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THE MINES OF CARDIGANSHIRE

J. R. Foster-Smith.

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CONTENTS

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EDITORIAL.

In completing this penultimate volume of Mr. Foster-Smith's series on the non-ferrous mines of Wales, the society is cognisant of the fact that but for generous financial assistance from the author this already much delayed work would not undoubtedly have appeared for many years. Indeed, some ten years have elapsed since this series was originally submitted for publishing and in that time changes and new information have inevitably come to light. Some of this additional material has been added where possible but it is left to the industrial archaeologist and mining historian to fill in the minutae of each site when known.

With the recent upsurge of interest in the mines of Wales and elsewhere, the late appearance of these volumes is to be particularly regretted since they would have, and indeed, continue to form the basis of any serious research concerning the old metal mines of the Principality. The enormous task of tracing many long-forgotten ventures was accomplished by the author over a decade or so ago and it is a tribute to the thoroughness of his work that many sites have hitherto received no mention in any published material.

As stated in his foreword, the author welcomes corrections and additions to information contained in this series and it is hoped that this addenda and corrigenda can be included in the final volume 'The Non-ferrous Mines of the South Wales Area' which is in preparation.

Previously published parts dealing with Flintshire, Denbighshire, Anglesey & Caernarvonshire and Merioneth are now out of print but can usually be obtained through the national library services.

R.H. BIRD.
Editor, N.M.R.S. publications.

AUTHORS NOTE

This monograph is one part of a larger work which sets out to make a complete survey of the sites and nature of all the presently identifiable nonferrous metal mines and trials in Wales. Each monograph covers a county of major importance or a group of counties of lesser importance from the point of view of metal mining.

The purpose of the work is to put on record the locations of and some brief notes upon as many non-ferrous metal mines as it has been possible to trace during a long period of research into the industry. It is hoped that the work may be found useful not only to students of industrial history, but also to the geologist or mining engineer who may have occasion to investigate the mines of Wales.

Many of the smaller mines and trials have now been almost or entirely obliterated and their location is no simple task. An exhaustive study of old records and large scale maps has been necessary, combined with a physical examination of the ground whenever possible, in order to locate some of the sites known to exist and so to compile the information given herein. Even so it has not been possible to locate accurately all the sites of which there are known records. However what has been done may save future researchers much time and trouble.

In a work of this nature it is quite impossible to claim that the data given is original and it has been necessary to draw upon all the available published sources of information. These are listed in the bibliographies for each section. Neither can it be claimed that all the information given in this work is indisputably accurate or complete, since in so comprehensive a work some mistakes are inevitable, but every care has been taken to avoid including incorrect date. Nevertheless corrections and amendments will always be welcomed by the author.

J.R. FOSTER-SMITH ,
THE OLD RECTORY,
MIDDLETON-IN-TEESDALE,
BARNARD CASTLE,
CO. DURHAM

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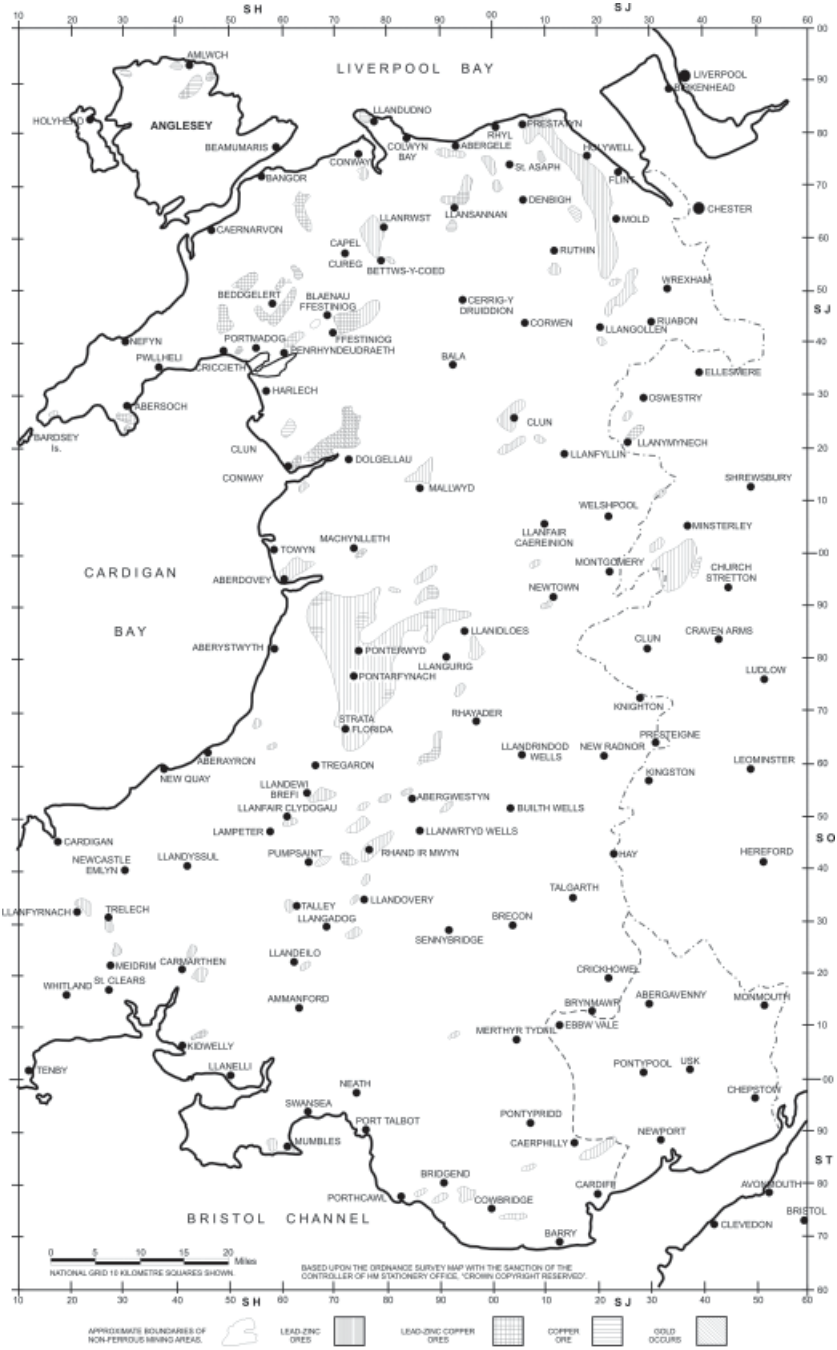


