A SURVEY OF EARLY BIOLOGICAL BOOKS IN TORONTO, 1450-1700

BY

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In a survey of early scientific works the first problem to be faced is one of definition: precisely what is "scientific"? While modern botany and zoology had their beginnings in the sixteenth and early seventeenth centuries, the study of plants and animals was hardly a systematic discipline in this period. The era in which Pierre Belon and William Turner did their pioneering work also saw numerous editions and translations of Bartholomaeus Anglicus' thirteenth-century encyclopedia of natural history. Furthermore, we find the seventeenth-century criterion of objective observation anticipated more in works of a distinctly unscientific bent (treatises on hunting, falconry, or gardening) than in the humanistic commentaries on the great classical naturalists. Our answer to this problem was to set no strict and fast rules for including a work in our bibliography. Instead, each item has been considered in the light of its possible interest to a student of the history of biology. A number of our decisions were necessarily personal and, perhaps, arbitrary, but this procedure has enabled us to include many relevant "borderline" works whose presence could not be justified by a narrower interpretation of "science".

We have begun our survey with renaissance editions of earlier authors, both classical and medieval. The influence of Aristotle, Pliny, or Bartholomaeus was, needless to say, considerable throughout this entire period. In the medieval section three incunabula are included. Original works printed after 1500 are divided into four categories. 1. Herbals and surveys of plants (both medically and botanically oriented). 2. Zoological works. 3. Miscellaneous items containing matter of botanical or zoological interest. 4. Biological and microbiological works by early members of the Royal Society and their contemporaries in England and on the continent. (This section includes some eighteenth-century editions of earlier works). All items are listed only in short-title fashion. A number of facsimiles have been included.

Local Symbols:

UTL	University of Toronto Library (usually Rare Books Room)
TPL	Toronto Public Library
AM	Academy of Medicine
ROM	Royal Ontario Museum
CRRS	Centre for Reformation and Renaissance Studies
FDH	Library of F.D. Hoeniger

I. CLASSICAL WORKS IN RENAISSANCE EDITIONS:

Aelian, Claudious

- AM Historia de Vi et Natura Animalium per Petrum Gillium tum ex Aeliano
Conversa... / c. 1530 /. (includes Libri Summarius de Gallicis et
Latinis Nominibus Piscium Massiliensium by Pierre Gilles. t.p.
lacking).

- CRRS Animalium Natura Libri VII, Pietro Gillio et Conrado Gesner interpretidus.
Cologne, 1616, 8^o. (Grk. and Latin texts).
- UTL Variae Historiae Libri XIII...1545. (Grk.)
- UTL τὰ ἐπισκόμμενα ἅπαντα ... (ed. Gesner), Zurich, 1556.
- UTL Variae Historiae Libri XIII...Geneva, 1604. (trans. J. Vutejius. Grk. and Latin texts).

Aristoteles

- UTL Omnia Quae Extant Opera...Averrois commentarii... Venice: Juntae, 1550-2, 11 vol. (11 vol. in 6).
- UTL Operum Nova Editio, Graece et Latine...Adscriptis and Oram Libri...ex Bibl. Js. Casauboni. Lyons: Laemarius, 1590. (vol. 2 only. includes de Plantis).
- CRRS Opera Omnia... Geneva: P. de La Rovièrre, 1606-7, 2 vol. (Grk. and Latin texts).
- CRRS de Historia Animalium... Venice: Scotus, 1545. (trans. T. Gaza).
- AM ...de Animalium... Frankfurt: A. Wechel, 1585.
- AM ...de Animalium Historica, Libri X... Frankfurt: A. Wechel, 1587.

Athenaeus

- UTL Deipnosophistarum Libri Quindecim... (ed. Dalechampius), Lyons: A. de Harsy, 1583 (includes sections on animals and plants).

Dioscorides, Pedanius (Pedacius)

The editions of Dioscorides by Pietro Andrea Mattioli may be considered original works. They are usually illustrated.

