A Brief Note on the Authorship of the First Flora Virginica: Clayton, Gronovius and Linnaeus

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ABSTRACT
A modern Flora of Virginia will soon be published, providing an occasion to remember the publication of the first Flora Virginica in the 18th century and to establish the proper attribution of its authorship. Based on a manuscript by John Clayton, Flora Virginica was published in two parts in 1739 and 1743 by the Dutchman Johan Frederick Gronovius. Although both names are printed on the title page, the book is often cited with Gronovius listed as the author. This tradition, interpreted in modern understandings of plagiarism, has led to an assertion that Gronovius misrepresented Clayton’s work as his own. This paper will review the cultural milieu and historical context of the publication. The discovery of an 18th century watercolor drawing with an inscription assigning Flora Virginica to Clayton and evidence from a letter shows that contemporaries regarded the book either as Clayton’s or as a joint enterprise. It is suggested that Gronovius be understood as an advocate willing to publish Clayton’s work in what he considered to be the most modern Linnaean taxonomic system when self-publication was all but impossible for Clayton. The book should be referenced as by Clayton and Gronovius.

INTRODUCTION
With the publication of a modern Flora of Virginia describing and illustrating more than 3700 vascular plant taxa in Virginia now on its way to realization (Flora of Virginia Project, Inc. 2003), the time is appropriate to revisit the question of the authorship of the first flora of Virginia. In this paper, literature will be reviewed, historical context established and new evidence introduced to suggest that, although Johan Frederick Gronovius was usually cited as the author of Flora Virginica (Clayton and Gronovius 1739, 1742) from the late 18th century up to the 20th, John Clayton (1694-1773) and Gronovius should correctly be called co-authors.

THE AUTHORS OF FLORA VIRGINICA
Original editions of the Flora Virginica, printed in two Parts and then bound together, have two title pages. Part One reads as follows (/ indicates line separations):
FLORA VIRGINICA/ Exhibens/ PLANTAS/ Quas/ V.C./ JOHANNES CLAY­TON/ In/ VIRGINIA Observavit atque collegit./ Easdem/ Methodo Sexuali disposuit, ad Genera propria/ retulit, Nominibus specificis insignivit, &/ minus cognitas descrip­sis/ JOH. FRED. GRONOVIUS. / PARS PRIMA./ LUGDUNI BATAVORUM, / Apud CORNELIUM HAAK, 1739.
The title page of Part Two, paginated in sequence to Part One, differs only from the 1739 title page by replacing Prima with Secunda and changing the date to 1743. Clayton’s name is placed above that of Gronovius and their roles are described. Clayton is the observer and collector of the plants and Gronovius is he who “classified
the same by sexual method, put them in their own genus, signified them with specific names, and described those that were less known."

Berkeley and Berkeley (1963) made a balanced assessment of the circumstances surrounding the publication of Part One in their indispensable biography of Clayton based on extensive archival research and supported by meticulous annotation and an extensive bibliography. All writers after 1963 who discuss Clayton depend on the reliability and thoroughness of their pioneering work. The book provides a rich description of 17th and 18th century botanical pursuits with special emphasis on Clayton's participation in the affairs of the botanical community in Europe and America.

Berkeley and Berkeley (1963; p58, 63-66), based on information in the Introduction to Flora Virginica written by Gronovius (Clayton and Gronovius, 1739), note that "Clayton began sending to Gronovius large numbers of dried plant specimens for identification as early as 1735, if not earlier" and that before 1739, Gronovius received Clayton's (no longer extant) manuscript titled "Catalogue of Plants, Fruits and Trees Native to Virginia" forwarded to him probably by Mark Catesby. To this writer's knowledge their account has not been challenged. Gronovius published the revised manuscript under the title of Flora Virginica. The title page makes it clear that Gronovius reorganized the manuscript according to the new classification system (Steam 2001; p247), the "sexual system" of Carolus Linnaeus, the Swedish physician and naturalist.

Berkeley and Berkeley (1963; p65) point out that Clayton's contribution to Flora Virginica was often ignored by later writers; they recognize that Gronovius "does give a full explanation and full credit to Clayton's "Catalogue" in the Introduction. It is not his fault that many later writers tended to ignore the latter (perhaps because it was written in Latin) and to give much credit to Gronovius and little to Clayton for this work."

