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THE MINES OF YORKSHIRE

Metalliferous and associated minerals

by

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PREFACE

In 1975, Roger Burt and his colleagues in the Department of Economic History at the University of Exeter began a project, supported by the Social Science Research Council, to analyse the mine-by-mine returns of production, ownership, management and employment that appeared in the annual *Mineral Statistics of the United Kingdom* (1845 to 1913). The data was assimilated and stored in what was probably one of the earliest computerised data-bases of historical information, and was also used to produce a series of county-based volumes of mineral statistics. The first of these, for Derbyshire, appeared in 1981 and was soon followed by others for the various Pennine counties, the Isle of Man, South-West England and, finally, central and north Wales. By 1990, ten county volumes had been published and the first stage of the project was drawing to a close. Work has not stopped, however, and it is intended to publish the *Irish Mineral Statistics*, also as part of the *British Mining* series, in 2003/4. Moreover, all of the published data, together with new material on Wales, will shortly be made freely available, in searchable form, on the world wide web. More importantly, a new generation of greatly expanded county data sets – of which this is the first – are planned to appear in the next few years. Mike Gill first proposed this latter extension project back in 1985 and this pilot on the pre-1974 county of Yorkshire has expanded progressively ever since. Clearly, further additions could continue almost indefinitely, but in 2002 it was decided that the data now provided a major new research tool and should be published.

There is over four times more data in this volume than in the original *Yorkshire Mineral Statistics*. Although it is presented in a broadly similar way, some changes have been made. Most significantly, there has been a far greater editorial input to exploit Mike Gill's extensive knowledge of the county's mining history and to give a clearer view of what is now a very much longer period. Similarly, whilst aware of Seneca's comment that "*anything that is divided into minute grains becomes confused*", entries have been made for the small mines which made up larger titles, such as the AD, Arkengarthdale and Grassington Mines. There are also new headings to include a wider range of data.

The successful progression of this project was achieved only with the active help and collaboration of a wide range of private and professional researchers, librarians and archivists. Many thanks are due to: Lawrence Barker (Swaledale), David and Margaret Carlisle (Arkengarthdale), Ray Fairbairn (Scargill), Dr Edmund Green (Swaledale, Wensleydale and Middleton Tyas), William Houston (post-war period), Alan King (Malham), Hazel Martell (Chatsworth Archive), Dr Jack Myers (Malham), Alasdair Neill (C20th returns), the late Dr Arthur Raistrick (Wharfedale), Dr Jim Rieuwerts (Calderdale), Ian Spensley (Swaledale and Wensleydale), Malcolm Street (Nidderdale) and Les Tyson (Swaledale, Arkengarthdale and Wensleydale). Thanks are also due to Professor Bernard Jennings for allowing the inclusion of data from his MA thesis

(see bibliography). The late John Owen gave invaluable help with the Cleveland ironstone mining industry, including detailed comment on the author's interpretation and expansion of the first volume, the provision of new data on mining before 1858 and the National Grid references of mines.

Mike Gill would also like to acknowledge the great amount of assistance given to him by the Chatsworth Estate, in particular Mr J.M. Sheard, the Agent at Bolton Abbey, and Mr M. Pearman, the Archivist at Chatsworth. Thanks are also due to the staffs of the following institutions: Bradford City Archives and Library; British Geological Survey Library, Keyworth; British Library, Wetherby; Brotherton Library, University of Leeds; Cumbria County Record Office, Carlisle; Durham County Planning Department; Durham County Record Office; Gateshead City Library; Guild Hall Library, London; Institute of Historical Studies Library, London; Institute of Industrial Archaeology Library, Ironbridge; John Rylands Library, University of Manchester; Manchester Central Library; Norfolk Record Office; Northumberland County Record Office; North Yorkshire County Record Office; Public Record Office (Chancery Lane and Kew); Sheffield City Library; Sheffield Record Office; Warwickshire County Record Office and the West Yorkshire Archive Service, Leeds.

The compilation of this data, which was in widely varying forms was a daunting task and without a computer it would have been impossible. Financial assistance for the work was given by Miss Mary McTurk, Billiton U.K. Limited and the Kildwick Church Parochial Council.

Any mistakes are, of course, Mike Gill's responsibility.

INTRODUCTION

I

The Mineral Statistics

This volume brings together production and ownership data for metalliferous mining in Yorkshire, from the earliest origins of the industry to the present day. It undoubtedly does not capture everything – some further material will surely become available – and it does not cover every period of the industry's history, as many mines worked for centuries before the earliest data presented here, but it does encompass everything that long and detailed research could reveal. To give perspective to the scale of the industry, we have also included aggregate information on national production of the various metals, and Yorkshire's contribution to those totals, as well as comparative data for the production of coal in the county, which was far larger and more important than the other activities put together.