- UTL I Discorsi di M. Pietro Andrea Matthioli...di Pedacio Dioscoride...
Venice: V. Valgrisi & B. Costantani, 1557.
- UTL Commentarii Secundo Aucti, in Libros Sex Pedacii Dioscoridis...
(ed. Mattioli), Venice: V. Valgrisi, 1558. (marginal MS notes)
- UTL Commentarii Denuo Aucti in Libros Sex Pedacii Dioscoridis...
(ed. Mattioli), Lyons: G. Coterius, 1562. (marginal MS notes)
- AM Commentarii...Dioscorides...(ed. Mattioli), 1565.
- UTL Opera Quae Extant Omnia; ex Nova Interpretatione Jani-Antonii Saraceni...
Frankfurt: A. Wechel, 1598.
- CRRS Les Commentaires sur...Dioscoride. (ed. Mattioli), Lyons: Rigaud, 1605.
(lacks leaf Ff 4).

Plinius Secundus, Caius

- AM Historia Naturale... Venice: Vercelli, 1501.
- TPL Historiae Mundi Libri XXXVII...que Auctis Sigismundi Gelenii Annotationibus... Basle: Froben, 1549.
- CRPS Historiae Mundi Libri XXXVII...S. Gelenii Annotationibus. Basle: Froben & Episcopus, 1554.
- UTL Historiae Mundi Libri XXXVII...Iacobi Dalecampi, Lyons: B. Honoratus, 1587.
- UTL Traducion de los Libros de Caio Plinio Segundo de la Historia Natural de los Animales... (trans.) Geronomo de Huerta...Madrid: L. Sanchez, 1599. (sp.)
- UTL The Historie of the World...Translated into English by Philemon Holland. London, 1601-2. (2 vol. in 1).
- UTL Historia Natural. Traducida por Geronimo de Heurta...Madrid, L. Sanchez, 1624-9, 2 vol. (sp.)
- UTL Historiae Mundi Libri XXXVII...Geneva: J. Crispinus, 1631.
- AM The Historie of the World...Trans. into English by Philemon Holland. London: Adam Islip. 1635.
- UTL Historiae Naturalis Libri XXXVII...Leyden: Elzevir, 1635, 3 vol.
- UTL Naturalis Historiae...cum Commentariis...Variorum...Leyden: Hackii, 1669.

Theophrastus

- UTL Sparse de Plantis Sententiae in Continuatam Seriem ad Propria Capita Revocatae...per Caesarem Odonum... Bologna: A. Benaccius, 1561.
- UTL de Historia Plantarum Libri Decem. (ed. Bodaeus Egbertus), Amsterdam: H. Laurentius, 1644.

II. Medieval Works (including three incunabula):

Albertus Magnus

- UTL Opera Quae Factenus Haberi Potuerunt sub. Thoma Turco, Nicolao Rodulphio, Ioan. Baptista de Marinis...in Lucem Edita Studio & Labore Petri Tammy. Lyons, 1651, 21 vols.

Bartholomaeus Anglicus

- TPL de Proprietatibus Rerum. Nuremberg: Koberger, 1483. (imperfect).
- UTL de Proprietatibus Rerum...London: T. Berthelet, 1535. (trans. John Trevisa).

AM de Proprietatibus Rerum. Frankfurt, 1650.

Crescenzi, Pietro de

UTL Ruralia Commoda...Speier: Peter Drach, c. 1490-5. (imperfect).

Herbarius Latinus

UTL Louvain, Jan Veldner, c. 1485-6. (imperfect).

III. ORIGINAL WORKS PRINTED AFTER 1500:

1. Herbals and Botanical Surveys up to 1660. One of the incunabula listed in the previous section, the Herbarius of 1485, is in Toronto the sole representative of the numerous herbals printed in the late fifteenth and early sixteenth centuries. These early herbals were primarily medical in content and aim, and although they were usually illustrated by a great many woodcuts, the artistry was often primitive. The various plants were merely presented schematically according to their essential features. It was perhaps because of Dürer and his followers that a remarkable change took place in the German Herbals after 1530. The printer of Otto Brunfels set an example for future botanical works by employing Hans Weiditz, a pupil of Dürer's, to illustrate Brunfels' text. Once Brunfels' herbal appeared, a number of European printers endeavored to produce works with equally lavish illustrations. These were often issued first in folio and then in several (reduced) octavos. With the illustrations or icones in the herbal of Leonhard Fuchs the art of the botanical woodcut reached its height; Fuchs' plates were popular enough in their own day to be sold as a separate volume, and they proved sufficiently accurate to illustrate many nineteenth-century botanical textbooks.