Further, although Gronovius did not specifically ask Clayton's permission to publish his information they conclude that it is "probably unjust to question the motives of Gronovius because of his full explanation of the circumstances" (Berkeley and Berkeley, 1963; p65). Berkeley and Berkeley (1963; p126) call Clayton a "co-author" of Flora Virginica, a judgment this researcher accepts.

Although the title page is specific and Berkeley and Berkeley call Clayton a "co-author," some library catalogs still name Gronovius as the author (e.g. Library of Congress Online Catalog 2004). Some current bibliographies also still cite the name of Gronovius alone (John Clayton Herbarium Database, 2003). Citation in scholarly books can be variable. In a recent collection of essays (Meyers and Pritchard, 1998) by historians of 18th century natural science, three different ways of attributing the authorship of Flora Virginica are given: to Clayton alone (O'Malley, 1998; p157; Laird 1998; p216), to Gronovius alone (Brigham, 1998; p121,135), and to both Clayton and Gronovius (Chaplin, 1998; p46).

The tradition of giving authorship to Gronovius noted by Berkeley and Berkeley (1963; p64, 65) and corroborated by present practices may have led to the perception that when the book was first published Gronovius alone was represented as the author (Reveal and Pringle, 1993; p161-162). Reveal (1992; p42) wrote that "Gronovius, with Linnaeus's aid, completely rewrote [the manuscript] following the new Linnaean method" without giving credit to Clayton.

Flora Virginica was published in January of 1737. Berkeley and Berkeley (1963; p197) write, "John Clayton, the American botanist, sent his specimen to Virgilius of Botanical Interest in America, and those are used in the first edition of Flora Virginica. Gronovius is using those names, and he is the one who published it."

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method," and he called Gronovius's action in publishing the reorganized manuscript without permission a "plagiarism."

HISTORICAL CONTEXT

Placing the differences in opinion about the attribution of authorship of Flora Virginica in an historical context can highlight the cultural climate of the burgeoning interest in botany as well as publishing practices in the 18th century that differ from those of the 21st century. Attention to such differences shows why the use of the term plagiarism is inappropriate.

Flora Virginica came into existence in the first half of the 18th century when collection, identification and classification of plants from the New World for commercial, medicinal, horticultural and national benefits were flourishing occupations of the leisure and educated classes (Berkeley and Berkeley, 1963; Stearns, 1970; Ewan and Ewan, 1970; Kastner, 1978; Meyers and Pritchard, 1998). The polite society without national boundaries to which participating natural philosophers belonged has been named the "Republic of Letters" (Daston, 1991; Gascoigne, 1998). The currency of exchange was honor, prestige and fame.

Communication was slow, difficult and expensive and it took place through a wide-ranging network of letter-writing, gifts of books and plant and seed exchanges (Swem, 1957; Berkeley and Berkeley, 1963; Kastner, 1978; Henrey, 1986). The intervention of intermediaries was important and losses of letters and botanical shipments at sea through wrecks, piracy and neglect of plants were high (Berkeley and Berkeley, 1963; p79, 130). This is the milieu in which the Clayton and Gronovius connection must be placed. For Gronovius to have asked for and received permission to publish the manuscript could have taken years and was fraught with possibilities of failure of communication.

With regard to the reference to plagiary, attention to recent studies of publication practices and authorship rights in the 18th century are helpful (Rose, 1994; Woodmansee and Jaszi, 1994). Rose (1994; p213, 214) notes that prior to 1710 authors could not be said to "own" their works although there was the obligation to identify authors on the title page, an obligation Gronovius honored. In a traditional patronage society "gentlemanly honor was the crucial value" as the notion of legal rights rose only in the 1760s (Rose, 1994; p215-216). Authors' rights were not defined in English statute until 1814, when copyright law codified long-standing practices (Feather, 1994; p191).

Nonetheless, although legal rights were not defined, concern about accurate attribution was alive. An example is found in one of the letters that the English botanist, John Ray, author of Historia Plantarum (Ray, 1686-1704) sent to a friend. Ray counseled a fellow botanist to publish his work so as to "lose no part of the honour due to you for any of your observations and discoveries" (Lankester, 1848; p417). Ray's comment emphasizes the accepted idea that an author had a moral right to the products of his or her pen, but also makes clear that honor and not financial return was the reward.

