COLLECTIONS VIII

LIBRARY AND ARCHIVE RESOURCES IN THE HISTORY OF SCIENCE AND MEDICINE AT THE UNIVERSITY OF LEEDS

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Although the University of Leeds has attained something of a reputation for the quality of its scholarship in the history of science, few historians are aware of the impressive collection of early scientific and medical books and manuscripts to be found in the University libraries. In order to make the library resources more widely known, we embarked on a systematic survey of the contents of the main historical collections. We wanted not only to give a general impression of the particular strengths and distinctive features of each collection, but also to mention the interesting or rare copies of individual works to be found in them. We have, therefore, examined every book related to the history of science and medicine in the relevant collections, and in doing so we have uncovered a number of important items. For example, we have identified a book which was once in Newton's library, and a previously unrecorded copy of Joseph Black's chemical lectures. More generally, we had not suspected the true size and range of the Chaston Chapman Collection, which makes it a valuable resource for the history of alchemy and early chemistry; nor were we initially aware of the strength of the Historical Collection of the Medical and Dental Library. The wealth of the legacies to (and the discrimination shown in recent purchases for) the Brotherton and Special Collections also impressed us.

Inevitably we were frequently thrown back upon our own historical knowledge in assessing the significance of the books which we have seen. It is therefore necessary to warn the reader that we are best acquainted with the history of seventeenth- and eighteenth-century British science, and we are all too aware of our limitations in other areas. Our coverage has been constrained by our collective competence, and it does not, for example, entirely reflect the strength of the holdings in nineteenth-century science.

Before we proceed to describe the individual collections, it might be useful to give a brief history of the University and of its libraries.[1] Leeds University was originally the Yorkshire College of Science, founded in 1874. Ten years after its foundation the College was amalgamated with the Leeds Medical School, and the following year the first librarian was appointed. Miss Fanny Passavant had just 4,000 books to look after: a joint collection formed from those of the two

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parent institutions. After a period as part of the federated Victoria University, the College became the University of Leeds in 1904. The library grew slowly but continuously, until in 1927 Lord Brotherton gave £100,000 for the construction of a new library, as well as donating his personal collection of books. The handsome circular reading room of the Brotherton Library was opened in 1936, as were the rooms on the first floor of the library where the Brotherton Collection remains to this day. The Special Collections, including the Chaston Chapman Collection, now occupy an area in the basement. The Medical Library has recently moved into the new Medical and Dental School building at the south end of the campus.

1. *The Brotherton Collection*

Lord Brotherton's private collection of books, manuscripts, and letters formed the basis of the Brotherton Collection, which initially contained about 35,000 books, and which has since been continually augmented by further purchases and donations.[2] The collection is largely literary in orientation, but the science section contains a discriminating selection of seventeenth- and eighteenth-century texts in natural philosophy and mathematics. Because these texts are almost all English, we will mention the place of publication only when this was not London.

The earliest book in this section is an edition of Euclid, *Elementa*, Venice, 1482. The first book in the collection to be printed in England appears to be William Gilbert, *De magnete,* 1600, closely followed by *The tvvoo bookes of Francis Bacon of the proficience and aduancement of learning,* 1605. Another early work is a first edition of Descartes, *Discours de la méthode,* Leyden, 1637. From the mid-seventeenth century, we have a number of works by Walter Charleton, including *The darknes of atheism dispelled by the light of nature,* 1652, and [Charleton], *The immortality of the human soul,* 1657. We also have Margaret Cavendish, Duchess of Newcastle, *Philosophical letters,* 1664; and the widely influential Galileo Galilei, *The systeme of the world,* (tr. by Thomas Salusbury), 1661. There are several works by Joseph Glanvill, among them his tract J. G[lanvill], *Some philosophical considerations touching the being of witches,* 1667. Works by other members of the early Royal Society include two by John Wilkins; William Petty, *The discourse . . . concerning the use of duplicate proportion,* 1674; and several of the tracts by John Wallis written against Thomas Hobbes.

Of Robert Boyle, we have Edmund Burke's copy of *The works of the Honourable Robert Boyle,* (ed. by T. Birch), 5 vols., 1774. There are several first editions of Boyle's works, for example, *Hydrostatical paradoxes,* Oxford, 1666; *Essays of . . . effluviums,* 1673; *A disquisition about the final causes of natural things,* 1688; and *Medicina hydrostatica,* 1690. Natural philosophy of the same period, but of a different school, is represented by works by the Cartesian, Anthony LeGrand: *Institutio philosophiae secundum principia Renati Descartes,* 1680; and *An entire body of philosophy,* 1694. Two works of the Aristotelian, Alexander Ross, are also present: *The philosophical touch-stone,* 1645, dicusses Sir Kenelm Digby, while 'A.R.', *Arcana microcosmi,* 1652, is an attempted refutation of Bacon. Another idiosyncratic text of this period is [Robert Midgley], *A new treatise of natural philosophy,* 1687.

The best known of seventeenth-century theories of the earth is [Thomas Burnet], *Telluris theoria sacra,* 1681–9; but this is far from unique in this genre. The collection also includes: Herbert Croft, *Some animadversions upon . . . the theory of the earth,* 1685; [Samuel Gott], *The divine history of the genesis of the world,* 1670; and John Harris, *Remarks upon some late papers relating to the universal deluge,* 1697.

Seventeenth-century optics is represented by [Thomas Powell], *Elementa opticae,* 1651; and mechanics by [Matthew Hale], *Observations touching the principles of natural motions,* 1677. There are also several seventeenth-century books on natural history, such as Gerard Boate, *Ireland's naturall history,* 1652; and Johannes Godartius, *Of Insects,* (tr. and ed. by Martin Lister), York, 1682.

The works of Newton are very well represented in the collection. For example, we have a first edition of the *Philosophiae naturalis principia mathematica,* 1687, as well as the second edition, 1713, and an edition published in Amsterdam, 1714. Of the *Opticks* we have the first edition, 1704 (signed on the title page 'S:M:', probably Samuel Molyneux[3]), the Latin translation, *Optice*, 1706, and the second and fourth English editions of 1718 and 1730. Other works by Newton are: *A new theory of the moon's motion,* 1702; *Lectiones opticae,* 1729; *Commercium epistolicum,* 1722; and *The method of fluxions,* (ed. by John Colson), 1736. This last has been annotated by the eighteenth-century natural philosopher William Jones. Further Newtoniana include Fontenelle, *The life of Sir Isaac Newton,* 1728; Voltaire, *The elements of Sir Isaac Newton's philosophy,* 1738; and J. T. Desaguliers, *The Newtonian system of the world the best model of government,* 1728.

Among works on natural philosophy in the eighteenth century, the collection possesses several lesser known texts. These include: Humphry Ditton, *The general laws of nature and motion,* 1705; Conyers Purshall, *An essay on the mechanical fabrick of the universe,* 1707; [Julius Bate], *Experimental philosophy asserted and defended,* 1740; and Cadwallader Colden, *An explication of the first causes of action in matter,* 1746. Benjamin Martin, *Philosophical grammar,* 1735, is slightly better known, but it seems worth mentioning that we have a copy of the second edition, 1738, which was owned by the radical John Wilkes.

Certain areas of physics and mathematics are prominent among the eighteenth-century books in the collection. The writings of William Watson and Benjamin Wilson on electricity, are supplemented by Benjamin Martin, *An essay on electricity,* Bath, 1746. Writings on optics include: Algarotti, *Sir Isaac Newton's theory of light and colours,* 2 vols., 1742; Robert Smith, *A compleat system of opticks,* 2 vols., Cambridge, 1738; and George Berkeley, *An essay towards a new theory of vision,* Dublin, 1709, which is one of several books in the collection from the library of E. N. da C. Andrade.

There is a particularly good selection of books on the calculus from the eighteenth century. Among these are: Ditton, *An institution of fluxions,* 1706; Joseph Raphson, *Historia fluxionum,* 1715; E. Stone *The method of fluxions,* 1730; Thomas Simpson, *A new treatise of fluxions,* 1737; Benjamin Robins, *A discourse concerning the nature and certainty of Sir Isaac Newton's method of fluxions,* 1735; and Colin Maclaurin, *A treatise of fluxions,* 2 vols., Edinburgh, 1742. Berkeley's writings on the calculus are represented by *The analyst,* 1734; and *Reasons for not replying to Mr. Watson's full answer,* Dublin, 1735.