The sources from which this data has been derived can be roughly divided into two groups - *archival material*, mainly for the period before the mid-19th century, and *official government returns*, for the period thereafter. The *archival* sources consist mainly of material generated by the owners of the minerals (the 'mineral lords') and the various mining companies that leased the rights to work them. Their 'quality' in terms of reliability and coverage is patchy, their survival random, their distribution now widespread and uncertain, and their interpretation subject to considerable difficulties. In the latter context, there are particular difficulties with the interpretation of weights and measures, which varied between place and over time before the early 19th century. For example, in Swaledale and Arkengarthdale care must be taken when using the above accounts because most smelt mills and some mines had their own system of weights until the mid-19th century. In Swaledale and Arkengarthdale, ore was usually weighed in Bings (8 cwts) and Horse Loads (2 cwts) and lead was in Stockton fodders of 22 cwts (2464 lbs). A local fodder, which weighed 34 cwts or 17 horse, was sometimes used for ore. At the normal rate of produce achieved by an ore-hearth (about 65%) this would give one fodder of lead (22 cwts). This system of rough, ready-reckoning is also reflected in the practice of each smelt mill making pieces of different weights (each practically a full fraction of a fodder). Nevertheless, examination of accounts shows that the average weight of the pieces, from batch to batch, seldom varied by more than a few pounds. When cast, each batch of 400 pieces was stamped with the mineral lord's or company's logo and a letter, called a mill mark, to help identify it. The next batch got the next letter, and so on from A through to Z. Casting pieces in this way helped to keep track of progress during smelting, allowed the quick estimation of the weight of lead in stacks, and also allowed for the easy identification of any pieces with damaged mill marks. However, whilst output figures must always be treated with caution during this early period, and total output for the county certainly exceeds the figures produced here, some good and reliable long runs of data have been assembled for some of the larger mining operations, such as the AD, Grinton and Hurst Mines in Swaledale, and the Buckden, Hawkswick, Conistone, Grassington and Hebden mines in Wharfedale.

Regular and *official returns* from the mines to the government first began to be collected in 1845 and have continued, in changing formats, to the present day. Printed and regularly published, these formed the basis of our earlier volume, which looked only at the period from the 1840s to the First World War. Here we have extended that coverage to 2000. The first published series, relating to the output of copper and lead, principally in the years 1845 to 1847, appeared in *Memoirs of the Geological Survey of Great Britain and the Museum of Practical Geology in London* Vols. I and II (H.M.S.O. 1845 and 1847). The recently established Mining Record Office, in particular its Keeper of Mining Records, Robert Hunt, did the work. This was regarded as a limited exercise, with no commitment for the publication of further annual series. In 1853, however, Hunt updated and extended the earlier series in a volume published by the Geological Survey, under his name, entitled *Records of the School of Mines*

and of Science Applied to the Arts, Vol. I Pt IV. In the same year, a Treasury Committee, enquiring into the working of the Geological Survey and Museum, reported favourably on the activities of the Mining Record Office and recommended that its activities should be placed on a more regular footing. This signalled the start of the regular collection and publication of a widening range of data on mineral extraction and related manufacturing and transportation.

The first of this annual series, for 1853, appeared in 1855 and was published under the title *Memoirs of the Geological Survey of Great Britain and of the Museum of Practical Geology: Mining Records: The Mineral Statistics of the United Kingdom of Great Britain and Ireland*. This continued the production data of lead and copper, from 1845, as an unbroken run. Thereafter, until 1882, the series was published by the Geological Survey in the autumn of the year following the recorded year. Robert Hunt retired after the preparation of the 1881 volume and the collection of a considerably extended range of data was rationalised. This was done by transferring the Mining Record Office from the Museum of Practical Geology to the Home Office, where the Mines Inspectors, established by the Coal Mine Inspection Act of 1850, had, for many years, been publishing similar output data in their annual reports.

In particular, the Coal and Metalliferous Regulation Act of 1872 required all active mines in the country to furnish the Mines Inspectorate with details of their output and employment and it was thought wasteful to continue the duplication of returns and computations by the Mining Record Office. Hunt's staff prepared the first of the new series, following the established format, which appeared in 1884 under the title *The Mining and Mineral Statistics of the United Kingdom of Great Britain and Ireland for 1882*. Unlike earlier versions, however, it appeared as a Parliamentary Paper. In the next year, the title became *Summaries of Her Majesty's Inspectors of Mines Reports to Her Majesty's Secretary of State, and the Mineral Statistics of the United Kingdom of Great Britain and Ireland, including Lists of Mines and Mineral Works*. From 1884 to 1887, they appeared annually as *The Mineral and Mining Statistics of the United Kingdom of Great Britain and Ireland, including Lists of Mines and Mineral Worked*. During these years, the volumes included returns of a) the quantity and value of all minerals wrought; b) the numbers of people employed in and about the mines and open works; c) the number of fatal accidents in the mines; d) a list of the mine owners, managers and agents; e) a list of the recorded plans of abandoned mines that had been deposited at the Home Office; f) an appendix showing the production of minerals in the British Colonies and Possessions.

From 1888 to 1896 the returns appeared as *The Mining Statistics of the United Kingdom of Great Britain and Ireland with the Isle of Man*, a change which was associated with important changes in content. The details of accidents in the mines, previously held over from the early annual reports of the Inspectors of Mines, were published separately, as was the *List of Mines*, a regular appendix of the names of the

mine owners, agents, managers and the numbers employed, which had been included at the back of The Mineral Statistics since 1853 for coal mines, 1859 for most metalliferous mines and 1863 for ironstone mines.

In 1897, the annual returns became the *Mines and Quarries: General Report and Statistics*. Their content was changed to the format they kept until the First World War, being split into four sections with Part III giving details of output. The latter was subtitled *General Report and Statistics Relating to the Output and Value of the Mineral Raised in the United Kingdom, the Amount and Value of the Metals Produced and the Exports and Imports of Minerals*.

