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THE

DOROTHEA SLATE QUARRY

c. 1828-1970

Gwynfor Pierce Jones

M.A. (Ordinary) Candidature, University of Wales, 1980

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SYNOPSIS OF "THE DOROTHEA SLATE QUARRY c.1823-1970"

The Nantlle Valley, near Caernarfon, was one of the centres of the North Wales slate industry. About twenty separate quarries once operated within an area of some two square miles, and this thesis is a monograph of the largest concern, the Dorothea Quarry.

Part I is a chronological history of the quarry from its opening c.1823 to its closure in 1970. The early development was carried out by William Turner, of Caernarfon, a noted local entrepreneur. He sold the lease in 1848 to a company largely made up of farmers and quarrymen. By 1860, one John Hughes Williams had acquired a controlling interest, and his successors remained the major shareholding group for the remainder of the operating life of the concern.

The next section, Part II, contains a description of the Dorothea site. A geological survey is followed by a discussion of the development of the workings, with a description of the main features. Plans and drawings are appended.

Part III A-E is a collection of discussions on a variety of individual subjects relating to the working and trading practices at Dorothea, with an emphasis on identifying the problems encountered, and evaluating to what extent these were overcome. The topics in the sub-sections are as follows:

A. Quarrying techniques, mechanisation, haulage and pumping, details of mineral and water leases, and legal actions;

B. Production problems, mechanisation, power sources, and waste disposal;

C. Sources of capital, analysis of financial and production statistics;

D. Sales organisation, advertising, marketing, and diversification of produce;

E. Transport outlets (roads and railways).

In the final section, Part IV, the social and working conditions of the workforce, management, and owners, are discussed. This includes the structure of the workforce and management, industrial relations, health and safety, housing, commerce, and social ammenities.

ACKNOWLEDGEMENTS

The author is especially indebted to Mr. M.J.B. Wynne Williams for waiving the 30-year embargo on the Dorothea Company papers, making available private documents, and providing detailed reminiscences of his period as managing director. I also wish to thank the archives staff at the Gwynedd Archives Service, Caernarfon, and at U.C.N.W., Bangor, and to the following ex-quarrymen who provided invaluable oral evidence:- Messrs. Tecwyn Griffiths, Ifor Hughes, Owen Humphries, Lefi Jones, and Gwilym Roberts. Mr. Gwilym T. Jones, of U.C.N.W. School of Education, gave valuable advice on the production of the maps. I wish to express my gratitude to my tutors, Mr. W.P. Griffith and the late Mr. Keith Williams Jones for their unfailing and meticulous attention.

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DECLARATION

I declare that the contents are entirely the result of my own investigation except where indicated by quotations and footnotes.

This work has not been accepted in substance for any degree, nor is it being concurrently submitted in candidature for any degree.

Signed: .....

THE DOROTHEA SLATE QUARRY 1828 - 1970.

INTRODUCTION.

The Cambrian and Ordovician rocks of north-west Wales contain several beds of slate, a rock derived from clay sediments which weresubstantially altered during earth-movements some 200 million years ago. The intense heat and pressure within the earth's crust had profound effects on the deeply-buried claystones, modifying both their physical and chemical characteristics.[1] The net physical transformation was a compaction of the clay constituent particles, so as to align their longest dimensions in a common plane, at right angles to the direction of the applied pressure; the most profound chemical change was the formation of new minerals within the claystone, especially mica, whose flakey crystals assumed an identical alignment to the clay particles. The new rock, slate, bore little resemblance to the parent claystone, which was probably a rather soft, crumbly material, similar to mudstone. Slate is a relatively hard, strong fissile rock which exhibits the physical characteristic of cleavage: this is a tendency to split preferentially in one plane not necessarily related to the bedding plane. Several rocks exhibit cleavage, notably shale and flagstones, but that in slate is particularly well developed, and in the best commercial deposits the rock can be split into large strong sheets, only 1/16" thick,[2] which proved an ideal roofing material.[3]

Slates have been used for roofing, flooring and building since at least Roman times[4], though little is known about the quarrying activities up to the eighteenth century. Undoubtedly, the first excavations for slate were on rock outcrops, where the action of frost had partially shattered the rock, aiding its removal; possibly the natural slabs produced by weathering processes first demonstrated to man the presence of cleavage in the rock, and brought to his attention the potential uses of the material. One of the earliest quarries was on Cilgwyn mountain, in the Nantlle valley, some 7 miles south of Caernarfon. Slates that roofed the house of a native Welsh prince at

Nantlle, in the thirteenth century, had probably been quarried from Cilgwyn[5]. By the eighteenth century cottagers on the Crown upland commons of north Caernarfonshire, (including Cilgwyn), freely quarried slate in small excavations, primarily for their own private use. Eventually, groups of workers became full-time quarrymen,[6] but working remained very disorganised and undisciplined.

Dr. Jean Lindsay surmises that, up to the nineteenth century, the use of slate in North Wales was restricted to the immediate neighbourhood of the source of the material, due to the inadequate means of transportation available[7]. However, as the main quarrying areas were relatively close to the coast, an export trade was in existance by the sixteenth century. In 1587 some 100,000 roofing slates were sent to Ireland from the small ports of Beamaris, Caernarfon and Conway. By the eighteenth century, trade had greatly increased; 2,500,000 slates were exported in an 18 month period between June 1729 and December 1730[8]. Thereafter, the trade has experienced a multitude of fluctuations and changing fortunes, closely following the trends of the building industry both at home and abroad; international politics, in the form of tarriffs and wars have also had an important role in shaping the economic history of the slate industry.

Once the scale of business of the 'cottage' slate industry increased to a moderate level, the local landowners and entrepreneurs secured an almost absolute control of the quarries, and a recognisable disciplined industry evolved within a relatively short period. The first landowner to take over the control of quarries from his tenants was Richard Pennant, the first lord Penrhyn, in 1782. In 1787 the quarries on the Glidir mountain near Llanberis, were taken on lease from Thomas Assheton Smith, the lord of the manor, by a private partnership, and the old Diphwys Quarry, near Ffestiniog, was leased to William Turner & Co., from 1799. Unorganised working at Nantlle came to

an end in April 1800, when John Evans & Co., obtained a Crown lease of the Cilgwyn Quarries[9]. Thereafter, the majority of slate quarries were worked by individuals such as Lord Penrhyn and Thomas Assheton Smith, or by companies drawing most of their capital from England; there are relatively few examples of Welsh capital invested in the industry, and the Dorothea Slate Quarry Company was one of the leaders of this category.

