The strengths of the John Rylands University Library of Manchester derive in large measure from the importance of Manchester science. We are accustomed to associate industrial archaeology with different parts of the country, less accustomed to recognizing the importance of regional traditions in the history of science and medicine. But such traditions have been very important. One could reasonably summarize much of Britain's place in the history of science by reference to four such traditions: the medieval and early modern universities at Oxford and Cambridge, renewed scientifically about a century ago; the Scottish universities, especially Edinburgh in the late eighteenth century; the metropolitan, institutionally-varied, heritage of London science; and the scientific, industrial and medical tradition of provincial England, for which Manchester serves as the best and greatest exemplar.

This last tradition grew in the eighteenth century with the industrial revolution. Throughout the nineteenth century the northern and midland provinces provided a strong, creative counterweight to the metropolis which before and since has dominated the cultural geography of England. This industrial, non-governmental tradition created scientific and medical societies, the major provincial universities, large civic libraries, and some notable cultural commemorations, such as the John Rylands Library. To some of these institutions science was integral; book collections were built up by societies for the use of interested members. These collections remain as records of the work and interests of those institutions. In some cases (for example, the Manchester Medical Society Library), scientific and medical books were acquired that were already of antiquarian interest. In the case of the John Rylands Library (and some sections of Owens College Library), scientific and medical books were included in large collections of fine books which were acquired from monied bibliophiles.

Thus, one may usefully begin the present survey by summarizing the relevant aspects of Manchester's history, so as to situate the major
collections. We can then go on to a more detailed account of the individual treasures which are held in Manchester, especially in the John Rylands University Library.

MANCHESTER INSTITUTIONS AND THEIR COLLECTIONS
Perhaps one should begin with John Dee, the Elizabethan scholar, astrologer and magician, who between 1595 and 1601 lived at the College attached to Manchester’s parish church. He was famous in his time, and has been the subject of good, recent scholarship; but Manchester was not essential to his story, nor vice versa. 2

A continuous tradition begins when, in 1656, some of the College buildings were converted to house a public library, endowed by Humphrey Chetham (1580–1653), a Manchester merchant who was Administrator of the Ship Money under Charles I. Chetham’s Library continues to the present day. Until the mid-nineteenth century it was Manchester’s main public library. John Dalton did much of his reading there. Science, technology and medicine were never a particular interest, but there are many important items.

The book collection includes about five hundred medical volumes, some of which were acquired very early, for example, Galen, Opera (3 volumes, 1538) and Hippocrates, Opera (5 volumes, 1621). Relatively few medical or scientific books were acquired after 1800, but there is a collection of nineteenth-century medical pamphlets. Books on natural sciences and mechanical arts total about twelve hundred. Unfortunately, many of the finest items were sold in 1980, including Kepler’s Astronomia Nova (Prague, 1609) and many of the illustrated volumes on natural history. Perhaps Chetham’s surviving science ‘rarity’ is the Canon Mathematicus of Vieta (Paris, 1609).

The Chetham’s manuscript collection holds relatively little science or medicine, but there are several items of interest, both general and local. There are five medieval medical manuscripts, including a collection of Roger Bacon; a Dutch translation of Paracelsus’s Werken (c.1600?); Aristotle’s Logica (1650); and a treatise of astronomy (c.1550) from Charles Towneley (see also Mun. A.2.30.97 for astronomical manuscripts and a catalogue of Charles Towneley’s books). An astrological manuscript of the time of Edward IV was described in J. O. Halliwell’s 1842 list as ‘one of the most curious astrological manuscripts in the Kingdom’. Eighteenth-century manuscripts include some lectures on experimental philosophy, mathematical

1 The most convenient guide to sources on Manchester science is the excellent monograph by Robert Kargon, Science in Victorian Manchester: Enterprise and Expertise (Manchester: University Press, 1977), which contains a good bibliography. In this article, in so far as it concerns Manchester science, I have concentrated on sources in the John Rylands University Library and on sources not covered by Kargon.

correspondence between John Lawson and Charles Wildbore, an account of the rise and progress of astronomy, and a collection of medical extracts apparently made around 1775 by an Edinburgh doctor. Some Hunter lectures on anatomy and midwifery survive in a nineteenth-century copy. For early nineteenth-century London there is a medical student’s diary (1820), which has useful notes on lectures, dissections, ward rounds etc. at St Thomas’s and Guy’s Hospitals.

The most important local manuscript, in three volumes, is the enumeration (no names) for the census of Manchester in 1773–75, on which Thomas Percival reported in his Observations on the State of the Population in Manchester and other Adjacent Places. But the only enlightenment doctor for whom Chetham’s has any personal papers is Edward Holme, the last of the line, who died in 1847. His inaugural thesis (Leyden, 1793) is preserved, along with some prescriptions he wrote for an antiquarian friend, plus other material on his position as a man of culture. The obituary which W. C. Henry wrote of Holme for the Transactions of the Medical and Surgical Association is preserved in manuscript. Other local scientific correspondence includes mid-nineteenth-century letters from Professor T. S. Davies, mathematics master at Woolwich, to T. T. Wilkinson, the antiquarian and natural philosopher of Burnley. There is a single printed report (for 1868) for the Manchester Students Scientific Society.