2. *Special Collections*

The Chaston Chapman Collection

A substantial part of the Early Science Collection is composed of the Chaston Chapman Collection of books on alchemy and early chemistry. This collection was formed by Alfred Chaston Chapman, FRS, and donated to the University of Leeds by his widow in 1939. Before his death in 1932, Mr Chapman had been a much respected consultant and research chemist, serving on many government advisory bodies. He was President of the Institute of Chemistry, and

member of the Court of Leeds University.[4]

The collection comprises books on a range of subjects from brewing to the history of the Royal Society, including books on chemistry and natural philosophy up to the nineteenth century. But the core of the collection is a corpus of books on alchemy and early chemistry in the sixteenth and seventeenth centuries, numbering between 250 and 300 works. Such a substantial collection could clearly provide a useful resource for those attempting to draw conclusions about trends in sixteenth- and seventeenth-century alchemy. It is for example larger than Newton's alchemical library in Trinity College Cambridge (109 volumes), which B. J. Dobbs has used as a sample of alchemical literature.[5] It is also comparable in size with the alchemical library of John Winthrop (275 volumes), of which the catalogue has been published by R. S. Wilkinson.[6]

Few of the sources from which Chaston Chapman purchased his Collection are identifiable, but it is interesting that the Collection includes the copy of Gabriel Clauder's *Dissertatio de tinctura universali,* Altenburg, 1678, which was once owned by Sir Isaac Newton. The book contains the 'Philosophemur' bookplate of Dr James Musgrave, the inheritor of Newton's library, his shelf-mark 'B1-23', and the shelf-mark 'Case AA D16 Barnsley', of Barnsley Park, to which the library was transferred by Musgrave's son.[7] This book had previously been regarded as missing and we are pleased to be able to record its location, although we regret to say that there are no annotations. It is not clear how Chaston Chapman acquired it; it is not listed in the catalogue for the sale of Thame Park House, in 1920, when some of the Musgrave books were sold off.[8] Another identifiable source for a number of Chaston Chapman's books is the library of Thomas South. Several handsomely bound volumes bear the bookplate of this eccentric (even slightly crazy) theosophist and mystical scholar of the early nineteenth century. The researches of South, and of his daughter Mary Anne Atwood, into alchemy and Hermeticism, are briefly described by Dobbs.[9]

Because of the failure of scholars to exploit such a potentially valuable resource in the history of science so far, we have decided to devote some space to a discussion of the Chaston Chapman Collection. This is not a full catalogue of the Collection; neither space nor time permit us to give complete bibliographical details of the items in it.[10] We will simply try to show some of its strengths, and indicate how it might illuminate particular areas of the history of science.

There are just a few books in the collection from before 1550. Gasparo Contarini, *De elementis et eorum mixtionibus,* Paris, 1548, presents the Aristotelian theory of matter. The earliest alchemical books are attributed to Geber, *Alchemiae,* Bern, 1545; and to Ramon Lull, *De alchimia,* Nuremberg, 1546. There is a copy of the dialogue by Giovanni Bracesco, *De alchemia,* Nuremberg, 1548.

If the collection is representative, it would support those scholars who have referred to the sudden upsurge in alchemical publications after about 1550.[11] Alchemical publications obeyed formal conventions of their own, to some extent associated with the survival of a manuscript culture among alchemists. Thus we find collections of tracts by different authors published together, for example *Artis auriferae quam chemiam vocant,* Basel, 1610; *Alchymistische sieben-Gestirn,* Hamburg, 1675; up to J. J. Mangetus, *Bibliotheca chemica curiosa,* 2 vols., Geneva, 1702. We also frequently find the ascription of works to earlier writers, who may or may not be their real authors, for example Albertus Magnus, *De mineralibus,* Cologne, 1569; Roger Bacon, *De arte chemiae,* Frankfurt, 1603; and a number of

works attributed to Lull, including *De secretis naturae,* Cologne, 1567, and *Theorica,* Cologne, 1566.

Certain geographical centres of publication emerge very strongly from a consideration of the holdings of the collection in the period from 1550. Frankfurt was producing works dating from Christoph Entzelt, *De re metallica,* 1551, to Conrad Khunrath, *Medullae distillatoriae,* 1703; but was especially strong in the early seventeenth century. Holdings of Frankfurt publications in this period include: Thomas Kessler, *Das . . . schoner chymischer Process,* 1641; Johann Mylius, *Antidotarum medico-chymicum reformatum,* 1620; idem, *Philosophia reformata,* 1620; Penotus, *De vera praeparatione,* 1594; Heinrich Nollius, *Naturae sanctuarium,* 1619; Michael Potier, *Novus tractatus chymicus,* 1617; idem, *Veredarius Hermetico-philosophicus,* 1622; Daniel Stolcius, *Hortulus Hermeticus,* 1627; Johann Rhenanus, *Solis e puteo emergentis,* 1613; and even a translation from the Englishman Samuel Norton, *Saturnus saturatus dissolutus,* 1630.

But Frankfurt was far from the only centre for alchemical publication in Germany in this period. Michael Sendivogius's *Novum lumen chymicum,* 1614, was printed in Cologne, as was his *Dialogus Mercurii alchymistae et naturae,* 1607. Israel Harvetus, *Demonstratio veritatis doctrinae chymicae,* 1605, was printed in Hannover; and Philip Müller, *Miracula et mysteria chymico-medica,* 1623, was published in Wittenberg. Other German alchemists from this period, whose works are in the collection, include Hoghelande, Khunrath, Detharding, Elsholtz, Kerner, and Michael Maier. Maier's *Scrutinum chymicum,* Frankfurt, 1687, and his *Arcana arcanissima,* [n.p.], [?1670], have particularly fine plates.

Outside Germany, the Collection indicates a particularly strong centre for alchemical publication in Basel. Among works published there are: Gerhard Dorn, *Trevisanus de chymico miraculo,* 1600; Gugliemo Gratarolo, *Alchemiae,* 1572; Paracelsus, *Archidoxorum,* 1570; Rupescissa, *De consideratione quintae essentiae,* 1561; Ventura, *De ratione conficiendi lapidis philosophici,* 1571; and three works by Johann Jacob Wecker, *De secretis,* 1592, *Antidotarium generale,* 1585, and *Antidotarium speciale,* 1588.

But alchemical publication was not confined to Protestant countries. Many works were published in France: Pierre Fabre, *Myrothecium spagyricum,* Toulouse, 1628; idem, *Palladium spagyricum,* Toulouse, 1624; and Conrad Gesner, *Quatre livres des secrets de médicine,* (tr. by Jean Liebault), Rouen, 1600. Publications at Paris included works by de Clave and Glaser; Palmarius, *Lapis philosophicus dogmaticorum,* 1609; Petrus Arlensis, *Sympathia septem metallorum,* 1610; Johannes Fanianus, *De arte metallicae metamorphoseos,* 1560; and the extraordinary work by David l'Agneau, *Harmonie mystique,* 1636, which tried to show that Aquinas and other scholastics were Hermetic philosophers. Two works by Georgius Figulus were published in Brussels in 1660, and Italy also has an alchemical tradition: beginning with Giambattista della Porta, whose *De distillatione,* Rome, 1608, is present, this tradition is represented by: A Biringuccio, *Pyrotechnia,* Venice, 1559; Ludovico Locatelli, *Theatro d'arcani,* Milan, 1644; and Giovanni Battista Nazari, *Della transmutatione metallica,* Brescia, 1599.

As well as the geographical theme, the Chaston Chapman Collection allows one to trace through some of the controversies which characterized the alchemy of this period. The propagandist Athanasius Kircher is represented by his *Mundus subterraneus,* Amsterdam, 1664, and his *Obeliscus pamphilius,* Rome, 1650. Some of his opponents are also here: Clauder defended his alchemy against Kircher in his *Tractatus de tinctura universali,* in Mangetus, op. cit.; and Salomon de Blawnstein

subtitled his *Interpellatio brevis,* Bienne, 1667, 'contra antichymisticum mundum subterraneum P. Athanasii Kircheri'. The controversialist Andreas Libavius is also well represented by an edition of his *Alchymia,* Frankfurt, 1606; idem, *Alchymistische practic,* Frankfurt, 1603; idem, *Syntagmatis selectorum,* Frankfurt, 1613–15; and idem, *Rerum chymicarum epistola,* Frankfurt, 1595. But Libavius's opponents also have their say. Oswald Croll's *Basilica chymica* is present in three editions, Frankfurt, [?1611]; Geneva, 1631; Geneva, 1643, of which the last two include the *De signaturis.* Also present is Joseph Michaelis's *Apologia chymica,* Middleburg, 1597, which is subtitled 'adversus invectas Andreae Libavii calumnias', and constitutes a point-by-point refutation of Libavius's *Rerum chymicarum epistola.*

When we turn from Continental to English works, the Chaston Chapman Collection again strongly bears out the claims of those who see a significant increase in alchemical publication after 1640.[12]

The trend remained strong however, through the 1670s and 1680s, and so cannot be simply identified with the period of the English Revolution. Previous alchemical publication appears to have been sparse, though it included *The secretes of the reuerend Maister Alexis of Piemont,* translated by William Warde, and present in two editions (1562, 1580). The period of the English Revolution and after saw a great increase in translations from Continental alchemists. Those present in the Collection (all printed in London) include: J. R. Glauber, *Description of new philosophical furnaces* (tr. by J[ohn] F[rench]), 1651; Basil Valentine, *Triumphal chariot of antimony,* 1678; idem., *Last will and testament* (tr. by J. W.), 1671 (extensively annotated); J. B. van Helmont, *Oriatricke* (tr. by J[ohn] C[handler]), 1662; Paracelsus, *Of the chymical transmutation* (tr. by R. Turner), 1657; J. J. Wecker, *Eighteen books of secrets,* 1685; J. S. von Weidenfeld, *Four books . . . concerning secrets,* 1685; and Otto Tachenius, *Hippocrates chymicus* (tr. by J. W.), 1677.

