s. One of the inevitable limitations of Phase I was that it was impossible to do justice to material of this sort within the constraints of time and the Project's necessarily tight schedule.

Personal recollections of tin and copper mining within the Project Area were not obtainable first hand, as mining had ceased by 1910 in the Valley; within living memory only granite quarrying and the china clay and stone industries could provide material for the Oral historian. LP Mendels MBE recalled his career with the New Consolidated Mines of Cornwall at Ponts Mill in the 1920s, when a new china clay works was established to process clay from Starrick Moor.

"In those days just after World War One there was a rumour: there's gold in them there hills!' It wasn't gold of course, it was china clay and they came down here from all parts of Great Britain and they were going to make a fortune. I'm sorry to say the Cornish saw them coming and very few survived. People came down and were persuaded to build large drys and large this, that and the other, including the Welsh company who built Trevanny. They had discovered a little deposit of clay near Starrick Moor and then started to develop it, but it was on the edge of the granite and didn't last more than four or five years. They built this wonderful clay dry and it was completely useless; it was taken over by ECC."
(LP Mendels, referring to the Trevanny Kiln)

Another industry of which there was first-hand experience was granite working and quarrying. The local quarries were past their peak by 1910, but lingered on until the 1930s; fortunately as the techniques involved had changed very little since the 19th century it was possible to obtain an insight into working methods which could also apply to early years. Tom Luxon, the last surviving stonemason in Luxulyan, was very helpful to the Project. His concern that the old workers and their methods should not be forgotten contributed greatly to the overall picture of the Valley and its industries.

"I'd love for you to hear about half a dozen of those jumpers, you mightn't believe it, it was beautiful. The blacksmith used to tune 'em up, get 'em different sounds, different weights. Years ago here, some of them that were stone people: if there was a wedding they would have half a dozen of they to ring instead of bells. It was beautiful."
(Tom Luxon, on ringing the jumpers or rock drills)

"Back years ago there was quite a number of places that men seem to have got in and they grabbed the stone here and there and made a bob or two, but not as their permanent job, maybe working Saturdays. Making these here mill stones, pig troughs, bird baths and all things like that. They also made sundials and if they saw a decent bit of stone by the side of the road they'd go for it and cart it away in a horse and cart, carry it where they lived and knock it out. This was going on for about twenty years when times were hard. It was a really hard life. But of course they were good men, good workers and they knew what they were doing."
(Tom Luxon, on jobbing masons)

Few interviewees remembered specific dates for events or site use, and it emerged that people carrying out their daily work were in most cases unable to foresee the later interest in their occupations. A few expressed regret at having discarded old documents and photographs. Even with the benefit of hindsight the rapidity of local industry's decline and the corresponding disappearance of the skills involved is startling.

Information concerning events of the 19th century was, as might be expected, often distorted through the passage of time and relaying of information through local folklore. In point of fact the recollection of occurrences as recent as the 1960s has become confused. This latter point is well illustrated by the conflicting accounts surrounding the demise of "Bessie", the petrol shunting locomotive used by ECC at Ponts Mill. Two local sources claimed that the engine had been tampered with, ran away and crashed and had to be scrapped in August 1961; however, information from Henry Orchard (owner of the scrapyard) suggested that "Bessie" had been purchased by a firm from 'upwards' and was subsequently still in use. It is therefore hardly surprising if events further back in time are open to misunderstanding and misinformation passed on through local folklore; those not recounted first-hand had to be treated with a certain degree of caution unless they could be otherwise corroborated.

From the interviews an impression emerged of life in the Luxulyan Valley during the early 20th century which demonstrated the interaction between the use of the area for work and leisure. A good example of this is the continued use of the Fowey Consols Leat originally constructed by Treffry in the 1830s:

"There used to be in Luxulyan a beautiful waterfall, every Sunday evening we'd go down for a walk (from Luxulyan Village) and meet the girls from St Blazey. You could walk right down on the bank and there was a timber launder, it used to have a handrail, and you could walk along; it was a beautiful view. People on the

train would look up to it, because it used to splash straight over the train."
(Tom Luxon, referring to the Carnears Aqueduct)

The aqueduct was replaced by a tunnel through Carnears in 1948 and now, together with the remainder of the complex fabric of Luxulyan Valley industries, exists only in the memories of older inhabitants and in the nostalgic images of Edwardian tinted postcards.

3.7) Ecological Survey Results (Paul Mason)

There are 14 general habitat types to be found within the survey area. Seven of these are woodland related, three relate to various forms of wetland (one of which is man-made), two are scrubland habitats, one relates to pasture, and one to quarrying activity. For a habitat distribution map see figure 3.

Half of these habitats could be further sub-divided into more specific habitat types, such as the carr form which could be separated into Willow, Alder, and mixed carr. The scrub could also be further sub-divided into Bracken scrub, Gorse, and Blackthorn scrub.

All of these habitats have their own particular characteristics which are reflected in the flora of the understorey (where one is present) and the ground flora. The physical features of the landscape also vary throughout the survey area which, combined with the different habitats, creates a variety of environments throughout the valley. The full Habitat Report forms a separate document, available from the Cornwall Trust for Nature Conservation; five sample habitats are described here to illustrate the range studied within the Project.

3.7.1) Carnears Wood (North) coppiced Oak woodland

The northern half of Carnears Woodland is a coppiced wood of Sessile Oak with a canopy at approximately 25metres. The understorey varies throughout the woodland with patches of Holly, and in the northern tip of the wood, a dense and spreading stand of Rhododendron Ponticum. Rhododendron, along with Laurel and Japanese Knotweed are a serious threat to the health of the woodland and are mentioned in more detail in the management section of this report. Most of the Oak coppice is however, free of an understorey , and where this is the case the ground flora consists mostly of a combination of Bilberry and Heather, with Bramble, Ivy and Honeysuckle competing for space.

The Bilberry and Heather combination is interesting because it is a remnant of the heathland habitat which is shown on the 1906 OS 1:2500 map. The heathland vegetation remains in the woodland as a direct result of coppicing activity. The cutting of the Oak trees before they mature and form a dense canopy has the effect of allowing more sunlight to reach the ground than would be found in an un-coppiced wood, thus the heathland flora can continue to thrive rather than be forced out by other woodland ground flora such as bramble, ivy and honeysuckle.

The two leat systems, Fowey Consols Leat and Wheelpit Leat, which run parallel to one another through the length of the coppiced woodland add an extra dimension to the Oak coppice. They create a break in the woodland allowing light to enter and stimulate the growth of a variety of wild flowers including Bluebells, Red Campion, Greater Stitchwort, Common Cow-wheat, Forgetmenots and Foxgloves. There is also a notable variety of Ferns including Lady Fern, Hard Fern, Broad Buckler, Hearts Tongue, Male and Scaly Male Fern.

This break in the woodland, and the presence of open water, have both contributed to the growth of a number of other trees along the banks of the leats which include Grey Willow, Alder, Hazel and the occasional Beech tree.

Another tree which grows near the northern end of the Fowey Consols leat and is of particular interest is Alder Buckthorn. This native deciduous shrub or small tree is common only in the south of Britain and even here its distribution is very patchy. The rarity of this shrub is due to its special ecological requirements which are a perennially damp acidic soil, well supplied with humus. It is also found growing on heathland and so the combination of the old heathland habitat in Carmears Wood and the leat system make it a suitable environment. Another factor which has contributed to its continued existence is the coppicing of the Oak woodland as the Alder Buckthorn does not like heavy shade and really deep shade may kill this shrub altogether. The charcoal produced from this shrub is of a high quality and was until recently used in the manufacture of gunpowder. More importantly however, in areas away from chalk or limestone, it is the only plant that one of our most attractive butterflies, the Brimstone, will feed on.

The Fowey Consols leat also plays host to Rainbow Trout of four or five inches in length, and a variety of aquatic insects which are the food source of the Dippers that can be seen feeding along the length of the leat. A Heron has been recorded in the vicinity, presumably preying upon the trout, and other birds that thrive on the variety of insects associated with Oak woodlands

include Treecreepers, Nuthatches, Blue Tits, Great Tits, Woodcocks and Woodpeckers, and the more common garden birds such as Robins, Blackbirds, Song Thrushes and Wrens. Small mammals such as Woodmice and Woodvoles also support a heathy population of Tawny Owls, and the Foxes that hunt along the foot-paths and leat systems.

The overall atmosphere of the wood is very pleasant and the deciduous nature of the Oak woodland adds seasonal changes to the environment.

3.7.2) North Hill Wood: mixed broad-leaved woodland

In contrast to the Oak coppice, North Hill Wood is an older largely unmanaged woodland of mixed broad-leaved trees. Its canopy is higher at about 30metres and comprises a mixture of Oak, Ash, Sycamore,and Beech, with localised areas of Silver Birch and the occasional Larch and Cherry. The under-storey is much denser with Holly, Hazel,and Rowan, scattered throughout the wood. There is also a healthy growth of saplings though many of these are of the faster growing Sycamore.

The remains of old field boundaries can still be seen in some parts of the wood, and growing from these are old Holly trees, some of which are as high as 10metres.

The northern and southern tips of North Hill Wood differ from the central section in a number of ways. Single tree species dominate the canopy, Beech in the north and Oak in the south, and the topography is different. In the central section of the wood the south east facing slope is constant and locally poorly drained, while in the north and south granite outcrops and rock clitter break up the constant slope and improve the drainage. The understorey and ground cover are also different in these areas of the woodland. In the Beech wood the understorey is limited to a patch of Holly of about twometres in height, but is otherwise clear between the widely spaced trees. The ground cover is also limited and is totally dominated by Great Wood Rush.

The ground cover in the other areas is much more varied and includes Bluebell, Lesser Celandine, Wood Anemone, Wood Speedwell, and Wood Sorrel. Under the Oak trees Heather and Bilberry can also be seen among the ground cover.

One noteworthy aspect of the understorey is the thick stand of Laurel to the south of Trevanny Clay Dry. The Laurel extends for over one hundred metres along the side of the Tramway and is

about twelve metres thick. Nothing grows beneath the Laurel and it is seriously threatening the health of the woodland.

Encompassed within North Hill Wood are two industrial areas that are of particular interest to the ecologist as they, in their state of disuse, have formed distinctive habitats of their own. They are Rock Mill Quarry at the northern tip of the wood, and Trevanny Clay Dry at the foot of the slope in the central part of the wood.

3.7.3) Trevanny Clay Dry

Trevanny Clay Dry was disused in the 1960s after operating as a clay processing plant for about 40 years. Since then it has gradually fallen into greater decay and has become over-grown with a wide variety of vegetation, making it one of the most interesting wildlife habitats in the whole valley.

The Pan has collapsed in many places and Alders, Silver and Downy Birch, Grey Willows and Elderberry shrubs have taken root in the old flues and now stand at one to twometres in height. Also growing from the collapsed flues are Rosebay Willowherb, Mouse-ear Hawkweed, Spear Thistle, Ribwort Plantain and Hearts tongue Fern, amongst others.

The walls of the settling tanks have been colonised by wild flowers including Violets, Golden Saxifrage, Wild Strawberry, Herb Robert and the infrequently occurring New Zealand Willowherb. The walls are also covered with Ivy, Bramble, and Honeysuckle which form a thick protective screen for nesting birds. There is a significant amount of bird life around the Dry and in addition to the more common birds Black Cap, Willow Warbler and Grey Wagtail have been recorded nesting in the area.

The great attraction for the birds is the vast number of insects that live in and around the settling tanks, some of which still hold water, and all of which are thick with vegetation. The settling tanks contain the greatest concentration of fresh-water life in the whole of the survey area, and are a natural reserve for breeding Frogs, Toads, and Newts, all of which appear on the governments latest list of protected wildlife. Damselfly and Dragonfly both frequent the fresh-water reserves, and the Great Diving Beetle has been recorded in the deepest pool, a species that is becoming increasingly rare.

Around the outside of the dry there are damp areas where Golden Saxifrage, Water Figwort, Germander Speedwell, and Coltsfoot grow in abundance. Also recorded around the clay dry is the Southern Marsh Orchid which has particular ecological requirements, and a

Bat feeding roost, both of which contribute to make this the most valuable wildlife site in the whole Valley.

For this reason it is recommended that any restoration work carried on in and around the dry is kept to a minimum. The dense growth of Laurels to the south of the dry could be cleared without detriment to the wildlife in the dry, and it would improve the health of the woodland. Also some of the larger trees growing from within the dry settling tanks could be felled in order to preserve the variety of trees and stop the dominance of a particular tree or species of tree. There could also be some restoration work to stabilise the structure from a safety aspect, such as the repair of hand rails and the removal of dangerous hanging beams in the filter press house, but intensive work could seriously endanger the reserve that has arisen from the decay of the clay dry.

The flow of water into the settling tanks and out again through the broken pipes should not be interrupted as it is essential to the fresh-water population within the tanks. The Newts use the old pipes as a means of getting into and out of their breeding ground. The stream of water running away from the clay dry and down the tramway could be diverted if this is necessary to preserve the tramway structure.

3.7.4) Rock Mill Quarry

Rock Mill Granite Quarry is at the northern edge of North Hill Wood and has been disused for the last eighty years. Since then it has become over-grown with vegetation and is now another valuable wildlife reserve.

Around the edge and the top of the quarry there are some large specimens of Silver Birch, many of which are quite old and have examples of the 'Witches Broom' effect in their branches. This is typical of Silver Birch and is the result of a gall in the bark causing a cancerous growth of twigs that is not significantly detrimental to the health of the tree.

The thin layer of acidic topsoil on the top of the quarry also has some Rowan trees and the occasional Rhododendron growing from it. The Rhododendrons are isolated but they ought to be removed before they spread and exclude the growth of other, native species. There is also a healthy growth of Heather and bilberry, and a lush carpet of mosses.

In the bottom of the quarry Laurel, Rhododendron, Willow and Silver Birch form dense cover for nesting birds, and the quarry wall itself is an attractive nesting site for certain species.

A pair of Ravens nested in the quarry during the year of the survey; as they were reported to be nesting in the same place twenty years ago it is quite likely that they have been there each year since then, and are the same pair as Ravens live for well over twenty years and return to the same nesting site. A pair of Kestrels also chose the quarry as a nesting site, but they waited until the early nesting Ravens had raised their young before laying their eggs.

Orchard Quarry, which is about a hundred metres south of Rock Mill Quarry, does not have any of the same characteristics as most of the quarry has been filled in with topsoil. It has thus lost most of its qualities as a reserve for wildlife.

Lower down the hillside from the two quarries granite boulders litter the woodland and on these can be found the infrequently occurring Tunbridge Filmy Fern. This small fern resembles a liverwort more than a fern and can be found on damp acidic rocks throughout the survey area.

3.7.5) The River

The River Par rises on Criggan Moor, with eastern tributaries rising on Crift and Bokiddick Downs, and the western tributaries flowing down from the china clay industrial areas around Bugle and Stenalees. Before entering the sea at St Austell Bay, Par, it flows the length of the Luxulyan Valley and it was this section of the river that came under observation during the wildlife survey.

The physical aspect of the river is attractive as it flows through the deciduous woodland, with large boulders creating rapids in the fast flowing water. Unfortunately the value of the river to wild-life is minimal as the water is too polluted for most plants and animals to survive. Ecological surveys carried out by South West Water show that the river water has a low pH value, thus making it acidic, and a high concentration of suspended solids. Both of these combine to make the river an unsuitable site for most wild-life.

Previous records from South West Water's Environmental Section show that the river was most heavily polluted in 1960. Since then it has improved although incidents of pollution, such as the one in July 1983 which included a fish kill, have meant that animal life is all but extinct in the river. The exception is macro-invertebrates such as stoneflies and caddis flies. These are particularly resistant to high levels of acidity and are the food of the Dippers, the only river related species to be found in the Valley.

3.7.6) Mineral Exploitation and the Ecology

The Luxulyan Valley has had a mixed history of mineral exploitation, including tin mining, granite quarrying and china-stone and china-clay processing. All of these have had an effect both on the landscape and the ecology of the valley, and even though there has been no mineral extraction in the valley for the past fifty years it is impossible to divorce past industrial activity from the present day ecology.

The Clay Dry and Granite Quarry already mentioned in detail are examples, and there are other quarries and industrial sites situated in the valley with equally interesting habitats. These include waste dumps remaining from tin mining ventures that have disturbed the top-soil, and the old tramways and leat systems which add their own characteristics to the deciduous woodland. The ecology, although not dependent upon the mineral exploitation, has however been enhanced in some areas by the new habitats created through the disuse of industrial sites.

3.7.7) Management

One or two aspects of management of the woodland have already been mentioned in this part of the report, such as the removal of Rhododendron and Laurel that are threatening the health of the natural flora in certain areas of the valley, and the preservation of valuable wildlife sites such as the quarry at Rock Mill and the Clay Dry in North Hill Wood.

It will also be necessary to manage the woodland around important archaeological sites in order to preserve the structures in question, as no active management has taken place in the Valley since the last coppicing of the Oak trees in Carmears Wood approximately 60 years ago.

For the woodlands as a whole a management strategy will be necessary to preserve the quality of the environment. Some thinning of undesirable species such as the fast growing and invasive Sycamore will be required, and in association with that some tree planting will be necessary.

It would also be nice to see an improvement in the quality of the river water, as this is one of the least attractive aspects of the valley and ought to be its greatest asset. There are many reports from local residents and people who have worked in the valley of Trout and Salmon in the river, and the return of those fish to the Luxulyan Valley would be the single most valuable contribution to the ecology.

3.8) Summary of Results

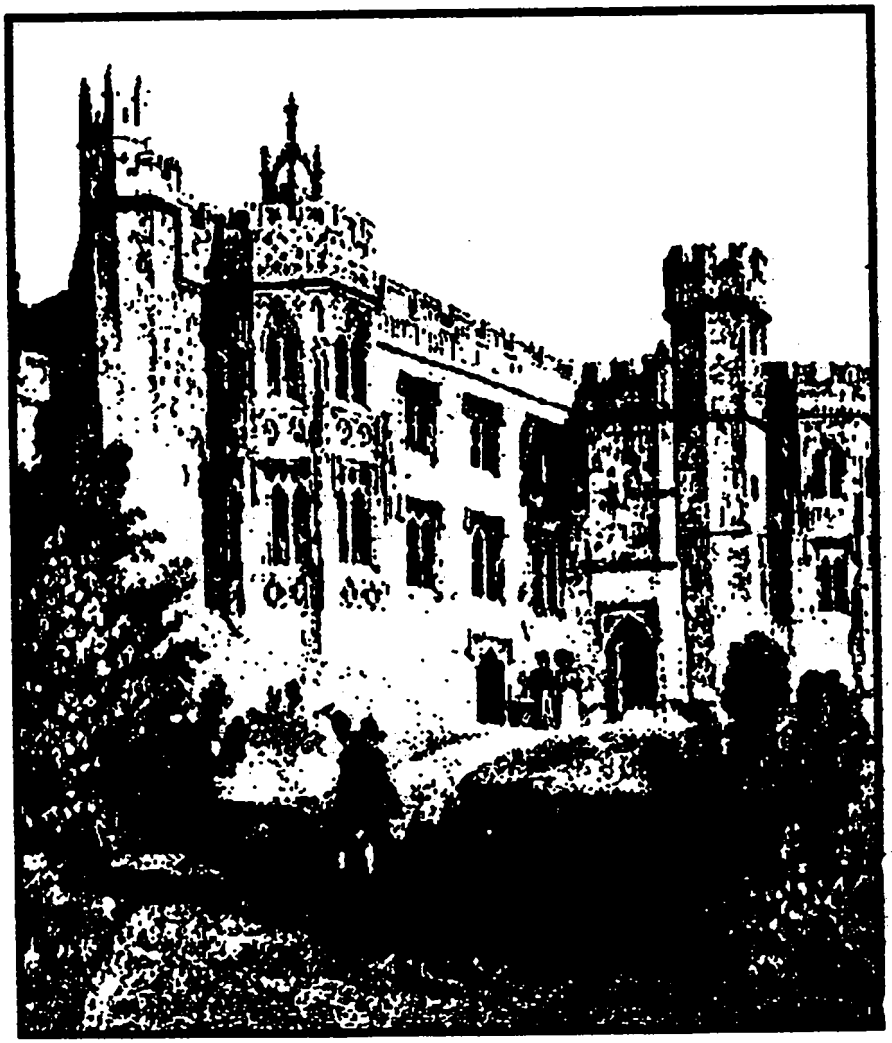
The Luxulyan Valley has always been held in a special regard by students of Cornish industrial history; the results of the Luxulyan Valley Project strengthen and fully justify its claim to a unique status not only within the County, but also within a West Country context. The diversity and breadth of the archaeological remains (in an excellent state of preservation) allows close study to be made of a fascinating episode in the development of Cornwall, at a time when pioneers in all fields were exploiting the natural resources of the area. The documentary sources available have proved equally rich; they complement and enhance the ground evidence in a fashion which brings to life the mute remains, and endow the Valley with an especial potential for education and interpretation.