For periodicals, the eighteenth-century holdings are particularly useful: Transactions of the Academies of Paris and of Berlin, and of the Royal Society. Chetham’s is particularly strong on theology and topography; it is always worth checking especially for science/religion and for local or regional studies. 3

The first Manchester institution formally devoted to science, technology or medicine was the Manchester Infirmary, founded in 1752, housed at Piccadilly from 1755 to 1908, now being extended on its site near the University. From the late eighteenth century it was an important centre of medical education; from about 1790 there was a collection of texts for the use of honorary staff and apprentices. Indeed, the inability of ordinary Manchester practitioners to gain access to this collection was a major reason for the formation of the Manchester Medical Society in 1834. As we shall see, the Society’s library came to replace the Infirmary’s as Manchester’s main medical collection. While the Infirmary’s archives remain a rich source for historians, the older parts of the Infirmary’s library have mostly been dispersed. 4


4 For details on the Infirmary teaching, and on the Manchester medical societies, the best source now is the thesis by Katherine Webb, ‘The Development of the Medical Profession in
The Infirmary represented the professional and philanthropic interests of Manchester's better educated medical men. To cultivate their more general scientific and cultural interests, and to cultivate the gentry and industrialists who shared them, Thomas Percival began a dining club that was formalized in 1781 as the Manchester Literary and Philosophical Society. It, too, continues to the present. From 1795 to the 1970s, it had its own premises on George Street. There Dalton had his laboratory, there a library and archive was built up, most of which was destroyed by bombs in the Second World War.

The chief founders of the Lit. and Phil. were Unitarians, interested in a range of social and educational projects. It was this group which, after the collapse of Warrington Academy, established here the Manchester Academy, a dissenting academy which gave an advanced, modern education to lay students as well as training would-be Unitarian ministers. From 1786 to 1803 the College had elaborate premises in Manchester. After several decades in York, it returned here in 1840, expected by some to act as a kind of university college. In fact, it left in 1853 for London (and then Oxford), soon after the less-denominational Owens College had been founded by endowment.

The Unitarian College always included teaching in mathematics and natural philosophy, as well as courses on natural history or experimental philosophy that were meant to connect with industrial interests. Its first Manchester period was notable for Dalton's employment (1796–1803). It contributed considerably to Manchester's scientific culture, but not to Manchester's present collections; the archives and collections are housed at the College in Oxford. It may well be, however, that many of the books used here in the 1840s are now in Manchester University, for some courses were held at the house of James Heywood, who was to provide the base of the Owens College library when it was founded at Quay Street.5

Thirty years earlier, in the 1820s, the Heywoods had been prominent in a whole series of cultural ventures. The (Royal) Manchester Institution was founded in 1824 for the propagation of the arts and sciences, especially the fine arts. Its building had been, from 1883,
the City Art Gallery; its archives are housed in the City's Central Reference Library. 6

In 1824, the Heywoods were involved with William Fairbairn, Richard Roberts and others in the formation of the Manchester Mechanics' Institute. This later (1883) became a technical college, was municipalized in 1892 and became linked to Manchester University in 1905; since 1966 it has been UMIST (the University of Manchester Institute of Science and Technology), a largely independent technical university. Much of its Victorian library is lost, but UMIST has many attractions for the historian of science. Its main library, recently renamed the Joule Library, has good runs of nineteenth-century technical periodicals, readily available on open shelves. The rare book and archive section contains many Victorian technical classics (for instance, William Sturgeon's *Annals of Electricity*), plus the personal library of J. P. Joule; this includes three bound volumes of lectures on heat by Joseph Black, taken by Henry Richardson, Edinburgh, 1769.

The key UMIST holding is a small collection of the notebooks and letters of J. P. Joule now housed on J floor of the main building, along with a useful collection of primary and secondary sources built up over the 1960s and 1970s by the Department of History of Science and Technology. Emeritus Professor Donald Cardwell has collected microfilms of Joule material from other collections; these microfilms and copies will be available at UMIST. Cardwell's biography of Joule will be published in 1989 by Manchester University Press. Alan Pate has prepared a full bibliography of all Joule's writings, both unpublished and published; this will also be available at UMIST Library.