The most productive slate quarrying areas of Caernarvonshire lie on the same rock strata, a series of beds running from the parish of Llanllyfni, seven miles south of Caernarfon, north-eastwards to the parish of Llanllechid, three miles east of Bangor. This slate range crosses the foothills of Snowdonia, and is dissected by four glacial valleys, three of which were important slate-producing areas, viz:- (a) the Ogwen valley, centred on Bethesda, where the massive Penrhyn quarry is situated; (b) the Llanberis district, containing a number of quarries, of which the Dinorwic was equal in size to Penrhyn; (c) the Cwyrfai valley, whose several small quarries did not develop mainly due to the narrowness of the slate beds at this location; and (d) the Nantlle valley, containing a plethora of quarries ranging in size from under 5 workers to some employing over 500 men (see Appendix I, Table I: Employment statistics). The Nantlle area closely resembles the Ffestiniog region in having a large number of economic units closely packed in a relatively small area.

The existance of a multitude of quarries in the Nantlle valley and Ffestiniog, compared to Bethesda and Llanberis, which were dominated by the Penrhyn and Dinorwic Quarries respectively, was a factor of land ownership. In the last two cases, the majority of the land was owned by two estates whilst at Nantlle, e.g., the land was divided between a number of landowners, each of whom leased their properties to different quarrying companies; some even subdivided their estates in an effort to increase the revenue from rents and royalties. Thus, the eight largest Nantlle quarries are located within

an area measuring about ¼ square mile, and after the mid-nineteenth century a critical shortage of tipping space occurred. The scale of the problem can be gauged by considering the 1890s, when the average production of the Nantlle region was 47,000 tons; assuming a 1:20 ratio of finished slate to debris, some 940,000 tons of debris had to be disposed of annually[10]. Most of the largest quarries were eventually forced to tip debris on top of their future slate reserves, so as to continue working in the short-term. However, this was instrumental in sealing the fate of those concerns, and by the twentieth century, when the old reserves had virtually been worked out, only a few quarries were in a position to continue in business by opening new workings.

A total of 29 quarries were opened in the Nantlle valley, though the maximum number at work in the peak year (1898) was 21. They can be classified in three distinct categories, according to their average output and the mean number of workmen (see Appendix 1, Table 2). Eighteen quarries were very minor concerns, producing less than 2,000 tons per annum and employing less than 100 men during an irregular period; several never developed beyond initial trial excavations, and others only worked during periods of good trade.

The second category is that of quarries producing 2,000 - 4,000 tons per annum, with a workforce of up to 250 men. Due to their relatively small size the seven quarries in this class show marked fluctuations in their fortunes, and generally experienced several changes of proprietors.

Whilst not insulated against the effects of trade fluctuations, the remaining four quarries - Cilgwyn, Dorothea, Pen-yr-orsedd and Tal-y-sarn, were larger than the rest, and their proprietors had greater financial reserves with which to weather the storms. Thus, these four quarries were consistently in a higher category than the other Nantlle quarries, as can be

shown from statistical examination of employment and production data (see Appendix I, Tables 3, 4) ; this group produced from 4,000 - 17,000 tons annually, and employed up to about 500 men.

The special factors at Nantile, discussed earlier, led to the evolution of a distinct type of quarrying technology, which developed to conteract the geological and human problems. One company in particular, the Dorothea Slate Quarry Company (later Limited), had to contend with almost every conceivable problem associated with the Nantile system of quarrying - rockfalls, flooding, haulage, lack of tipping space -, and also pioneered the introduction of modern machinery into the industry. Practically the whole course of the development of slate quarrying in the Nantile valley can be traced in, and described by, the history of the Dorothea quarry.

Fortunately, more survives of Dorothea than any other abandoned quarry in the area. The records of almost all the Nantile quarries have largely disappeared long ago, but the Dorothea quarry records have been deposited in the Gwynedd Archives, Caernarfon; these date from 1849 - 1970, and cover all aspects of quarrying from quarrying data, pay-books, sales, plant and machinery, to company finance and shares. In addition, the quarry has only recently closed, and thus many details not explained in documents can be verified by former workers and management. Also, the quarry site is well preserved, albeit derelict, and the layout of the buildings and site of machinery can be examined in detail. This is in contrast to many Nantile quarries, where abandoned buildings were demolished by sub-contractors, mainly unemployed quarrymen, during the 1920s - 30s, producing small slates for damp-proof courses. Thus the Cilgwyn, Coedmadog, Cloddfa'r Coed, Cloddfa'r Lon, Tan-yr-allt and Tal-y-sarn quarries are barren ground for the industrial archaeologist.

For these reasons, the Dorothea quarry, Nantile, was selected for study,

following the general pattern laid down by Lewis and Denton *et al* in their monograph of the Rhosydd slate mine, Blaenau Ffestiniog.[11]

INTRODUCTION: Notes.

1. This process is termed metamorphosis.
2. The actual size of a sheet depends upon the distance between vertical, horizontal, and oblique joints in the rock body. Although cleavage is important in determining the commercial value of slate-rock (the marketable 'quality' being partly dependent on the thickness of the product), the distance between the joints in the parent-rock is equally important.
3. See F.J. North, The Slates of Wales, (Cardiff, 1927).
4. See J. Lindsay,: History of the North Wales Slate Industry, (Newton Abbot, 1974), p. 18.
5. Loc. int., This fact is found in various local histories, but the original source was W.A. Ambrose, Hynafiaethau Nant Nantlle, (Tal-y-sarn, 1872), quoting Rev. J. Jones, vicar of Llanllyfni, who cited a manuscript dating from Edward I st's occupation of that house in May, 1283; the document was said to specifically mention the slated roof.
6. W.A. Ambrose, ibid., chapter on 'Y Llechgloddfeydd'.
7. J. Lindsay, op.cit., p.19.
8. ibid., pp. 24-6.
9. ibid., pp. 43-4.
10. Gwynedd Archives Service, Caernarfon office (hereafter GAS.), Dorothea MS 5, statistics of slate shipments from Nantle station, 1882-1913.
11. GAS., Dolgellau Record Office; and
M.J.T. Lewis and J. Denton, The Rhosydd Slate Quarry, (Shrewsbury, 1974).