This great concentration of industrial archaeology is a result not of the Valley's own potential for extractive industry (apart from granite), but of its utility as a power source and communications corridor. This was exploited throughout the 19th and 20th centuries by successive entrepreneurs of local industry, and the complex network which developed continued to be important, long after the great copper mine which had been the original harbinger of this change was gone. The survival of the Tramway system in so complete a form is entirely a result of Treffry's failure in planning and executing his original route; had that in fact been successful, there is no doubt it would readily have been converted to a locomotive railway by the CMR, leaving no trace on the ground. There would also have been no Carmears Incline or Treffry Viaduct to delight and intrigue the present day visitor. Accidents of history are rarely as enigmatic or fortuitous as this.

There are few sites in Cornwall where the historic landscape is of greater intrinsic quality than that of the Luxulyan Valley. Several areas have more spectacular and complete mining remains (West Penwith, Camborne and Redruth, and Caradon); there are better examples of china-stone mills (at Tregargus, St Stephen); more complete examples of granite quarries (at Penryn and on Bodmin Moor); and the use of water-power is perhaps equally well demonstrated elsewhere (Kennall Vale Gunpowder Mills). There are, however, no other sites in Cornwall or the West Country which synthesise all the elements of 19th century industry within so compact an area. Very few indeed can claim the scenic splendour which made the Valley famous even in its commercial heyday.

The Valley encompasses this complex range of industrial endeavour, and in addition connects the individual sites with a Tramway system which is itself particularly accessible and complete. The Velvet Path, leat systems, and china-clay kilns are added hues in an already rich palette. For those with a yearning for the romantic and the spectacular, there is the indisputably unique Viaduct, set in the grandeur of some of the very finest woodland scenery in the County. As a resource for Cornwall and the Nation, the Valley is of the very highest significance; it is to be hoped that the Luxulyan Valley Project has laid the foundations for a wider appreciation of its merits.

Section 4



Administration

4) THE PROJECT : ADMINISTRATION AND ACHIEVEMENTS

The administration of any large archaeological survey or excavation is a complex and difficult affair. When that administration must cover a time-scale of sixteen months, and involve the training of more than twenty largely inexperienced staff, the complexity assumes greater than normal proportions. The Archaeological Unit was fortunate in having the full support of the CRS Community Programme Agency at St Blazey, who unobtrusively ensured that the day-to-day running of the scheme was without problems. The CRS Supervisor at Ponts Mill was a man of immense tact and understanding; he was also of a thoroughly practical disposition which well counterbalanced the Director's occasional headstrong flights into the realms of fantasy.

The Project was planned well in advance of its starting date. However, the Archaeological Unit had no previous direct experience of a CP scheme of this type, and with the benefit of hindsight it is possible to see certain improvements which could have been made to the overall structure. These in general are of little consequence when weighed against the undoubted success of the Scheme. This section of the Report discusses the management and administration of the Project, in the hope that the conclusions drawn may be pertinent to consideration of the Scheme as a whole.

4.1) Staffing and Recruitment

The CRS Community Programme Agency at St Blazey organised the funding, recruitment, and administration of the Scheme. The Archaeological Unit was to direct the Project, and in this role was naturally anxious to be involved in recruitment. The posts were advertised in local Jobcentres and the Press, and the first batch of applicants were invited to the Unit's Offices at Truro to see for themselves the nature of the work which was to be undertaken. It is felt that this approach, prior to the more formal interviews, was beneficial in allowing the applicants a chance to assess their own suitability for the Project. When the interviews took place, the Director and CRS Supervisor were both agreed that an extremely selective approach was appropriate. Previous experience or skill was not an essential requirement; the main priority was for a genuine interest in and enthusiasm for the job. It was in any case most improbable that the scheme would be able to recruit many staff with prior experience or indeed much knowledge of so specialised a subject as archaeological field survey and site recording.

In the event, only one member of the Team had qualifications and experience relevant to the archaeological task; the rest were picked for their aptitude and willingness to fully participate in the Scheme, insofar as this could be ascertained from the interview. Recruitment took place over several months, and it proved difficult to find applicants of the right quality. The Project was as a result not fully staffed until August 1987. Filling the office and research posts was comparatively easy; the Survey Teams were apparently an unattractive prospect to the majority of those in search of work. It may be that the use of the term "Surveyor" was in itself off-putting. The job description was later changed to "Field Worker" and more applications were the result. The lengthy process of recruitment was not altogether a disadvantage; training of staff could be spread more evenly over the period, which assisted the Director greatly, and it was possible to more easily assess the suitability of new applicants for an already established working group.

The group identity and social cohesion of the Project staff proved to be perhaps the most vital factor in the success of the Scheme, and these aspects were consciously fostered and encouraged by the Director. For the Team to complete such a demanding task, it was obviously necessary that they should have a powerful incentive; one of the most effective spurs to progress is undoubtedly the unspoken but ever-present consensus of a peer group. To this end, working relationships within the Team were carefully considered and arranged. The Team-Leaders in the field were older than the members of their teams; it was hoped thereby that they would be able to exercise a quiet authority by the virtue of age, if not experience. As the Survey Teams would inevitably have to work unsupervised for much of their time, it was essential that they should perform well as isolated units. The office staff would also have to be able to integrate well into a pleasant but less than ideal indoor environment, with no individual privacy and often cramped working conditions. With no possibility of respite from any personal friction, it was an obvious requirement that the members of the Team should be highly compatible.

The majority of those employed were under 25 years old, and although many were well-qualified, they had little if any previous work experience in conventional terms. The members of the Team in the 25 to 45 age group were those who were most likely to have had some previous experience of similar work, and several of them had already participated in CP schemes. The older members of the group were in general retired early from a professional career, and were looking for a different and fulfilling challenge. The manner in which this group of diverse and varied individuals rapidly coalesced into an efficient

working unit was one of the great achievements of the Project. A measure of success for the methods of personnel selection may be that from August 1987 to the end of the Scheme the Project was fully staffed, and that of the 21 originally recruited 17 worked through to the end of the 16 month duration. It is also gratifying that the majority of the participants were local to the Project area, and were thus in a position to fully benefit from a study of their own landscape and its heritage.

4.2) Funding and Equipment

A detailed costing for the equipment and materials required by the Scheme was prepared by the Archaeological Unit in the Autumn of 1986, and was then passed to the CRS Agency for approval by MSC. The total running budget for the Scheme was £5308, which had to include accommodation, equipment, and all on-costs for the duration. Salaries for the participants were separately accounted for via MSC and the CRS Agency. The Director's salary was funded by grants from MSC, English China Clays International, and English Heritage.

The largest single item of expenditure was the Portakabin for the Project Workbase, at £2000. This, although a difficult item to transport and locate on site, was a vital component for the Scheme. It allowed the office staff to maintain close contact with the fieldworkers in a way that office accommodation off-site would not, and gave the Team a genuine base which was theirs and theirs alone. In this respect, the comfortable and well-lit interior of the Portakabin was certainly a large factor, as was the determination of the Director and Supervisor to provide the Team with good quality equipment and furnishings, within the constraints of the limited budget. Particularly expensive but essential items were a draughting table and plan frame; other furniture was purchased new but inexpensively in kit form from a local warehouse. This, although unsuited to long-term usage, was adequate for the 16 months of the Project.

The surveying equipment was the most difficult to source and fund; in the event many items were borrowed from the Archaeological Unit or elsewhere. The most simple pieces of surveying equipment are very costly, and as the method of plane-table surveying used by the Unit is now outmoded except for detailed archaeological work, purchasing or borrowing the equipment required was a matter of some concern to the Director. Eventually enough equipment was sourced to adequately supply all the Field Survey Teams. Another major item within the budget was a micro-computer and printer for the office. The Project was fortunate in acquiring some equipment from other completed CRS CP Schemes; this included a drawing table, typewriter, and 35mm

camera with lenses. One item which had not been budgeted for but which rapidly proved essential was a photo-copier; one was purchased second-hand, and while better than nothing, was continually in need of repair. As a result the Project was greatly restricted in the quality of its output for promotional material.

4.3) Training and Management

At the beginning of the Project the Director was faced with the prospect of training a willing but inexperienced staff in all the complex and demanding skills required for a survey of this type. It quickly became apparent that the training and supervision of the staff would be a full-time task, at least in the early months, effectively ruling out anything but this role for the Director himself. Once this fact had been accepted, and it was realised by the Team that they would swiftly have to be self-reliant in the field, good progress was made.

It is demanding for any person to have to assume the mantle of employer, teacher, and counsellor for 21 men and women who are largely unsure what is expected of them. This is the more so when that person must also have a working knowledge of surveying, archaeology, draughting, graphic art, documentary research, interview techniques, archive maintenance, photography, and computer science, at least to a level sufficient to direct operations. The Director is still unsure as to whether he measured up in any way to this definition for a paragon of virtue. Nonetheless, the members of the Team were very diplomatic, and if they noticed their Director stumble, they did not point it out.

A key element in the training of the Team was that they were not expected to cope alone; if they needed assistance, then it would be made available. To this end the Director endeavoured to divide his time fairly between the staff: mornings were generally spent in the Workbase, and afternoons were occupied with visits to the Surveyors in the field. Good communication between all members of a Project such as this is vital if difficulties are to be identified early and problems resolved before they threaten the running of the Scheme. The Team were kept well informed of the objectives and aims of the Project through a weekly work schedule, a map showing progress made, and meetings for all the staff at intervals to discuss the current situation. Members of the office staff were invited to accompany the Director on site visits, in order that they could be kept informed of conditions on the ground, and the Surveyors were encouraged to discuss their work with the staff in the Portakabin when they returned at the end of the day.

As the Scheme progressed so the Team required less direct supervision in their tasks, and it was possible to adjust the Director's role accordingly, allowing more time for school visits and other extra-mural activities. One aspect of CP which is potentially of great value to the participants is the availability of training courses provided by the managing Agency. Many members of the Team were able to take advantage of this, and gained experience in a wide range of skills including those as diverse as bricklaying and word-processing. This of course to some degree reduced further the limited time available for the Survey, as many of the courses were within normal working hours.

A priority for efficient survey and interpretation of the landscape is an understanding of the forces which have shaped it, be they man-made or otherwise. In order to raise the collective consciousness of the Team in this regard, impromptu talks were held on wet days with slides culled from CAU and the Director's personal collection. While the Luxulyan Valley undoubtedly contains a wide range of site-types, comparison with other areas is always beneficial for a true appreciation of the overall context of the archaeology. To foster this appreciation, a series of Field Trips to other localities was organised, and these proved both stimulating and popular. The visits included: Kit Hill; the Caradon-Minions area; Wheal Martyn China-Clay Museum; Kennall Vale Gunpowder Works; Wheal Coates and Trevellas Combe (St Agnes); East Pool Cornish Engines; Camborne School of Mines Museum; Cothele Mill and Quay Museum; Geevor Mine; and Cape Cornwall. All of these sites offered an interesting comparison with the Survey area, and allowed the members of the Team to better evaluate their work in a County-wide context. The Director also welcomed these opportunities to talk at great length on his favourite topics; the Team dutifully bore with this necessity on all occasions.

The dialogue with the Team was by no means one-way. While the academic aspects of the work were of necessity largely propounded by the Director, there was throughout the Scheme a lively discussion of the latest developments in computing, the graphic arts, education, and conservation, which considerably enhanced the overall quality of the working environment. The contribution of the Ecologist to a greater awareness of the wildlife in the Valley was also notable. By the end of the Project there was a general consensus that all members of the Team, including the Director and Supervisor, had considerably enriched their experience and knowledge as a result. Every individual on the Team brought with them to the Project the benefits of their personal enthusiasm, experience, and wisdom; and each one in some way had their own contribution to make.

4.4) Public Relations and The Local Community

From the outset, the Director was strongly of the opinion that the progress and aims of the Project should be clearly visible to the local community. Promoting the appreciation of the County's unique and often undervalued heritage is of prime importance, and there could be few better vehicles for that promotion than a scheme such as this. In maximising every opportunity to spread a deeper understanding of the distinctive history of the Luxulyan Valley, it was hoped to enlist the aid and support of local landowners and residents, thereby ensuring a successful conclusion to the survey.

4.4.1) Newsletter

A photocopied newsletter was produced at intervals as part of the Project, edited by the Computer Operator and with contributions from various members of the Team. Illustrations and line art were produced by the Graphic Artist and pasted up with the text output from the computer word processing software. The object of the newsletter was to maintain a higher profile for the Project within the local community, and to inform people of the aims and subsequent progress of the Survey teams.

Regular reports were included on the archaeological survey, together with updates on the Ecologist's findings. Issue number three was devoted to a double page feature on the ecology of the Valley; issues five and six had as their theme the specific subjects of granite quarrying and mining respectively. The quarrying issue contained extracts from documentary sources to highlight the decline of the industry during the early 1900s, and illustrations taken from photographs in the John Pollard collection.

Seven issues were produced in all, and were distributed through local outlets including shops, post offices and libraries; the newsletter was also direct-mailed to an ever expanding list of local contacts and councilors. The general level of interest and demand was high with over 200 copies of each issue distributed.

4.4.2) Exhibitions

Another means of creating a higher profile for the work of the Team was to stage Public Exhibitions. It was hoped that this would be both educational and a good exercise in public relations. Two venues were selected, Luxulyan Methodist Church Hall from 24th to 28th November, and St Blazey Methodist Church Hall from 1st to 5th December 1987.

The exhibitions were advertised well in advance by means of posters displayed in local shops, advertisements in the local press and the Project Newsletter itself. A great deal of work was involved for the Team in planning the presentation and preparing the exhibits themselves, and indeed at times the Director despaired of the deadlines being met; heroic efforts on the part of all concerned resulted in a splendid display on every occasion. Visitors to the first two sites numbered more than 200 and a great deal of interest and public goodwill was generated. It was particularly noticeable that all the publicity material available in the form of newsletters and factsheets was quickly swallowed up no matter how many were printed.

The Exhibition then went on to be displayed at John Keay House (the headquarters of ECCI) for six weeks, to Fowey Hall for a teacher's conference and seminar on outdoor educational resource, and to the Porthpean Outdoor Education Centre. It has also been booked for a tour of local libraries in the Autumn of 1988.

This display material also formed the core of a special Project Open Day at Ponts Mill on June 23rd 1988, when it was possible to show a great deal more of the work of the Team in one intensive session. Once again, there was a gratifying response both from the members of the Team to the challenge of setting up the display, and from the number of visitors (at least 150 in total during the six hour opening).

4.4.3) Landowners

The Project's relationship with local landowners was obviously critical to the success of the Survey. Although by far the greater part of the area to be surveyed was in the ownership of ECCI or the Forestry Commission, both of whom were immensely supportive and sympathetic toward the objectives of the Team, nonetheless many sites and areas vital to the full understanding and subsequent interpretation of the Survey results were in private hands. The Oral Historian was entrusted with the unenviable task of making contact with the local landowners and occupiers with a view to obtaining permission to survey; it is a tribute to his diplomacy, and also to the beneficial effects of the Project Newsletter, that only two landowners refused the Team permission to enter onto their property during the 16 months of Phase I. Some landowners were initially suspicious of the motives of the Team, but in most cases an invitation to the Workbase for an explanation of the aims of the Survey, coupled with reassurances that there was no intention to encourage public access onto private land without the owner's consent, was effective in allaying fears and securing the necessary cooperation.

4.4.4) Field Trips, Lectures, and Broadcasts

A major part of the Director's time was occupied in promoting both the Project and the archaeology of the Valley itself to the public. Field trips and lectures for various societies are a normal part of the work of Officers of the Archaeological Unit; when a particularly intensive project such as this is underway, they can occupy a substantial amount of time outside normal working hours. From the outset, close links were established between the Project and the Porthpean Outdoor Education Centre; both the Project Director and Andy Barclay, the Outdoor Education Officer at Porthpean, were keen to promote the Valley as an educational resource. As a result, several parties of teachers were given guided walks through the Valley, and many schools returned with groups of children for a similar tour.

The interpretation material produced by the Project's graphic artist was of particular value to all the visiting groups, but especially to the schools, who expressed a general consensus of opinion that this type of material was precisely what they required to make effective use of heritage areas for education.

Other visitors to the project included groups of local councilors, the Old Cornwall Society, the Trevithick Society, and the Cornwall Archaeological Society. A party of German children on an exchange visit were perhaps one of the biggest challenges to the Director and his staff, but the visit seemed to be well appreciated. Visits were also arranged for other Community Programme Schemes, including the Minions Project staff on several occasions and the Truro Research Project.

Lectures were given by the Director to several societies at various venues, including the Trevithick Society at Camborne School of Mines. The Project was also promoted in a slightly different fashion through broadcasts by the Director on Radio Cornwall on the history and archaeology of the area.

4.4.5) The Luxulyan Valley as Educational Resource

The great majority of the sites and landscapes examined by the Archaeological Unit over the past ten years have potential as an educational resource. In some instances this is compromised by problems of access or safety, and in many cases there is little interpretation material available. Amongst these sites the Luxulyan Valley is in many respects exceptional, and undoubtedly has tremendous scope for use by schools and colleges as an area in which it is possible to demonstrate landscape interpretation in the geographical, historical, and ecological sense. During the course of the Project the Valley was actively promoted to local schools in an attempt to assess the problems involved at

first hand for educationalists. As a result of this experience the main strengths of the Valley for education became apparent:

* As an area of varied woodland habitat.

* As a good area for outdoor adventure training.

* As a perfect outdoor classroom in which to study local industries and communications and their development through the 19th century.

* As a vehicle for demonstrating applied technology in action.

Discussions with teachers revealed that there was a pressing need in two areas. Firstly, the production and ready availability for schools of the basic resource material required by teachers. Teachers do not want their lessons to be ready-prepared; the requirement is for solid background information which the teacher can use to prepare his or her lessons and visits, preferably accompanied by attractive illustrative maps and interpretation material which can be directly utilised in the classroom and in the field. Secondly, there is need for well publicised and managed field trips for teachers and educationalists guided by an expert on the subject. The teachers should then be in a good position to make the best use of the historic landscape resources available to them.

All the schools which visited the Valley during the course of the Project seemed well satisfied with the value of the exercise. It is to be hoped that the foundations laid by the scheme will continue to beneficially influence the education of other children in the area.

4.5) Social Implications for Community Conservation

As a direct result of the activity detailed above in terms of the Newsletter, Exhibition, Field Trips and Lectures, several hundred people will have been brought into immediate contact with the work of the Project. Although an even higher profile could have been maintained, to do so would probably have required extra staff and would have absorbed valuable time and resources needed for the Survey itself. That the demand was there is beyond doubt; on numerous occasions the Team was asked for booklets and interpretation material on the Valley which did not exist, and which had not been planned for within the framework of Phase I. Many educationalists and teachers took all the material which was on offer, and then requested more. There is an enormous and largely untapped potential for the production of accurate and attractive material illustrating Cornwall's history and present-

day heritage, and the Director at many times felt completely inadequate when faced with this upsurge of interest in the Project Area. This is a dilemma to which any future project of this nature should give serious consideration. The solution may well lie in planning for the production of some interpretation material within the survey time-span itself, even if this involves the preparation of what is in essence an introduction to the site, to be followed by a fuller account at a later date.