It is notable that until 1897 the 'Clerks of the Mineral Statistics', responsible for preparing the publications, were still largely the same men that had worked with Robert Hunt from the earliest days of the Mining Record Office. This continuity contributed to an unparalleled wealth of experience in collecting and editing the material. Following Hunt's retirement in 1882, the new Home Office department had been jointly run by Richard Meade and James B. Jordan. Meade was appointed by Hunt in 1841 and he was joined by Jordan in 1858. Meade retired from the Home Office in 1889 and Jordan continued until 1897, thereby consolidating more than half a century's data gathering under three close associates.

Publication of the annual *List of Mines* continued, with breaks in 1939, 46, 47 and 49, until 1950, when it was discontinued. The output of individual mines was not given from 1914 to 1919 but was resumed between 1920 and 1938.

Reliable data sets are more difficult to find after 1950. Nevertheless, the Cleveland ironstone mines were listed in the *Guide to the Coalfields*, an annual publication by the *Colliery Guardian*. After 1960, the Mines Inspectorate also published a *List of Miscellaneous Mines in Great Britain*, which gives details of ownership, location and type of mineral worked. More recently, the British Geological Survey has produced a similar list, thereby resuming the task it relinquished around one hundred years before.

As might be expected, various libraries hold incomplete runs of the *List of Mines* and the *Guide to the Coalfields* etc, but the British Geological Survey Library, at Keyworth, probably has the most complete set, plus a wide range of general statistical data.

II

Yorkshire Mineral Production

This volume focuses on the record of metalliferous mining – not because it was Yorkshire's most important extractive industry, but because it was the sector recorded in greatest and most regular detail. It was the only form of mining for which detailed mine-by-mine returns are available in long and continuous series. Coal returns were only ever published in round totals for the county and never included the same range of detail as those for metals. Similarly, the returns for stone quarrying (mainly limestone, sandstone, flagstone and aggregates) and evaporite production (such as gypsum, potash and rock salt) generally only appeared as county totals, though mine-by-mine breakdowns can be found for some short sub-periods. These have not been included here, however.

The regular collection and publication of *official* metalliferous mining data started in 1845 with series for **lead**, with details of its **silver** content (estimated by assay rather than commercial refining) being added in 1851. These were joined in the now annual *Mineral Statistics of the United Kingdom*, by **copper** in 1848, though it is difficult to separate out the Yorkshire data until 1854. Returns for **zinc**, **barytes** and **fluorspar** began in 1854, but it is unlikely that they were comprehensive before the 1870s. **Iron** production was first recorded in 1855, but many producers, especially those in the West Riding, refused the Mining Record Office permission to publish their detailed returns. As a result, the only mine-by-mine returns published for Yorkshire were those voluntarily provided by companies in the Cleveland district between 1858 and 1881. From 1872, however, the publication of output data for individual mines in the coal measures was expressly forbidden by the Coal Mines Regulation Act. Details of production from Cleveland ironstone mines, which worked stratified deposits and came under the latter Act, disappeared after the reorganisation of the publication of the *Mineral Statistics* in 1881.

The relative scale of output of the different minerals produced in Yorkshire, and their share of national production, is shown in Table 1. **Ironstone** was clearly the most important both by volume and by value and it employed more capital and labour than the other metals combined. With a remarkably steady level of output of between five and six million tons annually from the 1870s - see Table 2 - the county total for the period 1855-1914 fell a little short of 300 million tons and comprised more than a third of total national production. Nearly all this output was derived from the Cleveland district, where ironstone mining had a long history, but developed rapidly after a successful trial of the Main Seam at Eston in 1850. The total production of the West Riding was a comparatively insignificant 12 million tons, most of which was mined before 1880. Within the Cleveland field, a major part of the total output was controlled by a handful of large producers. During the period 1858 to 1881, just

three companies, Pease & Co., Bolckow, Vaughan Co. and Bell Brothers, were responsible for around two-thirds of the district's production.

Even in 1880, when the orefield was fully developed, seven mines producing over a quarter of a million tons annually accounted for nearly 63 per cent of the total output, with the remainder coming from 37 smaller producers.

The output of Cleveland's mines and the numbers employed in them rose steadily between 1895 and 1914 but, at the same time, overall productivity fell by 25-30 per cent from about 850 tons per man year to 600 tons per man year. This was an inevitable consequence of the increased haulage distances, for ore and materials, as the maturing mines became more extensive. Moreover, as workings reached lease boundaries, production was also shifting to pillar extraction. To counter these effects, some mines introduced new technology, but, whilst they may have seen improvements, it was insufficient to reverse the decline.

The industry contracted at the outbreak of World War I, as mines closed or were merged, and the number of underground employees fell sharply and never recovered. The average annual output, which in the six years before the war was a little under six million tons, fell to 2.3 millions by the early 1920s. This process continued in the latter decade, when Dorman, Long & Co Ltd took over the mines of Bell Brothers Ltd (1923) and Bolckow, Vaughan & Co Ltd (1929). Other companies went out of business and by 1929 the industry was largely in the hands of two firms, Pease and Partners Ltd and Dorman, Long, the latter being the larger. This led to further rationalisation and the workforce shrank by a further 40 per cent. Nevertheless, output per man year was held at around 600 tons between 1922 and 1939, when some 31.3 million tons of ironstone were produced.

At the end of World War II, the industry had eight mines and the numbers employed had risen slightly. During the 1950s, mechanised loaders and diesel locomotives, for haulage, were introduced and new work systems adopted. Nevertheless, the mines could not compete with supplies of cheaper, higher quality, foreign ores and the last mine, North Skelton, closed in 1964.