However, native alchemical authors are also prominent in the Collection, including Elias Ashmole, *Theatrum chemicum Britannicum,* 1652; idem, *Fasciculus chemicus,* 1650; Kenelm Digby, *Two treatises,* 1658; idem, *A choice collection of rare chemical secrets* (ed. by. G. Hartman), 1682; idem, *Discourse concerning the vegetation of plants,* 1661; George Starkey, *Liquor alcahest,* 1675; idem (under the pseudonym 'Eireneaus Philalethes'), *Secrets revealed,* 1645; idem, *Ripley revived,* 1678; and Thomas Vaughan ('Eugenius Philalethes'), *Anthroposophia,* 1650. Lesser known native authors include John Bate, *Mysteries of nature and art,* 1654; and John French, *Art of distillation,* 1653.

As well as authors, the Collection represents the work of several publishers and translators, who clearly took a particular interest in alchemical works. Henry Pinnel published tracts by Croll and Paracelsus in his *Philosophy reformed and improved,* 1657, and also brought out *Five treatises of the philosophers' stone,* 1652. Richard Russell printed *The works of Geber,* 1678, and apparently intended an edition of Paracelsus. Pinnel and Russell are mentioned by Charles Webster,[13] but another publisher, who seems to have escaped sustained attention, is William Cooper. Cooper printed *Aurifontina chimica,* 1680, and J. R. Glauber, *Works* (tr. by Christopher Packe), 1689. He himself translated J. R. Glauber, *Golden ass,* 1673, and brought out *Collectanea chymica,* 1684.

Robert Boyle is represented by a number of his tracts, including some first editions: *Origin of forms and qualities,* Oxford, 1666; *The excellency of theology,* London, 1674; the second tome of *The usefulness of experimental natural philosophy,*

Oxford, 1671; *Certain physiological essays,* Oxford, 1661; and *The origin and virtue of gems,* London, 1672. A Latin edition of selected works of Boyle is also present: *Exercitationes de atmosphaeris corporum,* Cologne, 1680.

The Chaston Chapman Collection covers the transition from alchemy to chemistry, in the seventeenth century, but it also indicates that alchemical publication continued into the eighteenth century. Late alchemical works include: 'Cato Chemicus', *Tractatus quo verae ac genuinae philosophiae Hermeticae . . .*, Hamburg, 1690; [Alexandre de Limojon], *The Hermetical triumph,* London, 1740; Helvetius, *Vitulus aureus,* Frankfurt, 1705; Franciscus de Marsciano, *Scrutinum Hermeticum,* [Cologne], [?1744]; idem, *Tyro-chymicus instructus,* Cologne, 1744; and J. F. Meyer, *Alchymistische Briefe,* Hannover, 1767.

The chemical lecturing tradition emerges as an important element in the shift to more modern forms of chemical literature. The public lecturers at the Jardin du roi in Paris are represented in various editions of their works, including: Davisson, *Philosophia pyrotechnica,* Paris, 1657; de Clave, *Nouvelle lumière philosophique,* Paris, 1641; Barlet, *Le vray et méthodique cours de la physique résolutive,* Paris, 1657; Le Fèvre, *Compleat body of chymistry* (tr. by P.D.C.), London, 1670; Glaser, *Traité de la chymie,* Paris, 1668; Thibaud, *The art of chymistry* (tr. by 'A Fellow of the Royal Society'), London, 1668;[14] and Lémery, *A course of chymistry* (tr. by W. Harris), London, 1677.

Dutch chemistry is also well represented with: Le Mort, *Chemiae verae nobilitas,* Leyden, 1696; Barchusen, *Pyrosophia succincte,* Leyden, 1698; Christopher Morley, *Collectanea chymica Leydensia,* Leyden, 1684, which includes pieces by de Maëts, Margrave, Le Mort, *et al.* There are various editions of Boerhaave: *Elementa chemiae,* 2 vols. in 1, [Leyden], 1732; *Elementa chemiae,* Leyden, 1732, authenticated with Boerhaave's autograph; *A new method of chemistry* (tr. by P. Shaw and E. Chambers), London, 1727; ibid., 2nd edn., 2 vols., London, 1741; and *Elements of chemistry* (tr. and abridged by [Edward Strother]), London, 1732.

Works by German chemists of this period include: Werner Rolfinck, *Chimia in artis formam redacta,* Geneva, 1671; Zecharias Brendel, *Chimia in artis formam redacta,* Leyden, 1671; J. J. Becher, *Oedipus chymicus,* Frankfurt, 1680; idem, *Opuscula chymica rariora,* Nuremberg, 1719; idem, *Laboratorium potatile,* Frankfurt, 1689; Johann Kunckel, *Chymische Anmerkungen,* Wittenberg, 1677; idem, *Laboratorium chymicum,* Hamburg & Leipzig, 1722; idem, *Observationes et animadversiones chymicarum,* London & Rotterdam 1678; G. F. Stabel, *Chemiae dogmatico-experimentalis,* Halle, 1728; G. E. Stahl, *Experimenta . . . chymicae et physicae;* Berlin, 1731; idem, *Fundamenta chymiae dogmaticae et experimentalis,* Nuremberg, 1723 (copy apparently owned by H. B. de Saussure); idem, *Chymia rationalis et experimentalis,* Leipzig, 1746 (copy owned by Sir William Ramsay); and idem, *Traité du souffre* (tr. by Holbach), Paris, 1766.

The Early Science Collection

The Early Science Collection is formed partly from Chaston Chapman's bequest (of which books on alchemy and early chemistry have already been treated), and partly from donations and purchases from other sources. Since this Collection has a less coherent focus than the Chaston Chapman Collection, and is consequently less valuable as a body of literature on any particular topic, we shall confine ourselves to brief comments, roughly disposed under historical categories, without making any attempt to be exhaustive.

Early-modern natural philosophy is represented by works by Della Porta, Keckermann, 'Hermes Trismegistus', and Commandino, together with the following works which are not in the British Museum catalogue: Ficino, *Opera,* Basel, 1561; David van der Becke, *Experimenta et meditationes,* Hamburg, 1674; and Ettmüller, *Opera omnia,* Amsterdam, 1702. Among English natural philosophy texts of the seventeenth century, we have: Thomas Hobbes, *Elements of philosophy,* London, 1656; Henry Power, *Experimental philosophy,* London, 1664; John Evelyn, *Essay on . . . De rerum natura,* London, 1656; and Thomas Creech (ed.), *Lucretius the Epicurean philosopher,* Oxford, 1682.

As regards the mathematical sciences, we have two foreign editions of Galileo: his own *De systemate mundi,* Leyden, 1641; and Mersenne's *Nouvelles pensées de Galilei,* Paris, 1639 (this copy owned by the Dublin virtuoso and bibliophile, William Molyneux). Newtonians such as Hales, Hauksbee, and Musschenbroek are present. There is a copy of Roger Cotes's rare *De descensu gravium,* Cambridge, 1770; and a presentation copy, inscribed by the author, of Bryan Robinson, *A dissertation on the aether of Sir Isaac Newton,* Dublin, 1743. The Continental diffusion of Newtonianism is represented by David Gregory, *Astronomiae elementa,* Geneva, 1726; Archibald Pitcairne, *Opera,* The Hague, 1718; John Keill, *Introductiones ad veram physicam et veram astronomiam* (ed. by 'sGravesande), Leyden, 1725; and 'sGravesande, *Oeuvres philosophiques et mathématiques,* 2 vols., Amsterdam, 1774. But antipathy to Newtonianism is also evident in works like: Robert Green, *Principles of natural philosophy,* Cambridge, 1712; and William Jones, *Essay on the first principles of natural philosophy,* Oxford, 1762.