Within the immediate locality, there was general goodwill and a good deal of active co-operation from local people. It became clear that a great number enjoyed walking in the Valley and were interested in its history; they were pleased that an official body such as the Archaeological Unit was also prepared to take their heritage seriously, and expend time and effort studying it. In this instance, local goodwill may well have been fostered by the use of the Valley for many years almost as a public park, with few problems of individual land ownership and access.

It is in the nature of Community Programme (CP) schemes that the participants on the Project came from varied backgrounds and had a wide variety of previous experience and skill. This in itself did not disadvantage the Scheme, but prompted a rather different approach than might have been taken under more normal circumstances for a survey of this type. One of the difficulties with CP as it was structured in 1987 was that participants were expected and encouraged to actively seek "proper" jobs during the course of the Scheme; for a project such as the Luxulyan Valley Survey, this pressure was unwelcome, but recognised by the Director as an essential component of CP. It could have resulted in the loss of valued staff and extra time-consuming training of new recruits. In the event, the loyalty of the staff was such that very few left until the end of the scheme. This raises the issue of the benefit of the scheme to the participants.

The aim of CP is broadly twofold: to give the long-term unemployed an opportunity to obtain work experience in a new environment, and in the process to perform some task which is of benefit to the community. The result should be that some work of lasting value to the area is carried out by participants who will benefit in the acquisition of new skills (or the improvement of existing ones) and who in consequence will obtain new and secure jobs. The CP scheme itself is merely a vehicle to achieve the rehabilitation of those unfortunate enough to be without work back into the fold of full-time employment.

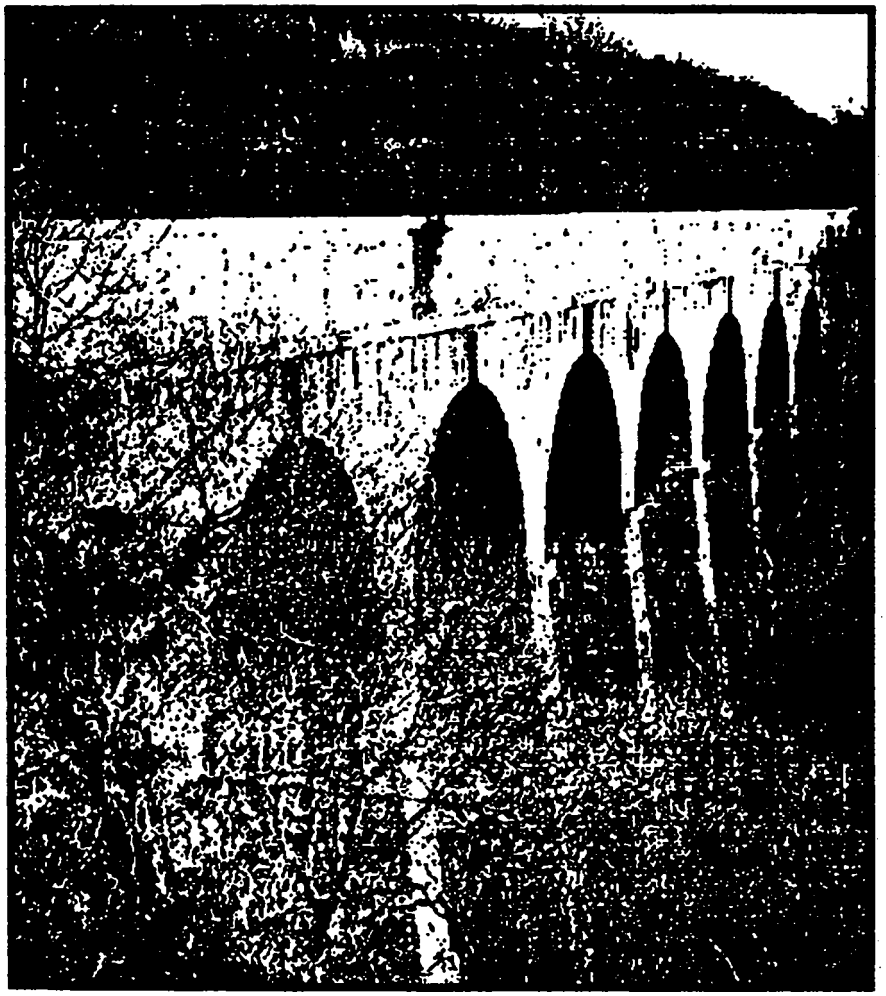
The Luxulyan Valley Project, although of great long-term benefit to the local community if it results in the protection and maintenance of an outstanding resource, did not conform to the other accepted criteria for a CP scheme. There was never any

suggestion that training field-workers in the art of archaeological landscape survey or site recording would result in their being able to obtain paid employment thereafter; indeed, jobs of this nature are scarce enough for graduate archaeologists. Historical researchers, likewise, are not greatly in demand. While the office staff did stand to gain useful experience for "real-world" application, in many respects these skills were also somewhat esoteric and rather specialised. It is significant that the Team, aware of these facts from the beginning of the Project, did not as a result distance themselves from the Director or his strange demands. Instead the attitude soon emerged that the Project itself was the aim, and the participants embraced the archaeological objectives of the Scheme as in themselves significant. Support for the Project could hardly have been more wholehearted to the very last day, despite the fact that most participants knew full well that they had no chance whatever of obtaining full-time employment doing similar work thereafter.

As the majority of the workforce stayed with the Scheme there must have been some positive benefit for the staff, more so than the minimal financial reward. It would seem that many of them found some needs fulfilled by their participation in the Project; the experience of working as part of a team, but with a clear sense of individual responsibility for the completion of a difficult and rewarding task was undoubtedly a challenge which had been lacking in their lives. The focus of the Project need not have been an archaeological survey; it could have been almost any task which could clearly be seen to worthwhile and demanding, and a similar commitment would have been evident. The benefit to the members of the Team was not the prospect of a job to follow, but the pleasure of working with a group of stimulating and socially compatible people in the performance of an interesting and worthwhile task. As a result, many of them left with a greater sense of personal worth and achievement, and with their self-confidence increased.

It is indeed a tragic indictment of our society that it should be so easily possible to find in one locality twenty well-qualified and able people whose talents and abilities were otherwise going to waste. It is also sad that one has little confidence in predicting a fulfilling future for those talents in the present economic climate. The Luxulyan Valley Project helped a few people, for a short time: but for those who took part, the benefits cannot be measured in simple terms of training or job opportunity. They amount to nothing less than an enhancement of self-respect and human dignity.

Section 5



Management

5) LANDSCAPE MANAGEMENT

Phase I of the Luxulyan Valley Project had as its prime aim the recording of the landscape by means of archaeological survey techniques; this was successfully accomplished, and in itself has no further implications. However, there had always been an implied commitment to active management of the area in the long-term. The was apparent in the very first discussions between CAU, the CRS Agency, and ECCI (as the major landowners). The Valley is in some respects typical of many landscapes in the County which have had a 19th century industrial usage, no longer relevant to the present-day needs of commerce; in this particular instance, the quality of the archaeology and the natural beauty of the site made it unlikely that the Valley could be re-used for industrial purposes without a major public outcry. Long-standing planning consent existed for the "winning and working" of minerals in the Valley by ECCI. In practical terms, this could have meant the use of the area for china-clay processing on a greater scale than at present, or as a waste disposal area.

It was evident that ECCI were anxious to allay public fears about the future of the area, and in fact wished to actively promote the use of the Valley for conservation and education; their co-operative attitude toward the Project and sponsorship of the Scheme were in themselves a measure of this desire. ECCI made it plain, however, that they themselves were not in the business of conservation management, and would prefer to see this role taken on by a new Custodian for the area. Whether this Custodian should be a body such as the National Trust, the County Council, or some other group is at the time of writing not resolved. In order to ease the way forward for fruitful discussion regarding the eventual Custodian for the site, ECCI in 1987 formally relinquished their current planning permission for the greater part of the Valley.

As part of its Phase I Survey, the Luxulyan Valley Project has studied and evaluated the needs of the area in terms of future public access, conservation management, and site interpretation, on the assumption that a Custodian for the Valley will be found who is prepared to implement these proposals. These findings are detailed in this section (5) of the Report. Phase II of the Project is due to commence in September 1988, and as an interim measure will begin active management principally of the paths and trackways necessary for public access. The Archaeological Unit will continue to be involved with Phase II as consultants for matters relating to the historic sites and features within the area.

5.1) Future Protection

Statutory protection is at present afforded to only one monument in the Valley, the Treffry Viaduct (Scheduled Ancient Monument 1048). There are very few structures in the area which would be suitable for protection as listed buildings; most of the archaeological sites and features consist of earthworks such as tramways and leats, with structures incorporated on their route at intervals. Many of these structures are now completely ruinous, and conservation work will involve only the consolidation of those remains. In general, the aim for future protection should be to maintain and conserve the essential character of the Valley and to ensure the continuing survival of the sites and features in their present form, insofar as is practicable.

To this end, it is suggested that the most appropriate method of protection would be for the designation as a Scheduled Ancient Monument of the entire Valley area, this to be defined approximately by the extent of the 1:1000 Survey. Such a measure would require consultation and agreement between the eventual site Custodian and English Heritage; it would also have to be integrated into English Heritage's forthcoming Monument Protection Programme.

An Area Scheduling of this type is probably the only satisfactory means of affording protection to the complex historic legacy within the Valley. As many of the monuments are linear in nature (tramways and leats), and the density of archaeological features throughout the Valley is so high, it would be extremely difficult to prepare a plan for scheduling on an individual site basis. In this instance, there is every justification for considering the Valley in its entirety to be the monument.

5.2) General Conservation Management

5.2.1) Aims and objectives for conservation and public access.

At present the long-term future of the Luxulyan Valley remains uncertain; while the major landowner, ECCI, has pledged its commitment to the preservation of the landscape by relinquishing its planning permission for industrial development in the area, the question of a future guardian for the Valley is unresolved. While this remains the case, the nature and degree of public access to the Valley for the future is a matter for speculation rather than design. As it is not yet known whether other landowners inside the Project Area will co-operate in this venture, another element of uncertainty is introduced to the planning of future management.

Given the present circumstances, the objectives for management must be decided on the basis of enhancement and maintenance of the existing sites and monuments within the Valley, regardless of the question of eventual public access. Those sites and monuments which have historic and archaeological merit, as defined by Phase I, will be the subject of management by Phase II and the future Custodian. When the issue of guardianship and public access is eventually decided, the monuments and routes between them in the Valley can be readily integrated into an overall access and interpretation scheme.

Public access should not in any case be regarded as a prerequisite for management priority; there is every reason to maintain and enhance significant monuments and sites where there is no possibility of unlimited public access to them. The situation at present is that the public do in fact use many of the footpaths and trackways through the Valley on a regular basis despite there being no legal right of way; there is therefore a valid reason to make such improvements as may be necessary to facilitate the present de facto right of access.

It is most improbable that any Custodian will be able to achieve all the management objectives within a relatively short duration; it will be necessary to monitor progress and discuss further implementation and maintenance of the conservation programme throughout succeeding years. Conservation is inevitably a long-term and ongoing commitment for the future Custodian of the area, and should be seen as a co-operative venture with the statutory authorities concerned.

5.2.2) Footpaths and Trackways

There are relatively few footpaths as such within the Valley; the pathways which are used at present mainly represent access ways of historic significance within the overall archaeological context. These include tramways, leat banks, an estate carriage road, and some early sunken lanes or hollow-ways. In this respect the planning of future access is simplified as for the foreseeable future it will not be necessary to create any new footpaths, and maintenance of the existing tracks will suffice for the present level of usage.

The historic nature of the existing footpaths does however create certain difficulties when considering the method used for remedial works by Phase II. As many of the routes are themselves historic monuments, any work on them will have to be carefully planned and executed within an archaeological framework, and the use of inappropriate materials or methods of work must not be allowed. The standard of work which might well suffice for a public footpath across farmland will not be suitable for many of the tracks in the Valley.

5.2.3) Structures

Many of the tracks and tramways themselves fall into the category of "structure" where they are highly embanked or incorporate bridges into their route. Other, more obvious structures are the various abandoned buildings associated with sites such as mines, quarries and mills, in varying states of repair and stability. Hedges and walls of differing types can also be considered within this category.

The main purpose of conservation as far as these structures are concerned must be to clear away intrusive and destructive vegetation from them, and to then stabilise the structure as far as possible in a sound but essentially unrestored condition. To this end, expert advice and training must be made available to the Custodian's workforce.

5.2.4) Sites

Sites, as understood in the archaeological context, may contain tracks, structures, earthworks and other features in any combination. Where a site such as a mill or mine exists as a discrete entity, it will be necessary to evolve a management strategy for its clearance and presentation within the historic context of the Valley. Certain sites may need no work other than official benign neglect; others may need a degree of management to ensure the safety of the public; and some sites will merit an intensive management and interpretation schedule.

5.2.5) Methods of Work

The initial clearance of any site or structure must be undertaken with the greatest care, in order that consequential damage is minimised and so that any archaeological features may be recorded and preserved as they are revealed. Spoil and debris must be neatly stored on site, as it may contain valuable archaeological evidence and in many cases will be required in later reconstruction. It will be necessary to fell trees where their root systems present a hazard to structures and earthworks, and some members of the management team should be trained in the use of chainsaws and safe felling techniques.

Drainage should where possible be directed along any original course revealed as clearance progresses. In cases where considerable flooding is evident and the original drainage system cannot be used, indiscriminate diversion should be avoided. Any new drains should be constructed in keeping with local traditions and must not cause flooding in ecologically sensitive areas.

Site clearance will require great care to avoid damaging structures within the area. All necessary tree felling and removal should be completed before any other work commences. Storage areas need consideration from several possibly conflicting aspects: convenience for building clearance and stabilisation, ease of access for transport, and the prevention of damage to archaeological features. Potential storage areas must therefore be examined carefully to ensure that no important surface features will be obscured as a result.

The clearance of structures within a site should be tackled in an ordered fashion. To preserve the integrity of the buildings, material from tumbled sections should be identified and stored separately for later use, in particular worked stones, lintels, steps and other specific structural items. In some cases stabilisation will be essential before clearance commences and may become necessary as work proceeds. Wherever possible, original material should be used, any replacement items being in keeping with the original work. Floors, hearths, other architectural features and in some cases machinery may be obscured by debris and care should be taken to avoid their unintentional destruction.

The reconstruction and stabilisation of structures should in all cases use traditional materials and techniques in order to preserve an authentic appearance. To this end, instruction should be given in masonry, walling, and the use of lime mortar for pointing. Where the structure merits a degree of restoration over and above the work required for stabilisation, the Field Officer of the Archaeology Unit should be consulted at all stages to ensure that authenticity is preserved within the current state of knowledge.

When new access ways have to be created, or access needs to be restricted or controlled for safety or preservation reasons, a sympathetic and appropriate use of stone, timber or vegetation should enhance rather than diminish the interest of the site and the natural beauty of the Valley.

5.2.6) Public Relations

The execution of the work within Phase II and later stages of management is bound to attract a great deal of public interest. In order to minimise any possibility of adverse comment, and to keep the local community informed and involved as work proceeds, two measures are suggested:

* A notice board, explaining the nature of the work and objectives for the Project, should be erected at each site where work is proceeding.

* The Newsletter "Valley" should continue in production for the duration of Phase II and be distributed to local shops, schools and libraries as was the case under Phase I.

5.2.7) Future Maintenance

All of the work (and by implication under MSC, public money) expended during Phase II will be completely wasted in the long-term if there is not an ongoing commitment to future maintenance of the sites and structures within the Project area. This applies most particularly to vegetation clearance; if this is not maintained on a regular basis, the efforts of the management team in 1988-89 will be negated within five years. It is therefore essential that discussions take place with the Custodian for the Valley as soon as that issue is decided, to ensure that an effective conservation and maintenance programme can be implemented. A Warden for the site will also be a prime requirement.

5.3) Detailed Management Strategy

250 hectares were surveyed in the Valley at a scale of 1:1000. Of this area, 16 hectares are proposed for active site management; in addition, 9 kilometres of tracks and 7 kilometres of tramways will require clearance and management, adding a further 4 hectares to give a total of 20. The remaining area of woodland where it is not within the ownership of the Forestry Commission will also be the subject of a non-intensive management programme, which should be undertaken as a co-operative venture with the Cornwall Trust for Nature Conservation (who hold the results of the ecological survey undertaken by the Project Team).

The following detailed proposals should be studied using the accompanying 1:2500 reduced plans of the 1:1000 Survey Area (page 172). Only those sites and monuments which fall within the ownership of ECCI are considered within this section of the management strategy; sites in private hands would have to be the subject of separate negotiation with regard to access and management agreements for the future. As such, they are discussed separately in section 5.4.

5.3.1) The Carmears Incline (Plans 2,5,6)

The Incline (T6,T7,T8) runs from the overbridge at Ponts Mill (T4, Plan 2) to the Incline Head Depot (T10, Plan 6). The surface of the Tramway on the Incline is in general well-preserved, with some damage due to erosion by water and un-authorised vehicular access; many self-seeded trees threaten the integrity of the embanked sections and the lower bridge. This is a particular problem on the Incline as the high embankment (T8) has a revetted stone facing which is now lined by trees. Attractive though these may be, the rooting of the trees within the stonework is causing damage to the structure, and will result in long-term problems if left unchecked. The lower bridge (T4) is also at risk from the same cause.

It will be necessary to create a vehicular access at the bottom end of the Incline to allow maintenance work to proceed; a gate will be required to prevent unauthorised usage, but this should make provision for horse-riders to continue their use of the Tramway system.

From this point (T4) to the checker's cabin at the head of the incline (a distance of some 750 metres) approximately 100 trees endangering the future integrity of the monument will need felling and clearing. Sapling growth should be removed from the complete surface and debris cleared. If total clearance of all vegetation to the original surface is considered desirable a minimum of 2.5 metres width will be necessary to reveal the

granite setts. Setts should be restored to their original positions where they have been displaced, and it should be realised that on the Incline there are also central setts which supported the rollers for the wire rope. As a common policy for all the Tramway system in the Valley, if there is a requirement to make good the surface (and this in itself would be desirable to limit further erosion) then a granite ballast should be used to bring the surface to a level approximately 3cm below the tops of the setts.

The lack of drainage has caused problems, particularly in the cutting (T7, Plan 5). Water flow in this area should be re-directed to the sides of the Tramway; a possible solution to the problem might lie in the repair and re-use of the old pipe-line laid beside the Incline throughout its length. The spill-way from the Carmears Leat has also severely eroded the Tramway where it passes underneath the Incline (R1, Plan 5), and this area will require remedial attention, as will the embankment north of the cutting (T8, Plan 6). At one point some 5 cubic metres of stonework will have to be replaced and scaffolding will be required. Tree felling and root removal along the edge of the embankment will necessitate further repair and stabilisation of the structure. Walls or Cornish hedges associated with the Incline should be repaired as necessary while work proceeds in the area.

Work on both the bridges (T4, Plan 2, V10, Plan 5) was commenced in Phase I. The walls and decks have been cleared of vegetation in both cases except for the mature trees on the lower bridge. Considerable care will be needed when removing these in order to avoid damage to the structure and expert advice should be sought. On the lower bridge (T4) coping stones need to be replaced on the parapet wall, and the majority of these have been recovered. When this work is complete, the bridge should be carefully re-pointed where necessary.

The Velvet Path bridge (V10) requires more extensive structural attention. In this particular instance it is felt that there is good justification for works which are in the nature of a re-construction rather than stabilisation, as there is photographic evidence for the original appearance of the bridge and the original materials are to hand. The parapet wall requires rebuilding to its original height before replacing the coping stones, the majority of which have been recovered from the tumble below. Although there appears to be no immediate danger to the structure, some erosion has occurred around the foundations and underpinning should be considered as part of the programme. Re-pointing will also be required, and the banks should be encouraged to re-vegetate where the removal of debris has left a scar.