The archive of UMIST itself goes back to the founding of the Mechanics' Institute. For the early decades, the chief items are bound minute books; for c.1880–1913 there are also large bound volumes of student records. The archive also includes the papers of Vivien Bowden, Lord Bowden of Chesterfield, especially from his years (1953–76) as Principal of UMIST. For the years of municipal control (1892–1955), one should also consult the City records at the Central Reference Library and in the Town Hall muniments room. 7

The Natural History Society was founded in 1821 as a middle-class subscription society, supporting a museum. It also accumulated a library, which would have been bigger had not Dr Edward Holme, a key supporter, left his book collection to University College, London. The Museum was eventually incorporated into Owens College on its new site on Oxford Road. Its book collection remained separate and


was catalogued in 1895. In 1939 the books and periodicals were incorporated into the University Library.

The Manchester Geological Society was founded in 1838. In 1850 its collections of specimens were added to those of the Natural History Society.

Two more local societies are particularly relevant for medical history. The Manchester Statistical Society was founded in 1833 by J. P. Kay and his friends. The Manchester and Salford Sanitary Association was founded in 1854. In both cases, such records as survive will mostly be found in the Central Reference Library.

Of all these special societies, the most important for book and periodical collections was the Manchester Medical Society, which was founded, in part, to supply local medical men with a library. From the foundation in 1834 to 1845, the library was housed in Faulkner Street, near the Infirmary. In 1845 it was moved to the Royal Manchester Institution, where its librarian from 1858 to 1863 was Thomas Windsor, the ophthalmic surgeon. A bibliophilic bachelor, Windsor spent his summers in bookshops, especially in Europe, buying antiquarian volumes for the Medical Society's (and his own) collections. It was Windsor who arranged for the library to move to Owens College after it incorporated the local medical school in 1873. From 1875 the Medical Society library was maintained by the Society at Owens, aided by a small grant from the College.

New reading rooms were provided in 1884, but these were not to Windsor's liking; nor was criticism of his antiquarian purchases. From 1883, Windsor collected instead for John Shaw Billings, the noted librarian of the Surgeon General's Library (USA). By the time of his death (1910), Windsor was partly reconciled with the Society whose library he had so ably developed; parts of his collection were bequeathed to the Society, some to the Surgeon General's, some to the University, and some to the then new John Rylands Library.

By that time, the University had increased its contribution for medical books and periodicals which it then owned. Since 1930 the Medical Society's books and periodicals have been part of the University Library; in 1981, when the Main Library was extended, the old Medical Library was abandoned. The pre-1700 books in the medical collections were the subject of a fine printed catalogue; however, this does not include the volumes which were collected by the John Rylands Library prior to its merger with the University

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10 On the medical collections see E. M. Brockbank, *A Centenary History of the Manchester Medical Society* (Manchester: Sherratt and Hughes, 1934).

Library in 1972. Most of the nineteenth-century medical books are now in a basement of the Main Library. With them is the Manchester Medical Collection discussed below.

So we come, like so many of the collections discussed, to the big two of Manchester's major libraries, that of the City and that of the University.

The City library was founded in 1852, initially at the southern end of Deansgate. From the 1930s it has occupied the well-known circular building by the Town Hall. In the words of Wilfred Farrar (in 1977): 'The 130,000 scientific and technical books include almost everything of importance published in Britain since the foundation of the library, together with a good deal of earlier data, and much from France, Germany and the United States.'\(^\text{12}\) It has vast holdings of scientific and technical journals (much less on medicine). It incorporates a Patents Library with complete British holdings, back to 1617. The Local History Library is a rich source for nineteenth-century history, not least because of its subject and biographical catalogues and its collections of newspapers and cuttings. The Archives Department is crowded but rich; much City Council material is here, from hospitals to gas works, though the Town Hall also has a muniment section.

Central Reference Library also has very extensive holdings of tracts and pamphlets, many of them concerning science, technology and medicine. In the 1970s the late Dr Wilfred Farrar, of the Department of History of Science, Technology and Medicine, UMIST, initiated two schemes to provide a subject index of this technical material, for the 'Science and Arts' series and for the series of 'Political and Historical' tracts. Both series are made up of bound volumes of tracts, mainly nineteenth-century; the Science and Arts series totals about 2,200 items, the Political series totals about 40,000. For the former, Wilfred Farrar and K. S. Sharples prepared a classified list of about 1,900 items, and this is available in UMIST Library. For the latter, F. John Chirgwin compiled a thesis listing 2,037 items arranged under agriculture; public health and medicine; civil engineering, transport and manufacturing; scientific and technical education; societies and institutions.\(^\text{13}\)

When the City Council was founding its library, so were the trustees of the new Owens College, then on Quay Street. From the beginning science, especially chemistry, was central.\(^\text{14}\) That emphasis

\(^{12}\) See 'Library and Archive Resources in the History of Science in Manchester', \textit{British Journal for the History of Science}, 10 (1977), 89–92.