There is at present no copy of the Brunfels herbal in Toronto, although a folio facsimile is now on order for CRRS. Fuchs' Kreuterbuch, 1543, is represented by facsimiles in UTL and FDH. Two later octavo editions of Fuchs, both 1549, one containing the reduced illustrations only, are in AM; UTL has one copy of a 1549 octavo as well:

UTL, AM de Historia Stirpium...Lyond: B. Arnolletus, 1549, 8°.

AM Primi de Stirpium Historia Commentariorum Tomi Vivae Imagines. Basle: Isengrin, 1549. 8°.

UTL has a Bock herbal:

UTL Kreutterbuch darin underscheidt Namen unnd Würckung der Kreütter, Stauden, Hecken und Beumen...Strassburg, 1565, F°.

while CRRS has a facsimile of Bock's 1577 F on order.

William Turner was England's first real botanist and one of the most important biologists of his time. Recently the Ray Society has published facsimiles of his two earliest botanical works, Libellus de Re Herbaria (1538) and The Names

of Herbes (1548) in a combined volume of which FDH has a copy. An original of Turner's Herball of 1568 is available:

FDH The First and Seconde Partes of the Herball... The Thirde Parte of William Turner's Herball, Colonge, 1568. (imperfect).

FDH has a copy of the next herbal in English:

Dodonaeus, Rembertus. A Niewe Herball or Historie of Planten... (trans.) Henry Lyte. London, 1578. (lacking final leaves of index).

The most famous (and least reliable) of all sixteenth-century herbals is that of John Gerard, who used the woodcuts of Tabermontanus. No copies of Gerard's 1597 edition could be located in Toronto, but the greatly improved edition by Thomas Johnson is available:

UTL, FDH The Herball or Generall Historie of Planten...Very Much Enlarged and Ammended by Thomas Johnson. London: Adam Islip, 1633.

AM The Herball...London, 1636.

UTL also has a facsimile of John Parkinson's Paradisi in Sole Paradisus Terrestris, 1629. Other botanical works of the period located in Toronto are:

Alpinus Prosper

AM de Plantis Aegypti Liber. Padua, 1640. (illus.)

Chabreaeus, Dominicus (Chabrée)

UTL Stirpium Icones et Sciagraphia cum Omnibus quae de Plantarum Natura... Geneva: I.A. Chouet, 1677.

Clusius, Carolus (l'Ecluse)

AM ...Exoticum Libri Decem...Item Petri Bellonii. Observationes, eodem Carolo Clusio interprete. Antwerp: Plantin, 1605.

AM Rariorum Olantarum Historica... Antwerp: Plantin, 1601.

UTL Caroli Clusi...Rariorum Plantarum Historia... Antwerp: Plantin, 1601. (imperfect. wanting portrait).

UTL Commentariolum de Fungis. (included in above item).

Cordus, Valerius

UTL de Halosantho... (Zurich? 1569?) (bound with Gesner's de Omni Rerum Fossilium Genere...Zurich, 1565-6).

Dalechampius, Jacobus (and see Athenaeus and Plinius)

UTL Histoire Generale des Plantes...Lyons, 1653, 2 vol. (illus.).

Estienne, Charles

- UTL L'agriculture et maison rustique...Paris: I. du Puis, 1564.
UTL L'agriculture et maison rustique...Lyons: I. Oliver, 1659.
UTL De re Hortensi Libellus, Vulgaria Herbarum...Lyons: S. Gryphius, 1539.

Mattioli, Pietro Andrea (see also Dioscorides)

- UTL de Plantis Epitome Utilissima. Frankfurt, 1586.

Mizauld, Antoine (Mizaldus)

- UTL Alexikepus; seu Auxiliaris et Medicus Hortus...Cologne, I. Gymnicus, 1576.
(bound with Historia Hortensium, 1577).
UTL Artificiosa Methodus Comparandorum Hortensium Fructuum...Cologne: I.
Gymnicus, 1577. (bound with Historia Hortensium, 1577).
UTL Historia Hortensium...Cologne: I. Gymnicus, 1577.

Van de Passe, Crispin (Passaeus)

- FDH Hortus Floridus. Arnhem, 1614. (pl. 42-51, 53 only).

UTL is also fortunate in possessing the first published survey of Canadian plants:

- UTL Cornut, Jaques Phillipe. Canadensium Plantarum...Paris: Le Moyne, 1635. (illus.)