Lead ore was the most important non-ferrous mineral produced in Yorkshire and its mining also has a long history. The principal areas of production, Swaledale, Arkengarthdale, Wensleydale and the Greenhow mining field, were established by the mediæval period. Although Wharfedale and Airedale also had earlier mines, they grew in prominence later. Production came mostly from fairly small mines until the late 18th century, when larger, more intensively capitalised mines, began to appear.

It is likely that for much of the early modern period Yorkshire's output was surpassed by, at least, Derbyshire, Durham, Cumberland and the Mendip. Precise comparisons

are impossible, however, because county based tables are not available before 1845. Nevertheless, there is enough data to show that in 1750 Yorkshire's output was in the range of 1500-2000 tons of pig lead. John Taylor (*Records of Mining* Pt.1, 1829) estimated that in 1828 Yorkshire produced around 4700 tons of pig lead and had overtaken Derbyshire. Taylor's total was optimistic, however, and a likely figure was 500-1000 tons lower. Between 1845 and 1913, some 328,657 tons of lead ore were mined, which accounted for 7½ per cent of the total U.K. output. Even at its peak, in the late 1850s, Yorkshire was responsible for only around one-tenth of U.K. production, reaching a peak of 12.8 per cent in 1857 when 12,406 tons were mined. Most of this came from mines in Arkengarthdale and the north side of Swaledale and when these passed their best, the county's output declined. As shown in Table 5, this process began in 1870 and, in common with other U.K. lead producing districts, accelerated in the 1880s and 1890s.

By the eve of the First World War, the Yorkshire lead industry was practically dead and only survived as an adjunct to barytes and fluorspar working (Tables 9, 12 & 13). However, some small amounts of ore are still occasionally produced during limestone quarrying at Swinden and Coldstones.

Although Yorkshire's lead ores contained some **silver**, it was generally too little to repay the cost of separating it. With cupellation, the lower limit for the economic desilverisation of lead was around 8oz per ton and, after 1833, this was reduced to between 2 and 3 oz per ton with Pattinsonisation. In the late 16th and early 17th centuries, the Rimington and Brunghill Moor mines were claimed to be rich in silver, but the production of neither mine was sustained. Hunt's returns, which are supported by available assays, show that the silver content per ton of lead at the following mines was: Grassington 4½ oz; Old Gang 2½ oz; Arkengarthdale 2 oz and Appletreewick 1¾ oz per ton, all of them near the limit for economic extraction. Nevertheless, ore from the Braithwaite mine, in Wensleydale, assayed at around 7 oz per ton and was reputedly sent to Bollihope for smelting and, presumably, de-silvering. The New Rake at Grassington produced 611½ ounces of silver in 1860, but that was the only recorded silver from those mines. With these few exceptions, therefore, the county's mines were not silver producers and it is clear that even the less than half a per cent contribution to national output, suggested by Table 7, is far too generous. For these reasons, the expression 'silver producer', which was liberally scattered throughout Hunt's statistics, has been deleted from all but those mines known to have produced some silver.

Some mines supplemented dwindling receipts from lead ore by switching to the production of other minerals. **Zinc** ore (blende) is scarce in Yorkshire, but some was worked at Apedale, Elbolton and Skelhorn between 1872 and 1883. In the 18th century calamine, for the brass industry, was sought in various part of the Dales. Some was mined at Swinden and Cobscar, but the largest deposit, which filled caverns, was

worked at Malham in the early 19th century. Small **copper** deposits were worked around Malham, Feldom, East Layton and Middleton Tyas in the 18th century. Copper was also worked at Merrybent in the 1860s and early 1870s, Kneeton in the 1890s and Billybanks from 1905 to 1912. The Merrybent mine reopened in 1910 and worked lead and copper ores until it closed in 1925. The total output of these mines, between 1863 and 1913, was 2588 tons of copper ore, but prices were depressed. A deposit of manganese was examined, but not worked, at Grassington in 1818.

Fluorspar from Gill Heads was bought for use as a flux at Grassington Cupola smelt mill in 1838 and a little was produced from Raygill barytes mine in the late 1870s. It became important after 1913 when the principal sources were the liberties of Appletreewick and Bewerley in the Greenhow mining field. Fluorspar has also been recovered from dumps at Wet Grooves, in Wensleydale, and in Arkengarthdale. Production from dumps and old lead workings tended to be small-scale and migrated across the area being worked, suggesting that few new reserves were found to replace those that were easily won. Yorkshire has never had the large, mechanised fluorspar mines found in Derbyshire and Durham and, with the exception of Dry Gill, most fluorspar has been produced by small groups of men since the mid 1930s.

Barytes was the most important secondary product. Nevertheless, its relatively low price meant that many mines with significant reserves could not exploit them profitably because working and transport costs were too high. Other deposits were often iron-stained. Small amounts of barytes were produced in the 1850s and early 1860s, but larger-scale working began in the 1870s. By the late 1880s county production, derived mainly from Lunehead and Raygill mines, with some from Rimington, was averaging over 3000 tons annually and accounted for around one-sixth of total UK output. Raygill was exhausted by 1900 and, except for two brief periods when the Glusburn mine was worked, Lunehead was left as the major producer. The latter, which also produced some lead, closed in 1938, but was reworked intermittently until the 1970s. During the 1940s, a new mine, Closehouse, also in Lunedale, took over as Yorkshire's main producer of barytes. In 1974, however, it became part of County Durham and closed during the 1990s. Between 1913 and 1990 barytes was recovered from dumps and shallow workings at Appletreewick, Cononley, Glusburn, Grassington, Old Gang and Arkengarthdale.