\(^{14}\) For a summary of the development of science, technology and medicine at Owens College and Manchester University see John V Pickstone, 'Introduction: A Centre of Intelligence', \textit{A Centre of Intelligence: The Development of Science, Technology and Medicine in Manchester and its
built on the scientific traditions of Manchester; the bearers of that tradition helped furnish the new college with scientific and technical books. The nucleus was provided by W. Charles Henry, by then retired to the life of a country squire. He gave the library built up by his father, William Henry - physician, manufacturing chemist and friend of Dalton. Other Manchester chemists who gave significant collections include: F. Crace Calvert, the carbolic manufacturer (1,300 volumes); Robert Angus Smith, first Alkali Acts inspector and ‘father of acid rain’ (over 4,000 volumes); and Edward Schunk, the industrialist and dye expert, who did fundamental work in organic structure using a private laboratory in his house (this house, including laboratory and library, was moved at his death to the University, as a chemical laboratory). In 1877 the Library also bought 3,600 science books from the executors of David Forbes.

Of the University’s famous early teachers, Henry Roscoe and his German colleague, Schorlemmer, also made major donations. The first zoology professor, Arthur Milnes Marshall, killed in 1893 in a climbing accident, left his books to the University. The marvellous antiquarian collections of Richard Copley Christie, first Professor of History, Political Economy and Jurisprudence (1853–69), contain many rare medical items. So too, on a smaller scale, does the library of W. L. Bullock, Professor of Italian (1935–44). The Victorian gynaecologist, William Lloyd Roberts left c. 5,000 volumes, mostly collected for their fine bindings.

Of special subject collections, that on Deaf Education and surdo-mutism (7,600 items) given by Abraham Farrar contains much of scientific interest. There are also special collections in psychiatry and psychology (Knapp) and on mental and multiple handicap (Hilliard). But for historians of science, pride of place must go to the F. W. Partington collection in the history of chemistry. Its creator had been a student and teacher of chemistry in Manchester University, and he became a major authority on the history of his subject. His collection of about 3,000 items is wonderfully comprehensive. It was bequeathed to the University in 1966 and is now housed in the John Rylands University Library’s Special Collections Division on Deansgate.


16 Charles W. E. Leigh, Catalogue of the Library for Deaf Education (Manchester: University Press, 1932). Dr Paul Arnold, of the Department of Psychology, Manchester University, is in the process of preparing a survey of the collection for publication in a future issue of this Library’s Bulletin.
By the mid-twentieth century the University Library had already inherited many special collections. It had incorporated the former libraries of the Medical Society and Natural History Society, as well as notable items from the Royal Infirmary and other hospital libraries. Its holdings of older books and journals were already impressive, but further riches were to come with the acquisition of the John Rylands Library in 1972. Though science, technology and medicine had not been special areas for that private library, the collections were generally so rich and varied as to encompass many items of technical interest.

As in other fields, the University Library’s scientific and medical books are now divided chronologically, between the Deansgate site and the Main Library building. Generally speaking, pre-1800 books are at Deansgate, along with most special collections and the older archival collections. The main site houses post-1800 books and periodicals, together with the University’s own archives, including several personal archives mostly relating to twentieth-century science and medicine.

In addition to the continued development of long-established institutions, four new archives have emerged in recent years each of which contains important material on the history of science, technology and medicine in Manchester and its region.

The Greater Manchester Museum of Science and Industry is now housed on the Castlefield site, including the original Liverpool Road Station. It incorporates an archive, inherited from its predecessor, the North Western Museum of Science and Industry, established on Grosvenor Street by Dr Richard Hills in association with UMIST’s Department of History of Science and Technology. Hills acquired an important collection of written and photographic material from Beyer-Peacock, the locomotive manufacturers. The GMMSI also has several other major items, including the National Paper Library, once at Maidstone.

In 1974, with the re-organization of local government, the County of Greater Manchester came into being. It has since disappeared in all but name; thankfully, the County Record Office persists, supported by the local councils acting in concert. For some years this Office, now at 56 Marshall Street in Ancoats, has been the only depository with the capacity to take big collections. Its holdings include the records of the Manchester Regional Hospital Board (1948–74).

The Centre for the History of Science, Technology and Medicine was established in Manchester University in 1986, partly as a result of staff transfers from UMIST. It is housed in the Mathematics Tower (3rd floor) and includes a small library of secondary sources. Primary sources include books on public health, amongst them the annual reports of the Medical Officer to the Privy Council and to the Local Government Board. These were given by Liverpool University to Manchester’s Wellcome Unit for the History of Medicine. The Unit
also has a small collection of oral history tapes on medicine in this region, plus a collection of reprints and photocopies on the same subject.

Also part of the Centre is the National Archive for the History of Computing, established in 1986–87 with a grant from the Leverhulme Trust. The NAHC will list material on British computing, industrial and academic, wherever it is held. Material needing secure storage will be brought to Manchester and housed after listing in the main building of the University Library. The NAHC will also provide a database and a research focus. It is already dealing with major collections from the National Research Development Corporation and the University’s pioneer Department of Computer Science.