PART I

CONCISE CHRONOLOGICAL HISTORY OF THE DOROTHEA QUARRY

(i). Early Workings: 1823-5, 1828-48.

The Dorothea slate quarry lies halfway between the Villages of Tal-y-sarn and Nantile, on low-lying land, at a central position in the Nantile Valley. This valley is a typically glaciated trough running directly east-west from a narrow coastal plain, some four miles into the foothills of Snowdonia. At its western end, the alluvial floor of the valley is about two miles wide, but tapers rapidly into a narrow eastern end, from which a high pass leads into the Gwyrfai Valley. The southern boundary is marked by the 2,000 ft. high Nantile ridge, a chain of four peaks, whilst the northern slopes are more gentle: north of the valley is a plateau of the Cilgwyn and Moeltryfan 'mountain' (1,000 ft. high), interupted at the north-eastern corner of the valley by a massive 2,000 ft. high volcanic peak, "Mynydd Mawr". On the floor of the valley there were formerly two glacial lakes, and a meandering slow-running river; in the 1890s a new canalised river channel was constructed for two miles downstream of the lower lake, so as to drain the latter, and provide better drainage for the floodplain, alleviating the threat of inundation of several low-lying quarries.

The land within the Nantile valley was divided into a number of small estates which were originally owned by local families, but eventually most of the landlords lived outside the area. The Dorothea quarry was opened on part of Tal-y-sarn Uchaf farm, which was part of the Pant-du estate; the latter comprised of six farms, in the early nineteenth century: Pant-du, Taldrwst, Tal-y-sarn Uchaf, Pen-y-bryn, Ty Mawr, and Talmignedd Isaf. The landlord was Richard Garnons and his wife, Dorothea, who resided at Caernarfon. In the mid-nineteenth century, the property passed to a relative, John Williams Morgan Gwynne Hughes of Tregyb, Llandeilo, Carmarthenshire and his successors, who sold the properties in 1932.

In the late eighteenth century, Richard Garnons began prospecting for slate on Pen-y-bryn farm, and in September 1801 he formed a consortium with two of the proprietors of the Diphwys quarry, Ffestiniog, William Turner and Hugh Jones, Dolgellau; they were joined by a fourth party, a certain William Wynne. They worked the Pen-y-bryn quarry until about 1816-20, and Garnons also appears to have independently opened a second quarry, 'Cloddfa'r Lon', on another part of the Pen-y-bryn land.[1] It is uncertain if any trials were made on the Dorothea site by Garnons or his consortium.

The earliest date quoted for the opening of the Dorothea quarry is 1823.[2] A map dated 1824 shows a small quarry on the site, and names the proprietor "Mr. Jones"; this is also the title given to the proprietor of the neighbouring Tal-y-garn quarry[3] a certain William Jones, who resided at Ty-Mawr farm (which was owned by R. Garnons).[4] It appears that William Jones became bankrupt in 1825,[5] and thus several facts tally with the accounts given by local historians, i.e., that the quarry was opened by a local person, and was only a small excavation when it was abandoned several years previous to 1828.

In the winter of 1828, or early 1829, the Dorothea quarry site was taken on lease by William Turner, one of Garnons' ex-partners at Pen-y-bryn and a noted quarrying entrepreneur, in partnership with John Morgan, banker, Caernarfon, his son-in-law. The first quarry manager was probably Thomas Edwards, Taldrwst farm, Llanllyfni; he had previously been Garnons' manager at Cloddfa'r Lon, and Turners' manager at Diphwys, Ffestiniog. At an unknown date, one of W. Turners' sons, Thomas, became general manager and slate salesman.[6]

The quarry was originally named "Cloddfa Turner", but at an unknown date, prior to 1848, it was renamed 'Dorothea', in honour of Mrs. Dorothea Garnons.

For the first six years the quarry consisted of a single pit; this probably expanded quite rapidly in surface area, but would not have been very deep. Due to geological difficulties, c. 1834, work in a southerly direction had to be halted, and preparations were made to remove a thick layer of sandy overburden overlying good rock west of the quarry. Turnors' scheme was novel in that he proposed to transport the debris from the quarry by canal. The pit was only 120 yards north of the Lower Nantile Lake, and excavation work proceeded from the lake-side. Whilst the canal was nearing completion, a previously unknown body of slate rock was uncovered south of the old pit, and its quality was such that the previous plans were abandoned, and a new quarry opened at that site.

The new pit, "Twll-y-weirglodd", (The Meadow Pit), was extremely productive for the first seven years, and the first quarry, 'yr Hen Dwll' (The Old Pit), later known as Quarry A, was apparently abandoned although it contained a vast quantity of workable slate. During this initial period, it is said that the winding machinery at Twll-y-weirglodd handled only workable blocks for days on end, with practically no rubble present, and that the quarrymen fought in the queue to get their loads raised from the pit, as the horse-powered whimsey could not cope with the volume of material produced. However, c. 1841, a worthless hard, grey slate vein was discovered at the southern end of the pit, and it became apparent that this underlaid the whole quarry. A shaft was sunk to discover the thickness of this vein, but was abandoned when its depth reached 9-10 yds. with no improvement in the slate rock. There were some hopeful signs, however, and as the green veins in the rock were rising towards the surface to the south, it was decided that a new trial shaft south of the quarry, near the lake shore, would give an indication of the geology under the grey vein much readier than continuing the shaft in the quarry.

The new shaft uncovered top-quality slate rock under the grey vein,

which was found to be 15 yds. thick. Development of the new site started immediately, and within a few years it became obvious that better winding machinery was required to cope with the rapid expansion of the pit. A steam engine was purchased c. 1843-5 to haul from the pit, which became known as 'Twll Fire', (or Quarry 'B') after the colloquial name for a steam engine ("fire engine"). Quarry B became the most important pit of the Dorothea quarry during the mid-nineteenth century, and its size increased when it was amalgamated with Twll-y-weirglodd (pursuing the blue slate north-eastwards under the grey slate vein). One other pit was opened at Dorothea in this period - Twll Coch (Quarry 'C'). This lay west of Quarry B, in the purple slate bed, and was commenced c.1843. However, this remained a small, unimportant pit, and was developed by W Turner's successors.