French mathematical sciences of the later eighteenth century are exemplified by the works of D'Alembert, Fresnel, *et al.* A possibly unique collection of pamphlets by the French mathematician Louis Poinsot is bound together with M. J. Bertrand's *éloge* of Poinsot. Biot, *Précis . . . de physique expérimentale,* 2 vols., Paris, 1817; and Lagrange, *Théorie des fonctions analytiques,* Paris, 1797, are in the BM catalogue only in later editions.

Among classic chemical texts, the works of Berzelius, Black, Davy, Fourcroy, Higgins, Macquer, Priestley, *et al.* are present, as are English editions of works by Scheele and Bergman. Dalton's *Meteorological observations and essays,* London, 1793, and his *A new system of chemical philosophy,* Manchester, 1808, are inscribed by the author as presentation copies to the Leeds Philosophical and Literary Society. Berthollet's *Recherches sur les lois de l'affinité,* Paris, 1801, is present, as are the *Mémoires de physique et de chimie de la société d'Arcueil,* 3 vols., Paris, 1807–17. Pierre Duhem's personal copy of Lavoisier, de Morveau, Berthollet, and Fourcroy, *Méthode de nomenclature chimique,* Paris, 1787, is something of a surprise. The book was acquired by Chaston Chapman, but we do not know how.

In natural history, there are several works by John Ray, and by Francis Willughby. The bio-medical sciences are exemplified by works by Malpighi, de Graaf, Mylius, and Leeuwenhoek. Francesco Redi, *Experimenta circa generationem insectorum,* Amsterdam, 1671; and idem, *Opuscula varia physiologica,* 3 vols., Leyden, 1729, are not in the BM catalogue.

The publications of a number of scientific societies are present, though sometimes only sporadically, as in the case of the Academia del Cimento, and the Imperial Academy of St Petersburg. The best collection concerns the Royal Society. We have the *Philosophical transactions* in the complete reprint, plus the abridgements by Motte (covering 1700–32), Baddam (1738–41), and Hutton,

Shaw, and Pearson (1665–1800). We also have the histories of the Royal Society by Birch (4 vols., London, 1756–7), Weld (2 vols., London, 1848), and Sprat (the first four editions, London, 1667, 1702, 1722, 1734) of which the first edition is present in large- and small-paper versions. There are some rare pamphlets concerning the Society, including John Hatzfeld's anti-Newtonian tract, *Two letters to the Royal Society,* London, 1724; and writings concerned with the John Hutton/Joseph Banks controversy of the 1780s: *An appeal to the fellows of the Royal Society,* London, 1784; and [Samuel Horsley], *An authentic narrative of the dissentions and debates in the Royal Society,* London, 1784.

There are several interesting works in the history of science. Chaston Chapman contributed some standard texts in the history of chemistry, for example those of Kopp, Hoefer, and Meyer, and oddities such as *The journal of the Alchemical Society,* 3 vols., London, 1913–15. We have also George Grote's copy of William Whewell, *History of scientific ideas,* 2 vols., London, 1858, of which the first volume has been extensively annotated.

There are also several works within the Special Collections area, which do not form part of the Early Science Collection, or of other named collections. Among the British books of scientific interest are: [John Napier], *Logarithmorum canonis descriptio,* Edinburgh, 1614; H. Briggs, *Logarithmicall arithmeticke,* London, 1631; John Ray, *Catalogus plantarum circa Cantabrigiam,* Cambridge, 1660; and John Locke, *An essay concerning humane understanding,* London, 1690.

Foreign books in this category include G. Ubaldo, *Le mechanice,* Venice, 1581; and Tycho Brahe, *Opera omnia,* Frankfurt, 1648. There are first editions of Della Porta, *Magiae naturalis libri xx,* Naples, 1589, and of the following works by Kepler: *Astronomia nova,* Prague, 1609, *Harmonices mundi,* Linz, 1619, and *Tabulae Rudolphinae,* Ulm, 1627.

The All Souls Collection

In the late 1920s the Warden and Fellows of All Souls College, Oxford presented the University of Leeds with a collection of some 2,300 volumes of antiquarian medical, scientific, and theological literature, 1,100 of these being related to medicine and science primarily of the seventeenth and eighteenth centuries. Since then the collection has retained its unique identity; there have been few, if any, additions to it, since subsequent acquisitions have generally been placed in the Early Science Collection. Because of its origins, the Collection contains a number of handsome books printed by the Oxford University Press, of interest to the bibliophile.

For the historian of seventeenth-century science, the Collection is particularly strong in the areas of mathematics and the mathematical sciences. British mathematical works include the edition of the works of William Oughtred published in Oxford in 1652, James Gregory's *Geometriae pars universalis,* Padua, 1668; John Wallis' *Opera,* Oxford, 1693–9; and more elementary works by Edward Wells and Richard Sault. Continental mathematicians are better represented. Italian works include Ghetaldi's *De resolutione & compositione mathematica,* Rome, 1640; Cavalieri's *Geometria indivisibilibus continuorum,* Bologna, 1653; Borelli's *Euclides restitutus,* Pisa, 1658; Viviani's *De maximis, et minimis geometrica,* Florence, 1659; and Francesco Maurolyco's editions of Apollonius and Archimedes. Equally substantial is the range of French works, such as Claude Mydorge's *Examen du livre des récréations mathématiques,* Paris, 1630; Ismael Boulliau's *Exercitationes geometricae tres,* and *De lineis spiralibus demonstrationes novae,*

Paris, 1657; de la Hire's *Sectiones conicae,* Paris, 1685; Jacques Ozanam's *Dictionnaire mathématique,* Amsterdam, 1691; l'Hôpital's *Analyse des infiniment petits,* Paris, 1696; and de Omeriquês' *Analysis geometrica,* Gadibus [?], 1698. The Collection also has the *Opera mathematica,* Antwerp, 1669, of the Belgian mathematician Tacquet.

There is much of interest too in the holdings of astronomical works. British astronomy is represented by John Bainbridge's *Canicularia. Una cum demonstratione ortus sirii heliaci, pro parallelo inferioris Aegypti . . .,* Oxford, 1648; Jeremy Shakerley's *Tabulae Britannicae,* London, 1653; and a number of works by Thomas Streete including his *Astronomia Carolina,* London, 1661. Again, Continental astronomers are better represented, as the Collection includes Guidobaldo del Monte's *Problematum astronomicorum libri septem,* Venice, 1609; Riccioli's *Almagestum novum astronomiam,* Bologna, 1651; Boulliau's *Astronomiae philolaicae fundamenta,* Paris, 1657; G. D. Cassini's *Observations sur la comète* and *Abrégé des observations & des réflexions sur la comète,* Paris, 1681; and Christiaan Huygens' *Kosmotheros,* The Hague, 1698. There are several works by the Danish astronomer Johann Hevelius, one of which, *Selenographia,* Danzig, 1647, is inscribed from the author to Jonathan Goddard, who was a leading member of the London and Oxford circles of natural philosophers during the 1640s and 50s.

Other items related to the mathematical sciences include Gaspar Schott's *Cursus mathematicus,* Würzburg, 1661; William Holder's *Elements of speech,* London, 1669, and *A treatise of the natural grounds, and principles of harmony,* London, 1694; and some of the many publications of Athanasius Kircher.

In terms of sheer numbers, seventeenth-century medical works make up perhaps the largest proportion of the Collection. However, the significance of many of them is difficult to assess, and we have therefore listed only those of obvious importance. An edition of the works of William Harvey published in Rotterdam in 1671, and Francis Glisson's *Tractatus de ventriculo et intestinis,* London, 1677, are the most noteworthy of English writings. Turning to Continental authors, the Collection has J. B. van Helmont's *Ortus medicinae,* Venice, 1651; Jean Pecquet's *Experimenta nova anatomica,* Paris, 1651; Jan Swammerdam's *Miraculum naturae sive uteri muliebris fabrica,* Leyden, 1672; Christian Marggraf's *Podoromus medicinae,* Leyden, 1674; and works by Liceti, Ezler, Rolfinck, Marcus Marci, and Gerhard Blaes amongst others. Also in the Collection are collected editions of the works of Cardano, Galen, Gregor Horst, Franz de le Boe (Sylvius), Malpighi, and Le Clerc.