5.3.2) Incline Head Depot and Wheelpit Mill (Plan 6)

This area includes a number of upstanding structures related to the Tramway and the later development of the Carmears wheelpit as a china-stone mill. Thick vegetation covers much of the site, and it will be necessary to effect clearance of this where historic details are obscured. Trees again threaten the integrity of certain features and will have be removed as part of the management process.

The granite plinth (T14) appears to be a machinery mounting platform, probably used for transferring power from the water wheel to the tramway haulage system. Vegetation has already been cleared to prevent deterioration of the structure. With provision of safe access it would make a good viewing point for the site as a whole, but judicious thinning of trees will be necessary to gain sight of the head of the incline.

Building T11 is the smithy/workshop for the site. Unlike the majority of the structures it is built in the main from rough moorstone and only the N.E. wall survives intact. The S.W. wall has been damaged due to tree growth and parts of both gable ends have collapsed. Again clearance was commenced in Phase I and stabilisation work will be required; tree growth should be removed and the surviving walls capped and re-pointed. A coil of wire rope (T13) lies close to the building; this is associated with the original haulage system and should perhaps be preserved in situ.

The checker's cabin (T10) at the head of the incline is more ruinous and unstable and will require urgent attention to prevent further deterioration. Some vegetation was cleared during Phase I; this work should be completed, the walls should be capped and pointed, and the interior carefully cleared of debris.

Little remains of building R2 and its function is unknown. Vegetation in and around the structure is dense and the survey in Phase I could not establish any links with other buildings on the site. Careful clearance and excavation will be necessary to ensure that no small finds or features are overlooked which would help to determine its original purpose.

The Wheelpit and its associated mill buildings on either side present particular problems. Approximately 20 trees need to be felled within this area and some tree surgery is needed on branches outside the perimeter; the trees concerned should be identified and marked in consultation with the Officer of the Archaeological Unit. The original inter-relationships of the structures should be considered carefully when planning access to and presentation of the site. The Wheelpit itself (T12) is

constructed of massive faced granite blocks which are in good condition and basically stable. Three mature trees endangering the retaining wall above the lower leat need to be removed, but liaison with ECCI should be established as the leat is still in active use. Other trees have established themselves in the masonry of the Wheelpit and will also have to be carefully removed, making good any damage which may result.

Much of the Mill area, particularly inside the buildings, is covered with deposits of ground china stone up to 0.5 metres in depth and special care will be needed to avoid overlooking smaller finds as clearance progresses. The more massive pieces of machinery should be left in situ until decisions can be reached on the feasibility of reconstruction. Apart from minor repairs to the walls, the wooden beams supporting the remains of the water wheel assembly will need to be replaced. Photographs of the mill, taken before its destruction by fire, show the original bridge across the wheelpit and any reconstruction should be based on this model.

Safety rails here and around the wheelpit will have to comply with modern requirements in the interests of safety, but should be in keeping with the spirit of the original. Considerable erosion has taken place inside the S.E. boundary of the area and it would seem sensible to prevent public access to the building from above for safety reasons. In view of the narrowness of the existing steps, a one way system should be instituted for public access, perhaps by building a new bridge across the upper leat which would allow access from above to the mill on the western side of the Wheelpit. A detailed plan for the presentation and display of this site should be a priority for the eventual Custodian of the Valley.

5.3.3) The Upper Tramway, Incline to Viaduct (Plans 8,10)

The line of the Tramway from the Incline Depot to the Viaduct is mostly clear and in regular use as a footpath. Throughout the greater part of this 860 metre distance it closely parallels the Carmears Leat, and has in places been covered to a depth of 0.3 metres or more by material thrown up from the leat during clearance operations. As a result, the surface is in many places muddy and liable to saturate quickly during the winter months. Few granite setts are visible, although rail is exposed at one point and more may be hidden.

Approximately 20 trees will need to be felled and scrub growth should be cleared, to give an average width of 2.5 metres to the Tramway throughout this section. As the tramway lies close to the south side of the leat which is still in use by ECCI, and a larger number of mature trees growing in the northern leat bank

will need attention, responsibility for these trees will need to be defined in the management scheme; liaison with ECCI will be necessary throughout clearance operations to ensure that the interests of both parties are safeguarded. Removal of the deposits of mud on the Tramway will also be required, and an improvement to the surface should be made by laying granite ballast. The section where rail is visible should be carefully excavated under the direction of the Officer of the Archaeological unit.

Where the Tramway runs into a cutting (T16, Plan 10) it has become waterlogged and overgrown, and the pathway no longer follows the Tramway but has been diverted alongside the leat. It is recommended that this area should not be cleared or drained but should be maintained in its present state as it is a valuable area for wildlife. Ideally, the southern bank of the leat should be used as the through path, but if safety considerations make this impractical, the Northern side should be followed as closely as possible.

A transhipment depot for granite (T17, Plan 10) with its associated tramway loop and branch lines occupied the last 110 metre stretch before the bridge. Undergrowth and saplings, dense in some places, and selected trees will need clearing to display features within the site. A small building (T18) which requires clearance and remedial work is shown on the 1906 1:2500 OS map. Early photographs show a large crane on site and any evidence of this and its mounting platform should be revealed and preserved. There is still in situ a pile of worked granite blocks ready for shipment, and while it would be pleasant to reveal these, steps must be taken to ensure that they do not as a consequence fall victim to theft. Vehicular access for clearance and maintainance should naturally follow the Colcerrow Tramway branch line (T31), and this must be gated where it crosses the road to Trethevey (T32) in order to prevent unauthorised vehicular access. This section of the Colcerrow branch from the Viaduct to the public road is clear to its full width and requires the minimum of remedial work.

5.3.4) Treffry Viaduct (T19, Plan 10)

The Viaduct, as the largest single structure in the valley and a Scheduled Ancient Monument, will pose particular problems for the eventual Custodian. It is at present uncertain what nature or extent of remedial works may be required; these in any case will have to be undertaken by outside contractors with the necessary expertise. The fabric, after 150 years, would appear to be in an essentially sound condition. Work will be required to re-point the masonry, remove vegetation where this is growing on the structure, and to seal leaks in the bed of the aqueduct section

below the Tramway deck. A full structural survey should be commissioned by the Custodian and its recommendations implemented in liaison with English Heritage (who should be able to provide some financial assistance in the form of grants). ECCI, as users of the water which flows across the Viaduct, will also need to be consulted and should be prepared to accept a proportion of the responsibility for maintenance work.

In addition, it may be thought desirable to remove some trees which are growing close to the Viaduct; these do not in any way threaten the structure, but their removal would once again allow clear sight of this impressive monument from below.

The question of parking at this location and of public access to the top of the Viaduct will be the subject of a new management initiative. Indiscriminate car parking in the area below (V16) and uncontrolled scrambling up the slopes beside the Viaduct is causing erosion and damage, which at this stage is reversible but cannot be sustained over many more years. Car parking facilities by the river should be regularised and defined by the use of natural granite kerbs, with litter disposal facilities and an interpretation board showing the recommended access ways into the Valley. Although in principle it would be far preferable to direct access to the top of the Viaduct via the public road and Tramway (T32,T31) in practice it would be impossible to enforce without the use of unsightly fencing. It is therefore suggested that the bridge across the leat (L6/2) (which is at present immediately below the Viaduct) should be relocated to the north and a new footpath be created to the Tramway above.

5.3.5) Upper Tramway, Viaduct to Cam Bridges (Plans 10,12)

The Tramway runs into a rock cutting immediately beyond the Viaduct (T26), and this area is at present very wet and overgrown. Vegetation clearance and drainage work should be undertaken as far as the bridge (T28), which is the limit of ECCI property. In the long term it should be a priority to negotiate a public access agreement with the owners of the Tramway beyond this point, so that a link may be established to Bridges and Luxulyan Village.

The Quarry (Q3) and its associated features is perhaps the best-preserved example of a small Cornish granite quarry in the Valley, with its fine pattern of finger-dumps. It is also little-visited and at present forms a useful haven for wildlife. In order to protect its fragile beauty, it is suggested that public access is not actively encouraged; those who are sufficiently motivated will discover it for themselves. Rubbish should be cleared from the quarry floor, causing minimum disturbance to wildlife, and a policy of benign neglect pursued

in this area. A five-year strategy review is suggested for all the sites in the Valley, and it may well be felt at a later date that some form of vegetation control is required for the quarry.

5.3.6) The Lower Tramway (Plans 2,5,7,8,9)

The Lower Tramway in its present route is clear and well-surfaced for 800 metres from Ponts Mill (T42, Plan 2) to the river bridge above the Central Cornwall Dry (T57, Plan 8). Some attention will have to be given to drainage in certain places, but otherwise the Tramway forms an excellent access way for walkers and riders, and is also well suited to vehicular access for future maintenance work. The gate at the Ponts Mill end should be retained.

The original route of the Quarry Tramway (T44) on the opposite side of the river, from T43 (Plan 5) to T45 (Plan 8) has been cleared of vegetation by the Phase II Team and is now once again accessible for walkers. Future maintenance will be required to cut re-growth, and some surfacing with stone may be thought desirable.

From the point at which the two Tramways re-join (T45) to Rock Mill Quarry (T50, Plan 9), the Tramway has been narrowed by the encroachment of vegetation and has suffered great damage to its surface through water erosion. Throughout this 650 metre stretch vegetation should be cut back to give an average width of 2.5 to 3.0 metres, and a proper drainage scheme instituted. The granite setts in section T48 must be preserved in situ; the river bridge (T49, Plan 9) should be cleared of the vegetation and debris which now obscures it. Both the quarries (Q1 and Q2) are outside ECCI ownership and are discussed in section 5.4.

5.3.7) The Central Cornwall Dry (C2, Plan 5) (see also 3.7.3)

This china-clay pan-kiln was built in the 1920s and was abandoned in the mid 1960s. The slate roof has been removed, but the main structure is intact and is a good example of the classic Cornish coal-fired kiln. It has great potential as an educational resource for schools, and also provides one of the best habitats in the Valley for water-related species such as toads and newts. The site could be a great asset to the overall interpretation scheme for the Valley, and would merit a comprehensive management initiative which should be undertaken in close consultation with the Archaeological Unit and the CTNC.

At present, intrusive vegetation in the form of willow and other scrub is rapidly obscuring the furnace room and pan (C2/1), and the brick stack at the eastern end has suffered partial collapse of the capping material. Conservation for this site should

commence with the clearance of vegetation and the removal of loose debris from the entire area in front of the settling tanks. The walls should then be examined, capped and re-pointed where necessary; it will be essential to erect scaffolding in order to deal with remedial works to the stack. This is a prominent feature in the Valley and its retention is of prime importance; demolition is not considered to be an acceptable alternative. The tanks at the rear of the kiln (C2/2) form a haven for many species of wild life, and they should remain untouched by management, with the exception of the tank at the western end nearest the furnace room; this should be cleared of vegetation so that there is one accessible example for interpretation purposes.

It will be necessary to repair the handrails on the furnace room steps for safety reasons, and the remainder of the site should be examined with this aspect in mind and measures taken to ensure public safety throughout. Interpretation boards should be erected at both ends of the site, and these should give an explanation of the china-clay process as it relates to this kiln.

To the west of the dry and on the upslope side of the Tramway, a large area of the woodland has become infested with cherry laurel. This intrusive species is not favoured by nesting birds or other wildlife, and allows nothing else to grow within its heavily shaded confines. The area covered is one of dumps created during the construction of the kiln (C2/5) and tin streamworks (M6). There are two possible approaches to this problem for the management strategy: one would involve the complete clearance of this area, including the destruction of the root systems of the laurel, followed by selective re-planting of broad-leaved species. The other would be to contain the laurel to its present area by cutting growth at the edge, thus preventing its spread to the rest of North Hill Wood. If clearance is undertaken, care should be exercised in order to protect the features related to the streamworks such as the tinner's shelters.

5.3.8) Lady Rashleigh Consols (M9, Plans 7,8)

At present there is no defined access way to this area of shallow mining, but it is possible to approach it from the Lower Tramway. The mine includes a series of openworks (M9/4) and shafts (M9/5,M9/3); there are two associated structures (M9/6, M9/7). Thick woodland and scrub covers the site.

It is suggested that for the present, public access to the area is not encouraged but is maintained at its current low level. The two open shafts should be securely fenced (not capped or filled) and the Office building M9/6 should be examined and consolidated as required. The area should be subject to policy

review as a potential education asset at a later date; should it then be decided that a greater degree of access is appropriate, new paths and steps will be required, which in themselves could be considered detrimental to the integrity of the remains if not planned and executed with care.

5.3.9) The Velvet Path

The Velvet Path, while a significant historical monument in its own right, is also of prime importance in that it links many sites and features on the Lanlivery side of the Valley, and is thus vital for any scheme involving public access. Its general condition throughout the 4500 metres of trackway in ECCI ownership is broadly similar: overgrown with scrub and small trees, eroded in places by surface water, but still easily identifiable on the ground and structurally intact. The Path is pivotal to an overall conservation strategy.

The section from the Incline Bridge (V10, Plan 5) to Rock Mill has already been cleared by the Phase II Team, and it is anticipated that the remainder of the Path will be similarly treated by the end of the 1988-89 Scheme, if present progress is maintained. This work includes the clearance of scrub and trees from the surface of the Path, repair of walls and hedges where required, and the re-instatement of appropriate drainage measures. Much work has already been done above Ponts Mill to control the flow of water down the hillslope where serious erosion was taking place.

As a general policy, the surface of the Path should be cleared to an average width of 3.0 metres. Trees and their stumps should be removed and the surface made good where necessary with crushed granite. In certain places surface water has destroyed the road bed and culverts will have to be built to contain the flow; these should echo the spirit of the originals, and should be constructed with granite lintels. Where the path climbs above the Carmears Rocks (V7, Plan 5) it may be considered good policy to fell some trees, in order that walkers may once again enjoy the view down to Par Bay.

5.3.10) Prideaux Wood Mine (Carmears) (M4, Plan 2,4)

This small tin mine is at present regularly visited by the public, and is easily accessed via the Velvet Path; in general the surface features are well preserved, and although in a woodland setting are not heavily overgrown. The mine is thus a good subject for presentation and interpretation, a conclusion which is countered to a degree by the somewhat enigmatic nature of the remains.

Conservation should include the following items as a priority. The shaft (M4/1) is choked with debris, but the security of this plug is doubtful and cannot be guaranteed. Expert opinion should be sought on this matter, particularly as the pump rod remains in the shaft and this is a potentially valuable historic artefact. It is considered that a fence around the shaft would represent a particularly unsightly intrusion in the landscape at this point, and alternative means such as a Cornish hedge should be considered, although this might present many practical difficulties. The structure beside the shaft (M4/2) has been cleared of debris during Phase I and requires little further work; the walls of the boiler house (M4/3) should be examined, capped, and re-pointed. The horizontal-engine house ((M4/8) should be cleared of vegetation and the walls stabilised where they are still upstanding. Other than this, it might be desirable to clear the reservoir pond (M4/7) of vegetation. Interpretation boards should provide an illustrated explanation of the tin-mining process and a plan of the site showing the main features. The other mining remains in this part of Carmears Wood present no hazard to the public and do not currently require any active management.

5.3.11) The Leat System

There are four major leat systems in the main Valley, two on each side of the river. Those on the north-eastern or Lanlivery side are still in use and actively maintained by ECCI (the Carmears and Fowey Consols Leats, L7 and L6 on the Plans). The two on the south-western or Luxulyan side are now dry and disused (the Wood Mill Leat and the Clayworks Leat, L4 and L8 on the Plans).

No active management is proposed at this stage for the two dry leats, although they must both be regarded as valuable historic monuments in their own right and their structures safeguarded during woodland management. In the future, it may be possible to restore the flow in part of the Clayworks Leat where it passes through North Hill Wood, with a resultant improvement in the drainage of the area.

The Fowey Consols and Carmears Leats are both extremely important for the extra dimension they bring to the woodland scenery and habitat, and also for their value as historic markers in the landscape. At present they are maintained by ECCI as feeders for the Ponts Mill Hydro-Electric plant. If it should transpire that ECCI no longer has a use for the leats, their maintenance must be undertaken by the Custodian in order to preserve this aspect of the Valley; whoever may ultimately be responsible, the methods adopted to clear and maintain the waterways must be traditional and in keeping with the historic nature of the site. Damage has been caused in the past by the inappropriate use of mechanical

aids during maintenance operations, and this practice must cease. Discussions should be entered into to establish a working agreement between ECCI and the Custodian for future guidelines and policy in this respect.

The Leat Reservoir (L7/R, Plan 12) is part of the historic Treffry heritage, and should be the subject of a conservation effort which will involve the clearance of vegetation and a thorough examination of the structure for defects in the masonry.

5.3.12) Ponts Mill Stoneworks and Canal Basin (Plan 2)

It is considered that there will be two main entrances to the Valley for the majority of visitors; at the Viaduct, and at Ponts Mill (see section 5.5). Ponts Mill therefore assumes a particular significance when seen as the main gateway to the Valley, and will require careful planning and management in order to fulfil this role without adversely affecting the operation of the ECCI works, or inconveniencing the residents of the hamlet. At present it is uncertain whether any of the area from the base of the Incline (T4) to the Lower Canal Basin (P2) will in fact be included in the land to be transferred from ECCI to the Custodian; the following proposals are therefore in outline only.

The stone mills themselves were demolished in the 1960s, and there are no remains worthy of conservation apart from the pan-kiln and its associated tanks (C4/2, C4/3). This structure is of less potential value as an educational resource than the Central Cornwall Dry, and there should be no objection in principle to its re-use as an Interpretation and Visitor Centre for the Valley. This could perhaps incorporate a small museum and display, toilet facilities, and Warden's accommodation in the long-term, and would also serve as a base and store for the Custodian's workforce. That such re-modelling would be a costly exercise is beyond doubt, and depends entirely on adequate funding being made available. Its desirability may also be called into question if a very low-profile future is considered appropriate for the Valley.

The Canal Basins (P2, P3) have been obscured by the dumping of waste material and subsequent overgrowth. The Lower Basin (P2) is the least affected, but even so reveals little of its original purpose to the casual eye. A conservation strategy for this area should initially focus on the bridge (P1) which has great architectural and historic merit; debris and infill should be removed from the area close to the bridge, and the structure with its associated iron launder should be the subject of remedial works. Japanese Knotweed which has colonised the Upper Basin (P3) must be removed and the root systems destroyed before it is able to spread further into the Valley. In the long-term, it

might be desirable to completely clear the Canal Basins of all infill and debris to reveal their original form. Any excavation of this sort would have to be professionally planned and supervised.

5.4) Sites Outside ECCI Ownership

Many sites outside the ownership of ECCI were included in the 1:1000 Survey and can properly claim to be part of the Luxulyan Valley complex. Whether they can eventually form part of a wider area accessible to the public is entirely dependent on the outcome of negotiations with the landowners concerned; as a result, any proposals detailed in this section are in outline only. The desirability of including these areas within the scope of management is not in doubt. To achieve this end, talks should commence at an early date with local residents, landowners, Parish Councils, Restormel Borough Council, and the County Council to establish a consensus for the future of the Valley. The acquisition of some of these sites may be necessary to ensure their inclusion, and this should be recognised as a possible hidden cost for the Custodian.

5.4.1) Orchard Quarry and Rock Mill Quarry (Plans 8,9) (also 3.7.4)

This section of the Valley is in private ownership and includes not only the two quarries (Q1 and Q2) but also a fine spread of mature woodland, and the smithy (Q2/3, Plan 9). The quarries have many significant archaeological features, and also form important wild-life habitats; if possible, both should eventually become accessible to visitors, and will require some non-intensive management to ensure their future as a resource. It is particularly important that the dumping of rubbish and spoil into the quarries from above is prevented. The hillside in this area is also enhanced by the natural rock outcrop of Will Luke's Hat, and pathways should be improved in this area to allow access for walkers; when access is implemented, it will also be necessary to fence the edge of both quarries to ensure public safety.