NON - FERROUS MINING FIELDS OF WALES

THE MINES OF CARDIGANSHIRE

INTRODUCTION

This county has been one of the largest producers of lead and zinc ores in Wales and includes most of the productive parts of the Central Wales orefield, besides many outlying occurrences.

History

The early history of mining in Cardiganshire is somewhat obscure and there is no definite indication of when mining operations were first carried out. However, the finding of very ancient mining tools and old workings at Cwmystwyth indicate that the industry is probably of considerable antiquity, possibly going back to pre-Roman times. Mining for lead ore was certainly very active in the seventeenth century and continued at intervals when trade was good to the nineteenth century when, in common with most lead mining areas, a tremendous expansion in mining took place, especially at the middle of the century. Much of this later activity was unfortunately of a highly speculative nature, sometimes earning an unsavoury reputation for lead mining in financial circles. Many of the ventures were, highly profitable however and the district seems to have reached its maximum of activity between 1850 and 1870. After the latter date it declined rapidly, due partly to the exhaustion of the more easily reached deposits and partly to the depressed price of base metals following the large expansion is overseas mining. Some of the larger mines remained at work until the early years of the present century, but since that time lead mining in the county has virtually been at a standstill, though some small scale operations have been carried out intermittently, especially for the production of zinc ore.

Output

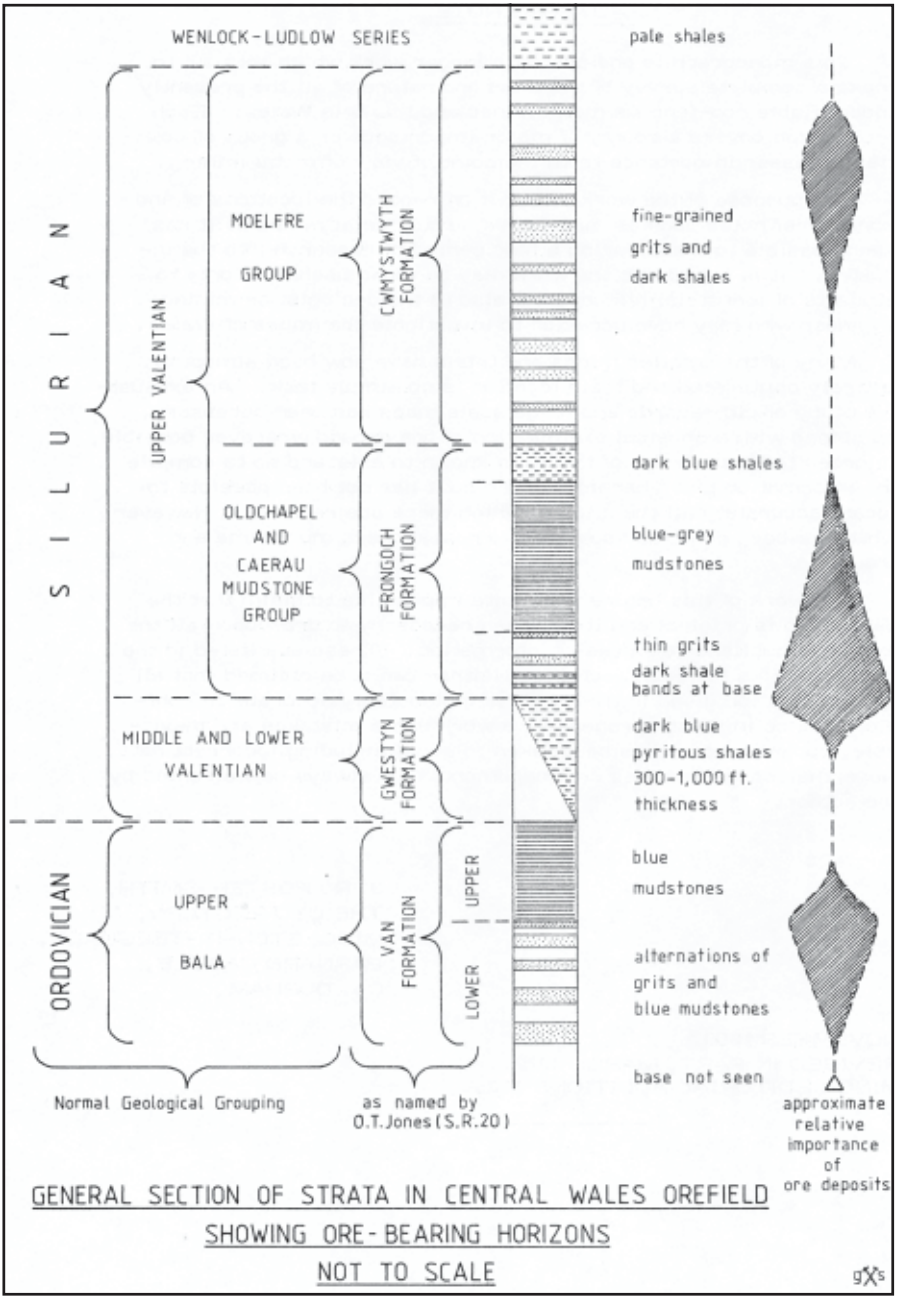
The output from Cardiganshire has undoubtedly been fairly large, much of it being obtained in days before proper records were kept, so that it is not possible to make an accurate estimate of the total figures, especially that for lead ore. Since 1845, when more accurate figures were first kept, the following output has been obtained, (though even here the figures are probably not complete, especially for the early part of the period.)

