less than its revenue. Three other canals formerly existed in Scotland. The Aberdeen canal, 18¼ m. long, running up the Don valley from Aberdeen to Inverurie was opened in 1807, but did not prove profitable and was ultimately sold to the Great North of Scotland Railway Company, by which it was abandoned. The Glasgow, Paisley and Johnstone canal, 11 m. long, was opened in 1811 and was bought in 1869 by the Glasgow and South-Western railway, which in 1881 obtained statutory powers to abandon it as a canal and use its site, so far as necessary, for a railway line. The Forth and Cart Junction canal was only half a mile long. It ran from the Forth and Clyde canal to the Clyde, opposite the river Cart, and was intended to allow vessels to pass direct from the east coast up that river to Paisley. The Caledonian railway, which acquired it together with the Forth and Clyde canal in 1867, obtained powers to abandon it in 1893.

*Railways.—*The first railway in Scotland for which an act of parliament was obtained was that between Kilmarnock and Troon (9¾ m.), opened in 1812, and worked by horses. A similar railway, of which the chief source of profit was the passenger traffic, was opened between Edinburgh and Dalkeith in 1831, branches being afterwards extended to Leith and Musselburgh. By 1840 the length of the railway lines for which bills were passed was 191¼ m., the capital being £3,122,133. The chief companies are the Caledonian, formed in 1845; the North British, of the same date; the Glasgow and South-Western, formed by amalgamation in 1850; the Highland, formed by amalgamation in 1865; and the Great North of Scotland, 1846.

Table XIII. shows the advance in mileage, goods and passenger traffic and receipts, from both sources, since 1857.

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| --- | --- | --- | --- | --- | --- |
| Table XIII.—*Illustrating Growth of Railway Business.* | | | | | |
| Year. | Mileage. | Passengers. | Passenger  Traffic  Receipts. | Goods  Traffic  Receipts. | Total. |
| 1857 | 1243 | 14,733,503 | £916,697 | £1,584,781 | £2,501,478 |
| 1874 | 2700 | 38,220,892 | 2,350,593 | 3,884,424 | 6,235,017 |
| 1884 | 2999 | 54,305,074 | 2,931,737 | 4,426,023 | 7.357.760 |
| 1888 | 3097 | 68,413.349 | 3,163,195 | 4,564,627 | 7,727,822 |
| 1900 | 3485 | 122,201,102  115,580,000 | 4,715,592 | 6,431,693 | 11,147,285 |
| 1905 | 3804 | 5,014,452 | 6,803,286 | 11,817,738 |

The total capital of all the Scots companies in 1888 was £114,120,119; by 1910 it exceeded £185,000,000. Since the passing of the Light Railways Act 1896, the Board of Trade has sanctioned several light railways. By 1910 the total railway mileage was 3844.

*Mining Industry.—*Coal and iron, generally found in convenient proximity to each other, are the chief sources of the mineral wealth of Scotland. The principal coalfields are Lanark­shire, which yields nearly half of the total output, Fifeshire, Ayrshire, Stirlingshire and Midlothian, but coal is also mined in the counties (usually reckoned as forming part of one or other of the main fields) of Linlithgow, Haddington, Dumbarton, Clackmannan, Kinross, Dumfries, Renfrew, Argyll and Peebles, while a small quantity is obtained from the Oolite **at** Brora in Sutherlandshire. The earliest records concerning coalpits appear to be the charters granted, towards the end of the 12th century, to William Oldbridge of Carriden in Linlithgowshire, and in 1291 to the abbot and convent of Dunfermline conferring the privilege of digging coal in the lands of Pittencrieff. The monks of Newbattle Abbey also dug coal at an early date from surface pits on the banks of the Esk. Aeneas Sylvius (Pope Pius II.), who visited Scotland in the 15th century, refers to the fact that the poor received at church doors a species of stone which they burned instead of wood; and although the value of coal for smith’s and artificer’s work was early recognized it was not used for domestic purposes till about the close of the 16th century. In 1606 an act was passed binding colliers to perpetual service at the works where they were employed, and they were not fully emancipated till 1799. An act was passed in 1843 forbidding the employment of children of tender years and women in under­ground mines. In 1905 there were 492 coal and iron mines in operation, employing 109,939 hands (89,516 below ground and

20,423 above). The total output in that year amounted to 35,839,297 tons, valued at £10,369,433. The total quantity worked up to the end of 1898 was 1,514,062 tons, the quantity then remaining to work being estimated at 4,634,785,000 tons. The quantity of coal exported in 1905 from the principal Scottish ports was 7,863,511 tons, and the quantity shipped coastwise to ports of the United Kingdom amounts annually to about 2½ million tons in addition.