Coal was worked extensively throughout Yorkshire and has been by far its most important mineral product. The Coal Measures outcrop along the eastern edge of the Pennines, from Sheffield to Leeds, and have been worked for hundreds of years. The coal seams vary in thickness from almost nothing to 14 feet, with most falling between two and six feet. They generally dip eastwards and are covered by younger Permian and Triassic rocks to the east of a line approximating to that of the A1 road. Along that margin, thin coal seams were often associated with beds of fireclay, ganister or sideritic clayband and blackband ironstone, which combined to make their working

viable. This led to an early iron industry as well as brickworks, pipeworks and refractory-ware works, as well as supporting rapid industrial growth from the 18th century onwards.

Apart from the Coal Measures, seams of poor quality coal were found in the Yoredale and Millstone Grit series in the Pennines and were worked extensively until the 1930s. Their output, which has never been quantified, was principally for local domestic use and lime burning.

The majority of the exposed coalfield, ie to the west of the A1, was developed by the end of the 19th century, whilst the deeper, concealed coalfield was developed in the early 20th century. Output from these mines peaked in the 1920s and averaged around 39 million tons annually until 1945, which was around 17 per cent of national output. After nationalisation, output steadily declined as mines closed or were merged, but productivity was increased through greater use of mechanisation. The National Coal Board sank a few new mines, such as Kellingley which began production in 1965, then in the 1970s it began to develop the virgin Selby coalfield. This involved sinking five mines, with ten shafts, and driving some 124 miles of roadways at a cost of about £1.3 billion. The output from each mine was brought to the surface at Gascoigne Wood for despatch to power stations.

A combination of Government policy, growing imports of coal in the 1980s and the increased use of gas by electricity generators in the 1990s led to the closure of many of Yorkshire's mines immediately prior to the industry's privatisation in 1993. This retrenchment has continued, with the Prince of Wales Colliery, at Pontefract, closing on August 30th 2002 and the whole Selby complex being scheduled for closure by 2004.

None of the above activity, which dwarfed that of lead mining many times over, is covered by this volume. A similar study covering Yorkshire's coal industry would be a major undertaking, with over 500 mines in the 1870s dwindling to seven in 2002. It would, however, be a significant addition to our knowledge.

Other extractive industries which do not feature here are stone quarrying and evaporite production. Yorkshire has been a major producer of **limestone**, **sandstone**, **flagstone** and **aggregates** for all purposes. **Gypsum** was formerly mined at Sherburn in Elmet near Leeds, and Boulby Mine, sunk on the site of an earlier ironstone mine, began work in 1973 and is still producing **potash** and **rock salt**. **Jet** and **alum** shale were also worked near Whitby.

III

The Mine Tables

The mine-by-mine returns reproduced in the following tables are those that appeared in the *Mineral Statistics* 1845 to 1913, its accompanying *List of Mines*, and the *List of Miscellaneous Mines*. They have been supplemented with miscellaneous additional material derived from mine accounts, smelting ledgers, and the *Colliery Yearbook*. The mine names are normally as they appear in the original returns, but editorial judgement has been used to ensure the proper allocation of data amongst sites. Where possible, location has been accurately specified by changing the original entry to the appropriate civil parish and adding Ordnance Survey National Grid references.

Four principal categories of information are listed for each mine, where available. **Production** data is given separately for each mineral and differs slightly between them. The absence of figures does not necessarily mean that the mine was not producing, because for some years its output might be subsumed in some other aggregate figures. See the *Comment* column for such details. In the earlier edition of the *Yorkshire Mineral Statistics*, the returns for iron were sometimes accompanied with the letters AC, to denote argillaceous carbonate ore. This is a redundant term for the Cleveland ironstone (which is an oolitic, chamositic, siderite mudstone) and has been deleted from this edition. The notation (P), to be found in the Merrybent mine copper returns, indicates that the data was derived from details of 'private contracts' with the smelters, rather than the more usual 'ticketing' auctions, of the type held in Cornwall or Swansea. Mine **Ownership and Management** returns are mainly drawn from the *List of Mines,* first published in 1859 for all non-ferrous workings and 1863 for non-coal measures iron mines. Although not entirely accurate, these returns give a guide to a mine's years of operation, as they purported to include the names and addresses of the owners and agents of all mines being worked that year. Careful examination of the earlier *Lists*, however, reveals periodic purges, when unusually large numbers of mines were removed. This suggests that the list was not edited for every annual edition. In a major change from the earlier edition of the *Yorkshire Mineral Statistics* the headings for Ownership and Management have been replaced by a new ones for **Mineral Lord**, as the owner of the minerals; **Worked by**, the company or individual working the mine; **Agent**, the manager or under-manager; **Secretary**, company secretary; and **Barmaster**, for customary liberties like Buckden, Conistone, Grassington, Hebden and Kettlewell. Because the volume covers a period of around 500 years, the title of the person responsible for running a mine varies from, for example, Agent, to Manager, Steward or Surveyor. For simplicity, therefore, the general term Agent, sometimes qualified by an entry in parentheses, has been used. The **Employment** returns were also drawn from the *List of Mines* and provide a useful check as to whether a mine was operational and also its likely level of production if this is not otherwise available. The original decision

to publish the detailed employment returns was left to the local Mines Inspector and some did not provide them until the end of the century. There is data for non-ferrous mines in Yorkshire, however, from 1877 to 1881 and from 1898 to 1950. The same detail for ironstone mines begins in 1894. Some employment statistics have been added from the evidence given to the Kinnaird Commission in 1862-3 and a few others from census returns. Together, all these series provide a simple and comprehensive view of where, when and what metallic and related minerals were being produced in Yorkshire and by whom.