2. Zoological Works, 1500-1660. There were far fewer original works on animals than on plants during the Renaissance. Zoological treatises did not have the practical appeal of the medically oriented herbals. Yet our period does include the encyclopedic surveys of Konrad Gesner of Zürich, and Ulysse Aldrovandi of Bologna. Toronto does not have the complete works of either, although we were able to locate:

- CRRS Conr. Gesneri Tigurini...Historiae Animalium Liber II. qui est de Quadrupedibus Oviparis. Frankfurt: A. Wechel, 1586.
UTL Gesner, Konrad. de Omni Rerum Fossilium Genere...Zurich, 1565-6. (8 vols. in 1).
FDH Gesner, Konrad. Vogelbuch...Zürich, 1583.
UTL Aldrovandi, Ulysse. Ornithologiae, [hoc est de Avibus Historiae Libri XII...] cum Indice Copiosissimo Variarum Linguarum. Bologna, 1600. (vol. 2 only; imperfect. pages missing at end).

Edward Topsell, an Anglican minister who knew little directly about animals, for some odd reason adapted Gesner into English. His work is more readily and completely available in Toronto than that of either Gesner or Aldrovandi:

- FDH The Historie of Foure-Footed Beastes. London, 1607. (bound with below).
- FDH The Historie of Serpents. London, 1608. (missing leaves supplied in Xerox).
- TPL The History of Four-Footed Beasts and Serpents...Collected Out of the
Writings of Conradus Gesner...by Edward Topsel...Whereunto is now added,
The Theater of Insects...by T. Muffet (q.v.)... London, 1658. (2
vol. in 1).

Few of the more specialized studies of animals are available in Toronto. William Turner's early ornithological work may be obtained only in A.H. Evans' reprint and translation (Turner on Birds, 1903) at CRRS, ROM, FDH. Also notable by its absence is the equally early (1544) ornithology of Longolius. But perhaps the most regrettable gap in the Toronto holdings is the lack of any work by the most scientific-minded of sixteenth-century biologists, Pierre Belon.

Other pre-1660 zoological works located in Toronto are:

- UTL Caius, John. de Canibus Britannica, Liber Unus; de Rariorum Animalium
FDH et Stirpium Historia, Liber Unus...London, 1729. (a late reprint.
The sixteenth-century English version of this work is available in
Arber's English Garner).
- AM Rondelet, Guillaume. ...Libri de Piscibus Marinis...Lyons: M. Bonhomme, 1554.
FDH (earliest illustrated treatise on fishes and marine life).
- UTL Moffett (Muffet), Thomas. The Theater of Insects...London, 1658. (printed
with Topsell's History of Four-Footed Beasts and Serpents...1658, q.v.).

3. Miscellaneous Items*:

Hartlib, Samuel

- UTL Sammuel Hartlib his Legacy of Husbandry. London, 1655.

Jonston, John

- UTL Thaumatographia Naturalis...Amsterdam: Janssonius, 1633.

Maplet, John

- TPL, CRRS A Greene Forest...1567. (reprint 1930).

Markham, Gervase

- UTL Farewel to Husbandry...London, 1684.

* See also A. Watson, "Early Farming Manuals in The University Library," RR, I, 3.

Monardes, Nicolas

AM de Simplicibus Medicamentis...interprete Carolo Clusio. 1574. (illus.)

Neander Bremanus, Johannus

AM Tabacologia...seu Nicotianae Descripti...Leyden: Elzevir, 1626. (illus.) after 1626

Porta, Giovanni Baptista

TPL, AM Phytognomonica...Berthelin, 1650 (illus.).

4. Biological and Microbiological Works by Early Members of the Royal Society
and their Contemporaries in England and on the Continent:

Blount, Thomas Pope

UTL A Natural History...Extracted Out of the Best Modern Writers. London: Bentley,
1693.

Boate, Gerard

AM Histoire Naturelle D'Irlande. Paris, 1666.

AM Irelands Naturall History. (trans. S. Hartlib), London, 1652.

Borelli, Giovanni Alfonso

UTL de Motu Animalium. Leyden, 1685. (2 vol. in 1. illus.).

Browne, Sir Thomas

AM, UTL Pseudodoxia Epidemica. 1646. (1st ed.).

UTL, UTL, FDH Pseudodoxia Epidemica. 1650. (2nd. ed.).

