

2. John Watt, An Early Eighteenth Century Scots Surveyor Some Recent Discoveries and Preliminary Findings

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Occasionally, researchers have the good fortune to uncover material which adds a new insight to established knowledge. During work on the early town plans of Glasgow, the author came across a collection of documents relating to John Watt, a Scottish land surveyor of the early eighteenth century. Watt is not well known among the ranks of Scots cartographers and his only printed map is a rare survey of the Clyde estuary published posthumously by his family in 1759. His nephew James, the inventor of the separate steam condenser, was a careful recorder of his own business transactions, including his time as mathematical instrument-maker in Glasgow from 1756. Among documents consulted by his biographer, J.P. Muirhead (1) are several of John Watt's cash books and manuscript surveys. Family papers from Doldowlod in Powys (2) also include a sizeable collection of the uncle's survey notebooks and plans. Surprisingly, no one studying what is a very considerable archive has discussed the material relating to the older Watt. These and other sources show that he was an active teacher of mathematical subjects and a surveyor in demand by local landowners, particularly in his home county of Renfrewshire. More significantly, the documents provide an unrivalled illustration of a surveyor's career and commissions, regardless of plan survival, for a largely understudied period in Scotland.

Watt was the older of two sons of Thomas Watt, himself described as a teacher of navigation and "Professor of the Mathematicks" in Crawforddyke, a small burgh near Greenock. The father had been educated at Aberdeen University, (3) probably coming under the influence of Duncan Liddel, appointed to the Marischal College chair of mathematics in 1661. Thomas had an important position in the local community as bailie of the barony, presiding on the head court as legislator and criminal judge for over twenty years (4). He was also a church elder and treasurer of the west parish of Greenock. For a brief period, he held the office of Session Clerk and, in the parish register of baptisms for September 1711, John's name first appears publicly as a witness. In October 1712, John was made clerk to the barony court but, although officiating on occasion with his father, he did not continue long in the post.

John's own mathematical aptitude may have led him to assist his father in teaching. A surviving document, subscribed by Samuel McCunn and dated 12 May 1715,(5) obliges him to pay John Watt thirty shillings sterling, as well as "one new hat when I first become mate", for instruction in a sequence of navigational exercises. These included "How to Transleat a Log Board or work a Traverse" and "To find the variation of the Compass". A group of hand-coloured drawings and texts of the Ten Commandments (6) survive from this time and, although naive in style, show some sense of design. More importantly, his reputation as a teacher began to grow. In August 1716, he travelled to Ayr and it is possible that he first tried to settle there. (7) Later entries in his books indicate that such trips involved teaching a range of

subjects, including arithmetic, book-keeping and navigation, to the sons of local lairds, with his lodging occasionally included in the payment.

Watt kept a meticulous note of his business transactions in cash books which survive for the period 1718-1736. As well as his personal expenditure, he recorded earnings from lessons and surveying commissions. For example, in 1724 Peter Henderson gave him a saddle in part payment for classes in arithmetic and navigation. Other settlements were made in coal, malt and claret.

Whether or not Williamson's suggestion that his father wrote letters of introduction is correct (8) the young mathematician eventually moved to Glasgow in January 1719 and quickly made his mark. Within four months he was employed on the division of Paisley Moss, the first of several such commissions. The survival of both draft and finished plan (9) provide details of how such processes were measured, the level of accuracy required and the care Watt took over the end product. His impact in Glasgow itself was equally impressive. In March 1720, following representations from a number of merchants and shipmasters in support of his teaching, the Town Council voted him an annual salary of £5 sterling, which he retained until his death.