TABLE 1

The production of metalliferous and principal related minerals in Yorkshire and their percentage share of total U.K. production 1850 to 1910.

	1850	1860	1870	1880	1890	1900	1910
Iron	-	1,727,019	4,380,605	6,773,353	5,695,006	5,550,667	6,205,825
%UK Prod	-	21.5	30.2	37.6	41.3	39.6	40.8
Lead	8,706	10,666	6,594	6,974	1,683	885	197
%UK Prod	9.4	12.0	6.7	9.6	3.7	2.8	0.7
Silver	-	3,387	620	7,105	-	-	49
%UK Prod	-	0.6	0.07	2.4	-	-	0.03
Zinc	-	-	-	-	-	-	-
%UK Prod	-	-	-	-	-	-	-
Fluorspar	-	-	-	84	-	-	-
%UK Prod	-	-	-	?	-	-	-
Barytes	-	1,750	-	2,739	1,572	2,332	1,882
%UK Prod	-	13.2	-	15.7	6.2	7.9	4.2
Copper	-	-	80	-	-	-	76
%UK Prod	-	-	0.07	-	-	-	1.82

Production is in tons of ore, except for Silver which is ounces of metal.
No zinc production for these particular years.

TABLE 2

Yorkshire ironstone production and its share of total U.K. output 1855-1914

Year	U.K. Total	N. Riding	E.& W.Ridings	Quarries	Total	% of U.K.
1855	9,553,741	970,300	255,000	-	1,225,300	12.83
1856	10,483,309	1,197,417	242,100	-	1,439,517	15.07
1857	9,372,781	1,414,155	207,500	-	1,621,655	17.30
1858	8,040,959	1,367,395	189,750	-	1,557,145	19.37
1859	7,876,582	1,520,343	175,000	-	1,695,343	21.52
1860	8,035,306	1,471,319	255,700	-	1,727,019	21.49
1861	7,215,518	1,130,761	235,500	-	1,366,261	18.94
1862	7,562,240	1,690,097	350,500	-	2,040,597	26.67
1863	8,613,951	2,078,806	475,000	-	2,553,806	29.65
1864	10,064,891	2,401,891	555,000	-	2,956,891	29.38
1865	9,910,046	2,762,359	575,000	-	3,337,359	33.68
1866	9,665,013	2,809,061	357,000	-	3,166,061	32.76
1867	10,021,058	2,739,039	579,000	-	3,318,039	33.11
1868	10,169,231	2,785,307	785,628	-	3,570,935	35.12
1869	11,508,526	3,094,678	230,905	-	3,325,583	28.90
1870	14,496,427	4,072,888	307,717	-	4,380,605	30.22
1871	16,470,010	4,581,901	407,997	-	4,989,898	30.30
1872	15,755,675	4,974,950	466,305	-	5,441,255	34.54
1873	15,583,669	5,617,014	407,388	-	6,024,402	38.66
1874	14,844,936	5,614,323	370,960	-	5,985,283	40.32
1875	15,821,060	6,121,794	353,582	-	6,475,376	40.93
1876	16,841,584	6,562,000	381,463	-	6,943,463	41.23
1877	16,692,802	6,284,545	402,746	-	6,687,291	40.06
1878	15,726,370	5,605,640	370,405	-	5,976,045	38.00
1879	14,379,735	4,750,000	321,789	-	5,071,789	35.27
1880	18,026,050	6,486,655	286,698	-	6,773,353	37.58
1881	17,446,065	6,538,471	320,981	-	6,859,452	39.32
1882	18,031,957	6,326,314	175,681	-	6,501,995	36.06
1883	17,383,046	6,756,055	170,832	-	6,926,887	39.85
1884	16,137,887	6,052,608	67,812	-	6,120,420	37.93
1885	15,417,982	5,932,244	126,596	-	6,058,840	39.30
1886	14,110,013	5,370,279	92,285	-	5,462,564	38.71
1887	13,098,041	4,980,421	81,868	-	5,062,289	38.65
1888	14,590,713	5,395,942	67,148	-	5,463,090	37.44

TABLE 2 (continued)