At an unknown date, post 1831, Owen Parry, clerk at the Cilgwyn quarry, replaced Thomas Edwards as Dorothea manager; the former had been Turner's manager at Pen-yr-orsedd, Nantlle, in the period c. 1816-28. He was retired c. 1838 because of infirmity and old-age, and was replaced by Robert William Rowlands, Llanllyfni, Turner's former manager at Pen-y-bryn. He remained manager until the winding up of the company.

The lack of company records for this period makes accurate discussion of the affairs of Messrs. Turner & Morgan impossible. However, it appears that by the late 1840s, William Turner, who was over 70 years old, gave control of the quarry to his son, Thomas, and that a decline in the fortunes of the company can be directly correlated to this action. It is claimed by local historians that the quarry ran at a financial loss during the mid-late 1840s, resulting in the suspension of working in April 1848,[7] when there was still 22 years of unexpired lease remaining.[8]

PART I (ii)

The Dorothea Slate Company, Caernarvon, 1848-92

In the six months following the closure of the Dorothea quarry in April 1848, several prospective purchasers came to inspect the leasehold,

but each one declined to buy the concern.[9] The quarry remained unworked until November 1848, when a Welsh Company (made up of local quarrymen, farmers and others, plus a contingent from Llangernyw, Denbighshire) purchased the lease, plant and machinery.[10] This was a very unusual occurrence in the Welsh slate industry in the early-mid nineteenth century; the usual pattern of events was for local entrepreneurs to prospect for slate, having first obtained a take-note from the landowners. If a commercial slate deposit was found, the entrepreneur either immediately sold his take-note to an English company, or invested a small amount of capital in developing the quarry over a few years, so as to obtain a greater profit from the sale. Several small quarries, employing less than 20 men, were run by Welshmen in the eighteenth and nineteenth centuries, but there had been only one important Welsh company in the industry prior to 1848, John Evans & Co., Caernarvon. From 1800-31, John Evans, a solicitor, and three partners had operated several quarries on Crown land in Caernarfonshire and Meirionydd, including Cilgwyn and Moeltryfan in the Nantlle area. However, the new Dorothea company was unique in that it was the first important commercial investment by the Welsh population in their slate industry, and was possibly the only company under the control of worker-shareholders. This unusual situation did not last for more than 5-10 years, and the company evolved into the domain of a single family, more in line with the mainstream of quarry companies in the area.

The idea of forming a Welsh company originated from a syndicate of quarrymen leasing a small quarry near Tal-y-sarn village. Their aspirations to become capitalists grew as they noticed the neighbouring Dorothea quarry lying idle for months during the summer of 1848. However, they had insufficient capital to raise the several thousand pounds required to secure the Dorothea lease and the large amount of plant, machinery, and other fixtures thereon, and therefore they were forced to bring in others to make up a company.

To organise such a venture, Rev. John Jones, the ex-quarryman Methodist Minister of Tal-y-sarn (a man of great influence throughout Wales), was seconded by the quarrymen, thus laying the future seeds of destruction. No doubt, had the Rev. John Jones not taken over the task of recruiting shareholders, the company would never have got off the ground, but his family group and the faction he recruited from Llangernyw, formed a powerful opposition to the local quarrymen, who were in the minority within three years of formation, due to share sales.

The first visible sign of friction occurred in July 1851, when the elected quarry manager, William Owen, Hafodlas, Tal-y-sarn, resigned as a result of an unspecified disagreement with the Rev. J. Jones or his eldest son, John Lloyd Jones.[11] He was replaced by Rev. J. Jones, who was injured in an accident with a run away wagon in 1853, and subsequently resigned. His resignation was only partly due to the relatively minor injury he incurred; an important sector of public opinion condemned his association with capitalism as being incompatible with the Ministry, and the wage reductions at the quarry, necessitated by the trade recession of the early 1850s, made Rev. J. Jones highly unpopular with the workforce. Thus, during his convalescence, friends and relations pressured him into re-thinking his philosophy, and this resulted in his sons, John and Thomas Lloyd Jones taking over their father's responsibilities in the company.[12] After 1855 the Rev.J. Jones took no further official part, in the running of the company (save an advisory role), and died in August 1857. From the mid-1850s the executive committee responsible for the day-to-day running of the quarry consisted of John Lloyd Jones, chairman, general manager (or 'Purser') and slate salesman; Thomas Lloyd Jones, joint-purser; and John Robyns,[13] who succeeded Rev. J. Jones as quarry manager.[14]

From 1853-8 the twenty or so local quarrymen-shareholders, being frustrated by their inability to influence company policy, sold their shares

to John Hughes Williams of Plas-yn-Blaenau, Llangeryw (later of Ty Coch and Glanbeuno, Caernarfon), whose two sisters were original shareholders of the company. He married Rev. J. Jones' youngest daughter in 1859,[15] and ultimately became chief shareholder when he purchased J.Ll.Jones' holdings in 1860.[16] In April 1860 J.H. Williams was elected chairman, and slate salesman, in place of J.Ll. Jones, and Thomas Ll. Jones became sole purser, or general manager.[17]

From 1860-4 the company's trading account showed little profit, and many shareholders became disillusioned, appointing J.H. Williams as an agent to sell their shares. No buyer was forthcoming, and J.H. Williams ultimately purchased these shares, which included the holdings of T. Lloyd Jones, and his mother, Mrs Frances Jones, and J. Robyns.[18] Interspersed in this episode was a conflict over management. J.H. Williams appears to have blamed T. Ll. Jones and J. Robyns for the disappointing performance of the quarry, and decided to install a works manager of his own choice; this probably precipitated the split in the company.[19]