Surviving documents relating to his output can be arranged into three distinct groups - commissions for the Glasgow Town Council, estate and other land mapping and manuscript drafts associated with his survey of the Clyde estuary. These plans range from rough working documents, often with many calculations across the mapped surface, to neatly finished drafts such as his plan of Kenmuir. In addition, several of his field books of measurements, angles and distances have been preserved, allowing the accuracy of his surveys to be checked. More significantly, they provide locations for particular sites and the dates of certain work (for example, in April 1730, he measured all the major streets and wynds in Glasgow). Entries commenting on canals suggest that Watt may also have been called on for advice on drainage in support of agricultural improvement. This was a time of early enthusiasm for reforms in farming practice, as personified in the activities of Sir Archibald Grant of Monymusk and John Cockburn of Ormiston. Watt's notes include details for the draining of Castle Semple Loch and several of his maps identify different qualities of ground (such as arable, stony or rocky muirs).

Glasgow's Burgh Records indicate continued support by providing a salary for an assistant and in commissioning a series of surveys from him. In 1724, he engaged John Murdoch, a former pupil from Ayr, as a writing master and, three years later, was requested to prepare a map of the lands of Provan lying to the northeast of the city. Other work involved plans of Port Glasgow, The "sixteen merk land" and the Gorbals lands owned by Hutcheson's Hospital. Published Council minutes provide only a limited impression of the extent of his surveying career. Within the material relating to Glasgow are the earliest surviving maps of any part of the city, including a skeleton street plan which identifies the site of the town ports (gates). He also seems to have worked on surveying the road into the burgh from the east. His Port Glasgow plan shows a grid layout devised for the town which has been suggested as influential in the later design

of Glasgow itself.

Watt's estate plans may be split conveniently into those covering parts of Renfrewshire and work in the neighbouring shires of Lanark, Ayr and Dumbarton. Although the attention paid to his home county is exceptional, it provides a unique depiction for the period. Apart from a manuscript county map, which may have been prepared by his family from his barony surveys, there are a little over 90 individual sheets illustrating parts of Renfrewshire, drawn mainly for the Earl of Dundonald and Colonel William McDowall. Over 700 distinct features are identified, including villages, houses, steadings, bridges, roads, mills and churches. There are frequent notes on field acreages and holdings, often with the tenant's name. Additional detail is provided by his field books which list the locations and bearings of each station. Angles were measured to local steeples and significant trees as well as notable hill tops such as Ben Lomond or Tinto.

Even at this relatively early date, local landowners were starting to sub-divide commonities (land held in common) and mosses. Between 1720 and 1730 Watt was employed on at least thirteen separate surveys involving either divisions or payment from inheritors, suggesting a common interest. Five mosses, including Renfrew and Montgrennan, are among the areas identified. This is a substantial number of land divisions with which one individual, albeit an important local surveyor, was connected. What is emerging from these records strongly suggests a more comprehensive approach to agricultural improvement than that of the isolated landowner. Watt's other surveys, most notably the Barony of Hamilton, indicate that this was part of a wider regional movement. It was, perhaps, this growing atmosphere of change which encouraged him to advertise in a leading newspaper:

"SURVEYS of Estates taken, and PLANS thereto drawn, by JOHN WATT, Teacher of the Mathematicks at Glasgow. The PLAN may shew, not only the Extent of the Whole, and the Quantity and Quality of each Mailine, Inclosure, Wood, Moss, Muir, Water, Highways, &c. but also the most convenient Way of laying out Inclosures and Mailines, and the Expence of Inclosing. The Level of low Grounds, Bogs, &c. taken, in order to Draining. (10)

Watt's abilities were appreciated by a wider circle than local merchants and lairds. In addition to Hamilton, he also worked for the Dukes of Montrose and Argyll. His receipts also show that major landowners were prepared to lay out quite significant sums (e.g. £25 from John Orr of Barrowfield for the barony of Grugar) on a detailed survey.