Yorkshire ironstone production and its share of total U.K. output 1855-1914

Year	U.K. Total	N. Riding	E.& W.Ridings	Quarries	Total	% of U.K.
1889	14,546,105	5,657,118	71,196	-	5,728,314	39.38
1890	13,780,767	5,617,573	77,433	-	5,695,006	41.33
1891	12,777,689	5,128,303	78,019	-	5,206,322	40.75
1892	11,312,675	3,411,400	81,816	-	3,493,216	30.88
1893	11,203,476	4,625,520	87,758	-	4,713,278	42.07
1894	12,367,308	5,048,956	67,191	-	5,116,147	41.37
1895	12,615,414	5,285,617	45,538	100	5,331,255	42.26
1896	13,700,764	5,678,368	56,474	50	5,734,892	41.86
1897	13,787,878	5,679,153	50,821	99	5,730,073	41.56
1898	14,176,936	5,730,413	54,696	479	5,785,588	40.81
1899	14,461,330	5,612,742	59,136	288	5,672,166	39.22
1900	14,028,208	5,493,733	56,688	256	5,550,677	39.57
1901	12,275,198	5,100,823	49,609	224	5,150,656	41.96
1902	13,426,004	5,402,164	41,688	5,494	5,449,346	40.59
1903	13,715,645	5,677,560	46,375	9,264	5,733,199	41.80
1904	13,774,282	5,727,696	38,903	8,089	5,774,688	41.92
1905	14,590,703	5,944,491	45,050	10,208	5,999,749	41.12
1906	15,500,406	6,113,426	49,454	11,203	6,174,083	39.83
1907	15,731,604	6,240,369	48,875	9,382	6,298,626	40.04
1908	15,031,025	6,081,329	44,404	8,396	6,134,129	40.81
1909	14,979,979	6,191,632	42,957	8,614	6,243,203	41.68
1910	15,226,015	6,160,241	38,170	7,418	6,205,825	40.76
1911	15,519,424	6,050,265	36,099	46,308	6,132,672	39.52
1912	13,790,391	5,158,860	31,831	40,673	5,231,364	37.93
1913	15,997,328	6,011,390	28,269	70,425	6,110,084	38.19
1914	14,867,582	5,654,287	24,229	79,499	5,758,015	38.73
Total	801,870,554	281,940,401	12,001,515	316,469	294,258,385	36.70

Notes a) North Riding includes the Cleveland orefield.
b) The appearance of quarried ore in 1895 does not mean that no ore was quarried before this, but simply that it was not separated until the Quarries Act of 1894.

Tables of Mine Production, Ownership, Management and Employment

Please note:-

1. All dates prior to 1752 have been adjusted to begin on January 1st.

2. The traditional term ‘ore’ has been used throughout instead of concentrate.

3. In the tables for lead either from Grassington or “Smelted at Grassington”, the figures for metallic lead up to, and including, 1849 are in smelt mill weight (i.e. 2460 lbs/ton). Thereafter, they are in tons of 2240 lbs. All figures for ore are in tons of 2240 lbs.

AD MINES Healaugh NY961017

Production:	Lead	Ore(tons)	Lead (tons)	Value (£)
	1684	305.60	177.19	
	1696		661.80	
	1697		490.02	
	1699		103.23	
	1700		462.18	
	1701		168.69	
	1736	250.50	193.72	
	1750	582.30	440.01	
	1751	1124.30	778.74	
	1752	1246.30	881.78	
	1753	616.50	413.95	
	1755	901.50	736.54	
	1756	861.00	621.28	
	1786		632.00	
	1787		689.00	
	1788		469.00	
	1789		544.00	
	1790		706.00	
	1791		839.00	
	1792		1183.00	
	1793		1100.00	
	1794		915.00	
	1796		1306.00	
	1797		1407.00	
	1798		1136.00	
	1799		1079.00	
	1800		1343.00	
	1801		3252.00	
	1802		2320.00	
	1803		1393.00	
	1804		1596.00	
	1805		736.36	
	1806		1510.82	
	1807		1468.26	
	1808		1142.14	
	1809		1196.59	
	1810		1196.59	
	1811		870.89	
	1812		389.42	
	1813		601.83	
	1814		339.86	
	1815		240.66	
	1816		575.34	
	1817		1600.05	
	1818		1834.02	

1819	1935.30
1820	2144.50
1821	1903.05
1822	1281.22
1823	1452.19
1824	1053.39
1825	1765.84
1826	2724.53
1827	1650.84
1828	1544.11
1829	1606.10
1830	1254.42
1831	1081.00
1832	1262.09
1833	1200.93
1834	1196.30
1835	1418.56
1836	1700.81
1837	1818.54
1838	1542.28
1839	2267.80
1840	3064.91
1841	2465.91
1842	2716.76
1843	3124.27
1844	2144.41
1845	2016.68
1846	1997.49
1847	1499.04
1848	1492.71
1849	1639.94
1850	1741.00
1851	1639.00
1852	1779.00
1853	1499.00
1854	1591.00
1855	1673.00
1856	3016.00
1857	2838.00
1858	2619.00
1859	1811.00
1860	1660.00
1861	1430.00
1862	1348.00
1863	1149.00
1864	1031.00
1865	1054.00

	1866	1338.00
	1867	2205.00
Comment:	1684	Data from NYCRO R/Q/R9/338
	1696-1699	Data from JLB MSS
	1736-1756	Data from PRO C114/145
	1786-1804	Data from Jennings Thesis
	1805-1816	Data from NYCRO ZLB 2/11
	1805-1816	Based on pieces weighing 158.601 Lbs
	1817-1849	Data from NYCRO ZLB 2/134
	1850-1867	Data from Jennings Thesis
	1684	December 1683 to July 1684
	1696	February to December 1696
	1699	September missing
	1700	December 1699 to September 1700
	1701	December 1700 to March 1701
	1364-1756	Smelted at High & Low Mills, Mill Gill
	1736	December 1735 to May 1736
	1750	June 1750 to December 1750
	1751	December 1750 to December 1751
	1752	December 1751 to December 1752
	1753	December 1752 to June 1753
	1755	June 1755 to December 1755
	1756	December 1755 to June 1756
	1750-1756	Inc. duty ore from: Spout Gill, Keldside
	1750-1756	Inc. duty ore from: Glovergill
	1801-1870	See Lane End, Keldside & Littlemoor
	1804-1912	See Swinnergill
	1806-1905	See Blakethwaite
	1811-1989	See Old Gang
	1818-1912	See Surrender
Mineral Lord:	-1548	Alice Staveley (1/4 share)
	1501-1561	Joan Neville (1/4 share)
	1548-1588	Edward Mollineux (1/4 share)
	1561-1588	John Mollineux (1/4 share)
	1588-1621	John Mollineux (1/2 share)
	1621-1635	Thomas Vachell (1/2 share)
	1515-1537	Francis Bigod (1/2 share)
	1537-1544	The Crown (Bigod's 1/2 share)
	1544-1568	Thomas Wharton (1st Lord) (1/2 share)
	1568-1572	Thomas Wharton (2nd Lord) (1/2 share)
	1572-1629	Philip Wharton (3rd Lord) (1/2 share)
	1629-1635	Philip Wharton (4th Lord) (1/2 share)
	1635-1696	Philip Wharton (4th Lord) (All shares)
	1696-1715	Thomas Wharton (5th Lord)
	1715-1722	Philip Duke of Wharton
	1722-1756	Trustees of the Duke of Wharton
	1764-1785	George Fermor (2nd Earl of Pomfret)