Lead ore concentrates	————	303,016	long tons.
Zinc ore concentrates	————	115,091	" "
Copper ore (grade not stated)	————	10,054	" "
Pyrite	————	5,076	" "

In the case of output of copper ore there is reason to believe that the figure given is a gross under-estimate, much output being unrecorded.

Geology

All the ores worked in Cardiganshire have been obtained from deposits which occur in lower Palaezoic rocks. Such deposits have been worked in rocks of Silurian and Ordovician age, the total thickness of the strata involved being some 10,000 feet. These rocks are mostly of Valentian and Bala systems, and in this part of Wales the sequence is as follows: First the Upper Valentian, which is divided into the Moelfre Group, (the Cwmystwyth Formation of O.T. Jones) consisting of grits and shales, amounting



GENERAL SECTION OF STRATA IN CENTRAL WALES OREFIELD

SHOWING ORE-BEARING HORIZONS

NOT TO SCALE

gXs

in all to some 4,000 feet in thickness. Second the Oldchapel and Caerau Mudstone group, (the Frongoch Group of O.T. Jones) amounting to about 2,600 feet in thickness. This group includes most of the more productive ore deposits in the county, specially toward its base. Third the middle and Lower Valentian strata,(the Gwestyn Formation of O.T. Jones,) consisting of about 800 feet thickness of dark pyritous shales and some grits in which but few ore deposits have been found. Fourth the uppermost Ordovician rocks, consisting of beds of Bala age, (called the Van Formation by O.T. Jones,) and comprising blue mudstones and grits. The productive section of this group is about 2,500 feet in thickness.

In this description of the Cardiganshire mines it has been found convenient to follow the nomenclature of rocks given by O.T. Jones, and the details of the stratigraphic section involved may be seen on the schematic diagram.

Structure

In the orefield area the strata have been folded into a succession of anticlines and synclines whose axes trend a little east of north. Fissuring and faulting follow two main strike directions, one about parallel to the axes of folding and the other almost east and west. The most productive veins are associated with the east and west striking veins, or faults, and the strongest of these are more in the nature of wide mineralised fracture zones than simple, clear-cut fault lines. These zones may be more than one hundred feet wide in places, with several “false walls”, several parallel ribs of mineralised ground with “horses” of country rock between them. Sometimes these “horses” of rock are themselves veined with minor mineralised fractures. The throw of the associated faulting too is very variable, both in the vertical and the horizontal sense, and may be scarcely appreciable on the one hand, or involving several hundred feet of vertical or horizontal movement on the other.

Considerable stretches of some of the main vein systems are covered by recent surface drift or peat and they have often not been prospected across such stretches. The principal veins of the Central Wales orefield are in fact noted for their remarkable persistency in strike length, though economic mineralisation seems to be confined to a number of favourable, but fairly short parts of the whole. The veins also show localisation of values by both structural and stratigraphic controls, which should render any future search for oreshoots in un-prospected parts of the veins somewhat more straightforward than is sometimes the case in major orefields.

In addition to the vein system, strong post-mineralisation faulting occurs in Cardiganshire. A good example of this is the complete cutting out of the veins at Cwmystwyth by the Ystwyth fault which can itself be traced for upwards of twenty miles along its strike in a more or less east and west direction. The throw of this fault varies between 2,000 and 3,000 feet.

Mineralisation

The vein filling in this orefield is commonly made up of angular fragments of country rock, or fault breccia, cemented by quartz or calcite. Mineralisation takes the form of lenses and strings within the fracture zones, or dissemination of spots of ore throughout them, such oreshoots being controlled by the structure of the wall rocks, which have in favourable places allowed the formation of cavities which were later filled by the mineralising solutions.

The usual ore minerals in Cardiganshire consist of galena and sphalerite or their alteration products, such as cerussite, pyromorphite and hemimorphite. Pyrite is also common and chalcopyrite has been found in economic quantity at times. The principal gangue minerals are quartz and calcite, the former being by far the most common, though the latter is abundant locally. Fluorite is recorded as having been found at one mine in South Cardiganshire, but it has not been possible to check the accuracy of this report, which relates to Brynambor mine. In any case the occurrence is of academic interest only. Barite or witherite are not known to occur anywhere in the county, though both minerals are known in the eastern part of the orefield, which lies in Montgomeryshire.

The silver content of the lead ores is not generally very high, averaging about 4 to 8 ounces per ton, but in a few places it has been reported as much higher. In the mines at Llanfair Clydogau the ore is reported to contain up to 80 ounces of silver per ton, from assays made about 1850.

Mining

Many of the numerous mines in Cardiganshire are small and are often little more than trials which did not discover enough ore to warrant the development of larger workings. On the other hand some of the mines in the county were among the largest and most productive Welsh nonferrous metal producers. The chief mining area lay in the northern part of the county which, together with the western part of Montgomeryshire forms what has been called the Central Wales orefield. South of the orefield area lay many ,scattered and less important workings, though all of them lie in somewhat similar geological situations to those which apply in the orefield area. These occurrences stretch to the county boundary and southward into Carmarthenshire. Some isolated trials have also been made on the west side of the county and near the sea coast.

In order to give some idea of the scale of operations in Cardiganshire the recorded output of some of the larger mines was as follows:-

East Daren mine, 24,460 tons of lead ore, Goginan mine, 25,108 tons of lead ore between 1887 and 1876, Frongoch mine, 56,095 tons of lead ore and 50,856 tons of zinc ore between 1834 and 1903, Cwmystwyth mine, 32,912 tons of lead ore and 18,913 tons of zinc ore between 1848 and 1916, Logaulas mine, 39,004 tons of lead ore between 1834 and 1891, and Glogfawr mine, 18,521 tons of lead ore between 1862 and 1917.