In two of Ray's volumes (Ray, 1688, II; Ray, 1704, III) are published the manuscripts of John Banister, a British-born natural philosopher who worked in Virginia. Banister's manuscripts were used by his contemporaries, like Leonard Plukenet, sometimes without
acknowledgment. Ewan and Ewan (1970; p144, 164) demonstrate how important Banister's materials were to Linnaeus and Gronovius in identifying Clayton's Virginia specimens, even though Linnaeus often did not properly acknowledge Banister. Thus, when Gronovius claimed in his Introduction to Flora Virginica (Clayton and Gronovius, 1739) that he decided to publish Clayton's manuscript catalog "lest, somehow by a like hatred of fate it be destroyed," he alluded to an historical truth.

On the other side of the coin, the English naturalist, Mark Catesby, published his own work. On his return to England, he etched plates based on his drawings and watercolors of American plants, animals and fish, printed the pages, hand colored the prints and published by subscription his Natural History of Carolina, Florida and the Bahama Islands (1729-47) (Brigham, 1998; McBurney, 1997). Catesby thus established the authorship of his own work and received both its monetary and honorific rewards.

Clayton, living in colonial America, could not publish his own manuscript. Holland was one European country with the technical and literary competency to publish scientific treatises in the international language Latin. Through intervention of the older Catesby who probably met Clayton in Virginia, Clayton's botanical collections were brought to the attention of Gronovius in the mid-1730s (Berkeley, 1963; p53, 54, 58). Gronovius had frequent visitors in Leiden who shared his interest in botany. In 1735, when Linnaeus came to Leiden seeking his medical degree and bringing his botanical manuscripts with him to be published, Gronovius and Dr. Isaac Lawson helped him by printing and circulating them (Turner, 1835; Blunt, 2001; p98). Gronovius was the intermediary who proposed to the wealthy Anglo-Dutch George Clifford that Linnaeus become his physician and garden superintendent (Turner 1835; Blunt, 2001; p101). Linnaeus classified the worldwide plant collection, including some of Clayton's plants given to Clifford by Gronovius, in Clifford's famous garden. The book, Hortus Cliffortianus, 1737, with Linnaeus's classifications and Georg Dionysius Ehret's botanical illustrations, utilized Linnaeus's ideas on taxonomy (Berkeley and Berkeley, 1963; p52). Linnaeus's role in the classification of Virginia's plants was important. In 1738, Gronovius wrote to Dr. Richardson, his English friend: "I assure you, Sir, it was by his [Linnaeus's] principles alone that I could reduce several of your Virginian plants to their proper genus, which till now could not be referred to any class ... " (Smith, 1821, II, 179; Berkeley and Berkeley, 1963; p61).

Through his connections and with his interest, Gronovius's publication of Flora Virginica in Latin made Clayton's work available to the international world of botany, something the Virginian could not do in the colonies. When Gronovius enlisted the help of Linnaeus in classifying Clayton's Virginia plants with the new principles, he could reorder Clayton's plants in conformity with the most modern botanical taxonomic method, a method to which Clayton, who relied on the polynomial descriptions of Ray, had no access. The title page of Flora Virginica accurately described their relationship.

Linnaeus knew of and recognized Clayton's contributions as a collector of Virginia's plants, honoring him in 1737 by giving the genus name, *Claytonia*, to one of his collected plants (Berkeley and Berkeley, 1963; p70). Clayton was sent one of Clifford's privately printed Hortus Cliffortianus, a gift mediated by Gronovius (Berkeley and Berkeley, 1963; p68). Subsequent to the publication of Part One in 1739, Clayton acquired several of the books authored by Linnaeus as he mastered the new
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important to the study of Virginia flora. Thus, Clayton and Gronovius established their critical classification system, acknowledging them in his only surviving letter to Linnaeus from 1748 (Berkeley and Berkeley, 1963; p36, 105-106). Clayton, despite his geographical isolation in America, thus became a member of that thriving society of natural philosophers without national boundaries, the Republic of Letters.