UTL Pseudodoxia Epidemica. 1658.

UTL, FDH Pseudodoxia Epidemica. 1672.

Prof. N. Endicott also owns several editions of this work.

Charleton, Walter

UTL Onomasticon Zoicon...London: J. Allestry, 1668.

Cole, William

UTL de Secretione Animalis Cogitata. Oxford, 1674.

Duncan, Daniel

UTL Histoire de l'Animal...Montauban: S. Dubois, 1686.

de Graef (Graaf), Regnier

UTL Traite de Nature et de l'Usage du suc Pancratiq. Paris: de Varennes,
1666.

Grew, Nehemiah

UTL The Anatomy of Plants. London: Rawlins, 1682.

UTL, AM Musaeum Regalis Societatis...London, 1681.

Hale, Sir Matthew

TPL The Primitive Origination of Mankind...London, 1677. (a work on spontaneous generation).

Hoboken, Nicolas

UTL Anatomia Secundinae Vitulinae...Utrecht: Ribbius, 1672.

Hooke, Robert

UTL Micrographia Restaurata: or the Copper Plates of Dr. Hooke's Wonderful Discoveries by the Microscope...London, 1745. (3rd. ed.).

A facsimile of 1st ed. of Micrographia (1665) has been issued recently by Dover Press.

Josselyn, John

FDH New-England Rarities Discovered: In Birds, Beasts, Fishes, Serpents, and Plants of the Country...1672. (facsimile, Berlin, 1926).

van Leeuwenhoek, Anthony

AM Epistolae Physiologicae super compluribus Naturae Arcanis...Delft, 1719. (illus.).

AM Opera Omnia seu Arcana Naturae, ope Exactissimorum Microscopiorum Detecta... Epistolis. Leyden, 1722, 4 vol.

Lovell, Robert

UTL Enchiridion Botanicum, or a Compleat Herball...Oxford: Davis, 1665.

Oliger, Jacobaeus

TPL Museum Regium; seu Catalogus Rerum Naturalium, quam Artificialium, quae in Basilica Bibliothecae Augustissimi Danae Norvegiaeq...Copenhagen, 1696.

Paullus, Simon

UTL Quadripartitum Botanicum. Strasbourg, 1667.

Ray, John

UTL, FDH Catalogus Plantarum Angliae et Insularum Adjacentium...London: J. Martyn, 1677.

UTL L'histoire naturelle...Paris, 1767.

UTL Observations Topographical, Moral & Physiological; Made in a Journey through Part of the Low-Countries, Germany, Italy, and France...Whereunto is Added a Brief Account of Francis Willughby, Esq; His Voyage Through... Spain...London: J. Martyn, 1673.

UTL Synopsis Methodica Stirpium Britannicarum...London: Smith, 1690.

Redi, Francesco

AM Osservazioni...intorno Agli Animali Viventi che si trovano Negli Animali Viventi. Florence, 1684. (illus.).

AM Experimenta circa Generationem Insectorum. Amsterdam, 1671. (illus.).

UTL Esperienze intorno alla Generazione degl'Insetti...Florence, 1668.

Willughby, Francis

UTL Brief Account...Voyage Through...Spain...(bound with Ray's Observations, q.v.).

ROM Ornithologia. 1676.

FDH Ornithology of Francis Willughby. 1678. (trans. John Ray).

Although our search turned up a number of unexpected items, especially in the Academy of Medicine Library, Toronto's holdings in the fields of early botany and zoology remain on the whole disappointing. The Redpath and Osler Collections at McGill contain far more in these fields than the combined Toronto collections. Moreover, the scarcity of such books on the present market, and their enormous expense when they are available, will probably preclude Toronto's ever having a first-class collection in this area. We can, however, take heart in the knowledge that more and more of these works are being issued in facsimile editions. Microfilm collections too, which were not included in the present survey, will enable Toronto to eventually obtain a more representative collection of works from the formative period of modern biology.

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Canadian readers are reminded that contributions for restoration of libraries, manuscripts, and works of art are being received by the Art Gallery of Ontario, Grange Park Road, Toronto 2B. Cheques should be made out to the Art Gallery and marked "Save Italian Art Fund." Aid in the United States is being organized by the Committee to Rescue Italian Art, Inc., 1 East 78th Street, New York, N.Y. 10021.