1785-1787 George Fermor (3rd Earl of Pomfret)
1787-1816 G. & T.W. Fermor, Charlotte Denys
1816-1835 T.W. Fermor, Charlotte Denys, G.W. Denys
1836-1857 G.W. Denys (1), Lady Pomfret, F. Shuckburgh
1857-1876 G.W. Denys (2), Lady Pomfret, F. Shuckburgh
1876-1880 G.W. Denys (2), Lady Pomfret, G. Shuckburgh
1881-1884 F.C.E. Denys, Lady Pomfret, G. Shuckburgh
1884-1889 F.C.E. Denys, Lady Pomfret, S.F.D. Shuckburgh
1889-1917 F.C.E. Denys, T. Fermor-Hesketh, S.F.D. Shuckburgh
1922-1924 J.F.E. Radcliffe, T. Fermor-Hesketh, G.F.S. Shuckburgh
1924-1940 J.F.E. Radcliffe, T. Fermor-Hesketh, C. Shuckburgh
1940-1944 Louise M. Pearson (nee Radcliffe), Fermor-Hesketh, C. Shuckburgh
1944-1955 L.M. Pearson, F. Fermor-Hesketh, Shuckburgh
1955-1980 L.M. Pearson, T. Fermor-Hesketh, Shuckburgh

Comment: 1635 Manor of Healaugh united
1530-1544 See Muker

Worked by: 1679 Philip Swale and Robert Barker
1736-1756 Alexander Denton - Principal Trustee
1764-1808 Pomfret & Denys

Agent: 1715 Joseph Etherington
1722-1735 Mr Etherington
1735-1754 James Close
1735-1736 Anthony Pratt & William Clarkson
1749-1753 John Guy (Grove Steward)
1749-1756 Thomas Stodart (Grove Steward)
1755-1756 Thomas Hutchinson
1765-1768 Jeremiah Hutchinson
1769-1772 John Metcalfe
1802-1822 John Davies
1822-1861 James Littlefair
1861-1883 Thomas Raw
1884-1900 Simon Cherry
1901-1928 Edward Cherry

AGNES Arkengarthdale NY954042

Production:	Lead Ore(tons)	Lead (tons)	Value (£)
1907-1916	No detailed returns		

Comment: 1907-1909 Inc. Little Punchard and Routh
1910-1916 Standing

Mineral Lord: 1907-1916 See Arkengarthdale

Worked by: 1907-1916 “CB”, Lead Mines Ltd

Agent: 1907-1916 Thomas Harker

Employment:	Underground	Surface	Total
1907	6	4	10
1908	4	2	6
1909	2	0	2

AILESBURY Whorlton NZ494008

Production:	Iron	Ore(tons)	Value (£)
	1872	No detailed return	
	1873	87968.00	26390.40
	1874	94829.00	28448.70
	1875	89174.00	
	1876	76546.00	
	1877	63918.00	
	1878	59150.00	
	1879	45446.40	
	1880	66042.00	
	1881	60910.00	
	1882-1887	No detailed returns	
Comment:	1887	Abandoned April	
Mineral Lord:	1872-1887	Marquis of Ailesbury	
Worked by:	1872-1875	North of England Ind. Iron & Coal Co.	
	1876	North of England Ind. Iron & Coal Co. Ltd	
	1877-1887	Carlton Iron Co. Ltd	
Secretary:	1873-1875	H. Jackson	
	1876-1885	Robert Bell	

Employment:	Underground	Surface	Total
1883	-	-	39

AITHWAITE END Carperby Cum Thoresby SD982903

Production:	Lead	Ore(tons)	Lead (tons)	Value (£)
	1864	4.00	2.40	
	1865-1867	No detailed returns		
Comment:	1868-1876	Suspended		
Mineral Lord:	1862-1876	Lightfoot's Devisees		
Worked by:	1862-1867	Messrs Winn		

Employment:	Underground	Surface	Total
1862	11	-	-

ANGLEZARKE LIBERTY SD631164

Production:	Lead	Ore(tons)	Lead (tons)	Value (£)
	1689-1830	No detailed returns		
Comment:	1781-1790	Witherite Producer		
Mineral Lord:	1689-1694	Sir Richard Standish		
	1721-1756	Sir Thomas Standish		
	1781-1812	Sir Frank Standish		
	1812-1841	Frank Hall Standish		
Worked by:	1689	Sir Richard Standish & Co.		
	1721-1732	Sir Henry Houghton		
	1781-1790	Sir Frank Standish		
	1824-1830	John Thompson & Co.		

Index to personal names

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