SELECTED SOURCES IN THE JOHN RYLANDS UNIVERSITY LIBRARY OF MANCHESTER

The Library is rich in its holdings of ‘classical’ scientific and medical texts, both in manuscript and printed format. The more than 500 western medieval codices, for example, include several notable works on astrology, alchemy and medicinal plants,17 whilst, for those with the appropriate linguistic skills, there is a wealth of resources to be found amongst the Library’s oriental manuscripts.18 The excellence of the early modern printed book collections derives largely from the acquisition by the University Library of the collections formed by Richard Copley Christie and the Manchester Medical Society, and by the John Rylands Library of the Althorp Library created by the second Earl Spencer. With the partial exception of medicine,19 no specific catalogue of these early scientific and medical books is available; however, a fair indication of their range can be gained from the published catalogues of relevant exhibitions mounted by the Library over the years,20 whilst for books printed in England, or in English elsewhere in the world, before 1801 titles are being recorded in the three international short-title union catalogues (STC for 1475–1640, Wing for 1641–1700, ESTC for 1701–1800). Within the space available it will be possible to do no more than quote representative examples.

17 For a partial guide see Neil Ripley Ker, *Medieval Manuscripts in British Libraries* (3 volumes, Oxford: Clarendon Press, 1969–83), iii. 393–470. The John Rylands University Library section of this catalogue has been reproduced on microfiche by Chadwyck-Healey Ltd. as part of the on-going project *National Inventory of Documentary Sources in the United Kingdom* (hereafter *NIDS UK*) where it appears as document number 0.063.174.

18 For an overview see Frank Taylor, ‘The Oriental Manuscript Collections in the John Rylands Library’, *Bulletin of the John Rylands Library*, Manchester, 54 (1971–72), 449–78. This article is also reproduced in *NIDS UK*, 0.063.025.

19 See footnote 11.

20 For example, *An Exhibition of Notable Books on Science and Medicine held in the Arts Library of the University* (Manchester: University, Arts Library, 1962); *Discovery of the Universe: An Exhibition of Astronomy Books to Bid Farewell to Halley’s Comet, May–July 1986* (Manchester: John Rylands University Library, 1986); *From Herbs to Drugs: Green Pharmacy – An Exhibition Organised to Coincide with the 124th British Pharmaceutical Conference, 1987* (Manchester: John Rylands University Library, 1987).
Works from the ancient period include Aldine editions of Plato *Opera* (1513), and Aristotle (1495–98). Both belonged to Christie, as did the *Opera* of Archimedes, published in Basle in 1544 by Heravigius, and the Euclid *Elementorum Libri XV*, by the same publisher, 1533. Ptolemy is represented by the Latin edition of the *Almagest* produced in Venice in 1515, and by a Greek text (Lib.XIII) of Basle, 1538; Hippocrates by the *Opera* of Basle, 1526; and Galen by several texts published in Lyons, 1542, by Dolet. Major medieval texts include the *De Proprietatibus Rerum* by Bartholomaeus Anglicus (Nuremberg, 1483); Roger Bacon, *De Mirabili* (Paris, 1542) and his *Mirror of Alchemy* (London, 1597); Albertus Magnus, *Opus Philosophie Naturalis* (Brescia, 1493); Guy de Chauliac, *Chirurgia Magna* (Venice, 1480), and a rare French translation from Lyons, 1542. Renaissance editions of Arabic medical authors include Rhazes, *Opera* (Venice, 1497) and Avicenna, *Liber Canonis* (Venice, 1507).

In Renaissance editions of Renaissance texts, Manchester is astonishingly rich. Practically all the ‘great books’ are represented, and in first editions. An introductory list might begin with the astronomers: Copernicus, *De Revolutionibus* (Nuremberg, 1543); Bruno, *De L'Infinito Universo et Mondi* (London, 1584) – owned by R. C. Christie along with fifteen other sixteenth-century editions of Bruno’s works; Brahe, *Astronomiae Instauratae Progymnasmata* (Frankfurt, 1610), *Astronomiae Instauratae Mechanica* (Nuremberg, 1602) and *De Mundi Aetherei Recentioribus Phaenomensis Liber Secundus* (Prague, 1603). Christie built a notable collection of early editions of Ramus; Agricola is also well represented.

Of Galileo the Library collection includes first editions of *Il Saggiatore* (Rome, 1623), *Dialogo . . . sopra i Due Massimi Sistemi del Mondo* (Florence, 1632) and *Discorsi e Dimostrazioni Matematiche* (Leyden, 1638). Works of natural philosophy include Servetus, Cardano, William Gilbert’s *De Magnete* (London, 1600 and Stettin, 1628) and Athanasius Kircher’s *Magnes* (Cologne, 1643). On Renaissance anatomy, the Library holds several editions of Vesalius, *De Fabrica* including a first edition (1543); Realdus Colombo, *De Re Anatomica Libri XV* (Venice, 1559); and Johann Dryander, *Anatomiae* (Marburg, 1537). Herbals include Ryff’s edition of Dioscorides, *De Medicinali* (Frankfurt, 1543) and Fuchs, *Neu Kreuterbuch* (Basle, 1543).