The successful candidate for the post of Dorothea manager was Robert Owen, formerly of Rhosgadfan near Caernarfon, manager of Samuel Holland's quarry at Blaenau Ffestiniog. However, R. Owen was persuaded by his employer to remain at Ffestiniog, and the second man chosen was John J. Evans, sub manager of the Cilgwyn quarry, Nantile; he commenced at Dorothea on 28 December 1864 at a salary of £300 per annum.[20] The whole structure of management was now changed, with only one general manager cum salesman, and a chief quarry manager, aided by two sub-managers.[21] The result of J.J. Evans' expertise was a dramatic rise in production of 175% within three years, reaching 15,000 tons per annum, and a doubling of profits; in the 1870s production was twice that of the early 1860s, and profits were trebled, with regular dividends averaging £60 per share per annum.[22] However, as a

result of successfully arbitrating in the Penrhyn quarry dispute of 1874, J.J. Evans was appointed chief working manager of that quarry. He was succeeded at Dorothea by Owen Thomas Owen, the chief quarry cle k, who appears to have been a genius, though in a different vein to J.J. Evans. Largely due to a trade recession after 1876, profits fell rapidly, but investment in plant and machinery and other improvements at the quarry was increased.[23] O.T. Owen's most important contribution to the Dorothea quarry was in connection with the catastrophic flooding of the workings in December, 1884. A large landslide occurred on the southern face of Quarry B, at 11.30 p.m., on 30 December 1884, killing seven men on a night shift. Most of the bottom of the pit was filled with debris, and the productive working faces were lost, but more seriously, the fall tapped the Lower Nantlle Lake, much of which had been infilled by the Dorothea tips. The water poured into the quarry at a tremendous rate, totally overpowering the pumps. Attempts were made to dam the flow, using slate debris and wooden baulks, but the torrent of water swept all aside. The position was made worse by abnormally high rainfall, and by March 1885 the quarry was full of water, and the company totally disheartened. Even J.J. Evans, the resourceful ex-manager, could not offer a solution. However, O.T. Owen would not be beaten, and perceiving that once the water levels in the quarry and lake were equalised, there would no longer be a pressure difference, sent the workforce to make slates from the old rubbish tips, to await events. In April and May, 1885, gangs of men worked waist-deep in icy-cold water, with a special iron rake, cleaning out the breach at the quarry's edge, to prepare foundations for a dam. Wooden piles were driven across the breach, and the dam was puddled with clay. Several additional pumps were installed around the quarry edge, and pumping was resumed on 24 June 1885. Within a few days it was found that the water level in the quarry was lowering, and by December 1885, the pits were completely dry. However, Quarry B was full of debris, and full production was not resumed until c. 1887 at least. The company suffered a

trading deficit of £15,000 in 1885, and lost production thereafter is incalculable.[24]

The events of 1885-6 were an ominous begining to the reign of the new company chairman, John Albert Alexander Williams. His father, J.H. Williams died on 1 March 1879. aged 68 years, and as the eldest son, J.A.A. Williams was only 16 years old, the inheritance of Dorothea shares was administered by J.H. Williams' trustees and executors, Cornelius Davies (brother-in-law) who became general manager of the company: Evan Evans, a tanner, of Caernarfon; and the Rev. D. Lewis Williams, Llanwnda. The terms of the trust are complex,[25] but the important effect was that J.A.A. Williams inherited 24 shares on coming of age in March 1884 (an event marked by great jubilation in the Nantlle valley and Caernarfon), and in 1890, upon the coming of age of J.H. Williams' youngest son, Ivor Hadd Clynne Williams, the old trusteeship came to an end. Thereafter, J.A.A. Williams was sole trustee, empowered to control the voting power of the 71½ family shares (from a total of 100 issued), but distributing dividends amongst his four brothers and sisters.[26] This arrangement was devised by J.H. Williams to preserve the absolute power of his heir, as chairman of the company, whilst providing an income for all his children. However, J.A. A. Williams did not take much interest in the running of the quarry, as had his father, leaving Cornelius Davies, his uncle, (general manager) who had prior to 1860 managed a coal mine,[27] and O.T. Owen, who had sadly become an alcoholic,[28] to manage Dorothea.

The quality of management after 1885 is difficult to assess. Financially, the company recovered from the flooding, the situation not being assisted by a bad trade slump in the mid-1880s. However, it would appear that the actual state of the quarry pits deteriorated, with very little future planning and overburden removal occurring. Consequently, J.A.A. Williams' first full year as chairman was celebrated by two massive landslides which buried all the

working-places (or 'bargains') in the two main pits, in January 1891. Production was practically halted, and the costs of restoring the quarry to full working adversely affected the company's trading balance for several years. Thus, probably to protect the family finances from future potentially catastrophic landslides which might possibly render Dorothea unworkable, and possibly to create an avenue for the withdrawl of his own capital, if required, J.A.A. Williams formulated a scheme, in 1892, to reorganise the Dorothea company under the Limited Liabilities Act of 1862, and the Dorothea Slate Company, Caernarvon, was dissolved in 1893.[29]

PART I (iii)

The Dorothea Slate Quarry Company Limited, 1893-1970.

The Dorothea Slate Quarry Company Limited was registered in April 1893, and had an identical list of shareholders to the old company, J.A.A. Williams became the first managing director, but against his wishes was forced to give seats on the Board to his brother, Arthur Wynne Williams, and to Evan Evans, Caernarfon (representing Evelina Scott and Anita Potter, nee W. Williams); the youngest brother, Ivor Hedd Glynne Williams, had been committed to a mental institution.[30] O.T. Owen held the post of quarry manager for only six months after the reorganisation; he died suddenly on 24 October 1893, aged 49 years. John J. Evans returned for a second term as manager of Dorothea in January 1894, and in the next six years he battled to restore the quarry to its former glory, to overcome the effects of the neglect resulting from O.T. Owen's nervous breakdown, in the late 1880s.[31]

The most significant feature of the years 1893-1913 was the vast sums spent by the Dorothea company on special projects. These schemes were under three main headings:- flood prevention; Pen-y-bryn (Quarry F) development; and the Cornish pump scheme (Quarry C). The company was a major contributor towards the Nantile Vale Drainage Scheme, 1893-5, which aimed to drain the Lower Nantile Lake; including a private river diversion, this flood prevention work amounted to £4,626.[32] The Pen-y-bryn Quarry F development had been

estimated at £4,600 to reach a break-even point, but this figure was wildly inaccurate, and by 1912 over £30,000 had been spent on this project with minimal returns. The Dorothea company worked Quarry F from 1897-1932, mainly to preserve the attendant water-rights, but both J.J. Evans and his successor, William John Griffiths (1905-35) presented the directors with highly optimistic forecasts for this pit. In the event, the quality of the rock did not justify the high expenditure, and after acquiring the freehold, in 1932, Quarry F was closed, having produced a total adverse balance of £60,069 on the Dorothea company's Reserve Fund.[33] The third special project was a new pumping system at the Dorothea quarry, comprising a 155 yds deep shaft, housing two lifts of Cornish mine pumps, powered by a large Cornish beam engine. The original estimate of £5,000 was exceeded by £7,750 due to unforseen difficulties, and the whole project took six years to reach completion. However, the benefits of the improved pumping system were great, and allowed the pits to be sunk down to an eventual depth of some 500' ; in addition, the new system initially cut the costs of pumping by £1,000 per annum.[34]