In August 1731, Watt bought two plans of the Clyde at a cost of ten shillings. These are most likely to be copies of "A New and Exact Map of the River Clyde done by the late Mr. John Adair" published that year by George Scott and engraved by Richard Cooper. This is a generalised map of the west coast covering Kintyre, the coast of Ireland and the Mull of Galloway, drawn at about 4 miles to an inch [1: 253440]. It shows a limited number of soundings, rocks, sandbars and anchorages but fails to match the detail of Adair's east coast charts. Such a map is considered to have been of limited use to west coast

mariners.

At about the same time, Watt's accounts begin to show a noticeable increase in money flow, largely based on entries for promissory notes drawn on the Glasgow sugar houses. Whereas entries up to 1730 list his teaching and survey income as figures mostly below £10, sums in excess of £30 start appearing regularly from the beginning of 1731. Following on from these transactions, Watt notes a series of payments in and out for the insurance, fitting out, rigging and copper of the "Greenock". This vessel traded with Norway, exchanging tobacco for deals. Along with other Glasgow merchants, Watt was involved in dispatching men to Philadelphia to build a ship (the "Thetis") to engage in the sugar trade. Although she was lost subsequently with all hands, Watt continued to have interests in both coastal and trans-Atlantic shipping in partnership with his brother James in Greenock.

Such concerns had an adverse effect on his teaching. Compared with 134 entries for scholars in 1725, the figure had dropped to only 19 names nine years later, earning him a little over £20. John Murdoch may have taken a greater responsibility for the actual instruction by this date and the Burgh Minutes indicate that Murdoch's salary as teacher continued after Watt's death.

It is feasible that these shipping interests led to his charting the home waters of the Clyde estuary on which he recorded expenses of £2 in August 1734. This resulted in the chart printed by his brother and nephews but James Watt, the engineer, adds some confusion to the map's history. Writing in 1794, he commented: "The Survey as far as the Point of Toward, was done by my uncle before I was born; the remainder was added by my father and my brother, but is not over accurate". (11) Muirhead, in his biography, added that several alterations were made before engraving, particularly in the depiction covering the entry to the firth. Elsewhere, Muirhead's comments are confusing or wrong (for example, that Watt died unmarried) and must be treated with caution. Only 450 copies were printed, at a total cost of £20, with sales channelled mainly through James Watt's own shop. The sheet was undoubtedly an improvement on the earlier Adair chart. It consists of two sections - the larger scale "River of Clyde Surveyed by John Watt", indicating soundings, shoals and anchorages, and a general "Entry to the River and Firth of Clyde" showing an area covering Colonsay, part of Mull, Loch Ryan and part of the Northern Ireland coast. A study of the two charts shows up some marked differences. Only three soundings off Jura are given on the more extensive plan and the two coastal delineations differ in outline. Furthermore, the chart credited to Watt alone extends beyond Toward Point.

The surviving draft plans relating to the firth and west coast depict a wider coverage than the River Clyde itself. Some sheets are not necessarily concerned with marine features and the variety of handwriting styles strongly suggests that they are the work of more than one individual. A draft of Rosneath and Gareloch seems to be based on earlier work by John Watt, since payment for a survey of the peninsula was received in 1732. Although the plan marks shoaling at Rhu, it is primarily concerned with coastal settlements. Furthermore, the writing is not that of John Watt and sailing directions on the

back of the sheet may have been written by his brother, James. Other landward mapping provides even more information on the construction of the printed charts. The manuscript county map of Renfrewshire,(12) which forms the basis of the more detailed published chart, marks rocks, soundings, anchorages and shoals but is, again, not in John Watt's hand. Many of its features seem to have been taken from a county map published by Charles Ross in 1754. Although John Watt did take bearings and measurements of the Clyde from Stobcross to Knock Point, (3) there is no surviving evidence to show that he was concerned with such features specifically found on a sea chart as soundings or rocks. More significantly, an extremely detailed map of the west coast, again with no anchorages or depths but which includes the islands and seaboard south of Loch Sunart, Coll and Barra, is quite clearly not by John Watt. It marks many offshore rocks and islands, depicting an area greater than the printed chart. In addition, it indicates a lighthouse on the Little Cumbrae, which was first erected in 1754-5. This draft shows signs of correction around the Mull of Kintyre and may have been part of preliminary work for an intended publication. A more finished chart entitled "The Firth and River of Clyde with Parts Adjacent", (14) designed with west at the top of the sheet and a coverage similar to the Cooper-Adair engraving of 1731, would appear to be a copy prepared as an improved depiction but seems to have little relation to the final printed version. James Watt was to use his uncle's maps when involved with schemes to deepen the Clyde in the 1760s but this seems to be confined to the area up-river from Dumbarton. His father James consulted at least one other chart, possibly by John Watt, junior, of Loch Indaal harbour on Islay, for manuscript sailing directions again appear in his hand.