The scientific revolution of the seventeenth century is well represented by works of Descartes, Huygens, Boyle, Hooke and, of course, Newton. Medical writers include Glisson, Harvey and Lower. From this period onwards, the book-holdings are very comprehensive for British works and for mathematics, physical sciences, chemistry and medicine. This is as much due to the continual and routine development of the Library’s stock in response to the teaching and research requirements of the University as to the more obvious acquisition of named subject collections from time to time, vital
though those have been to the establishment of the Library's reputation. There are some relatively weak areas in the coverage of the scientific literature (for example, early nineteenth-century continental biology), of course, but, taking the University's holdings together with those of other Manchester libraries, a researcher working on printed books and journals would rarely have cause to use the inter-library loan network or inter-city rail tickets in pursuit of his or her primary sources. The rest of this article will focus on the manuscript and archival resources of the John Rylands University Library and on their potential for attracting scholars from other centres of learning in this country and abroad.

Lecture notes constitute one of the earliest sources, surviving as a genre well into the nineteenth century. These were presumably taken first for private use, but often such notes were sold. The Library has several collections of notes taken at lectures at Edinburgh University, some of them given by Charles Henry in 1851. These include his father's notes from John Allen's 1795-96 course on 'The Animal Oeconomy' and Dr Black's 1795-96 lectures on chemistry. Other sets of notes from Black appear to cover 1768, 1769, 1774-75, and 1796. William Cullen's lectures on chemistry (1762-63) were also presented by Charles Henry, as were notes on Thomas Charles Hope's lectures of 1805-06 and Robert Jameson's lectures on natural history. The Library also has a manuscript of History of Anatomy by Alexander Monro (Primus?) and lecture notes on Alexander Monro III. There are other sets of lecture notes in the Manchester Medical Collection, discussed below.

Private notes and correspondence could also be bound occasionally for preservation or possible sale. This appears to be the case for the notes and letters of Henry Baker (1698-1774), naturalist and pioneer speech therapist. These form eight stout volumes in the Library's Special Collections Division, covering his microscopical work including experiments on the regeneration of Hydra (the Polyp). They also include extensive notes on his practice as a tutor for children with speech impediments. It seems likely that close study of either of these aspects could result in significant additions to the presently limited secondary literatures.

From the same period, the Library has a small collection of the letters of Gilbert White, the parson-naturalist of Selborne. These are mostly domestic and mostly printed in R. Holt White, Life and Letters of Gilbert White of Selborne (2 volumes, 1901); they passed to the Library through the family of the Earl of Stanford, with which White was connected. There is also an autograph letter from William Herschel to Joseph Banks about the discovery of Saturn's sixth satellite (1789), and autograph notes and corrections by Werner in a copy of his Von der ausserlichen Kennzeichen der Fossilien (1774). But, as would be expected, the majority of manuscript remains on science are from people who were active in and around Manchester.
For the early industrial revolution, the Library has several archival items of peculiar interest, including a statement by the son of John Kay, the Bury artisan, about his father’s invention of the flying shuttle. For the ‘Manchester enlightenment’ archive material is rare; Thomas Percival, John Ferriar, Charles White, Thomas Henry, Thomas Barnes and T. B. Bayley appear to have left little besides books. For William Henry (son of Thomas, friend of Dalton) there are manuscript notes for courses of lectures on chemistry which he gave in 1798–99 and 1804–05, plus notes relating to his ‘Elements of Experimental Chemistry’. The Dalton manuscripts which survived the bombing of the Lit. and Phil. and which were purchased by the John Rylands University Library in 1979 have been listed by Leslie Smyth. There appear to be no lecture notes by Dalton, but there is a holograph part-manuscript of *A New System of Chemical Philosophy*, Vol.I, pt.I, first published in 1827, and there are manuscript notes by Dalton in a copy which William Henry lent to him of W. Higgins, *A Comparative View of the Phlogistic and Antiphlogistic Theories.*

The Library has some important company papers for the early nineteenth century, especially for the textile industry, but relatively little archive material from local devotees of science and medicine. The Joule collection is at UMIST. The Kay-Shuttleworth papers include a few items on the early professional life of J. P. Kay (later Kay-Shuttleworth) who was a doctor in Manchester before he became a reforming bureaucrat. These papers, together with others held by the family, provide the basis of a biography now being written by Professor Richard Selleck of Monash University, Australia; this will go well beyond the existing biographical study by Frank Smith.23 There is also useful medical material in the Hibbert-Ware papers and the Bellot papers. The Bellot family included several surgeons, especially practising in Stockport; Samuel Hibbert-Ware’s papers also shed much light on nineteenth-century polite science, especially geology. The University collections appear to contain relatively few records of nineteenth-century general practice, though there are some records in the Central Reference Library’s Archive Department.