5.4.2) Prideaux Wood (Plan 1)

This area of woodland is owned and managed by the Forestry Commission. There is at present public access along the main trackway (R3) through the wood. The hillslope was clear felled and planted with conifers in 1960, and is due to be clear felled again shortly after 2000. Public access and management for the area is problematic on two counts: firstly, the use of the woodland as a forestry and the need to accommodate commercial ends, and secondly the hazardous nature of the mining remains within it.

If public access to the wood were to be encouraged, considerable management effort would be required to locate and re-fence the many open shafts. This initiative could, however, be considerably aided by the detailed survey plans now available as a result of the Luxulyan Valley Project. When clear felling takes place, it would seem inevitable that damage will result to many of the archaeological features unless great care is taken; the form of the site thereafter will also depend on the nature and extent of re-planting. Whatever decisions may be taken with regard to the main woodland, it is essential that the openwork and process floors of the South Prideaux Mine (see fig 20) are preserved intact. This site is one of the most valuable in the Valley for its archaeological content, and should be the subject of a management plan designed to conserve the remains and display them to the public; a detailed strategy for this should be the topic of discussions between the Forestry Commission and the Archaeological Unit.

5.4.3) New Fowey Consols Mine (Broadmoor) (Plan 3)

This compact site is in private hands and at present there is no public access to it. The boundaries of the site are well defined and there is no current use of it for agricultural purposes. It contains the only Cornish beam-engine house within the Valley itself, and is thus potentially of great value for interpretation; remedial works to the engine-house and other structures would be required before public access was possible. It is suggested that the eventual Custodian of the Valley should enter into negotiations with the landowner with a view to purchase of the site. If this can be achieved, a management plan should be prepared to conserve the remains, and this should be a priority as the buildings will not survive for much longer without attention.

5.4.4) Tramway from Cam Bridges to Luxulyan (Plans 12,13)

The Tramway in this section is currently overgrown and neglected as it passes through agricultural land; its boundaries are clearly defined by embankments and stone walls, and there would be no technical difficulty in clearing and re-instating the trackbed as a stockproof public footpath. This could then serve as a link from the public road at Bridges into the Valley for walkers and riders. To this end, it is suggested that negotiations take place with the landowner for an access and management agreement.

5.4.5) Colcerrow Tramway and Quarries (Plans 14,15,16)

The Colcerrow area encompasses some of the most significant archaeological features within the entire 1:1000 Survey,

including the Tramway branch, a long section of the Velvet Path, several structures associated with the Tramway, a unique survival of early permanent way, and the largest granite quarry complex in the Valley. All of this lies within private ownership, as do the Pennyloaf and Elephant Rocks which are natural features of some note. Ideally, the area should be made accessible to the public with adequate safeguards built-in to a management agreement which will ensure the privacy and rights of the landowner. To this end, negotiations should take place between the Custodian and the landowner as a matter of priority, although it is recognised that this will probably form a long-term initiative: the exact ownership and rights within the area appear to be somewhat confused and there are conflicting claims to be taken into account.

Should such negotiations prove successful, it will be necessary to draw up a conservation and access strategy based on the results of the 1:1000 Archaeological Survey.

5.5) Public Access and Interpretation

Access to the Valley for the future will be constrained by the narrow and winding character of the public roads which serve it. These are unsuited to heavy traffic, and will not allow a great increase in the number of private cars which use them, nor are they suitable for coaches (with the possible exception of the road to Ponts Mill from Penpillick Hill). A natural limitation is therefore imposed on the promotion of the Valley as a tourist resource in the accepted sense; however, the paths and trackways within the Valley are clearly capable of absorbing many more walkers and riders than is currently the case, particularly when the paths created by management schemes are brought back into use. It is therefore anticipated that the main thrust of promotion will be directed towards walkers, cyclists, and horse-riders, all of whom will benefit from an opportunity to enjoy the use of country lanes with little traffic to access the Valley itself. If this constraint can be perceived by the Custodian and County authorities as a positive benefit rather than a limitation to be overcome by road improvement schemes, the Valley will be better able to establish itself as one of Cornwall's foremost assets. The success of the Valley as a public resource should be measured not by the number of visitors which pass through it, but by the quality of the experience which is available to those who seek it out.

It is assumed that free access throughout the Valley will be available to walkers and riders on all sections of the Tramway and Velvet Path. Smaller pathways and leat bank paths will be accessible to walkers only. The present network of Tramways and

paths will be sufficient to give access to all areas (when cleared), with the exception of parts of North Hill Wood near Will Luke's Hat. Car parking will be provided at two sites: the Viaduct, where the present informal parking should be regularised to a degree and contained in order to protect the river banks, and at Ponts Mill.

If full use is made of the tarmac area beyond the bridge at Ponts Mill, and a similar area is provided with a gravel surface immediately in front of the stone-mill dry, this should suffice for present levels of usage and allow reasonable growth in visitor levels over the next five years. It is possible to accommodate and turn coaches at Ponts Mill on an occasional basis. Schools and field centres already make use of these parking areas, and their mini-buses are unlikely to cause problems. Walkers and riders will also be able to join the Velvet Path where it meets the public road at Penpell and Trethevey; in addition, it is hoped that it will be possible to negotiate agreement for walkers along the Forestry Commission Track through Prideaux Wood. Ultimately, the Tramway from Bridges to the Viaduct should be cleared and made accessible, which will give an alternative route from Luxulyan village for walkers and riders, rather than that via Gatty's Bridge. This would form part of a 6 kilometre footpath route from Luxulyan to Par Harbour, entirely free of motorised traffic and passing many historic sites *en route* including the Treffry Viaduct, Wheelpit Mill, Carmears Incline, Par Canal Basin, Limekilns, and St Blazey Locomotive Depot; such a path would be a great asset to the area, and would ideally complement the existing Saints Way long-distance footpath.

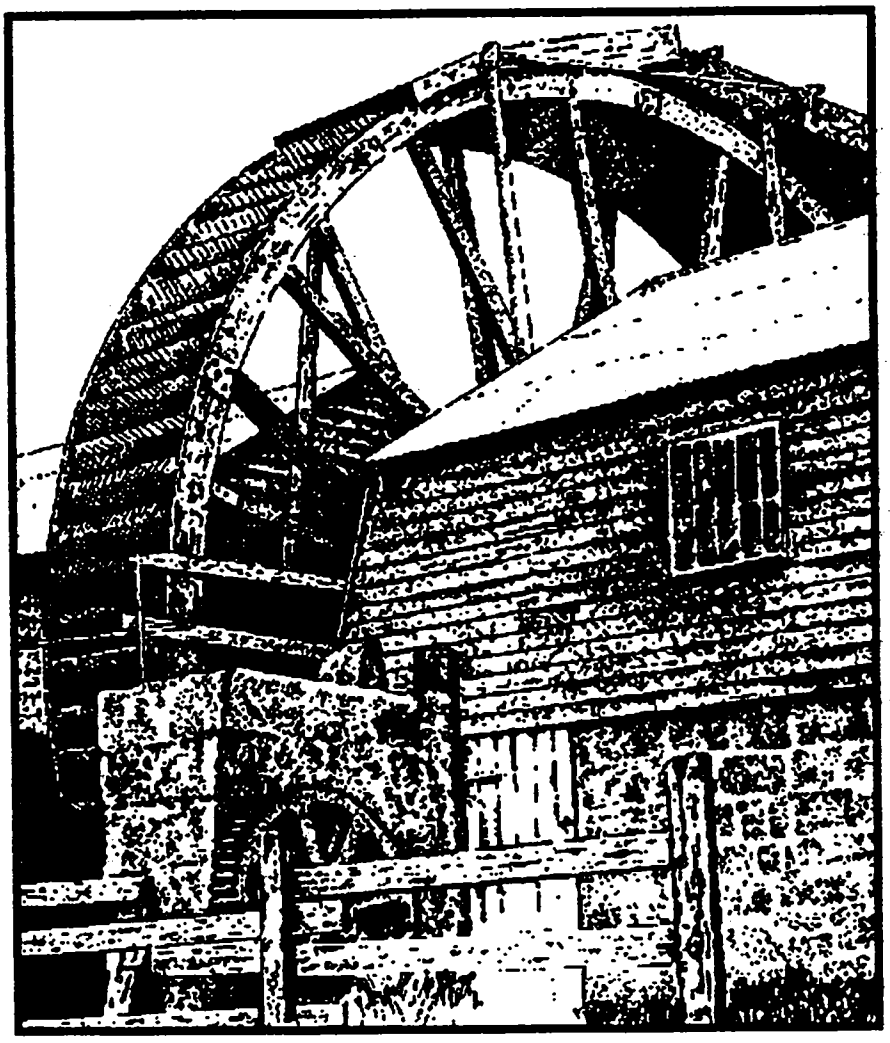
The utilisation of the Luxulyan Valley as an educational and cultural resource will depend upon the quality of the interpretation material which is produced to accompany the physical management of the site. That such material is greatly in demand by schools and the general public is not in doubt, and there would seem no good reason why the production of maps, pamphlets and books should not be effectively self-funding after an initial period of subsidised support. Examples of this type of material produced by Phase I of the Project are shown in Appendix (F). It is assumed that this printed material will be either produced by the Custodian in-house, or will be commissioned by the Custodian from an outside body wth the required knowledge and expertise. Lest it should be thought that this aspect of conservation strategy is merely "icing on the cake", it should be pointed out that the substantial amounts of public funding committed to the Project will have been to a degree wasted unless a wider and more sophisticated public awareness of the historic landscape can be clearly seen to result.

Initially, a folded A4 pamphlet should be produced showing the main sites within the Valley and outlining a brief history of the area. This should be followed by a brochure with rather more detailed accounts of the individual sites and attractive drawings and photographs, together with packs for schools which could include a set of 35mm transparencies. A full account of the Valley's history and heritage should then be commissioned which would include the findings of the Phase I Survey; this would form the definitive source on the Valley for the forseeable future.

In the Valley itself, non-intrusive and vandal-proof interpretation boards should be erected at each major site; these will explain the function and history of the monument in clear and visual terms. Sites which have the potential for a degree of re-construction as part of this endeavour include the Wheelpit Mill and Central Cornwall Dry. In the long-term, it may be possible to establish a small museum and display at Ponts Mill; this could be modelled on the National Trust facility at Cothele Quay, and need only be staffed during the summer months.

A resident site Warden or Ranger would be a great asset to the full use of the area if funding is available. A continued presence of this sort is likely to reduce vandalism and unauthorised access by motorcycles, and would be of great benefit to school parties who would have a knowledgable and sympathetic guide available to them. Increased pressure on the Valley as a result of greater leisure demand is inevitable; rather than hope that this problem will resolve itself, it is preferable by far to prepare for it in a structured fashion. Public awareness and appreciation of the County's heritage can only be heightened by promotion and custodianship of the highest quality; given this, there is every reason to have confidence in the future of a unique landscape.

Section 6



Appendices

APPENDICES

APPENDIX A) GLOSSARY OF TERMS

ADIT A level tunnel driven into the hillside in order to give access to a mine. Might be used for drainage or hauling of the broken ore. Elsewhere in Britain a LEVEL or DRIFT.

ALIDADE Sighting instrument used to obtain direction of fixed points for surveying.

AQUEDUCT A bridge carrying water across an obstacle in the landscape.

BALANCE BOB A rocking beam and balance-box used to counter the weight of the pump-rods in a shaft, thereby easing the load on the water-wheel or beam engine.

BATTER The slight slope on a wall or bank necessary to give stability.

BEAM-ENGINE A type of steam-engine much favoured in Cornwall for use in pumping, winding, and treating ores on Cornish mines. Power from a large cylinder set vertically in the engine-house was transferred via a rocking beam or bob to the pumps in the shaft outside; for winding and crushing, the bob was instead attached to a flywheel and crank.

BLOWING-HOUSE Furnace used for the smelting of tin using charcoal as a fuel.

BOILER HOUSE A building designed to contain the boilers for a steam engine on a mine or other works; usually associated with an adjacent stack.

BUDDLE A device for concentrating tin ore. In the mid-19th century became established on Cornish mines as a circular pit with rotating brushes; the tin from the stamps was fed into the centre of the pit and flowed by gravity to the edge, concentrating the heavy ore at the centre of the buddle.

CALCINER A furnace and heating chamber in which ores were roasted to drive off impurities such as sulphur and arsenic.

CAPSTAN A manually operated winding drum, usually installed on a mine to raise pitwork from the shaft for maintenance or repair.

CHAIR See Saddle.

CHINA CLAY Powdery white mineral produced by the decomposition of feldspar in granite; this process is known as kaolinisation. Extracted from the remaining quartz and mica by directing a stream of water over the kaolinised mass; the resulting clay slurry is then purified and dried.

CHINA STONE Granite which has been only partially kaolinised, and is therefore quarried in lump form. The stone is ground and mixed with china-clay in porcelain manufacture.

CORBEL Stone or timber projection from a wall or structure, acting as a supporting bracket.

CORNISH HEDGE A stock-proof boundary having two battered stone faces and an inner core of earth and small stones.

DUMP A pile of waste material (rock or earth), usually from a mine or quarry.

DUMPY LEVEL Telescopic sighting device used to establish levels across a site.

ENGINE HOUSE A building designed to contain a steam, gas, or oil engine on a mine or other works.

FILTER PRESS An hydraulic device for unwatering china-clay slurry. Produces Press-Cake for the Pan.

FINGER DUMP A linear dump of waste material from a mine or quarry, flat-topped to allow material to be barrowed or trammed along it.

FLAT RODS Iron rods which were to used to transfer power from a steam-engine or water-wheel to a remote location.

FLY WHEEL A wheel attached to a crank driven by a reciprocating engine, used to store energy and smooth the transfer of power.

GUNNIS Cornish equivalent of Openwork.

HOLLOW-WAY A lane or trackway which has, through intensive use, become lower than the surface of the surrounding landscape.

HORIZONTAL ENGINE A steam engine where the cylinder(s) are laid on a horizontal bed and the piston rods are attached to a crank and flywheel.

HORSE WHIM Similar to a capstan, but in this case power supplied by a horse walking around a circular platform was applied to an overhead winding drum; frequently used for winding from small

shafts on Cornish mines.

INCLINE PLANE An earthwork which enables a tramway or canal to ascend a steep rise; laid with rails and powered by water or steam.

LAUNDER A wooden or steel trough used to carry water across or around an obstacle, also to feed water onto the buckets of a water-wheel.

LEAT An artificial water-course, built to supply water to a mill or mine.

LIME KILN An upright coal-fired kiln used to roast limestone in the manufacture of agricultural lime.

LINHAY The storage area at the front of a china-clay pan-kiln.

LINTEL Horizontal timber or stone support above an opening in a wall or structure.

LOADING The masonry platform in front of an engine-house (or elsewhere on a mine) on which machinery such as cranks, flywheels and angle-bobs was mounted.

LODE An area of mineralisation within the mass of underground rock. In other parts of Britain a VEIN, or SEAM.

LODE-BACK PIT Shallow shaft dug into the upper part of a mineral lode from surface.

MAGAZINE Small strongly built store containing explosives (gunpowder or dynamite); often circular, sometimes with additional enclosing walls to contain blast.

MICROPTIC ALIDADE Alidade with telescope attached, used to obtain distance and direction when surveying with Plane Table.

OPENWORK A mineral extraction site open to the surface rather than underground; similar to a quarry but usually distinguished by its narrow and precipitous form.

OVERBURDEN Earth and subsoil removed in the process of opening or extending a quarry.

PAN Floor heated from below via a series of brick-lined flues in a pan-kiln.

PAN-KILN Process building used to dry china-clay slurry on a floor heated by warm air from a coal-fired furnace.

PLANE TABLE Drawing table mounted on a tripod used for surveying with an Alidade.

PLUG and FEATHER Steel tapered plug and wedges used to split rock when inserted into a drilled hole and hammered tight; also known as Tare and Feather.

PRE-HISTORY Period before written records are available (usually pre-1086 in Cornwall).

PROSPECTING PIT A small pit dug in search of minerals.

REVETMENT A stone facing to a bank or earth face.

ROTATIVE ENGINE A beam engine where the reciprocating motion of the beam is converted to rotary motion via a sweep rod, crank, and flywheel.

RUNNER STONE Granite block which was rotated in the Grinding Pan of a china-stone mill.

SADDLE Support for Tramway rails, usually of cast-iron. Chair in 20th century usage.

SETT A granite or other stone block, used to pave a road or to support rails on a Tramway.

SETT The legal boundary within which a mine or quarry could extract minerals.

SETTLING TANK Masonry-lined open tanks at the rear of a pan-kiln where china clay slurry was allowed to settle and thicken.

SHAFT A vertical or near-vertical tunnel sunk to access minerals; often connected to an Adit.

SINK An area in the floor of a quarry which has been excavated below the surrounding level.

SOPWITH STAFF Sighting target used with Microptic Alidade to obtain distance when surveying.

STACK A chimney on an industrial site, used to carry away smoke or fumes from boilers, furnaces and calciners. Often situated at the end of a Flue.

STAMPS A mechanical device for crushing ore-bearing rock to a fine sand. Heavy iron-shod wooden beams were lifted and dropped onto the rock by a series of cams mounted on a rotating drum; usually driven by a water-wheel or rotative steam engine.

STONE MILL Mill used to grind china-stone to a fine powder for use in the porcelain industry (as a glaze and in the body of the ware).

STOPE Underground cavern produced during the extraction of ore-bearing rock. Also the area in a china-clay pit which is being actively worked.

STREAMWORKS An area worked for alluvial tin deposits by shallow excavation. Often characterised by linear dumps, river diversion, and evidence for reservoirs and leats.

SWEEP ROD Bar used to connect the beam of a Cornish Engine to a crank and Fly Whweel.

TAILINGS The waste sand and slime from stamps and buddles, not containing workable quantities of mineral.

TAILRACE The channel along which water flows after having passed over or under a water-wheel and is then returned to the river.

TRAMWAY A railway constructed to a lighter or more temporary standard than that accepted for "main-line" routes. Often, though not always, powered by horses; on mines, small wagons were pushed by hand.

TRANSOM Cross-timber separating the two baulks of timber supporting the bridge-rails on early GWR track.

TURNOUT Junction where one line of rails splits into two.

UPCAST Material thrown up from an excavation or pit.

WAGGON 19th century form of the later wagon; used to distinguish references in the Report to early Tramway vehicles from those to later railway wagons.

WATER-WHEEL Wheel fitted with buckets or paddles around its periphery, and driven by the force of a stream of water directed onto them.

WHEELPIT A structure built to house a water-wheel, often excavated and stone-lined, but sometimes free-standing.

WHIM PLAT The level and usually circular platform on which a horse-whim was sited.

WHIM A winding gear used for hauling from a shaft; consists of a power source and a winding drum. See Horse-Whim.

APPENDIX B) GAZETTEER OF SITES SURVEYED

This appendix catalogues the survey drawings made by the Project, other than the 1:1000 landscape survey sheets. Many of the sites listed here are also included on the 1:1000 landscape survey, but some are outside the 1:1000 area. All the survey drawings, together with their associated context records, are stored in the archive of the Archaeological Unit at Truro.