Much of this extraordinary expenditure coincided with the severe trade recession which followed the ending of the Penrhyn quarry strike, in 1903. This slump lasted until 1909, and its effects were accentuated at Dorothea by two major landslides and a dispute with the landowner regarding the extension of the tipping area. The result was a reduction in the annual output to 5,000-9 tons, due to the permanent closure of half the quarry. Even after trade returned to normal, the Dorothea quarry continued to experience severe difficulties, the main incident being a recurrence of the 1884-5 flooding. In November 1910 the Quarry B flood-protection dam, erected in 1885, was undermined by a rockfall, and water from the remnant of the Lower Nantile lake broke into the quarry. The flow was too powerful for the Cornish pumps to contain, and the lower portion of the pit was soon flooded. However, the experience gained in 1885 enabled the management to dam the breach within a matter of weeks, and although a second 'fall' brought in another stream of

water, the quarry was made water-tight, and the flooded lower 30 yds had been pumped dry by January 1911. Despite the prompt and successful action of the management, the managing director, J.A.A. Williams, became convinced that the quarry was doomed, and he made arrangements to sell the entire family shareholding. His brother and sisters disagreed, and after a bitter argument the matter was resolved by J.A.A. Williams selling his personal shareholding to the family and friends. The new managing director was Arthur Wynne Williams, who served until his death in 1947, aged about 80.[35]

Paradoxically, the First World War (1914-18), which was a very lean period for the slate trade, was a more successful period for the Dorothea company than the preceeding decade. Dorothea was the only large quarry to remain in full-time production, and after June 1916 there was a marked increase in sales and prices, due to military building contracts, resulting in large profits. After 1918, this trend continued for four years, but in 1922 the boom collapsed, and sales were so low as to force production cuts, by operating a three-day working week.[36] The trade recession of the 1920s was accompanied by other problems, which added to the production costs. The first of a series of incidents was the collapse of the water defence retaining wall, on 10 April 1922. A few days later, a stream of water burst into the quarry, and almost simultaneously, the lowermost portion of the pumps was damaged by a falling rock. Only prompt action by a naval diver saved the quarry, and the cost of repairing the damaged dams was £10,642.[37]

The next incident was a spectacular landslide, of 200,000 tons, involving a 140 yds high face at Quarry C, Dorothea. The parish road was undermined, only minutes after a bus had crossed that spot. Fortunately, the 'fall' did not disrupt production because the affected half of the pit was disused. However, in January 1926, some 300,000 tons of mainly worthless grit-stone collapsed from the opposite side of the same pit, burying most of the productive faces. This was a serious blow, and resulted in a reduction in

the company's trading balance of over £13,000 on the previous year, and the burden of expenditure on clearing the debris had to be carried for nine years.[38]

The inter-war period was characterised by several fundamental changes in the operations of the Dorothea company. In addition to Pen-y-bryn quarry (F), taken on lease in 1892, the company took over several neighbouring quarries as going concerns in the process of going into liquidation, viz., South Dorothea (Quarry E) in 1921, and Gallt-y-fedw (Quarry G) in 1932. Several freehold agricultural properties had been acquired since 1893, for water-rights, and in 1932 the company purchased its own freehold, plus several other properties on the Pont-du- estate; the latter contained many small quarries, which were acquired for water-rights and as a holding operation. These acquisitions yielded little financial returns (save Quarry G), but were very important in providing buffering around the main quarrying site, and for controlling the drainage of the valley basin.[39]

The major turning point for the Dorothea quarry in technological and operational terms was the appointment of Owen Giller to succeed W.J. Griffiths as quarry manager, in 1935. O Giller practised a different concept of quarrying methods to that employed by previous management. In place of removing overburden on a small scale, he launched a concentrated programme, in 1935-6, aimed at un-topping the purple slate rock east of the small Quarry D, including a change in the quarrying system to the gallery style used at Dinorwich and Penrhyn. The steam engine driving the main mill was replaced by electric motors, powered by a private diesel-oil generating set, and winding and haulage arrangements were altered in 1937-40 to centralise slatemaking from quarries C,D,E and G at the main mill. The labour structure was also changed, with the old bargaining system being replaced by a mass-production system, as developed at the Penrhyn quarry.[40]

The full effect of this changeover was not realised, due to the inter-

vention of the Second World War. After an initial collapse, the demand for slate boomed due to bombing of cities, and the industry was placed under Government control. The cessation of development work due to the unavailability of labour and Government directives discouraging such action, plus the very high taxation on profits, led to a highly unsatisfactory financial situation at Dorothea, in 1946. The gallery system installed by O. Giller was destroyed by ceasing to work the overburden, and the cost of restoration put heavy pressure on the dwindling financial reserves. Production costs increased continuously, and skilled labour became scarce, such that the production capacity of the quarry decreased to only 2,000-3,000 tons per annum.[41]

In an effort to reduce production costs, and to counteract the reduction in the labour force, the company invested in modern plant and machinery from the 1940s onwards. The items bought included excavators, dumpers, and loaders, and in 1963-4 a complete programme of modernisation was commenced . Unfortunately, the slate trade suffered a bad depression in the mid 1960s, and the Dorothea company was beset with cash-flow problems. By 1969 the readily available supply of slate rock had run out, and there was little justification for increasing the company's large bank overdraft to finance the massive development programme required to extend the life of the quarry. Thus, the company went into voluntary liquidation in March 1970.[42] The last managing director was Mr Michael John Barnard Wynne Williams, the fourth generation of the Williams family to be involved in the business. His father, John George Wynne Williams had been in the post for only 10 years, succeeding A.W. Williams in 1947. J.G. W. Williams died suddenly in December 1958 (aged about 60) and was succeeded by his brother, Arthur Ivor Wynne Williams. Mr M.J.B.W. Williams was appointed joint managing director (to assist his uncle) in 1961, and obtained complete control after A.I.W. Williams' death in 1968. Other directors in the period 1911-70 were:- Sir Thomas Edward Roberts, Caernarfon (1911-26); John Sydney Mathews, managing director of the Craig Ddu and Manod slate quarries Ffestiniog (1935-60); William Owen, the company secretary

(1940-50); and Sir Reginald Lawrence Williams, Bart., (1968-70). The quarry managers were:- William John Griffiths (1901-35); Owen Giller (1935-45); E.H. Jones (1945-64) and W.F. Flemming (1964-69).[43]

The Dorothea plant and machinery were disposed of by public auction in September 1970, and the 830 acres of freehold land were due to be sold in a similar manner in April 1972. However, a private sale of the whole estate was concluded prior to the auction. The purchaser was a property development consortium, which was granted outline planning permission for a holiday complex. In 1975, this permission was revoked, as being contrary to the new Gwynedd Council planning philosophy, and a smaller development, proposed by a second purchaser of the site, has also been refused.