For the later Victorian period, the key ‘industrial’ collections are the papers relating to the engineer, Sir Joseph Whitworth. These were collected by Commander Bertram R. Faunthorpe for a biography

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21 Albert Leslie Smyth, *John Dalton, 1766–1844: A Bibliography of Works by and about him* (Manchester: University Press, 1966); most of the items marked ‘LP’ are now in the John Rylands University Library (relevant entries from this bibliography are also reproduced in *NIDS UK*, 0.063.181).


23 For a handlist of the Kay-Shuttleworth papers see *NIDS UK*, 0.063.095.

24 Webb, ‘The Development of the Medical Profession’

25 A handlist appears in *NIDS UK*, 0.063.069.
which was never published, and so include much secondary material and correspondence, with relatively little primary material. A good full-length study of Whitworth remains a major desideratum in the history of technology. The archive of James Woolley Sons and Co. Ltd., chemists and druggists, provides reasonably comprehensive documentation on a major regional firm, illuminating both business aspects and the professional relations of chemists and druggists.  

There are also papers on Galloways, and on Sharp, Roberts and Co., both local engineering firms. For F. Crace-Calvert, chemist and manufacturer, there is a 'volume of specifications of patents in which [he] was interested', 1681–1850; a printed book with some manuscript annotations. The Library also has a notebook on chemistry from c.1845 by David Forbes (1828–76) whose science library was mentioned above.  

As might be expected, the major collections of personal papers are from University staff. For Henry Roscoe the Library has holograph lecture notes for 1857–58, the first year of his professorship at Owens. There are also copybooks of papers and letters etc. relating to his researches, to industrial and public health analyses, and to University business. For his colleague, Carl Schorlemmer, Britain's first professor of organic chemistry, there is a holograph manuscript of the 'Geschichte der Chemie', an unpublished history of chemistry to the end of the seventeenth century.  

Other notable manuscript collections from Owens professors include the archive of William Stanley Jevons, philosopher and economist, who also presented not a few of the works on history of science; and twenty volumes of notebooks compiled during the mathematics professorship of Horace Lamb (1849–1934). Lamb was a central figure in British applied mathematics, especially fluid mechanics. He worked on the theoretical problems of early aviation, was associated with the young Ludwig Wittgenstein, and fathered the painter, Henry Lamb. Applied mathematics has attracted little attention from historians, except for the eighteenth century. Lamb’s notebooks are therefore a major resource. H. B. Dixon (1852–1930), Professor of Chemistry (1887–1922), left a holograph notebook, partly on combustion, plus two letters from Lothar Meyer, and other papers. Some of Dixon’s lectures are recorded in notebooks left by F. W. Partington (for 1906–12), together with his notes on dynamics and thermodynamics. The geologist and botanist W. C. Williamson is represented by correspondence, plus an album of photographs. There are the papers of A. M. Marshall, Professor of Zoology between 1879 and 1893, whilst the Zoology Department has deposited its ‘archive’
c.1879–c.1966, which also contains material on the students’ Biological Society.

For science, technology and medicine since the Great War, there are several major personal collections. That of G. N. Burkhardt (Lecturer and Senior Lecturer in Chemistry) relates to the Chemistry Department and the work of the Manchester Joint Research Council which promoted liaison between science and industry, c.1944–67. Burkhardt was for years devoted to the cause of chemical education in Manchester. His papers, both private and collections of printed material, thus help illuminate aspects of university science which historians often neglect in pursuing the moving frontiers of scientific knowledge. 29

Sir Harry Platt (orthopaedic surgeon, President of the Royal College of Surgeons, and Professor of Orthopaedic Surgery, 1939–51) left an important collection of books and papers. In the field of astronomy, the Library holds the papers of Zdenek Kopal (Professor of Astronomy, 1951–81) plus those of Sir Bernard Lovell (Professor of Radio-Astronomy, 1951–80), who has given a large archive from the Jodrell Bank radio-observatory which he developed and directed. Kopal has been a major figure in astronomy for the past four decades; he is well-known for his lunar studies. The papers, as yet uncatalogued and unused, are clearly a major tool for anyone interested in post-war astronomy in Britain and its relations with the space programme. Lovell’s work is even better known, because of the fame of his radio-telescopes. He has himself provided printed accounts of the dramatic history of Jodrell Bank, and he is the subject of a recent biography by Dudley Saward. 30 But for more detailed research in radio-astronomy in Manchester the archive in the John Rylands University Library is, and will remain, the essential base.