Inevitably, when we turn to alchemy and chemistry the collection is overshadowed by the Chaston Chapman bequest. There are, however, some items of interest, including the *Pharmacopoeia Londinensis collegarum,* London, 1650; Glauber's *Opera,* Amsterdam, 1651–8; Thomas Willis' *Pharmaceutice rationalis,* Oxford, 1674–5; along with works by Stellatus, Portzio, Webel, Clauder, and Weidenfeld. The holdings of natural history are limited, although there are copies of Morison's *Praeludia botanica,* London, 1669; Tournefort's *Histoire des plantes,* Paris, 1698; Ray's *Methodus plantarum nova,* London, 1682; and Claude Perrault's *Description anatomique d'un camelon,* Paris, 1669.

For the historian of eighteenth-century medicine and science the strengths of the Collection are somewhat different. There are few works of note from mathematics and physics, although David Gregory's edition of Euclid published in Oxford in 1703, Edmund Halley's *Menelia sphaericorum libri III,* Oxford, 1758;

and Samuel Horsley's *Apollonii Pergaei inclinationum libri duo,* Oxford, 1758, deserve mention. Natural history is represented mainly by the inevitable volumes of Linnaeus and Albrecht von Haller. Chemistry is rather better served with works by Berthollet, Black, Chaptal, Crawford, Nicholson, and Rutty. However the two subjects which are well illustrated by the Collection are astronomy and medicine.

Works of physical astronomy include Alexis Clairaut's *Theorie de la figure de la terre,* Paris, 1743; Pierre Bouguer's *La figure de la terre,* Paris, 1749; and Laplace's *Traité de mécanique céleste,* Paris, 1799–1825, while observational astronomy is represented by John Flamsteed's *Historia coelestis Britannicae,* London, 1725; Jacques Cassini's *Tables astronomiques,* Paris, 1740; Nevil Maskelyne's *Astronomical observations made at the Royal Observatory,* London, 1776–1811; William Wales and William Bayly's *The original astronomical observations, made in the course of a voyage towards the South Pole and round the world,* London, 1777; Sir Henry Charles Englefield's *On the determination of the orbits of comets,* London, 1793; and James Bradley's *Astronomical observations,* Oxford, 1798–1805. The Collection also has introductory texts by Jacques Cassini, Joseph Lalande, Roger Long, and Samuel Vince, along with Bailly's magisterial histories of astronomy and George Costard's lesser known *A letter to Martin Folkes . . . concerning the rise and progress of astronomy amongst the ancients,* London, 1746; *A further account of the rise and progress of astronomy amongst the ancients,* Oxford 1748; and his *The history of astronomy,* London, 1767.

Developments within British medicine are well charted by the Collection. Beginning with doctors influenced by Newtonianism, we have Richard Mead's *A mechanical account of poisons in several essays,* London, 1702; his *Medica sacra,* London, 1749; and John Freind's *Opera omnia medica,* London, 1733. Moving to Scottish writers, John Hunter's *A treatise on the venereal disease,* London, 1786; Alexander Monro II's *Works,* Edinburgh, 1781; and Alexander Monro III's *Observations on the structure and functions of the nervous system,* Edinburgh, 1783, are in the Collection. From later in the century we have John Pugh's *A treatise on the science of muscular action,* London, 1794; and Sir Alexander Crichton's *An inquiry into the nature and origin of mental derangement,* London, 1798. Continental medicine is less well represented, being confined largely to the work of major figures like Boerhaave, Friedrich Hoffman (the younger), G. B. Morgagni, Abrechet von Haller, and Gerard van Swieten.

The Collection boasts an impressive range of periodicals. There are complete runs of the *Acta eruditorum* and *Nova acta eruditorum,* the *Histoire de l'académie royale des sciences,* and the *Observations sur la physique . . .* (continued as the *Journal de physique . . .*). Rarer periodicals include the *Acta literaria Sueciae Upsaliae publicata* (continued as the *Acta literaria et scientiarum Sueciae),* 1720–39; the *Historia et commentationes academiae electoralis scientiarum et elegantiorum literarum Theodoro-Palatinae,* 1766–84, and the *Miscellanea curiosa medico-physica academiae naturae curiosorum,* 1670–96. The collection also has runs of the *Philosophical transactions,* the transactions of the Royal Irish Academy and of the Royal Society of Edinburgh, along with various medical periodicals of the eighteenth century.

Special Collections Philosophy

Special Collections Philosophy has a number of works illustrating the rise of Cartesianism during the seventeenth century. The major English exponent of the Cartesian system, Anthony LeGrand, is represented by his *Philosophia veterum, e*

mente Renati Descartes, London, 1671, and his *Man without passion: or, the wise stoick . . .,* London, 1675; whereas the critical response to Cartesianism can be seen in J[ohn] D[avies], *Reflections upon monsieur Des Cartes' Discourse . . .,* London, 1679; Edward Howard's *Remarks on the new philosophy of Des-Cartes,* London, 1700; and an edition of Descartes' *Principia philosophiae,* owned by a student at Wadham College Oxford in the 1720s, which contains quotations from Boyle and Ray on the falsity of the Cartesian laws of motion. P. S. Régis' *Système de philosophie,* Paris, 1690, and P. D. Huet's *Censura philosophiae cartesianae,* Helmstedt, 1690, illustrate both sides of the debate over Cartesianism on the Continent. Descartes' rival, Pierre Gassendi, also finds a place in the collection with his *Animadversiones in decimum librum Diogenes Laertii . . .,* Leyden, 1649, and J. Bougerel's *Vie de Pierre Gassendi,* Paris, 1737.

Eighteenth-century controversies surrounding earthquakes can be traced in John Flamsteed's *A letter concerning earthquakes, written in the year 1693,* London, 1750; Stephen Hales' *Some considerations on the causes of earthquakes,* London, 1750; and Thomas Sherlock's *A letter from the Lord Bishop of London . . . on . . . earthquakes,* London, 1750. Other items of interest include George Cheyne's *Philosophical principles of religion: natural and revealed,* London, 1715; Thomas Knight's *Reflections upon catholicons, or universal medicines, with some remarks on the natural heat that is in animals . . .,* London, 1749; Abraham Tucker's *The light of nature pursued,* London, 1768; Adam Smith's posthumous *Essays on philosophical subjects,* London, 1795; and Thomas Reid's personal copy of Lord Kames's *Sketches of the history of man,* Edinburgh, 1774, which incorporates a number of Reid's corrections of his tract on logic which is included in this work.

Leeds Literary and Philosophical Society

In 1937 the Leeds Literary and Philosophical Society gave its library to the University. Since then, unfortunately, the library has largely been dispersed within the Brotherton Library, so that its identity has mostly been lost. As might be expected, the collection is particularly strong in geological publications of the late eighteenth and early nineteenth centuries, and there are several bound volumes of tracts from the nineteenth century on geology, natural history, meteorology, and papers read before the Society. Individual works worth noting include Francesco Redi's *Experimenta circa varias res naturales,* Amsterdam, 1685; Abraham Trembley's *Mémoires, pour servir à l'histoire d'un genre de polypes,* Leyden, 1744; John Wilson's *A synopsis of British plants in Mr. Ray's method,* Newcastle upon Tyne, 1744; Benjamin Hoadley and Benjamin Wilson's *Observations on a series of electrical experiments,* London, 1756; John Ellis' *The natural history . . . of zoophytes,* London, 1786; James Hutton's *An investigation of the principles of knowledge,* Edinburgh, 1794; and presentation copies of Charles Babbage's *The ninth Bridgewater treatise,* 2nd edn., London, 1838; J. P. Smith's *On the relation between the Holy Scriptures and some parts of geological science,* London, 1839; and Samuel Bailey's *A review of Berkeley's theory of vision,* London, 1842.

Anglo-French

The Anglo-French Collection was begun in 1919 with the intention of illustrating the influence of Great Britain on France from the sixteenth to the end of the eighteenth century.[15] If the Collection is a representative sample of French translations of English scientific and medical works, it provides suggestive evidence as to which aspects of English intellectual life interested French savants during the period.

In the seventeenth century, translations of philosophical and medical works seem to have been the most popular. The collection contains translations of a number of Bacon's writings, along with those of Thomas Hobbes, Sir Thomas Browne, Lord Herbert of Cherbury, and Thomas Sprat, and there are medical works by Sir Kenelm Digby, Robert Boyle, Richard Lower, Thomas Willis, and the Scot Duncan Liddel. Other authors represented are the mathematicians Henry Briggs, James Hume, and Alexander Anderson, the Baconians Gerard Boate and Joshua Childrey, the plant physiologist Nehemiah Grew, and the virtuoso John Wilkins. Individual works of particular interest include Anderson's *Exercitationum mathematicarum decas prima,* Paris, 1619; Liddel's *Operum omnium iatrogalenicorum,* Leyden, 1624; Hume's *Traité de la trigonometrie,* Paris, 1636; Lower's *Traité du coeur . . .,* Paris, 1679; and Willis's *Opus postumum,* Leyden, 1676, and *Opera medica & physica,* Leyden, 1676.