Despite his success as a land surveyor, businessman and teacher, John Watt's personal life was a succession of tragedies. Married twice, both wives pre-deceased him and none of his children survived childhood. The last entry in his day book for 1736 records, with some pathos, "I being sick & mostly confin'd to ye house this whole year past makes a great deal of confusions in my Books". He died in the January of 1737.

Such a career as that briefly sketched may have been exceptional and it is sensible not to exaggerate Watt's importance. Although the work of a provincial figure is valuable in itself, given the very partial present knowledge of this period, the uncovering of these documents has a considerable significance beyond that of the individual cartographer and highlights several additional points. It throws light on surveying in the west of Scotland at an earlier date than previously considered, as well as adding to the growing knowledge of Glasgow's support and employment of surveyors. Information on Scotland's mapping is still to be found in archives beyond the national boundaries. Watt is not necessarily a successor to John Adair in the preparation of both land maps and sea charts, since there are questions about his contribution to marine cartography. It may be that he is remembered for a chart to which he contributed relatively little marine information. On the other hand, his range of work for Glasgow's Town Council was to be influential in establishing the value of the services of a surveyor in the corporate imagination and may have contributed to the creation of the post of burgh surveyor in the later eighteenth century (15). His business and shipping interests provide another example of

local entrepreneurship in the development of Glasgow as a major trading entrepot. More significantly, his estate surveying gives further insight into the initial attempts at agricultural reform in Scotland at a time when the popular image has been frequently characterised by the lawlessness of Rob Roy or the economic limitations of the early improvers. Much work remains to be done on these papers but this introduction provides an impression of the range and wealth of the material awaiting analysis.

References:

1. Held in the Boulton and Watt papers within the Birmingham City Archives.
2. Now added to other collections at Birmingham, with the reference "James Watt Papers" (JWP).
3. *Fasti Academiae Mariscallanae Aberdonensis*, edited by Peter J. Anderson. (Aberdeen: New Spalding Club, 1898). Vol.2, p.235.
4. George Williamson Letters Respecting the Watt Family. (Greenock, 1840), p.4-5.
5. Birmingham City Archives, B&W Muirhead Box 4/11/1. Obligation: McCunn to Watt.
6. Birmingham City Archives, B&W Muirhead Box 3/4/1-11.
7. Supplement to the Fourth, Fifth, and Sixth Editions of the *Encyclopaedia Britannica*. (Edinburgh, 1824). Vol.6, p.778.
8. George Williamson *Old Cartsburn*. (Paisley, 1894), p.198.
9. Birmingham City Archives, B&W Muirhead Box 3/4/12.
10. *Caledonian Mercury*, no.1539, 19 February 1730, p.8272.
11. James P. Muirhead *The Life of James Watt*. (London: Murray, 1858), p.10.
12. Birmingham City Archives, B&W Muirhead Box 3/5/5.
13. Birmingham City Archives, JWP C7/17.
14. Birmingham City Archives, B&W Muirhead Box 3/5/6.
15. John N. Moore "Many Years Servant to the Town": James Barrie and the eighteenth century mapping of Glasgow" *Scottish Geographical Magazine*, vol.113, 1997, pp.105-112..