PART I, NOTES

1. J. Lindsay, History of the North Wales slate Industry, (Newton Abbot, 1974), pp. 80, 97-8; J. Griffiths, Chwarelau Dyffryn Nantlle a Chymdogaeth Moeltryfan (Conway 1934) pp.46-7
2. GAS MS 392, Dorothea quarry.
3. GAS Railway plans No. 1, Nantlle 1824.
4. GAS Ms 392, Tal-y-sarn quarry; J. Griffiths, op.cit., p.20.
5. ibid, R Williams "Hunangofiant Chwarelwr" Cymru 1899.
6. J. Griffiths, op.cit., p.29.
7. ibid. pp. 28-30, 35-42.
8. GAS Dorothea MS 911
9. J. Griffiths, op.cit., p.30
10. Dorothea MS 5
11. ibid., MS 1; J. Griffiths, op.cit., p.32
12. ibid., p.33; Rev. O. Thomas, Cofiant y Parch J. Jones, Pennod XIII, but the quoted date of 1854 is possibly incorrect; the accident probably occurred in 1853, being the date when the new incline (on which the accident happened) was built.
13. Although some sources name him as John Robinson, his signature was "John Robyns."
14. Dorothea MS 676. John Robyns is named as quarry agent in this ledger, the first surviving pay-book, 1857.
15. Baner ac Amserau Cymru, November 1859
16. Dorothea MS 1. Thomas Owen, slate merchant, Caernarfon was joint-purser from 1851- 1861.
17. Loc cit.
18. ibid., MS 5
19. Loc cit.
20. loc cit.
21. Dorothea MS 673. The sub-managers in 1889 were Henry Parry and Robert Williams (unidentified).

PART I Notes contd

22. ibid., MS 20

23. ibid., MS 5, 20

24. ibid., MS 614.

25. See PART III c for detailed account.

26. J.H. Williams' children were;- John Albert Alexander Williams (1863-1945):- Arthur Wynne Williams (c. 1865-1947); Evelina Scott (nee Wynne Williams); Anita Clementina Potter (nee Wynne Williams); and Ivor Hedd Glynne Williams (1869-1918).

27. Dorothea MS 2108.

28. ibid., MS 1945.

29. See PART III C for further details.

30. Dorothea MS 1284.

31. ibid., MSS 5, 1945.

32. ibid., MS 20.

33. ibid., MSS 44, 983, 1245, 1350.

34. ibid., MSS 5, 614, 880.

35. ibid., MSS 5, 1228, 1257.

36. ibid., MSS 5, 20.

37. ibid., MSS 1197, 1199, 1391.

38. ibid., MSS 20, 563.

39. ibid., MS 20.