In Cardiganshire occurs an example of a group of mines which was operated successfully over a considerable period by one company; a method of operation which seems at the present time to offer the best chances for success in any large mineralised area. This group of mines was worked under the name of the Lisburne Mines by Messrs John Taylor and Sons, for almost eighty years. The Cardiganshire amalgamation however was not so extensive as that operated by Halkyn District United Mines Ltd, in Flintshire, neither were their mines contiguous with one another in all cases. Nevertheless the Lisburne Mines did demonstrate that better results could be obtained by including a group of properties under one management than by the usual piecemeal operations of this area, fortunately all too common in the Cardiganshire field. Had there

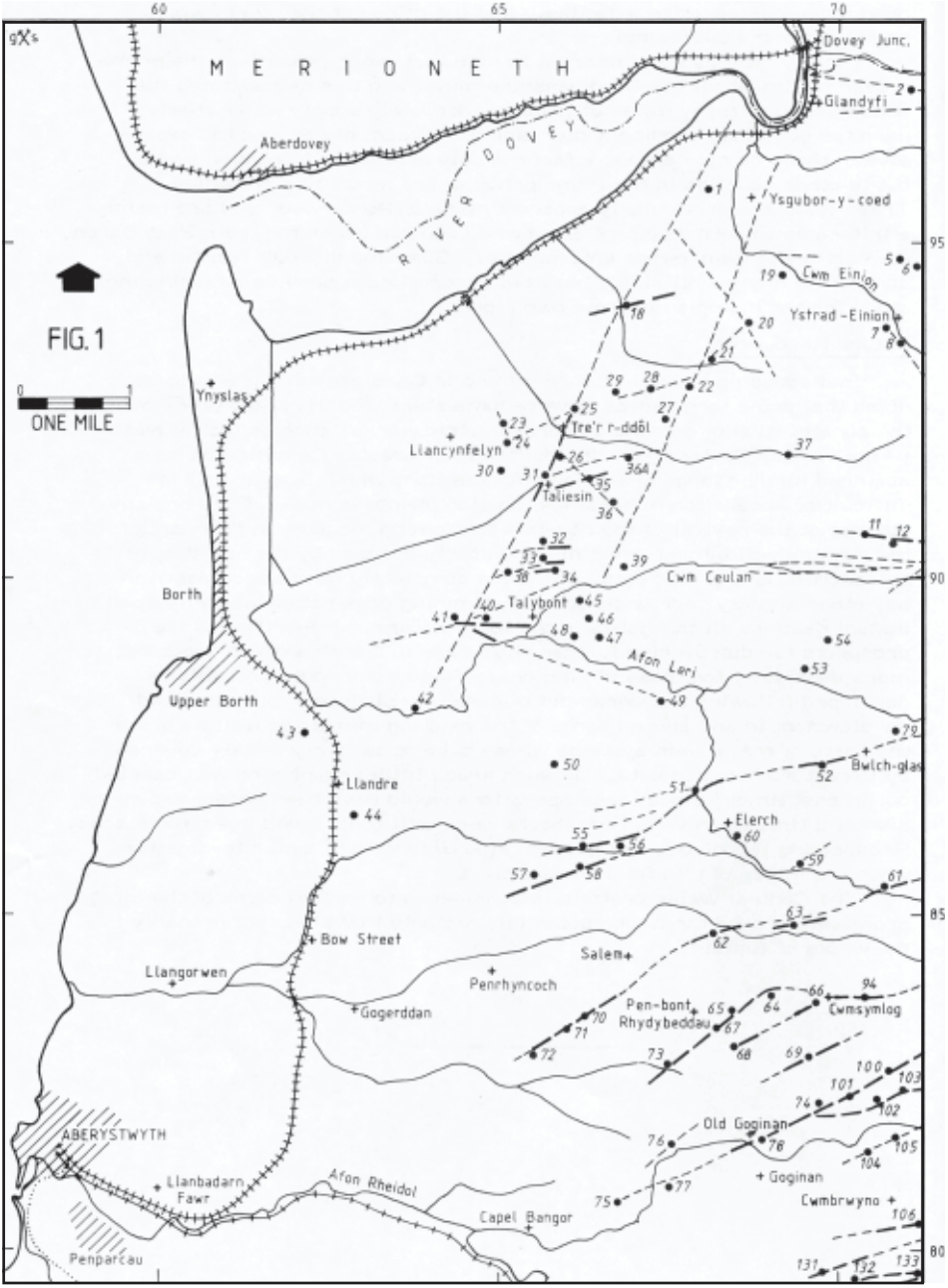
been more co-operation it is likely that the mines of the county would have been more successful.

Finally, it may be of interest to note that water power was the prime mover in almost all the Cardiganshire mines and this necessitated the construction of many miles of leats to adequately supply waterwheels used for pumping, winding and crushing. Steam power was too expensive in these remote areas, a fact not only applicable to central Wales but to other counties in the Principality where mountains prevailed. These leats are particularly apparent north of Ponterwyd and are mainly attributable to John Taylor & Sons who required water for their East Daren, Cwmerfin and Cefni rwyno enterprises. Spanning difficult terrain and contouring many a hillside, these old watercourses provide a fascinating study for the historian in their own right.