In the eighteenth century, medical translations, covering the whole of medical science, seem to have continued to attract the most interest. From the early eighteenth century there are works by George Cheyne, John Freind, and Richard Mead, while later authors include John Arbuthnot, John Huxham, John Fothergill, and the Scots William Cullen, John Gregory, Francis Home, John Hunter, David Macbride, Alexander Monro II, and William Smellie. Philosophical works were again popular; there are numerous editions of Bacon's works and David Mallet's *Life,* along with the encyclopedist Alexandre Deleyre's *Analyse de la philosophie du chancelier François Bacon,* Amsterdam, 1755. The writings of Berkeley, Hume, and Adam Smith also began to appear in translation. The philosophical controversies surrounding Newtonian natural philosophy can be traced in Pierre Desmaizeaux's *Recueil de diverse pièces, sur la philosophie . . .,* Amsterdam, 1720; the editions of Samuel Clarke's *De l'existence et des attributs de Dieu,* Amsterdam, 1717, and *A collection of papers, which passed between the late learned Mr. Leibnitz, and Dr. Clarke,* London, 1717; and in Voltaire's *Élémens de la philosophie de Neuton* [sic], London, 1741 (first published in 1738), and his *La metaphysique de Neuton* [sic], *ou parallèle des sentimens de Neuton et de Leibnitz,* Amsterdam, 1740, which he described as a supplement to the *Elémens.* The popularity of natural theology is evident in the number of editions of John Ray's and William Derham's works in that genre.

In the physical sciences, Newtonianism again bulks large with translations of Newton's own works and those of Hauksbee, Stephen Hales, J. T. Desaguliers, Roger Cotes, John Keill, Colin Maclaurin, Robert Smith, and the popularizations of Benjamin Martin and Francesco Algarotti. The growth of the sciences of electricity and magnetism is reflected in the publications of Benjamin Franklin, Joseph Priestley, Tiberius Cavallo, John Michell, Jean Ingenhousz, and Charles Stanhope. Of special interest are Coste's translation of Newton's *Traité d'optique . . .,* Amsterdam, 1720, and the *Principes mathématiques* (tr. by Mme. du Chatelet), Paris, 1759; Franklin's *Expériences et observations sur l'électricité faites à Philadelphie en Amérique,* Paris, 1752; Michell's *Traités sur aimans artificiels* (tr. by A. Rivoire), Paris, 1752; Priestley's *Histoire de l'électricité,* Paris, 1771; Cavallo's *Traité complet d'électricité,* Paris, 1785; Ingenhousz's *Nouvelles expériences et observations sur divers objets de physique,* Paris, 1785; Stanhope's *Principes d'électricité* (tr. by J. T. Needham), London, 1781; and the *Recueil de traités sur l'électricité, traduits de l'allemand & de l'anglais,* Paris, 1748.

There is a striking increase in the number of translations of British publications on chemistry and natural history evident in the Collection, no doubt

related both to their growing number and importance. Authors of works on chemistry in the Collection include John Arbuthnot, Henry Cavendish, William Cullen, Robert Dossie, Stephen Hales, Richard Kirwan, William Lewis, David Macbride, George Martine, Joseph Priestley, John Quincy, Peter Shaw, and Robert Whytt. Perhaps the most significant translations are Hales' *La statique des végétaux* (tr. by Buffon), Paris, 1735; Martine's *Dissertation sur la chaleur,* Paris, 1751; Priestley's *Expériences et observations sur différentes espèces d'air,* Berlin, 1775; Cavendish's *Expériences sur l'air,* London, 1785; and Kirwan's *Essai sur le phlogistique,* Paris, 1788. Henry Baker, John Ellis, John Hill, John Turberville Needham, and Lazzaro Spallanzani are the major writers on natural history represented in the Collection. There is a noteworthy selection of works by Needham, including his *Nouvelles découvertes faites avec le microscope,* Leyden, 1747; *Lettre. A l'auteur du Journal encyclopédique . . .,* [Brussels?], [1770?]; *Idée sommaire, ou vue générale du système physique . . .,* Brussels, 1776; *Observations des hauteurs . . .,* Berne, 1760; *Réponse de Monsieur Needham de la Societé Royale . . .,* Turin, 1762; and an edition of Lazzaro Spallanzani's *Nouvelles recherches sur les découvertes microscopiques . . .,* London and Paris, 1769, which contains notes and additional materials by Needham.

The area of fewest translations is that of mathematics, probably reflecting the differences between British and Continental mathematicians over the calculus, and the limited achievements of British mathematics during the eighteenth century. Authors whose publications merited translation include Newton, Colin Maclaurin, William Playfair, Thomas Simpson, Nicholas Saunderson, Edmund Stone, and Charles Walmsley.

3. *The Historical Collection of the Medical and Dental Library.*

Founded in 1831, the Medical Library is the oldest of the University Libraries. Many of the works in the Historical Collection come from the Leeds General Infirmary Library, which was founded c. 1767 and added to the Medical Library in 1865. The Medical Library was further enlarged in 1875, when the Leeds and West Riding Medico-Chirurgical Society deposited a number of books and periodicals there. This collection was eventually presented to the University in 1926, when the Medical Library itself came under the control of the University librarian. In 1977 the Medical Library moved to its present location in the new Medical and Dental building, and was amalgamated with the Dental School Library.[16] The Historical Collection is now housed in the Medical and Dental Library, in a well appointed room of its own. Unfortunately the Collection is not fully covered by the main catalogue in the Brotherton Library, although there is a catalogue in the Medical and Dental Library which readers may consult. It is hoped that the present survey will serve as at least a rough guide to the hitherto ill-explored riches of the Collection.

There are few works in the Collection from the sixteenth century, but of these the most important is undoubtedly Vesalius' *De humani corporis fabrica,* Basel, 1543. Also to be found are editions of Dioscorides, Galen, Laurentius, Piccolomini, and Paulus, along with a collection of post-Hippocratic and Galenic writings by Henri Estienne. Seventeenth-century medical writings are much better represented. From the first half of the century there are works by English physicians such as Phillip Barrough, John Betts, and William Prynne. The important publications from later in the century are largely by William

Harvey and his followers. Contained in the Collection are Harvey's *Exercitationes de generatione animalium,* London, 1651, and his *The anatomical exercises . . . concerning the motion of the heart and blood,* London, 1653; Francis Glisson's *Anatomia hepatis,* London, 1654; Nathaniel Highmore's *Corporis humani disquisitio anatomia,* The Hague, 1651; Thomas Willis's *Pathologiae cerebri, et nervosi generis specimen,* London, 1668, an English translation of his *Pharmaceutice rationalis,* London, 1679, and his *Opera omnia,* Amsterdam, 1682; and a pair of interesting works published together, Malachi Thruston's *De respirationis* and what appears to be a signed copy of George Ent's *Animadversiones in praecedentum diatribum,* London, 1670. Controversial publications include Noah Biggs's *Mataeotechnia medicinae praxews,* London, 1651; Marchamont Needham's *Medela medicinae,* London, 1665; and Gideon Harvey's attack on the Royal College of Physicians, *The conclave of physicians,* London, 1683. Four works on the analysis of medicinal waters worth noting are Edmund Deane's *Spadacrene Anglica,* London, 1626; William Simpson's *Hydrologica chymica,* London, 1669, and his *Hydrological essays,* London, 1670; and George Tonstall's *Scarborough spaw spagyrically anatomized,* London, 1670. Thomas Winston's *Anatomy lectures at Gresham Colledge,* London, 1659; Thomas Sydenham's posthumously published *Processus integri in morbis fere omnibus curandis,* London, 1693; and Martin Lister's *Sex exercitationes medicinales,* London, 1694, should also be mentioned. Other physicians from the second half of the seventeenth century whose works are in the Collection include Henry Atherton, Philip Barrough, Robert Bayfield, John Brown, William Cole, Sir John Floyer, Walter Harris, Everard Maynwaringe, Richard Morton, and William Salmon.