40. See PART III for details.

41. Dorothea MSS 1415, 2119.

42. See PART III E for details.

43. Dorothea MS 20.

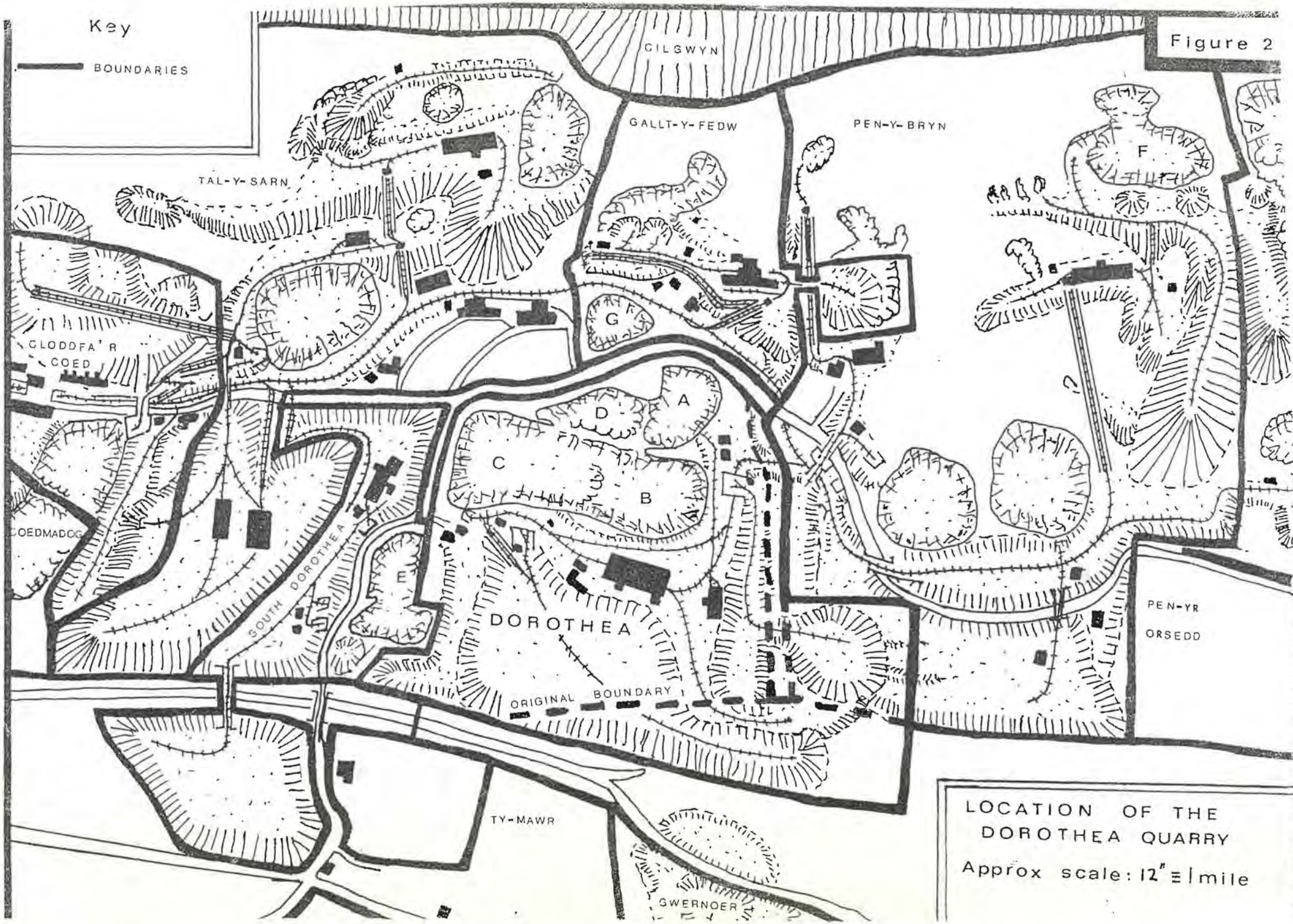
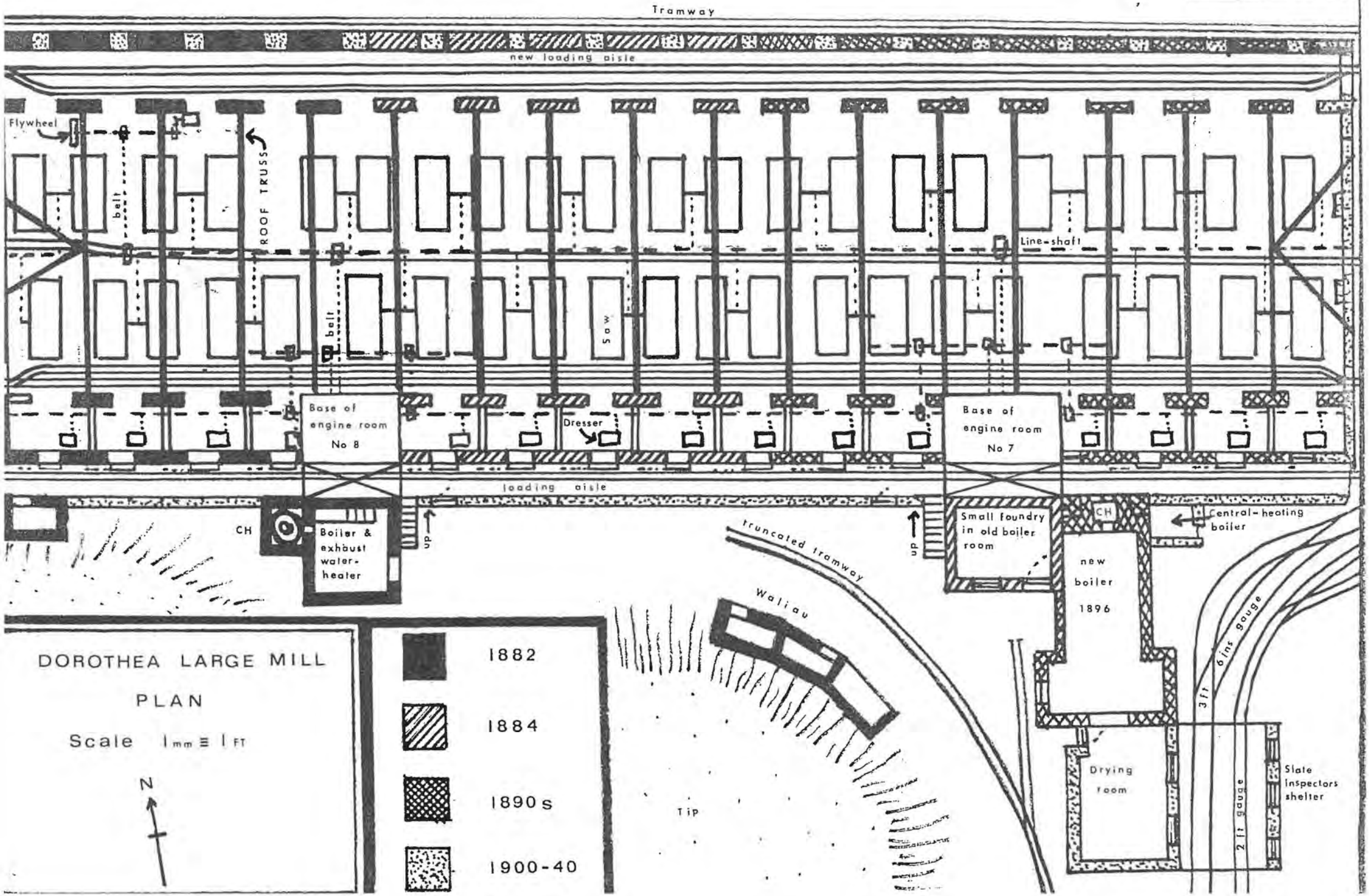

Key
BOUNDARIES
Figure 2
CILGWYN
GALLT-Y-FEDW
PEN-Y-BRYN
TAL-Y-SARN
F
G
CLODDFA' R
COED
A
D
C
B
OEDMADOG
SOUTH DOROTHEA
E
DOROTHEA
PEN-YR
ORSEDD
ORIGINAL BOUNDARY
TY-MAWR
GWERNOER
LOCATION OF THE
DOROTHEA QUARRY
Approx scale: 12" = 1 mile

Figure 13


Tramway
new loading aisle
Flywheel
belt
ROOF TRUSS
belt
Saw
Line-shaft
Base of engine room No 8
Dresser
Base of engine room No 7
loading aisle
CH
Boiler & exhaust water-heater
up
up
Small foundry in old boiler room
CH
Central-heating boiler
new boiler 1896
truncated tramway
Waliau
Tip
Drying room
3 ft 6 ins gauge
2 ft gauge
Slate inspectors shelter
DOROTHEA LARGE MILL
PLAN
Scale 1mm ≡ 1 FT
N
1882
1884
1890s
1900-40