There are also several smaller collections of Manchester-related material including papers relating to Grafton Eliott-Smith (Professor of Anatomy, 1909–19). Henry Miers, crystallographer and Vice-Chancellor (1915–26), kept a journal from which some sections have been photocopied; Donald Core, an infirmary physician left some papers (c.1900–32) on Manchester medicine and the University; Claude Wardlaw (Professor of Botany, 1940–58) left a small collection of papers and books (some of the latter are in the Centre for the History of Science, Technology and Medicine). There are also small collections of papers, mostly typescripts, relating to F. C. Williams (Professor of Electrical Engineering, 1946–77) and Michael Polanyi (Professor of Physical Chemistry, 1933–48, and of Social Studies, 1948–58). Twentieth-century material from outside Manchester

29 A handlist appears in NIDS UK, 0.063.064.
includes copies of the papers of C. G. Barkla (1877–1944), the physicist, and a small collection of material, mostly family letters, from Sigmund Freud.

Some of the ‘professional’ archives mentioned above are kept and listed with the archives of the University administration, so filling out the historical record of an academic community, and so facilitating research on that community. Such consolidation is very useful, and universities, like other major institutions, have a responsibility to amass and arrange collections which will represent their past. In Manchester, that collecting function has best been displayed by the Medical Society, especially by the late Dr E. B. Leech, to whom we owe the Manchester Medical Collection.

This collection, mentioned previously at various points, brings together books, printed papers and some manuscript material relating to individuals and organizations of Manchester medicine. Moreover, it is housed, on semi-open access, with the collections of nineteenth- and early twentieth-century medical books so as to form a uniquely convenient tool for historical studies in medicine. The books include practically all relevant texts by local authors, so one can browse over the work of Percival, Ferriar, Kay, Roberts, Dreschfeld, etc. Some volumes of lecture notes (for example, for John Hull) are also included, as are some institutional reports and some volumes of typed reminiscences. The latter includes Ransome’s ‘Some Great and Good Men and Women I have known’, which contains interesting notes on his childhood and on his advocacy of formal courses for medical officers of health. Charles Wilcock’s recollections of colonial medicine offer more recent autobiography. Such material, plus books by little-known local authors, is easy of access, and collectively it affords a unique panorama of medical writing in a major regional capital.

Two series of archive boxes house more riches. In one are arranged the offprints of local medical authors; in another, printed and manuscript material describing these men and women, including clippings and obituaries. The division may be arbitrary at times, but by checking both files one can usually get the basic biographical and bibliographical information on any figure of consequence in Manchester medicine. One can also find biographical snippets on a vast number of medical not-so-well-knowns. In some cases, original manuscript material is included – lecture notes, letters, a few notebooks.

If one adds the bound minutes of the Medical Society, the local medical journals and student publications, the printed records of local hospitals, dispensaries, etc. and the boxed collection of clippings, photographs, offprints etc. filed by institution, then one begins to see the richness of this collection. Suppose, for example, you are interested in University physiology laboratories: where else could you so readily search out the biographies and publications of staff, their books plus those of their contemporaries, the annual reports, newspaper cuttings, student articles and the ephemera which are here available.
for the Manchester case? For historians of medicine in Manchester it is an often-used resource.

It seems worthwhile, in conclusion, to assess Manchester’s strengths and weaknesses for research in this field. The comparators, clearly, must be London, Oxford, Cambridge and Edinburgh.

Most historical research, in this field as in others, is not based on one particular archive or collection; rather it requires wide and deep holdings of secondary and primary sources, both journals and texts. Manchester has such holdings for science, technology and medicine. The John Rylands University Library can claim a very solid coverage of primary texts from the beginning of printed books up to the present; its holdings of medical journals are exemplary, as are its collections of journals in physical science. For technology, the journal runs can be complemented by the collections at UMIST and the Central Reference Libraries. The collection of secondary material in the history of science, technology and medicine is more patchy; medicine is relatively well covered, and in all areas interested staff and librarians have helped acquire most of the standard items. Only recently has the University formally recognized the history of science, technology and medicine as a major field of historical research, and now, of course, funds are rarely available for filling gaps in secondary (or, indeed, primary) sources. However, a scholarly community is now established; that will ensure the development of collections, and also provide support to scholars who will visit for work on these collections. The Centre for the History of Science, Technology and Medicine will welcome enquiries.

For research on rare or unique material, usually manuscripts and archives, the John Rylands University Library is strong across a wide range. For the medieval and Renaissance period, astronomical, astrological, alchemical and medical manuscripts have been noted, but there is no systematic listing of such material. Scholars with the requisite technical, linguistic and historical competences are encouraged to visit and search; they may find riches, and the Library will be helped towards a more complete knowledge of its stock. Anyone whose interest in the history of science extends into the history of Renaissance books will clearly find the Manchester collections particularly advantageous. For the modern period, the main strengths relate directly to the history of Manchester and its region. The major exceptions to that rule are the newer archival collections (for example, for computing) plus certain outstanding book collections on deaf education and on the history of chemistry. But to say that the unique collections are mostly local is not to downplay them, for in science, technology and medicine, no provincial city is at once so important and so well documented. Much remains to be explored. In this enterprise the John Rylands University Library is particularly important for its medical archive and for the documentation of the scientific community in and around Manchester University.