Important seventeenth-century Continental works in the Collection are Guilio Casserio's *De vocis auditusque organis historia anatomica,* Ferrara, 1600–1, and his *Tabulae anatomicae,* Venice, 1627; Andreae Laurentius' *De crisibus libri tres,* Frankfurt, 1606; Fabricius's *Observationum & curationum cheirurgicarum centuria tertia,* Oppenheim, 1614; Johann Neander's *Tabacologia,* Leyden, 1626; Johannus Veslingius's *Syntagma anatomicum,* Padua, 1647; Thomas Bartholin's *Cista medica Hafniensis,* Copenhagen, 1662; Theodore Kerckring's *Spicilegium anatomicum,* Amsterdam, 1670; Regnier de Graaf's *De mulierum organis generationi inservientibus,* Leyden, 1672; Pierre Borel's *Historiarum et observationum medico-physicarum,* Frankfurt and Leipzig, 1676; and Nicholas Lémery's *Traité universel des drogues simples,* Paris, 1678. Amongst the editions of collected works from the seventeenth century in the Collection we should mention those of Lazarius Riverius, Wilhelm Fabry, Daniel Sennert, Michael Ettmüller, Jean Riolan the younger, Franz de la Boe, and Paracelsus.

As one might expect, given the origins of the Collection, its real strength lies in medical publications of the eighteenth century, particularly those of English and Scottish physicians. Some of the more important or interesting titles printed in England are John Quincy's edition of Sanctorius, the *Medicina statica,* London, 1720, which contains supplementary iatro-mechanical essays by Quincy and James Keill; William Cheselden's *A treatise on the high operation for the stone,* London, 1723, and his *Osteographia,* London, 1733; George Cheyne's *An essay of health and long life,* London, 1724, and his *The English malady,* London and Dublin, 1733; the deist Thomas Morgan's *Philosophical principles of medicine,* London, 1725; William Hillary's *An inquiry into the means of improving medical knowledge,* London, 1761; John Rutty's *A chronological history of the weather and seasons, and of the prevailing diseases in Dublin,* London, 1770; Andrew Wilson's *Medical researches,*

London, 1776; Thomas Percival's *Philosophical, medical, and experimental essays,* London, 1776; J. G. Zimmerman's *A treatise on experience in physic,* 2 vols., London, 1782; J. Elliot's *Elements of the branches of natural philosophy connected with medicine,* London, 1782; Thomas Beddoes's *Observations on the nature and cure of calculus,* London, 1793; and his *Essay on . . . pulmonary consumption,* Bristol, 1799; John Abernethy's *Surgical and physiological essays,* London, 1793; and five dissertations on fevers by George Fordyce, published in London between 1794 and 1803. In addition, there are editions of the collected works of Archibald Pitcairne, Richard Mead, John Fothergill, and Charles Collingnon.

As well as a good selection of pharmacopoeias from London, Edinburgh, and the Continent, there are several works on chemical topics. Of these we should mention William Lewis's *An experimental history of the materia medica,* London, 1761; Donald Monro's *A treatise on mineral waters,* 2 vols., London, 1770; William Falconer's *An essay on the Bath waters,* London, 1772; George Pearson's *Observations and experiments for investigating the chymical history of the tepid springs of Buxton,* 2 vols., London, 1784; and Richard Kirwan's *An essay on the analysis of mineral waters,* London, 1799. There are also several works printed in the provinces, such as Clifton Wintringham's *Tractatus de podagra,* York, 1714; John Burton's *A treatise on the non-naturals,* York, 1738; Matthew Dobson's *A medical commentary on fixed air,* Chester, 1779; and William Withering's *An account of the foxglove, and some of its medical uses,* Birmingham, 1785.

A significant number of historical works by English physicians is included in the Collection too. Perhaps the most noteworthy are John Freind's *The history of physick,* 2 vols., London, 1725–6; John Aikin's *Biographical memoirs of medicine in Great Britain from the revival of literature to the time of Harvey,* London, 1780; William Black's *A historical sketch of medicine and surgery,* London, 1782; and Thomas Henry's *Memoirs of Albert de Haller.* Warrington, 1783. An important document relevant to the history of medicine in the East Riding during the eighteenth century is *A catalogue of the books belonging to the Medical Library, at the General Infirmary at Hull,* Hull, 1790.

The rise of the Edinburgh medical school, and of Scottish medicine more generally, during the eighteenth century, is well illustrated by the Collection. Apart from various works by William Cullen and the Monros, the Collection contains William Smellie's *A treatise on the theory and practice of midwifery,* London, 1752; William Porterfield's *A treatise on the eye,* 2 vols., London and Edinburgh, 1759; Francis Home's *Medical facts and experiments,* London, 1759, and his *Clinical experiments, histories, and dissections,* Edinburgh, 1780; Robert Whytt's *Observations on the nature, causes, and cure of those disorders which have commonly been called nervous hypochondriac, or hysteric,* Edinburgh, 1765, along with his *Works,* Edinburgh, 1768; John Gregory's *Observations on the duties and offices of a physician; and on the method of prosecuting enquiries in philosophy,* London, 1770; John Hunter's *The natural history of the human teeth,* London, 1771, his *Observations on certain parts of the animal oeconomy,* London, 1786, and his *A treatise on the blood,* London, 1794; and William Hunter's *An anatomical description of the human gravid uteris,* London, 1794. The controversies surrounding Brunonianism are represented by John Brown's *Elementa medicinae,* Edinburgh, 1780, his *Works,* 3 vols., London, 1804, and Robert Jones's *An inquiry into the state of medicine on the principles of inductive philosophy,* Edinburgh, 1781. An invaluable resource for the study of the Edinburgh medical school is the Collection of some eleven volumes of medical theses covering the period 1751–1793. We should also mention here a work by one of

Edinburgh's most famous American graduates, Benjamin Rush's *An account of the bilious remitting yellow-fever . . .*, Philadelphia, 1794.

Continental publications and physicians of the eighteenth century are less well represented in the Collection. However there are several important works such as J. B. Morgagni's *Adversaria anatomica omnia,* 2 vols., Padua, 1719, and his *Epistolae anatomicae duae,* Leyden, 1728; Bernard Albinus' *De ossibus corporis humani,* Leyden, 1726, and his *Historia musculorum hominis,* Leyden, 1734; a number of works by Gerhard van Swieten including his *Commentaria in Hermanni Boerhaave aphorismos,* 5 vols., Leyden, 1742–72; numerous works by Albrecht von Haller including his *Primae linae physiologiae,* Göttingen, 1747; C. N. le Cat's *A physical essay on the senses,* London, 1750, and his *Parallèle de la taille latérale,* Amsterdam, 1766; and the collected works of Bartholomeo Eustachius, Friedrich Hoffman, and Frederick Ruysch.

Of the few nineteenth-century works kept in the Collection, James Lucas's *A candid inquiry into the education, qualifications, and offices of a surgeon-apothecary,* Bath, 1800; J. E. Stock's *Memoirs of the life of Thomas Beddoes,* London, 1811; Samuel Tuke's *Description of the Retreat; an institution near York, for the insane persons of the Society of Friends,* York, 1813; and William Prout's *An inquiry into the nature and treatment of gravel,* London, 1821, are perhaps the most interesting. Works with more local significance are William Hey's *Practical observations in surgery,* London, 1803; and C. T. Thackrah's *An introductory discourse, delivered to the Leeds Philosophical and Literary Society,* Leeds, 1821.

The unique feature of the Collection, and clearly an important resource for historians of medicine and science, is the set of eighty-nine volumes of bound tracts and dissertations from the period c. 1745–1830. Works of medical interest include Samuel Musgrave, *Speculations and conjectures on the qualities of the nerves,* London, 1776; William Cullen, *A letter to Lord Cathcart,* London, 1776; William Hey, *Observations on the blood,* London, 1779; S. F. Simmons, *An account of the life and writings of the late William Hunter,* London, 1783; Martin Wall, *Dissertations on select subjects in chemistry and medicine,* Oxford, 1783; and an anonymous tract, *Observations on the medical practice of Dr. Brown,* Ipswich, 1788. On more specific topics, animal heat is discussed in John Elliot, *Philosophical observations on the senses of vision and hearing . . . and an essay on combustion and animal heat,* London, 1780; William Morgan, *An examination of Dr. Crawford's theory of heat and combustion,* London, 1781; and Edward Rigby, *An essay on the theory of the production of animal heat,* London, 1785. Medical electricity is discussed in Richard Lovett, *The electrical fluid applied as a remedy,* 2nd edn., Worcester, 1778; Tiberius Cavallo, *An essay on the theory and practice of medical electricity,* London, 1780; Francis Lowndes, *Observations on medical electricity,* London, 1787; and a marvellous example of charlatanry John Bell, *The general and particular principles of animal electricity,* [London?], 1792. There are also a number of tracts by Thomas Beddoes, including *A letter to Erasmus Darwin,* Bristol, [1793]. Of primarily scientific interest are Torbern Bergman's *Outlines of mineralogy* (tr. by W. Withering), Birmingham, 1783; George Pearson's *A translation of the table of chemical nomenclature, proposed by De Guyton . . . Lavoisier, Bertholet, and de Fourcroy,* London, 1794; T. Garnett's *Outlines of a course of lectures on chemistry,* Liverpool, 1797; and C. H. Wilkinson's *An analysis of a course of lectures on the principles of natural philosophy . . . to which is prefixed, an essay on electricity,* London, 1799.