1:1000 LANDSCAPE SURVEY

SX 050570 CAM BRIDGES
SX 050575 LUXULYAN
SX 055565 ROCK MILL
SX 055570 TREFFRY VIADUCT
SX 055575 GATTY'S BRIDGE
SX 060560 LITTLE PRIDEAUX
SX 060565 MIDDLE VALLEY
SX 060570 LOWER COLCERROW
SX 060575 COLCERROW
SX 065560 CARMEARS
SX 065565 TRETHEVEY
SX 065575 COLCERROW
SX 070555 PRIDEAUX WOOD
SX 070560 PONTS MILL
SX 070565 PENPELL
SX 075560 PENPILLICK

BUILDING AND SITE SURVEYS

PRN	SITE NAME	NGR (SX)	SCALE
0000	PENTEWAN HARBOUR	01900 47200	1:500
0000	ST CATHERINES CASTLE	11850 50900	1:50
0000	CASTLE DORE	10350 54800	1:500
0000	CARVEAR CLAY KILN	05300 54400	1:100
5001	PRIDEAUX HILL FORT	05900 55700	1:500
5062	TREFFRY VIADUCT - ARCH ELEVATION	05700 57100	1:50
5062	TREFFRY VIADUCT - PLAN & ELEVATION	05700 57100	1:200
5072	ST BLAZEY BRIDGE LIME KILNS PLAN	07100 55100	1:100
5072	ST BLAZEY BRIDGE LIME KILNS ELEVATION	07100 55100	1:50
5076	AUSTENS ENGINE HOUSE	08300 56050	1:50
5092	PONTS MILL BRIDGE	07300 56200	1:50
9000	PONTS MILL CANAL BASIN	07300 56200	1:200
9015	BUILDING NEAR WHEELPIT MILL	06610 56670	1:50
9016	BRIDGE ACROSS INCLINE	06720 56420	1:50
9017	UNDER BRIDGE, BOTTOM OF INCLINE	07090 56280	1:50
9018	GRANITE SETTS ON INCLINE	06740 56490	1:20
9019	BUILDING NEAR VELVET PATH	07350 56520	1:50
9020	PRIDEAUX WOOD MINE BUILDING	07250 56470	1:50

9021	PENPELL BRIDGE	07370 56840	1:50
9022	PRIDEAUX WOOD MINE BUILDING	07260 56480	1:50
9025	NEW FOWEY CONSOLS MINE WHEELPIT	07710 56120	1:50
9025	NEW FOWEY CONSOLS ENGINE HOUSE	07710 56120	1:50
9025	NEW FOWEY CONSOLS ENGINE HOUSE	07710 56120	1:50
9025	NEW FOWEY CONSOLS ENGINE HOUSE	07710 56120	1:50
9025	NEW FOWEY CONSOLS ENGINE HOUSE PLAN	07710 56120	1:50
9026	NEW FOWEY CONSOLS MAGAZINE	07750 56325	1:50
9027	LADY RASHLEIGH CONSOLS MINE BUILDING	06435 56485	1:50
9028	LADY RASHLEIGH CONSOLS MINE BUILDING	06460 56500	1:50
9029	ROCK MILL SMITHY ELEVATIONS	05805 56795	1:50
9029	ROCK MILL SMITHY PLAN	05805 56795	1:50
9030	STRUCTURE AT TOP OF INCLINE	06610 56720	1:50
9030	STRUCTURE AT TOP OF INCLINE	06610 56720	1:50
9031	COLCERROW QUARRY TRAMWAY PLAIN LINE	06275 57785	1:20
9031	COLCERROW QUARRY TRAMWAY BAULK ROAD	06280 57800	1:20
9032	COLCERROW SMITHY	06230 57620	1:50
9033	BUILDINGS ON COLCERROW TRAMWAY	06240 57500	1:50
9034	WHEELPIT ON COLCERROW TRAMWAY	06240 57500	1:50
9034	BUILDING ON COLCERROW TRAMWAY	06240 57520	1:50
9035	COTTAGE ABOVE PONTS MILL	07200 56150	1:50
9037	SOUTH PRIDEAUX WOOD MINE - CALCINER	06910 55500	1:50
9038	TREVANNY CLAY KILN	06550 56300	1:200
9050	TREVANNY CLAY KILN FIRE DOORS	06550 56300	1:10
9500	WHEEL PIT STONE MILL	06610 56720	1:100
9725	CAM BRIDGES LEAT RESERVOIR	05500 57300	1:100
9750	WHEAL TREFFRY / RESTINNIS	05600 55400	1:200
9775	SOUTH PRIDEAUX MINE	06900 55550	1:200
20300	MENACUDDLE WELL	01200 53350	1:20
20473	ST BLAZEY LOCO DEPOT ELEVATIONS	07300 53750	1:50
20473	ST BLAZEY LOCO DEPOT PLAN	07300 53750	1:200

ARTEFACTS

PRN	TITLE	SCALE
AF 9023	TRAMWHEEL NEAR ENTRANCE OF QUARRY	1:5
AF 9024	TRAMWHEEL - BASE OF QUARRY INCLINE	1:5
AF 9036	TREFFRY TRAMWAY SYSTEM - RAIL SECTIONS AND CHAIRS	1:1

DOCUMENTARY ARCHIVE (MAPS AND PLANS)

DDTF 891/2	BODIGO COMMON 1834
DDTF 1051	TRAMWAY & CANAL ca 1845
DDTF 2887/5	PONTS MILL 1830
DDTF 2892/1	ST BLAZEY BRIDGE (CANAL)
DDTF 2903	LESTOON & LAVREAN 1834
DDTF 2908/2	PAR 1835
DDTF 2896/1	PROPOSED RAILROAD 1833
DDTF 2918/1-8	PROPOSED RAILROAD 1839
DDTF 29182	PROPOSED RAILROAD 1839
DDTF 2925	PROPOSED RAILWAY 1845
DDTF 2926/2	BRIDGES DEPOT 1846
DDTF 2928/1	RESERVOIR 1846
DDTF 2937/1	CORN MINS RLY 1886
DDTF 2900	LAVREAN 1834
DDTF 2911	PAR 1835
DDTF 2907	PENPILLICK 1834
DDTF 2774	ST BLAZEY FOUNDRY
DDTF 3485	PONTS MILL 1920
DDTF 2960	PONTS MILL 1870
DDR 1289/2	BODIGGO 1839
DDR 1416/1-2	GATTY'S BRIDGE 1876
MRO 13232	NORTH FOWEY CONSOLS
MRO R313B	LADY RASHLEIGH CONSOLS 1881
AD 119/2	ST BLAZEY CONSOLS 1886
AD 119/1	PRIDEAUX WOOD 1886
DDX 484/1-2	FOWEY TRAMROAD 1824

APPENDIX C) BIBLIOGRAPHY

Allen John, History of the Borough of Liskeard, 1856, p 465

Barton DB, History of Copper Mining in Cornwall and Devon, 1978, p 13, 15, 26, 45, 58, 75, 77, 93

Barton DB, A Historical Survey of Mines and Mineral Railways of East Cornwall and West Devon, 1964, p18 - 25

Barton RM, A History of the Cornish China-Clay Industry, 1966 p 75 - 76, p 78 - 79, 61-64, 66, 80, 96--97, 109, 115

Barton RM, Life in Cornwall in the Early 19th Century, 1974

Barton RM, Life in Cornwall in the Middle 19th Century, 1974

Barton RM, Life in Cornwall in the Late 19th Century, 1974

Burrow JC & Thomas W, Mongst Mines and Miners, 1893

Cornwall Association of Local Historians, 1985, Oct 1985 No 10, 11 p 8-13 1984 OCT No 8 p 6-7

Cornwall and Devon Mining Directory, 1862, p 72, St Austell District

Davies & Gilbert, Parochial History Vol 3, 1838, p 5, p 55

De La Beche H, Geology of Devon, Cornwall and West Somerset, 1840

Devon & Cornwall Notes & Queries, Spring 1987, p 5-8

Dines HG, Metalliferous Mining Region of South West England, p 531 - 539, p 567

Flower PW, A History of the Trade in Tin, 1880

Gerrard GAM, The Early Cornish Tin Industry, 1986

Hadfield Charles, Canals of South West England, 1967 p 173 - 174

Hamilton-Jenkin AK, Mines & Miners of Cornwall Vol 14, 1967 p 5-17, 19, 23-37, 23-46

Harris GF, Granite and our Granite Industries, 1888 p 42-47

Henderson Charles, Essays in Cornish History, 1935
p 61-67, 108, 112, 114

Henderson Charles, Old Cornish Bridges, 1928, p 82-83

Henwood George, Cornwall Mines & Miners, 1972, p9, 19, 31, 33, 37, 42, 44, 52, 55, 57, 66-69, 90-92, 96-97, 209, 211, 214, 220, 256

Hitchens & Drew, History of Cornwall Vol 1, 1824
p 75, p 622 Vol II p 75

Industrial Archaeology Review, Vol 7, no 2 Spring 1985

Keast John , The Story of Fowey

Keast John , The King Of Mid Cornwall, 1982

Lake, Parochial History of Cornwall Vol 3, 1870
p 185, 193 - 194

May SC, A History of the Railway, Fowey to Newquay 1830 - 1896, 1982 p 7-10

Mining World, 1881 (3.12, 24.12), 1873 (25.10, 22.11, 6.12)

Mining Journal:

1835: Oct 31; Nov 21, p105; Nov 28, p115.
1836: Sep 3.
1838: Jan 6; Mar 31.
1839: Jan 5, p3; Jun 1, p173; Jun 8, p177; Jun 22, p193; Jul 20, p27; Aug 3.
1840: Feb 22, p62; Jul 11, p220.
1843: Apr 22, p136; Aug 5, p253; Sep 9, p288; Nov 18, p376; Dec 9, p404.
1844: May 25, p169, 179.
1849: Feb 6.
1850: Feb 2, p54; Jul 20, p345; Oct 26, p510.
1860: Feb 18, p113; Apr 7; Apr 14, p225.
1863: Oct 12; Oct 17; Oct 24.
1868: Jan 2.
1873: Jul 12, p759; Jul 26, p821.
1876: Jan 8, p153; Jan 29, p128; May 2, p1137; May 27; Oct 2; Oct 7, p1258; Oct 14, p1137; Nov 18; Dec 2; Dec 23.
1910: Mar 10.

Pearse Richard, The Ports and Harbours of Cornwall, 1964
p 37, 43, 47 - 49

Penaluna, Historical Survey of The County of Cornwall, 1819, p 45, 56, 261, 333

Penderhill-Church John, The China-Clay Industry: A brief Historical Survey From 1746 to Present Day

Polwhele Richard, Cornwall Vol 5,6,7, 1978

RCSC, Mining & Shoreline Evolution nr St Austell Vol 19, 1959-1960

Rideout Adelaide, The Treffry Family, 1984

Roddis Roland, Cornish Harbours, 1951, p 39, 40

Rowe J, Cornwall in the Age of the Industrial Revolution, 1953, p 142, 144, 158, 305, 307, 325, 204, 324, 22-30

Royal Cornwall Gazette:

1825: Mar 26; Jun 13; Jun 25; July 1.
1826: Jan 14; Jan 18; Mar 11; Jul 29; Aug 19.
1829: Jul 29.
1830: Oct 28; Dec 11.
1832: Jan 17; Mar 2; Apr 7; May 5; Jun 19; Jul 19; Jul 23; Sept 15; Dec 7.
1833: Jan 19; Jan 26; Feb 2; Feb 9; Feb 16; Mar 6; May 11; Jun 8; Jul 9; Dec 25.
1835: Apr 25; Jun 13; Jul 25; Oct 30; Nov 6; Nov 20.
1839: Mar 29; May 10.
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1852: Sept 24; Oct 8; Oct 29; Nov 5; Nov 15; Nov 19; Nov 26.
1863: Jan 16; Jan 23; Feb 27; Mar 27; Apr 24; May 1; May 20; Jul 3; Jul 17; Jul 24; Aug 7; Aug 21; Sept 14; Oct 12; Oct 17; Oct 30; Nov 6.
1868: Jan 2; Jun 3; Jul 16; Jul 23; Nov 26; Dec 10.
1874: Mar 28; Apr 4; May 2; May 16.
1887: Feb 25.
1910: Mar 10.

Spargo Thomas, Statistics and Observations on the Mines of Cornwall and Devon Vol 3,4, 1864

Spargo Thomas, The Mines of Cornwall 1865, 1865 p 14 - 16, 18

Stanier Peter, The Granite Quarrying Industry in Devon & Cornwall 1800 - 1900

Stone Trades Journal, 1908, Aug p 60, Nov p 157, 1909, Jan p221, 1911, p60, p 365, p794 Jun 1909 p 365

Thomas Charles, Mining Fields of the West, 1871

Todd A.C & Laws P, Industrial Archaeology of Cornwall, 1972 90/109, 111/112, 119/120,39, 75-76, 5, 97-102

Burt Roger, Cornish Mines, 1987, p10, 11-13, 15-29, 42, 115, 189-190, 274, 391--392, 452

Watson JY, A Compendium of British Mining, 1843, chap 1,2,3,7

West Briton:

1818: Jul 24.
1830: Apr 2.
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1832: Jul 6; Jul 27; Aug 24; Sept 7; Sept 21; Nov 23; Nov 30.
1833: Jan 11; Jan 18; Jan 25; Feb 1; Feb 8; Feb 15; Jun 7; Jul 12; Aug 9; Nov 15; Nov 22.
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1839: Mar 15; Jun 21.
1840: Aug 7.
1841: Apr 9; Apr 30.
1843: Mar 10.
1845: Jul 11.
1847: Aug 6.
1848: Sept 15.
1850: Feb 1.
1851: Nov 21.
1852: Jun 25.
1853: Apr 29.
1855: Oct 26.
1857: Jun 12; Jul 10; Oct 2.
1858: Jul 9.
1860: Apr 6.
1861: Dec 27.
1865: Aug 11.
1866: May 18.
1872: Dec 16.
1874: Jun 4.
1875: Apr 12.

Woodfin RJ, The Cornwall Railway, 1959, p 9

Worth RN, Sketch of the Life of William West of Tredenham, 1880, p 32 - 35, 14, 21, 49, 57.

APPENDIX D) ACKNOWLEDGEMENTS

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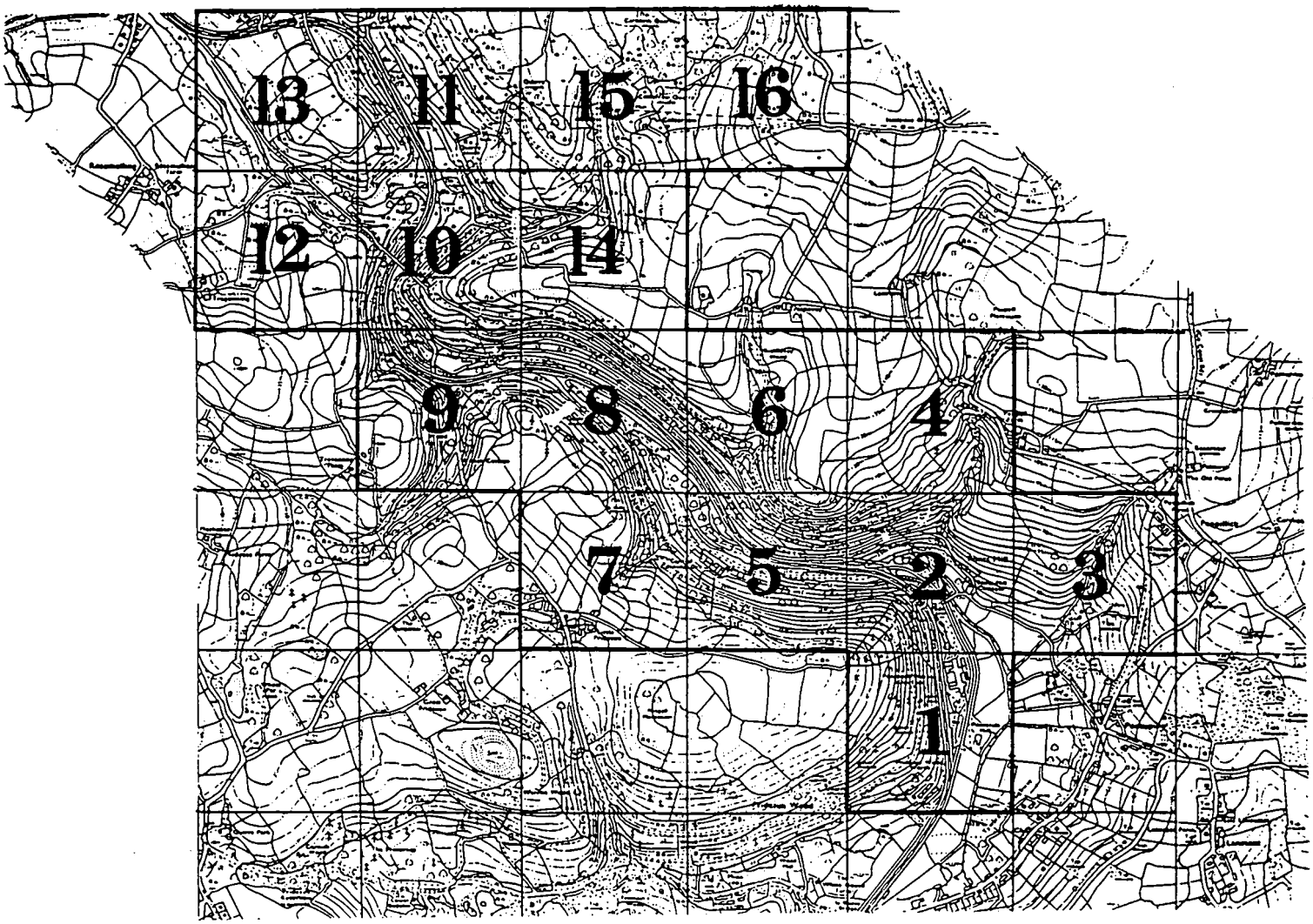
APPENDIX E) SURVEY PLANS (1:2500)

The following plans are copies of the 1:1000 Surveys produced by the Project, reduced to a scale of 1:2500 for reproduction in this Report. The originals are stored in the archive of the Cornwall Archaeological Unit, Truro.