Future Resources

In discussing possible future mining in Cardiganshire it should be noted that some large areas have become sterilized in recent years by the construction of dams and hydro-electric works, such as that at Nanty-moch, near Ponterwyd. In addition the Forestry Commission have acquired further large areas for afforestation, which land is at least difficult of access for mineral exploration purposes now. Further, any attempt at the revival of the non-ferrous mining industry in this part of the country will almost certainly be bitterly opposed by the new deeply entrenched fishing interests, who often completely fail to see reason in any other activity, nor understand that mining does not necessarily spell instant death to all the fishes in the local waters. Nevertheless the prospects for discovering further resources in Cardiganshire are good, more especially for those of zinc ore. Resources could probably be developed following a programme of carefully planned exploration and development in and around some of the existing mines, as well as along the parts of major vein systems whose outcrop is fairly thickly covered by recent surface deposits. In such areas little prospecting was carried out in past times, since these operations would have been unduly expensive at a time when virgin oreshoots were still to be found in easier places. Prospecting techniques and geological knowledge are better to-day than when the mines of this field were active.

The Central Wales orefield is considered to contain some of the most promising ground for future potential, not only in Wales, but probably in the whole of Britain.


60
65
70
95
90
85
80
MERIONETH
Dovey Junc.
Glandyfi
Aberdovey
RIVER DOVEY
Ysgubor-y-coed
Cwm Einion
Ystrad-Einion
FIG. 1
0
1
ONE MILE
Ynyslas
Tre'r-ddôl
Llancynfelyn
Taliesin
Cwm Ceulan
Talybont
Borth
Upper Borth
Afon Leri
Llandre
Bwlch-glas
Elerch
Bow Street
Salem
Llangorwen
Penrhyncoch
Pen-bont Rhydybeddau
Cwmsymlog
Gogerddan
ABERYSTWYTH
Old Goginan
Goginan
Llanbadarn Fawr
Afon Rheidol
Capel Bangor
Cwmbrwyno
Penparcau