The Collection also boasts good runs of many of the major medical periodicals published in the eighteenth and nineteenth centuries in Britain. One rarity

from the seventeenth century worth mentioning is the *Acta medica & philosophica Hafniensia,* 4 vols. (ed. by Thomas Bartholin), Copenhagen, 1673–7.

For those interested in the history of the Leeds Medical School, there is a set of notes by William Hey the elder on medical and surgical cases, and a miscellaneous group of the manuscripts of Thomas Scattergood, who lectured in forensic medicine and was Dean of the School from 1884–1900. From an earlier period, there is an important group of lecture notes taken by the Leeds surgeon James Tatham in Edinburgh in the late eighteenth century. These record the lectures of Thomas Young on midwifery, William Cullen on clinical medicine, and Joseph Black on chemistry, the last being unidentified until we undertook our survey.[17]

4. *Manuscript Collections.*

The Brotherton Collection contains a few manuscripts of scientific interest. The most important of these is probably the bound volume of 'Lectures upon hydrostatics, pneumatics, optics, mechanics, and astronomy', by Nicholas Saunderson, the blind lecturer in natural philosophy at Cambridge in the 1720s and 1730s.[18] The Brotherton Collection also includes two substantial bodies of correspondence: that of the ethnologist Edward Clodd (1840–1930), and the Gosse correspondence, mainly concerned with the literary critic Edmund Gosse, but also containing letters of his father, the naturalist Philip Gosse (1810–88).[19]

The Clodd correspondence includes forty letters (1893–1928) from Sir James Frazer, two (1892–3) from Alfred Russel Wallace, and four (1896–1900) from Herbert Spencer. There are also some letters of the naturalist Henry W. Bates (1825–92), including two ([1861–2]), from Charles Darwin, and two (1867, [c. 1870]) from Sir Charles Lyell.

The Gosse correspondence includes two more letters ([1857], [1863]) from Charles Darwin, and two each from T. H. Huxley and A. R. Wallace. There are twenty-nine letters (1853–8) between Philip Gosse and Charles Kingsley.

Most of the University's manuscript holdings in science are kept with the Special Collections. We have a letter from Fatio de Duillier to Newton, dated London, 17 April, 1690. Fatio discusses Huygens's experiments with object glasses, and also recommends a servant to Newton, admitting 'He shaveth but indifferently, but that may soon be learned.' A neatly written set of 'Lectures on chemistry by Joseph Black, M:D:' is unfortunately incomplete. We have vols. 1–3, 9, 10 of the set, dated 1786–7. The first three volumes discuss chemistry in general, the doctrines of heat, mixture and phlogiston, and salts, alkalies and acids. Volumes nine and ten discuss metalline chemistry, mineral waters, and the table of elective attractions.

Among the more recent material, are two further letters ([1875], 1880) from Charles Darwin; and a notebook containing Sir William Bragg's researches on X-ray diffraction, made at Leeds in 1913. Papers of other former members of Leeds University are extensive, including substantial collections from the physicists Professor Richard Whiddington (1885–1970), and Professor Edmund Stoner (1899–1968). The correspondence and papers of Professor Arthur Smithells are of obvious relevance to further research on the subject of flame spectra in the 1890s and 1900s.[20] Extensive use has already been made of the notes of Professor William Astbury (1898–1961) on his researches into protein structure in the period 1934–61.[21]

Material relating to local scientific societies is present in abundance. The

deposit of the Leeds Philosophical and Literary Society includes the minute books, papers, and correspondence from the period 1819–1951, and the papers of William Hey. A handlist of this collection is available. A substantial amount of material relating to the Yorkshire Geological Society has also been deposited here. The minute-books of the Society from 1837, and various letters and maps, may be consulted with the permission of one of the trustees.

NOTES

[1]See R. Offor, *A descriptive guide to the libraries of the University of Leeds*, Leeds, 1947.

[2]D. I. Masson, 'The Brotherton Collection of rare books and manuscripts', *The University of Leeds review*, 1978, *21*, 135–54.

[3]We wish to thank Dr. K. T. Hoppen, of the University of Hull, for confirming that this identification is a 'strong possibility'.

[4]See his obituary in *The Times*, 19 October 1932, p. 16.

[5]B. J. T. Dobbs, *The foundations of Newton's alchemy; or 'The hunting of the greene lyon'*, Cambridge, 1975, chapter III.

[6]R. S. Wilkinson, 'The alchemical library of John Winthrop', *Ambix*, 1963, *11*, 33–51; 1966, *13*, 139–86.

[7]See P. E. Spargo, 'Newton's library', *Endeavour*, January 1972, *31*.

[8]See John Harrison, *The library of Isaac Newton*, Cambridge, 1978.

[9]Dobbs, op. cit. (5), pp. 148–9.

[10]Materials for such a bibliographical study could include: J. Ferguson, *Bibliotheca chemica*, 2 vols., Glasgow, 1906; *Bibliotheca alchemica et chemica*, London, 1949; and *Catalogue of the Ferguson collection*, Glasgow, 1943. To these might be added Alan Pritchard, *Alchemy: a bibliography of English-language writings*, London, 1980. During Chaston Chapman's lifetime, only Ferguson's work was available, to which he appears to have made reference. His typewritten catalogue to the collection includes frequent repetition of the proud note 'not in Ferguson'.

[11]See, among others, H. M. E. de Jong, *Michael Maier's 'Atalanta fugiens'*, Leyden, 1969, p. 37, and Lynn Thorndike, *A history of magic and experimental science*, 8 vols., New York, 1941–58, v, p. 532.

[12]For example, P. M. Rattansi, 'Paracelsus and the Puritan Revolution', *Ambix*, 1963, *11*, 24–32 (24); K. Thomas, *Religion and the decline of magic*, London, 1973, p. 270; and C. Webster, *The great instauration*, London, 1975, p. 386.

[13]Webster, op. cit. (12); p. 281 for Russell, p. 280 for Pinnell.

[14]A note by Henry Oldenburg, in his 'Liber epistolarii', Royal Society MS. 1, f. 129^{r}, attributes the translation to Dr William Aglionby, FRS.

[15]A detailed examination of the Anglo-French Collection is given in a series of article by Richard Offor, 'A collection of books in the library of the University of Leeds printed before the beginning of the nineteenth century containing—(a) translations from English into French. (b) books written in French on Great Britain and on British affairs', *Proceedings of the Leeds Philosophical Society (Literary and Historical Section)*, 1925–8, *1*, 292–8; 1928–32, *2*, 109–23, 361–76; 1936–8, *4*, 55–76; 1938–43, *5*, 277–93, 403–11; 1944–47, *6*, (i), 111–24, 196–215, 283–312.

[16]This summary is based on Offor, op. cit. (1), pp. 114–127, and on A. M. Collins and J. A. Sharp, 'Some books in the Historical Collection of the Medical and Dental Library', *The University of Leeds review*, 1979, *22*, 172–90, which discusses in some detail five works on anatomy from the period 1543–1733 which are in the Collection.

[17]The Black lectures, of which there are 62, are untitled and undated. The early lectures are almost word-for-word identical with those printed by D. McKie in *Annals of Science*, 1959, *15*, 65–73; 1960, *16*, 1–9; 1962, *18*, 87–97.

[18]The lectures are internally dated '1734'; but Dr G. N. Cantor informs us that other copies of these lectures, which he has examined, all bear the dates 1723 or 1734. This is so even in those cases when the owners could not have attended Cambridge lectures at the time stated. Dr Cantor thinks it likely that these lectures date from before 1733.

[19]See *A catalogue of the Gosse correspondence in the Brotherton Collection* (with an introduction by Philip Gosse), Leeds, 1950.

[20]Unfortunately, this material was not exploited in the recent study of Robert K. DeKosky, 'George Gabriel Stokes, Arthur Smithells, and the origin of spectra in flames', *Ambix*, 1980, *27*, 103–23.

[21]Robert Olby, *The path to the double helix*, London, 1974.