1:2500 Plans
Key Map



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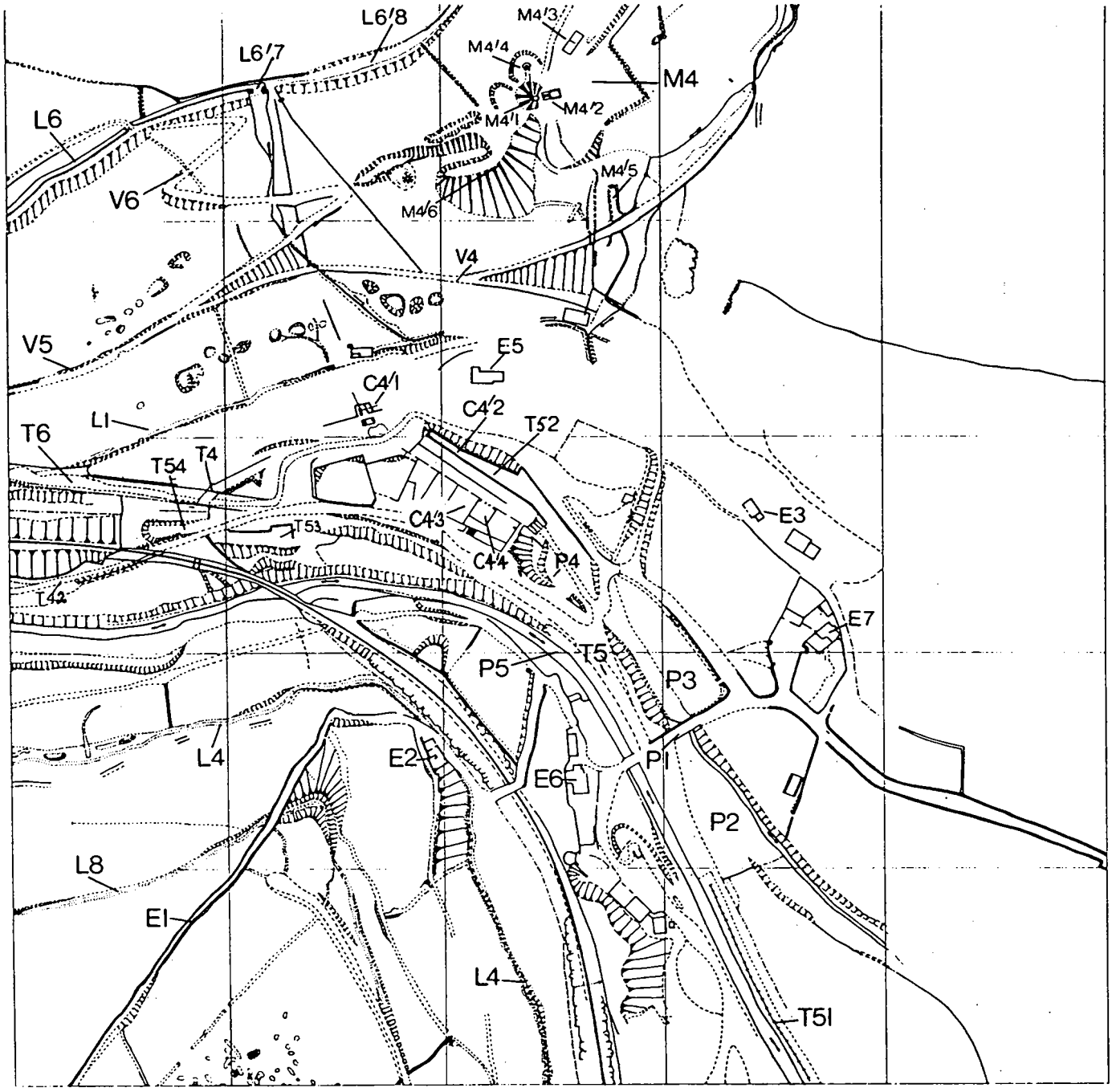
Prideaux Wood



Plan 2
Ponts Mill

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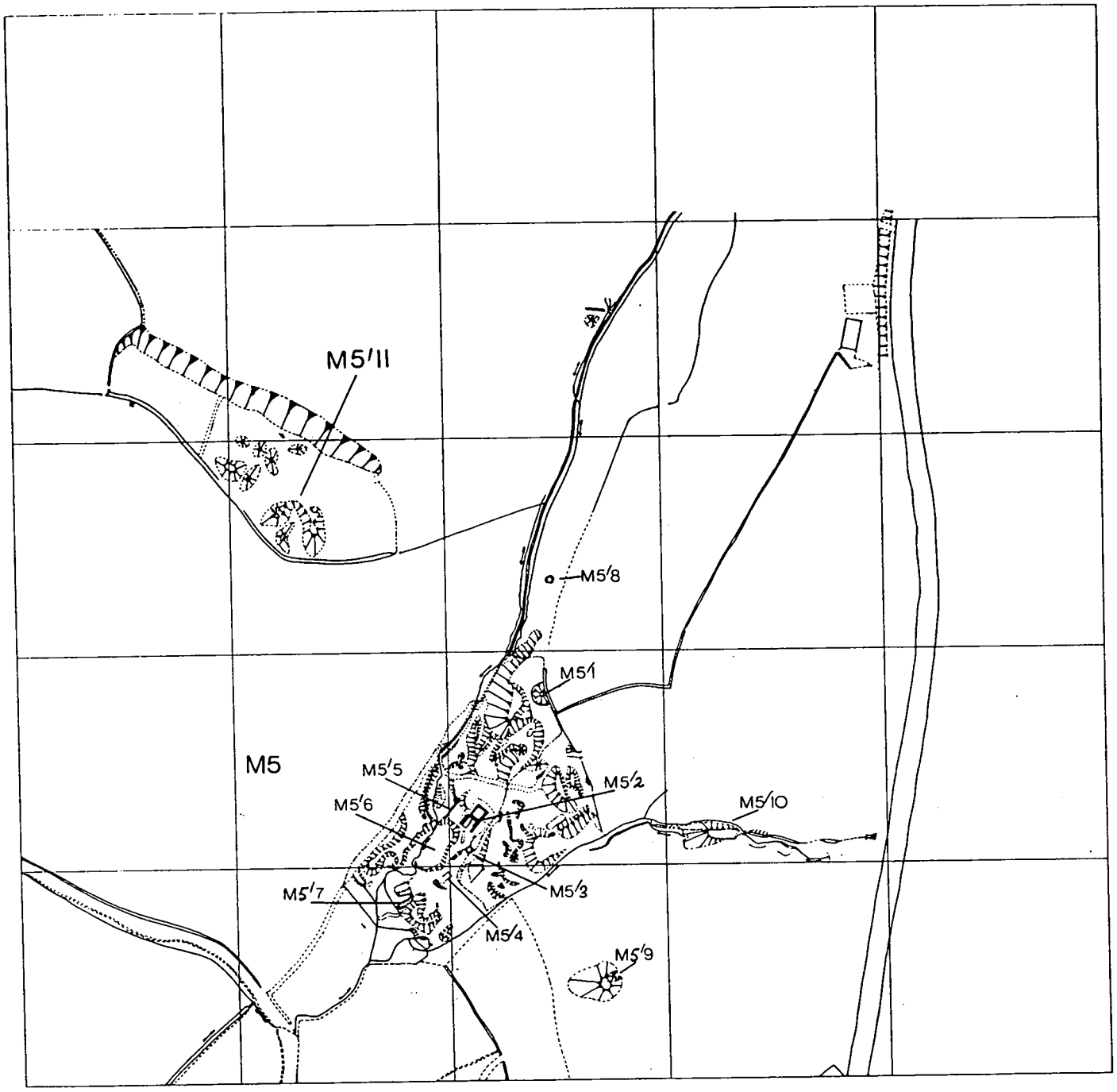
LUXULYAN VALLEY



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Penpillick

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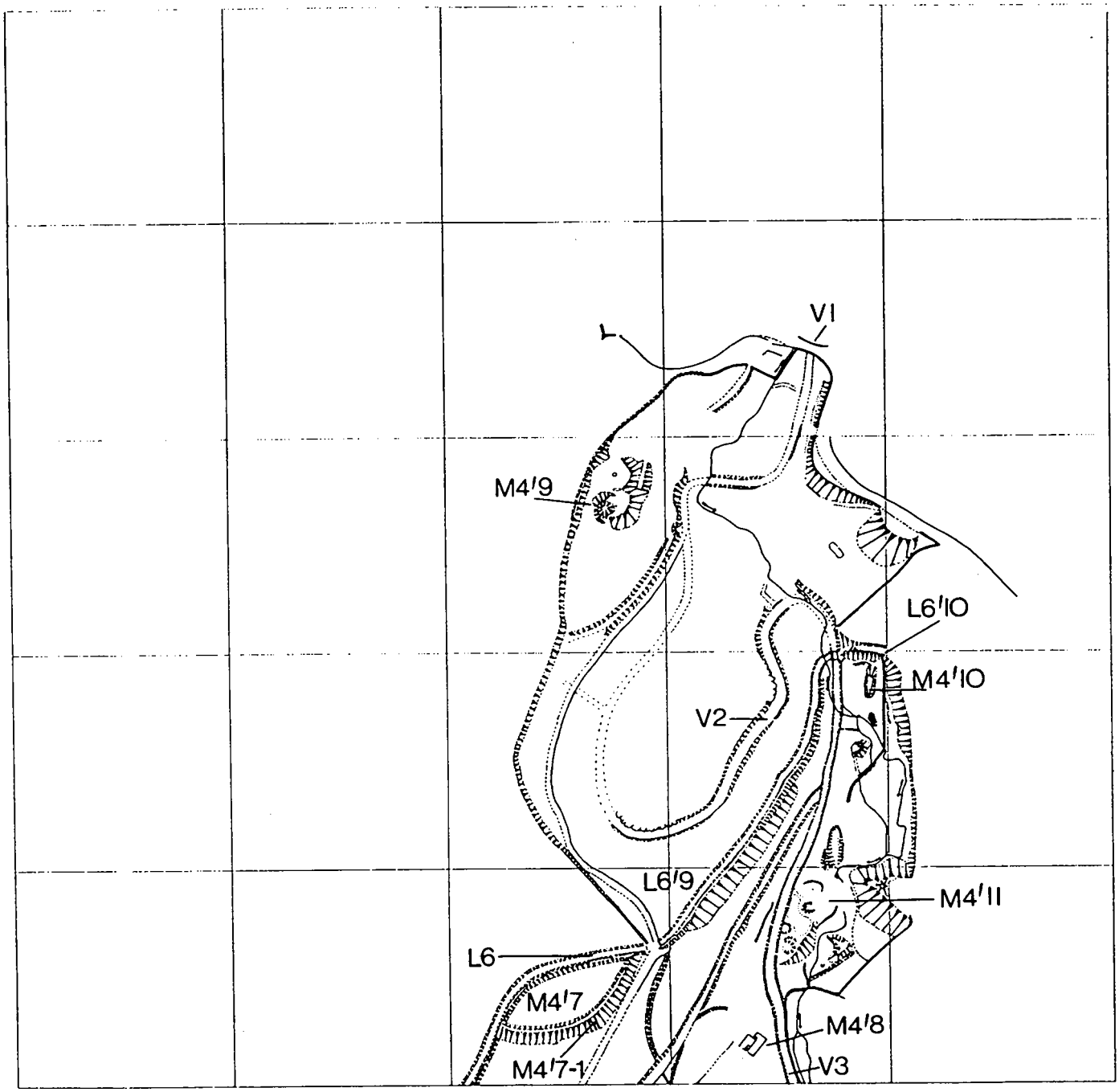

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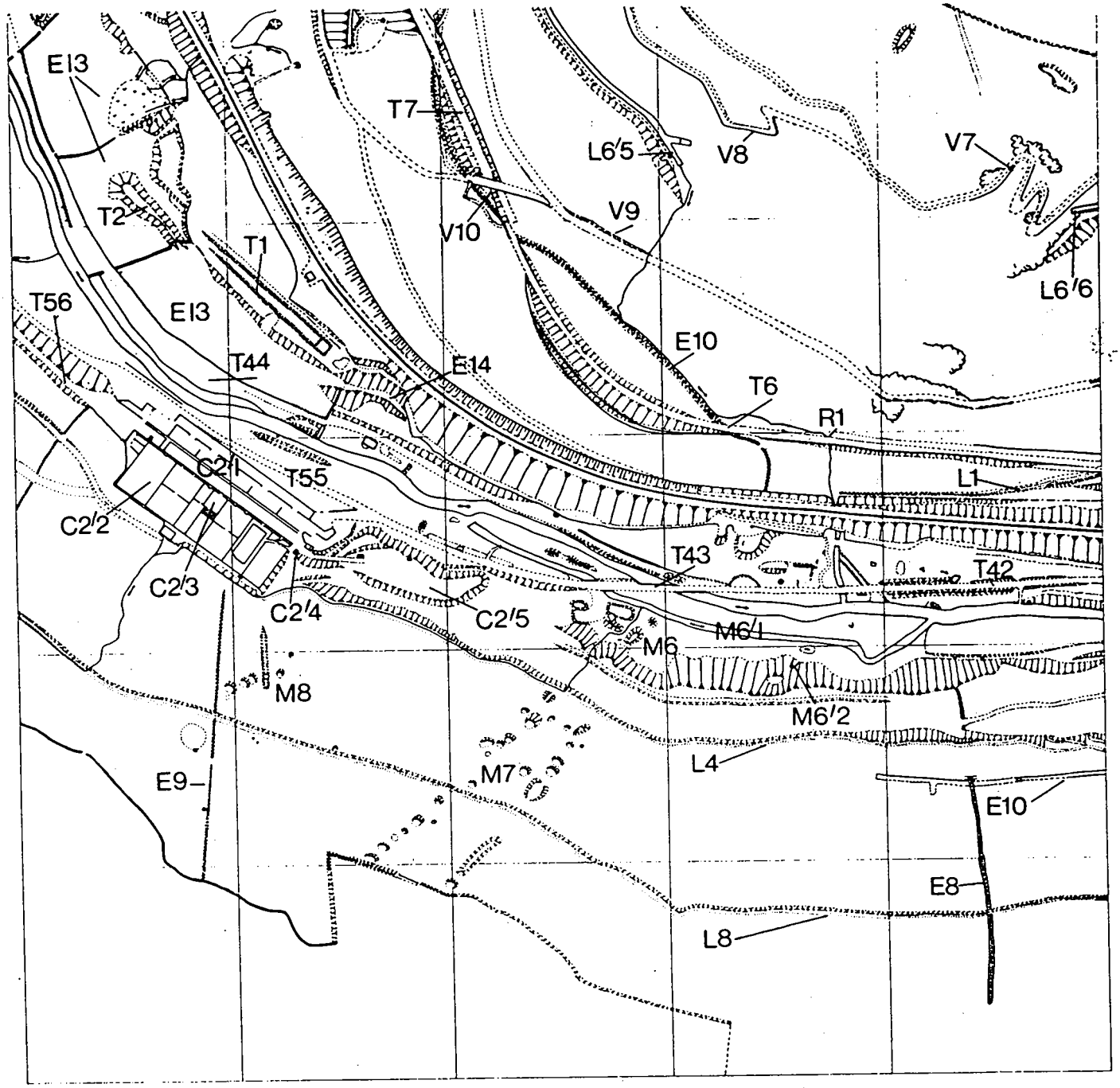
Penpell



Plan 5
Carmears

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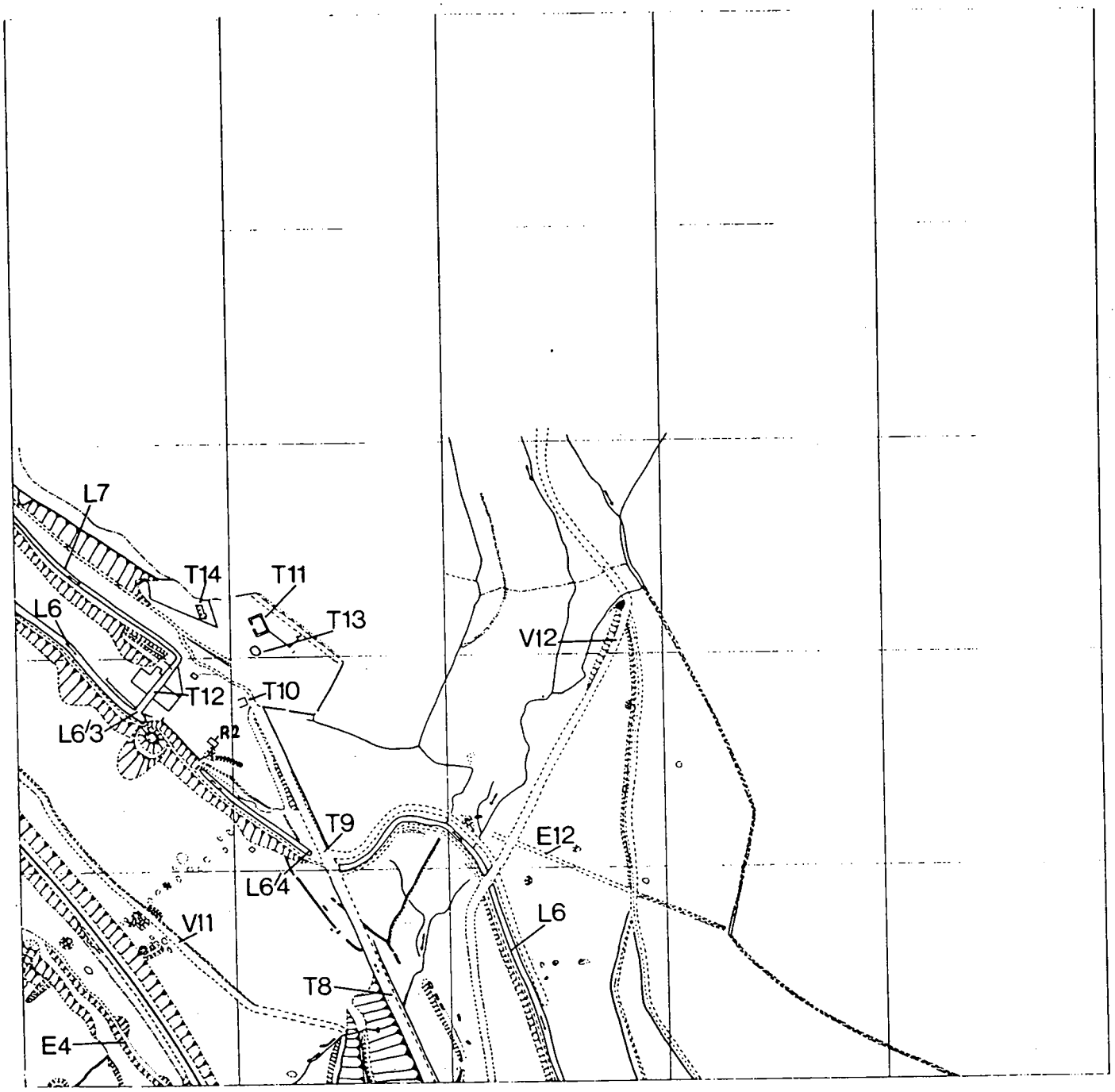

Plan 6
Trethevey

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LUXULYAN VALLEY

Plan 7
Little Prideaux

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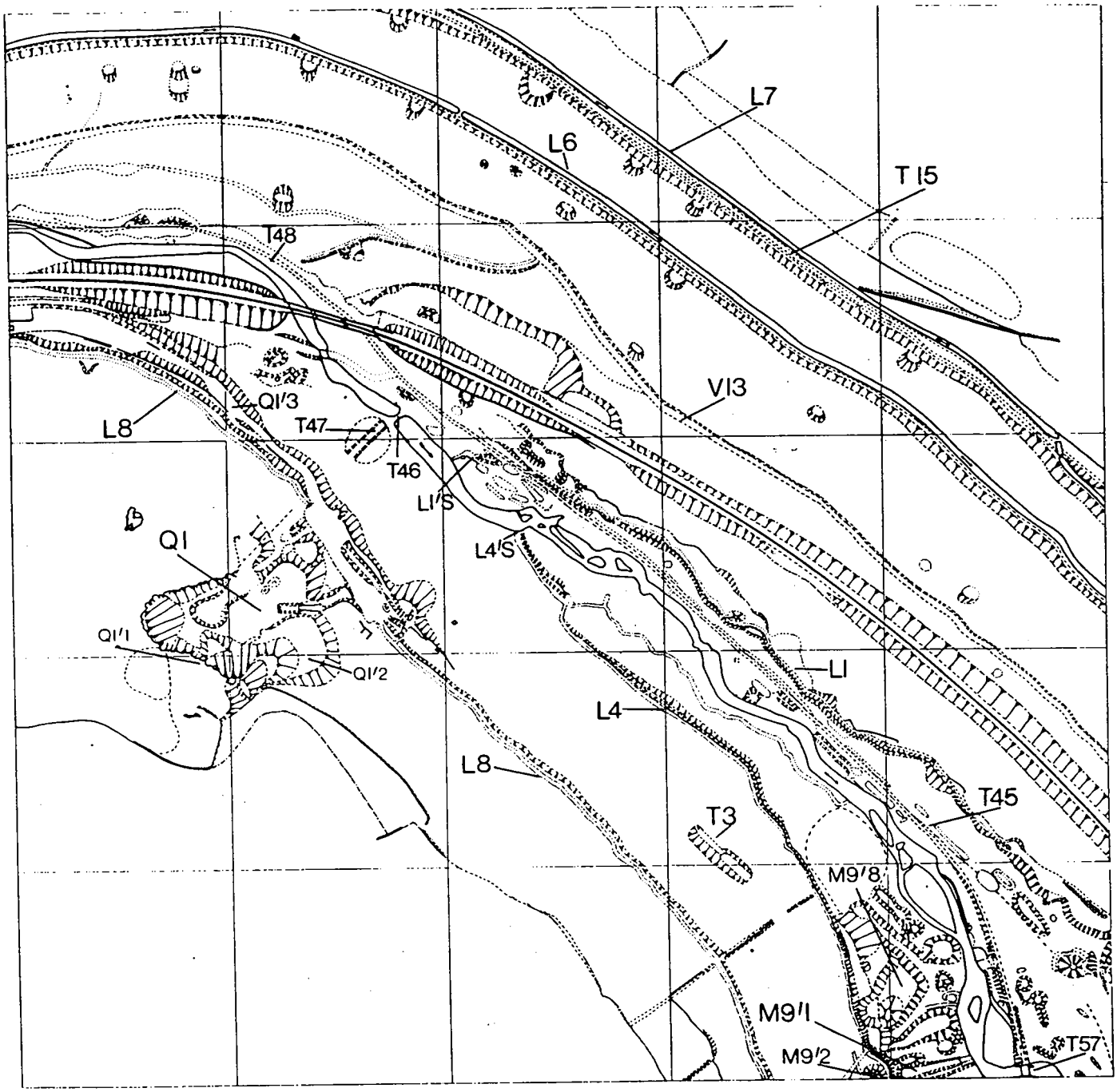