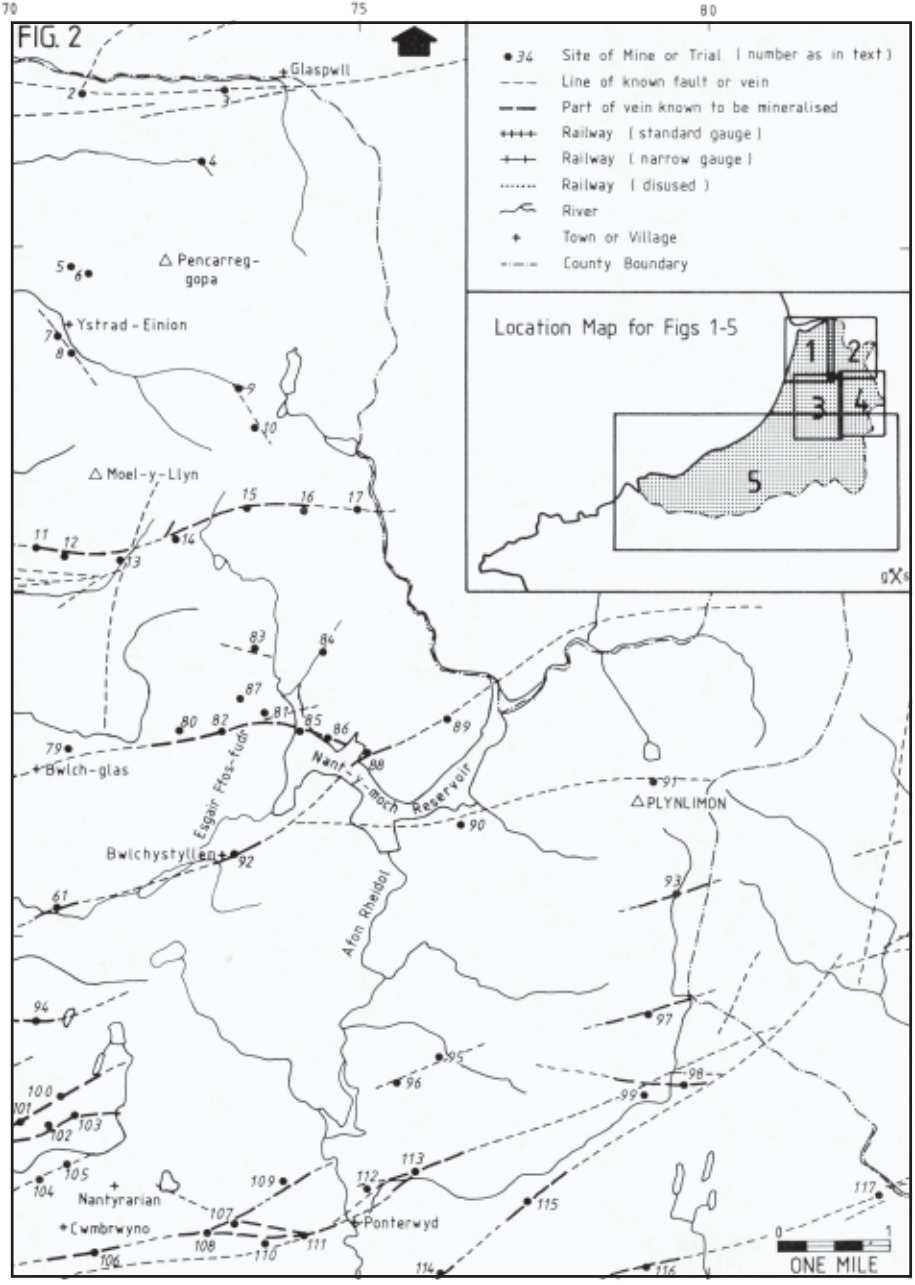
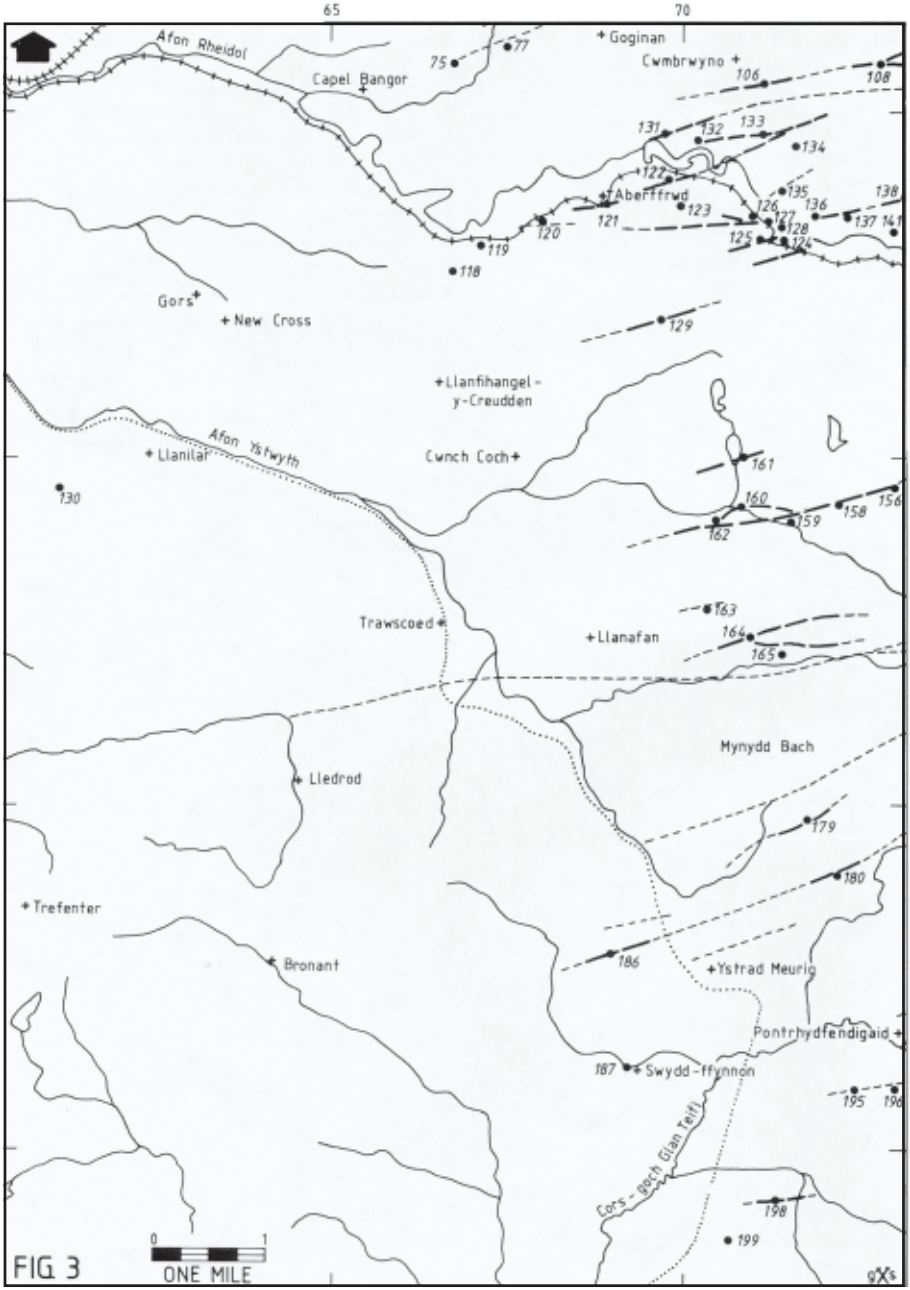