The rise of the iron industry dates from the establishment of the Carron ironworks near Falkirk in 1760, but it was the introduction of railways that gave the production of pig-iron its greatest impetus. In 1796 the quantity produced was 18,640 tons, which had only doubled in thirty-four years (37,500 tons in 1830). In 1840 this had grown to 241,000 tons, in 1845 to 475,000 tons and in 1865 to 1,164,000 tons, almost the height of its prosperity, for in 1905 the product of 101 blast furnaces only amounted to 1,375,125 tons, and in the interval there were years when the output was below one million tons. More than one-third of the iron ore (that chiefly worked being Black Band Ironstone) comes from mines which also yield coal. The iron- producing counties in the order of their output are Ayr, Lanark, Renfrew, Linlithgow, Dumbarton, Fife, Midlothian and Stirling, the first three being the most productive. In 1905 the quantity of ore raised was 832,388 tons, valued at £320,875 and yielding 249,716 tons of metal. The imports of ore in that year amounted to 1,862,444 tons of the value of £1,420,379.

The oil shale industry is wholly modern and has attained to considerable magnitude since it was established (in 1851 and following years). Linlithgowshire yields nearly three-fourths of the total output, Midlothian produces nearly one-fourth, a small quantity is obtained from Lanarkshire, and there is an infinitesimal supply from Sutherland. The mineral is chiefly obtained from seams in the Calciferous Sandstone at the base of the Carboniferous rocks.

Fire-clay is produced in Lanarkshire, which yields nearly half of the total output, and Ayrshire and, less extensively, in Stirlingshire, Fifeshire, Renfrewshire, Midlothian and a few other shires. With the exception of the counties of Orkney, Shetland, Caithness, Sutherland and Inverness, granite is quarried in every shire in Scotland, but the industry predominates in Aberdeenshire, and is of consider­able importance in Kirkcudbrightshire; limestone is quarried in half of the counties, but especially in Midlothian and Fife; large quantities of paving-stones are exported from Caithness and Forfar- shire, and there are extensive slate quarries at Ballachulish and other places in Argyllshire, which furnishes three-fourths of the total supply. Sandstone, of which the total production in 1905 was 1,142,135 tons valued at £320,761, is quarried in nearly every county, but the industry flourishes particularly in the shires of Lanark, Dumfries, Ayr and Forfar. Lead ore occurs at Wanlockhead in Dumfriesshire and Leadhills in Lanarkshire. In 1905 there were produced 2774 tons of dressed lead ore, of the value of £25,823, yielding 2167 tons of lead in smelting and 11,409 oz. of silver. Gold has been found in the county of Ross and Cromarty. A small quantity of zinc is mined in Dumfriesshire and of barytes at Loch- winnoch in Renfrewshire. The precious metals were once worked at Abington in Lanarkshire and in the Ochils, and lead was mined at Tyndrum in Perthshire. In 1905 there were 66 mines apart from coal and iron, employing altogether 5329 hands, and 1127 quarries employing 7390 persons inside the quarries and 4797 persons outside, or 12,187 in all. Alumina is treated at works near Foyers in the shire of Inverness, where abundant water power enables electricity to be generated cheaply. The Foyers installation is the largest water-power plant in the United Kingdom.

*Iron and Steel.—*In 1901 the number of persons engaged in working of the raw material was 23,263, of whom 8258 were employed in steel smelting and founding, 7781 at blast furnaces in the manufacture of pig-iron, and 7224 at puddling furnaces and rolling mills. All the great iron foundries and engineering works are situated in the Central Plain or Lowlands, in close proximity to the shipbuilding yards and coalfields, especially in the lower and part of the middle wards of Lanarkshire, in certain districts of Ayrshire and Renfrewshire, at and near Dumbarton, in south Stirlingshire and in some parts of East and Mid Lothian and Fife. In 1901 the number of persons employed in engineering and machine-making—including 24,122 ironfounders, 24,944 blacksmiths, 26,567 fitters, turners and erectors, 9767 boiler-makers and 18,618 undefined—amounted to 118,736. In miscellaneous metal trades, embracing tinplate goods, wire workers, makers of stoves, grates, ranges and fire-arms, makers of bolts, nuts, rivets, screws and staples, and those occupied in several subsidiary trades, the number of operatives in 1901 amounted to 13,209. In the same year there were 7279 persons employed in the