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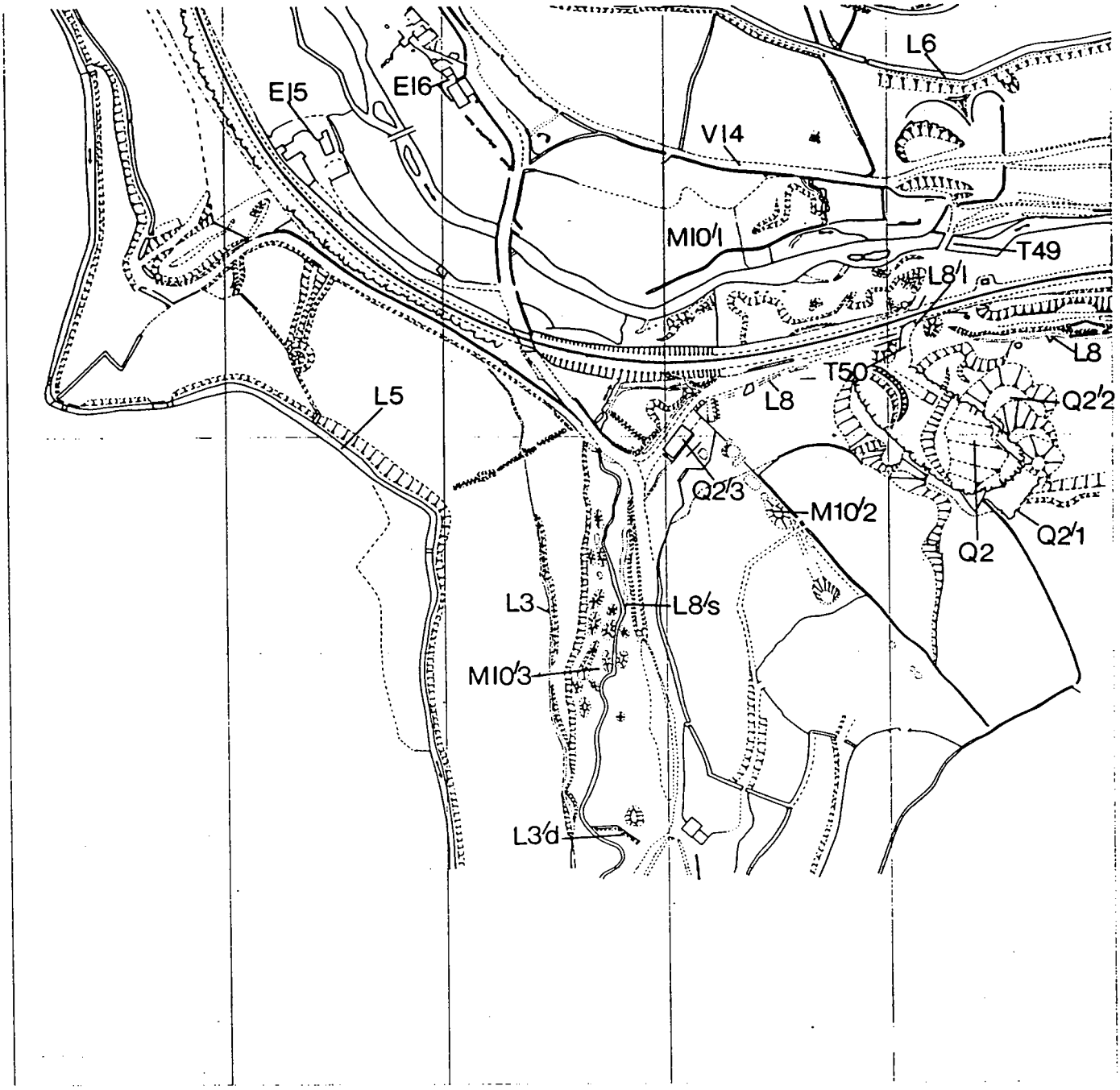
Middle Valley



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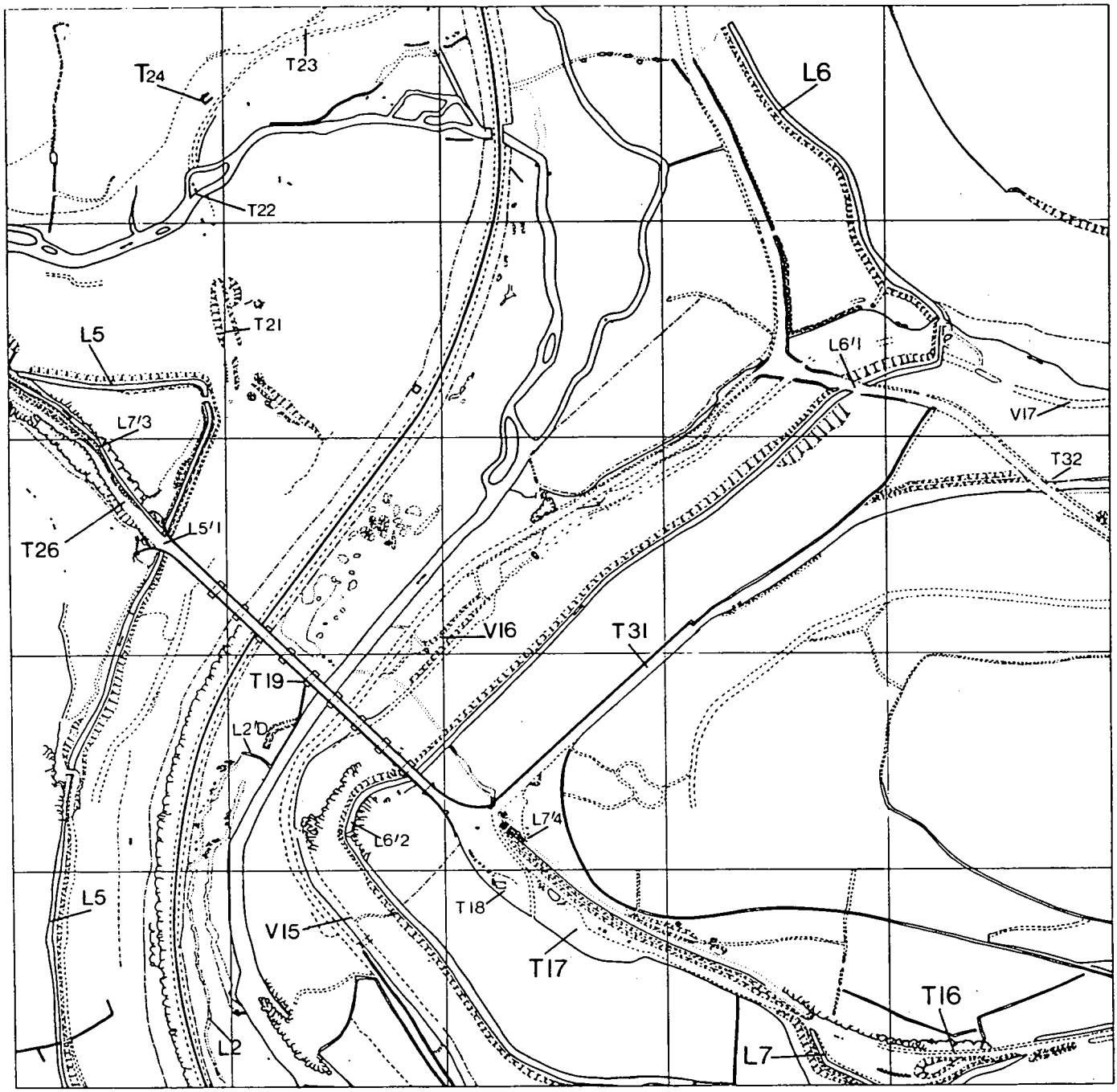
Rock Mill



Plan 10
Treffry Viaduct

Plan II
Gatty's Bridge

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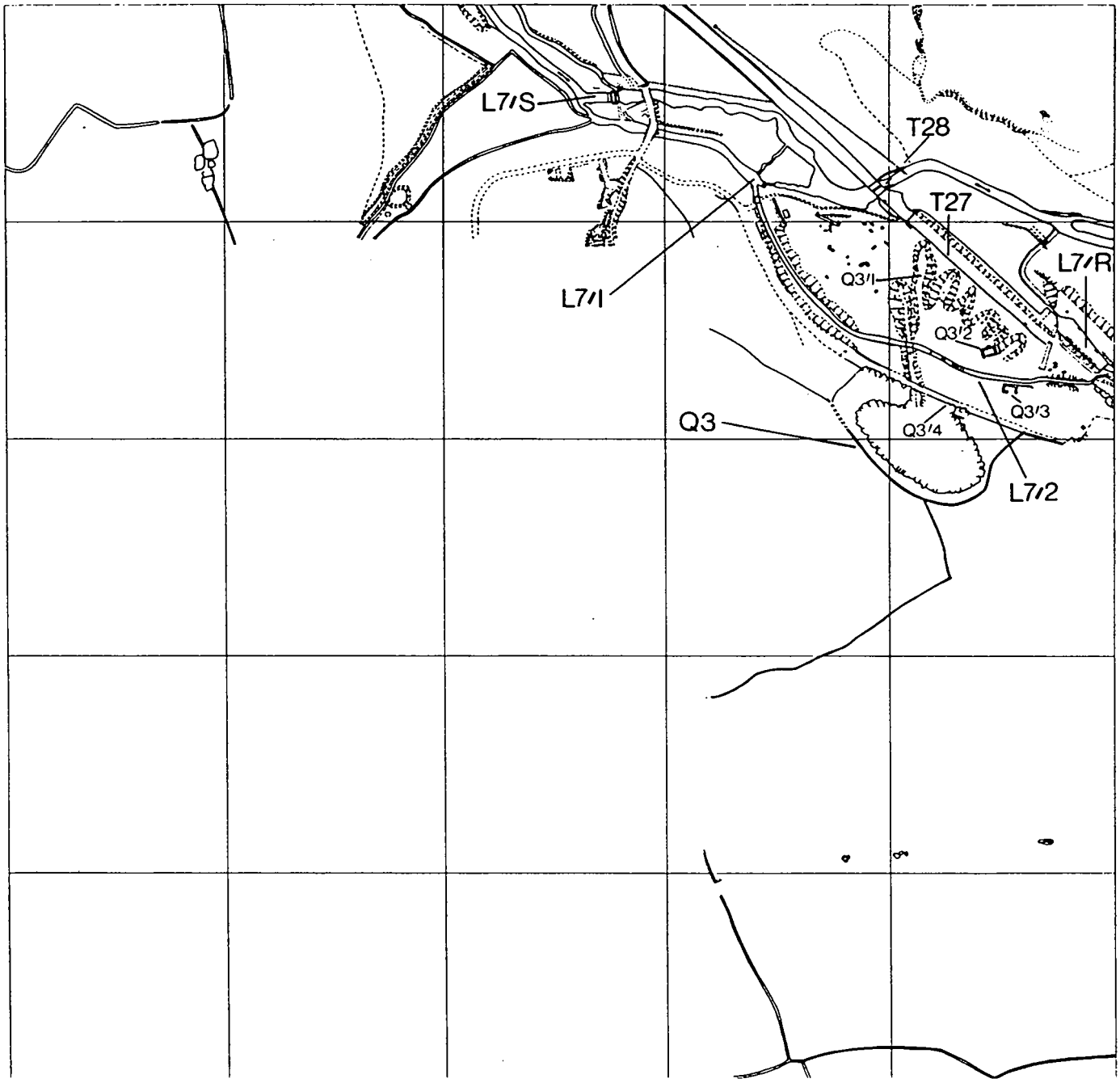
LUXULYAN VALLEY



Plan 12
Cam Bridges

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LUXULYAN VALLEY

Plan 13
Luxulyan

Plan 14
Lower Colcerrow

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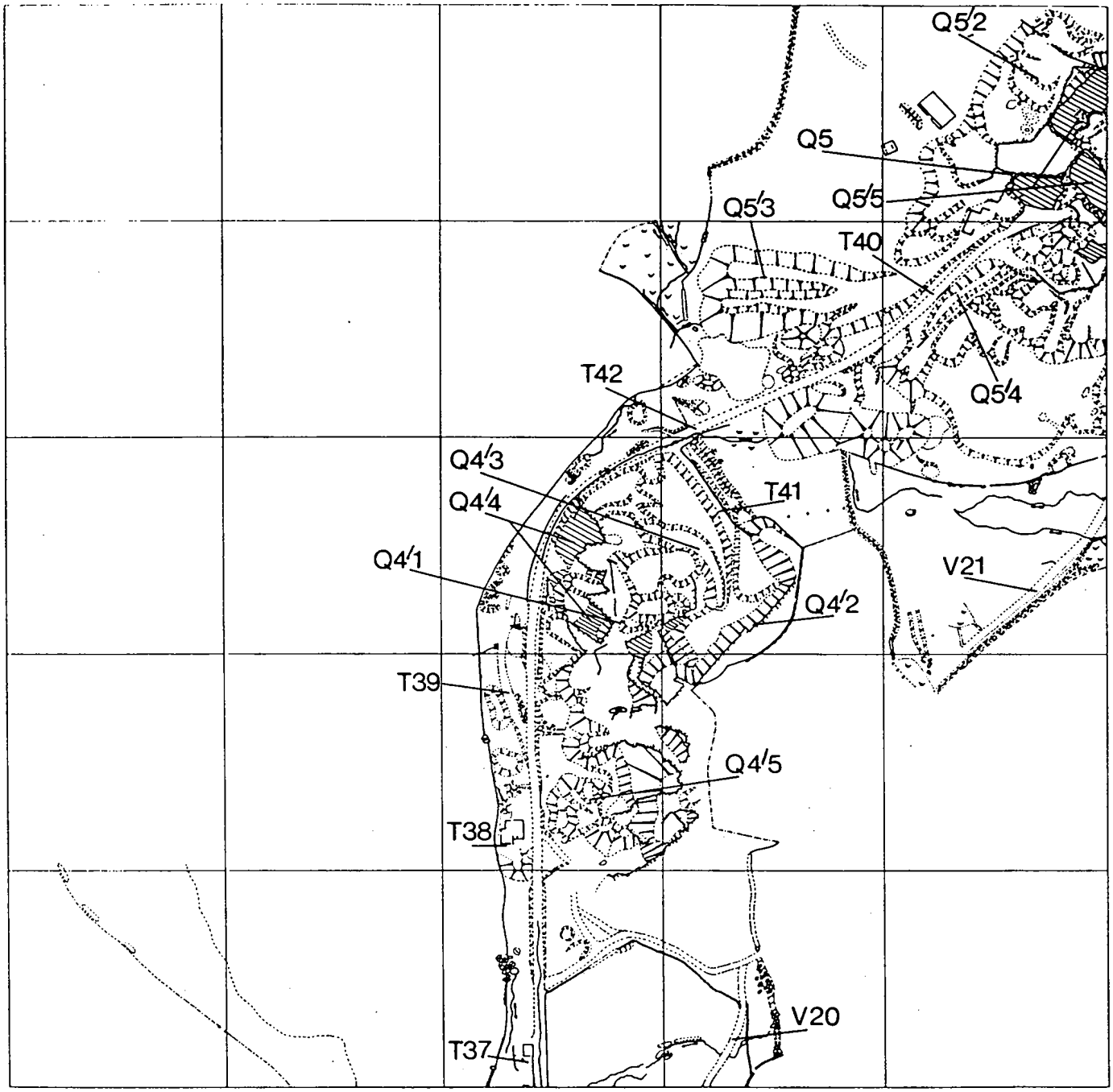

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Colcerrow

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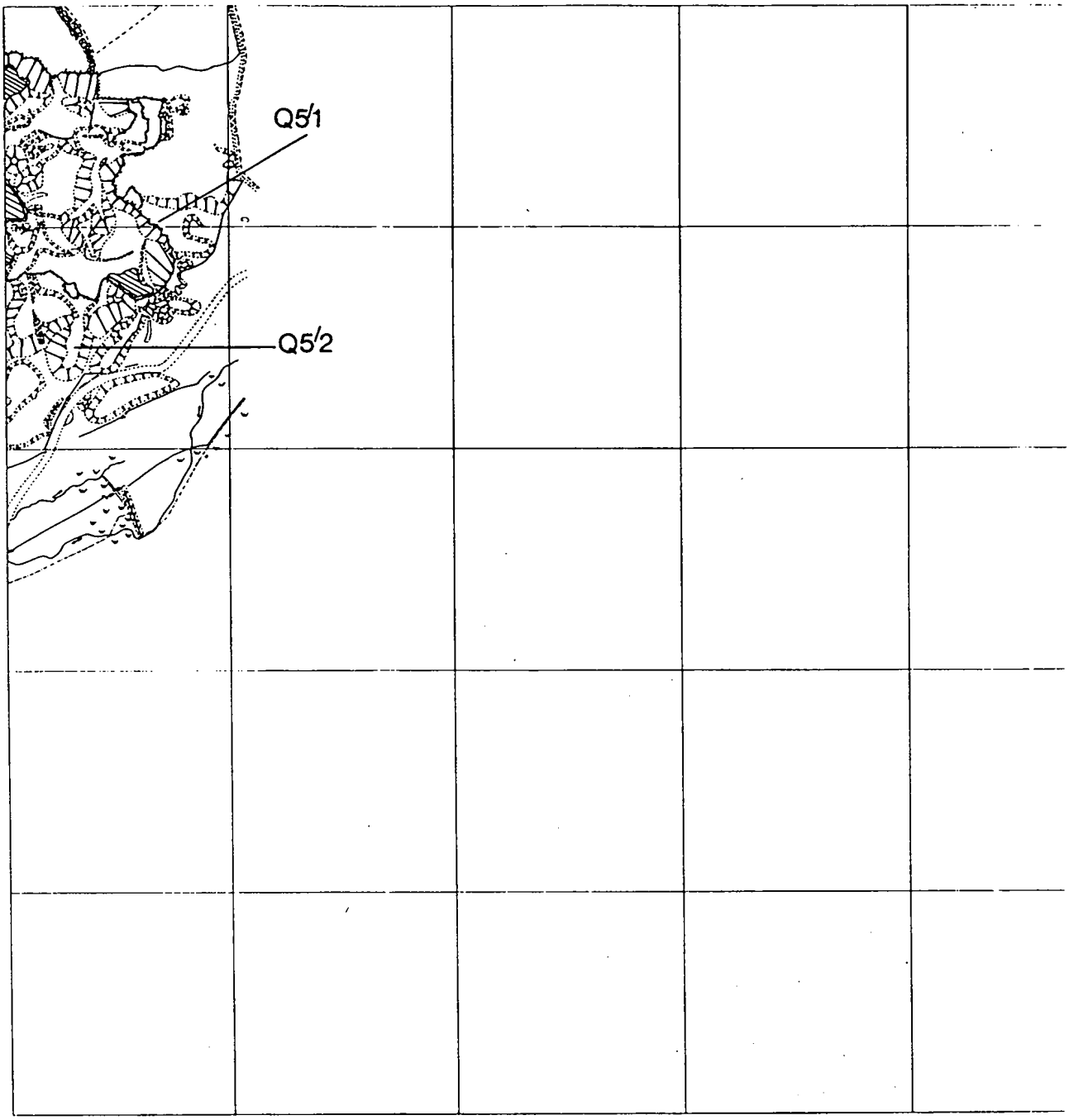

Plan 16
Colcerrow