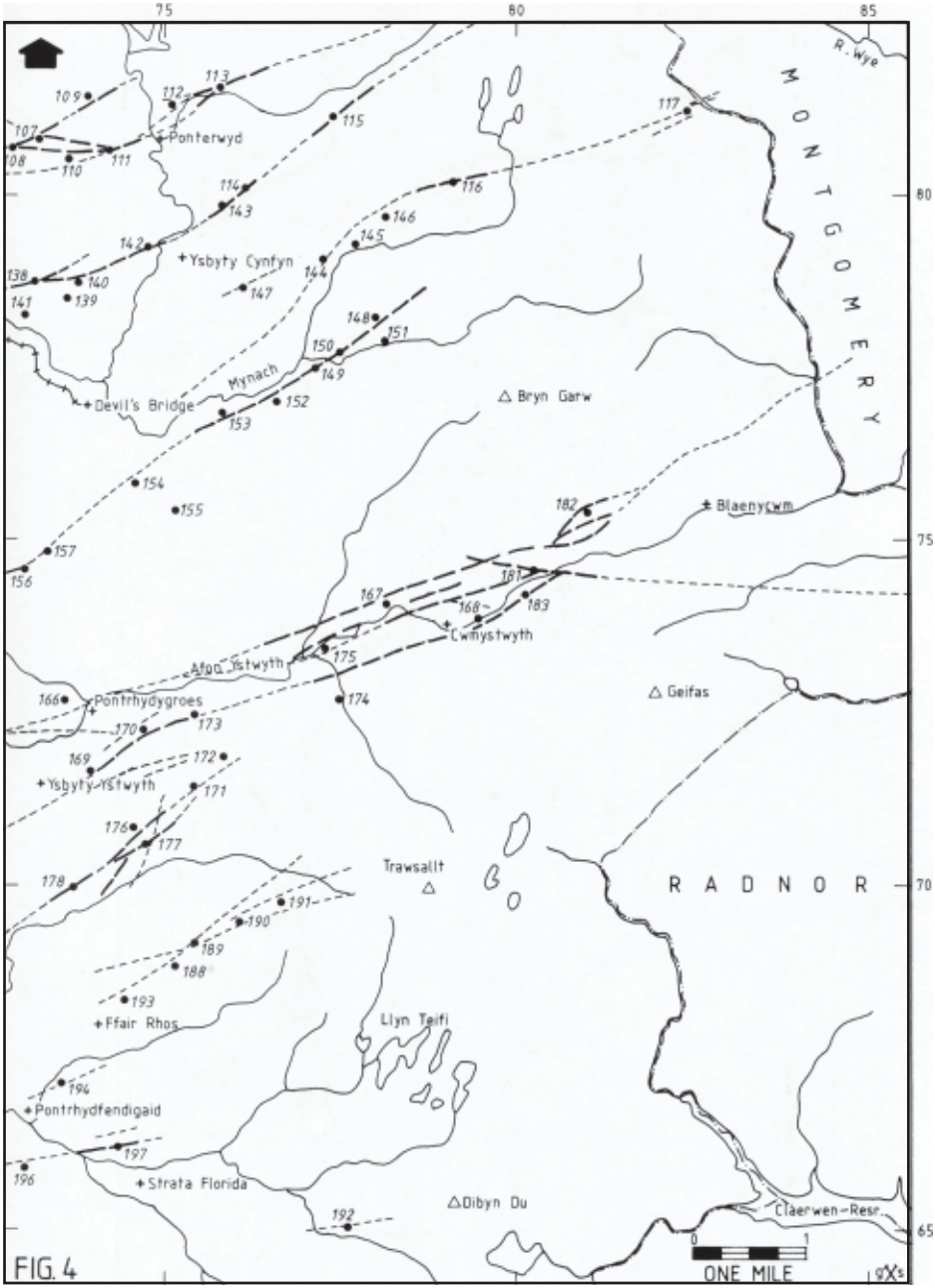
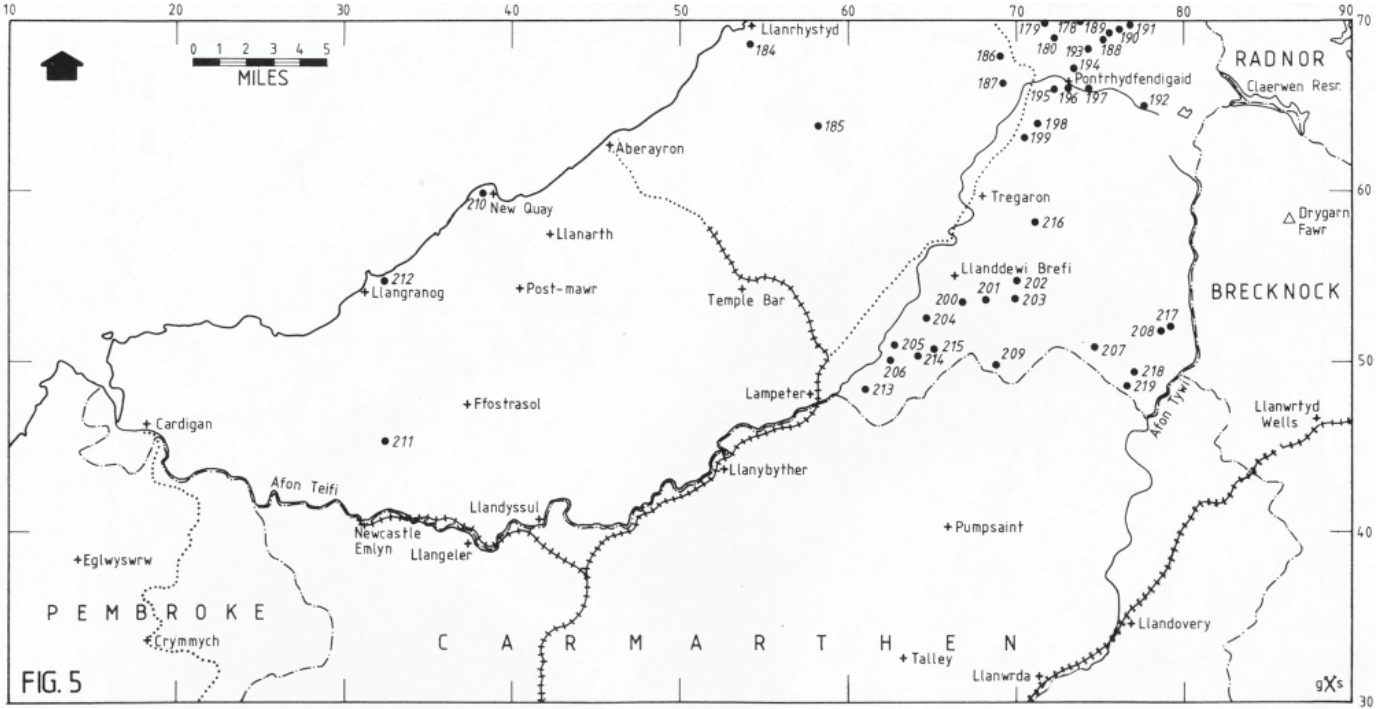


FIG. 2
70
75
80
95
90
85
80
Site of Mine or Trial (number as in text)
Line of known fault or vein
Part of vein known to be mineralised
Railway (standard gauge)
Railway (narrow gauge)
Railway (disused)
River
Town or Village
County Boundary
Location Map for Figs 1-5
1
2
3
4
5
Glaspwll
Pencarreg-gopa
Ystrad-Einion
Moel-y-Llyn
Bwlch-glas
Eggair Ffos-fuch
Nant-y-moch Reservoir
PLYNLIMON
Bwlchystyllen
Afon Rheidol
Nantyrarian
Cwmbrwyno
Ponterwyd
ONE MILE


65
70
80
75
70
65
Afon Rheidol
Capel Bangor
Goginan
Cwmbrwyno
Aberffrwd
Gors
New Cross
Llanfihangel-y-Creuddin
Afon Ystwyth
Llanilar
Cwnch Coch
Trawscoed
Llanafan
Mynydd Bach
Lledrod
Trefenter
Bronant
Ystrad Meurig
Pontrhydfendigaid
Swydd-ffynnon
Cors-goch Glan Teifi
0
1
ONE MILE
FIG 3


75
80
85
R. Wye
MONTGOMERY
80
75
70
65
RADNOR
Ponterwyd
Ysbyty Cynfyn
Devil's Bridge
Mynach
Bryn Garw
Blaenycwm
Cwmystwyth
Afon Ystwyth
Geifas
Pontrhydygroes
Ysbyty Ystwyth
Trawsallt
Llyn Teifi
Ffair Rhos
Pontrhydfendigaid
Strata Florida
Dibyn Du
Claerwen Resr.
0
1
ONE MILE
FIG. 4


0 1 2 3 4 5
MILES
Llanrhystyd
184
185
Aberayron
New Quay
210
Llanarth
212
Llangranog
Post-mawr
Temple Bar
Cardigan
211
Ffostrasol
Lampeter
Llanybyther
Afon Teifi
Llandyssul
Newcastle Emlyn
Llangeler
Eglwyswrw
Crymmych
PEMBROKE
CARMARTHEN
Talley
Llanwrda
Pumpsaint
Llandovery
Tregaron
Llanddewi Brefi
Pontrhydfendigaid
179
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RADNOR
Claerwen Resr
Drygarn Fawr
BRECKNOCK
Afon Tywi
Llanwrtyd Wells
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90
70
60
50
40
30
FIG. 5

CARDIGANSHIRE - DETAILS OF THE MINES

1) **YNYS-HIR**

Ysgubor-y-coed Ph. SN/682958 (To Ynyshir House.)

A report in the Mining Journal of 19 October 1850 refers to a trial here, but no other reference to this working has been found and no details of the workings are known. A major fault strikes about north-north-east along the west side of the hill and the rocks to the east side of this fault are at a low horizon in the Frongoch Formation, which is a favourable horizon for ore deposits in this area.

Ref.: MJ., 19 October 1850

2) **CAERHEDYN**

Ysgubor-y-coed Ph. SN/71 0974

This is the site of a trial working apparently made to test the Llyfnant fault, which strikes about east and west, with a downthrow to the north. The basal beds of the Frongoch Formation are on the north side of the fault, while rocks of the Gwestyn and Van Formations lie on the south side. A level was driven south from the Llyfnant Valley, but no details of the working or its history are known. It was not successful in finding significant quantities of ore, in common with other trials in this region. It is evident that the veins of the Llyfnant Valley fault system are poorly mineralised at best.

3) **MAESCYLIN**

Ysgubor-y-coed Ph. SN/731974

Another trial for lead ore was made on fractures of the Llyfnant fault system at this place, where some levels were driven southward from the Llyfnant Valley. The trials were unsuccessful; no details of their history are known.

4) **BRWYNO-UCHAF**

Ysgubor-y-coed Ph. SN/727963

This apparently unsuccessful trial is represented by a shaft sunk on the south bank of the upper reaches of Afon Brwyno. The trial occurs in rocks of the Van Formation and was probably made to test the numerous minor fractures hereabouts, which strike about east and west, but no further information about it has been found.

5) BWLCH-Y-MAEN

Ysgubor-y-coed Ph. SN/709948

A trial level was driven in a north-easterly direction in rocks of the Van Formation here. No details of the workings or their history are known and the trial was evidently not successful.

6) **CAE-MARDIN**

Ysgubor-y-coed Ph. SN/712947

This is the site of another trial level driven north-east in rocks of the Van Formation. No details are known and it was evidently not successful.

7) **YSTRAD-EINION = DOLGOCH**

Ysgubor-y-coed Ph. SN/706938 See Plate IX

The vein worked here strikes north-west and occurs in mudstones of the Van Formation. Mineralisation consists chiefly of calcite in which chalcopyrite, sphalerite and some galena occur. The adit level occurs at 590 ft. A.O.D., which is at about 30 fathoms depth at the shaft, the total depth of which is believed to be about 80 fathoms, and the workings seem to be fairly extensive. Dressing floors were built just to the south of the adit level portal.

The mine is reported to have been at work for many years before 1845, during which period no output was recorded. An attempt to rework the mine in 1860 did not last long, but the mine is known to have been at work again about 1890-91, when 9 tons of lead ore, 10 tons of zinc ore and 45 tons of copper ore were produced. Today this little mine is noted for its 16' diameter underground water wheel which still remains virtually intact.

Refs: OTJ, p.149. MJ - May-June 1860. DEB Pt.3 p.43.

8) **CWM EINION**

Ysgubor-y-coed Ph. SN/708935

A trial level was driven here, probably on the same vein which was worked further to the north-west at Ystrad-einion mine. The mine seems to have been at work about 1745 and was probably active at about the middle of the 19th century, but no details of the workings or their history are known, The trials do not seem to have been successful

Ref.: WJL., p.96.

9) **BLAENEINION**

Ysgubor-y-coed Ph. SN/733930

A trial level was driven to the east from the headwaters of Afon Einion, at the base of the Frongoch Formation. No vein is known to occur here and the trial was not successful, but no details have been found.

10)**BRYN MELYN**

Ysgubor-y-coed Ph. SN/735925

A trial level was driven from the west bank of a stream which flows into Llyn Conach. The trial occurs at a low horizon in the Frongoch Formation and was evidently not successful, but no details are known.

11) **CREIGIAU DUON**

Ceulanmaesmawr Ph. SN/704907

This seems to be the most westerly of a series of trials made on the north vein of Blaenceulan Mine, which represents the fingering-out to the west of the Esgairhir Vein. A crosscut level was driven to the north under Creigtau Duon in Gwestyn rocks. The trial does not seem to have been successful, but no details of the workings or their history are known.

12)**LLECHWEDD-LLWYD**

Ceulanmaesmawr Ph. SN/707906

A series of trial shafts was sunk hereabouts in rocks of the Gwestyn and Van Formations, to test the Blaenceulan North Vein to the west of that mine.

ALPHABETICAL LIST OF MINES IN CARDIGANSHIRE

Note An asterisk before an entry means that it refers to an alternative name for a mine, rather than the principal name used.