NEW EVIDENCE

New evidence shows that one contemporary acquainted with Clayton’s reputation, the German artist Ehret who illustrated Hortus Cliffortianus, did not use Gronovius’s name when he referred to Flora Virginica. A watercolor drawing by Ehret, inscribed “PRINOS Joh. Clayton. Flor. virg. 39,” was found by this researcher in one of the more than 12 boxes of uncataloged botanical drawings by Ehret in the Victoria and Albert Museum Word and Image Department (Fig. 1). Ehret knew that the Prinos is described on page 39 of the 1739 Flora Virginica, where it is called by its early name, Agrifolii, or a holly (Clayton and Gronovius, 1739). Also included in Flora Virginica is the herbarium number, Clayt. n. 78, that Gronovius gave to Clayton’s specimen. Gronovius imposed the new Linnaean “sexual system” in ordering Clayton’s plants. Hence, because the flower of Prinos has six stamen and one pistil, it was listed under “Class: HEXANDRIA. Order: Monogynia” signifying that the plant had six male parts and one female part. Among the generic names used in the past for the genus Ilex is Prinos, associated with certain deciduous species of North America whose flower parts are usually found in sixes (Dallimore, 1908; p6, 144, 147). In Fernald’s 8th edition of Gray’s Manual of Botany (1950; p981) Prinos is a sub-genera of Ilex. The plant now bears the name Ilex verticillata [(L.) Gray] or winterberry.

Ehret, having left Leiden, was in England and between 1739 and 1742 was in a perfect position to have full knowledge of the circumstances of the production of Flora Virginica and to attribute the book to Clayton. He and Catesby made botanical studies in the famous garden belonging to Peter Collinson, the most important member of the wide-ranging letter-writing and botanical exchange network of natural philosophers (Swem, 1957; Berkeley and Berkeley, 1963; p79-80). Together they drew the plants Collinson grew from the cuttings and seeds received from the colonial naturalists, including Clayton (McBurney, 1997; p42,150). The Ilex verticillata under the name “Prinos” was introduced into Great Britain in 1736 (Andrews, 1999). Collinson must have successfully grown the plant because he observed that it was dioecious with staminate and pistillate flowers on different plants and sent that information to Gronovius to be added in Part Two of the Flora Virginica (Clayton and Gronovius, 1743; p153).

Alexander Garden, the Carolina botanist, also understood the relationship between Clayton and Gronovius. Garden, in a letter of 1753, told his former botany professor at the University of Edinburgh, Dr. Charles Alston, that “I’ve got Clayton’s description of the Virginia Plants revised by Gronovius” (Berkeley and Berkeley, 1963; p125).

SOURCE OF ERROR

In the publication of Species Plantarum (Linnaeus, 1753), the modern starting point for botanical nomenclature, Linnaeus used his new binomial nomenclature (Steam, 2001; p7, 8). For instance, he systematized Prinos as Hexandria monogynia with the binomial Prinos verticillatus and synonym Prinos folius longitudinaliter serratis, Gron. virg. 39 (1753; p330). By using “Gron. virg. 39” rather than “Joh. Clayton. Flor. virg.
FIGURE 1 Georg Dionysius Ehret. Prinos. Watercolor drawing. DP1A. By permission of the Victoria & Albert Picture Library.

39," as on Ehret’s watercolor, Linnaeus in effect gave the authorship of Flora Virginica to Gronovius alone. This imprecise citation, appearing elsewhere in the widely used Species Plantarum, is most likely the source of the future misattribution of Flora Virginica to which Berkeley and Berkeley (1963; p64, 65) refer, a mistake which is continued in some current library catalogs and bibliographies.
SECOND EDITION OF FLORA VIRGINICA

In 1757, when Clayton apparently despaired of Gronovius's promised publication of a Part Three of Flora Virginica, he sent a manuscript describing his new botanical discoveries to Collinson, who had helped Catesby, Mitchell and others to publish their work in Europe (Berkeley and Berkeley, 1963; p131, 132). Letters written by John Ellis, an active member of the Royal Society, refer to this manuscript and suggest Ehret will do its illustration. A rough draft of Clayton's manuscript in the Linnaean Library in London, outlined for the printer by Ellis, is all that survives of this never published manuscript (Berkeley and Berkeley, 1963; p138, 183-191). The drawing by Ehret mentioned above, with the reference to Clayton's name, is the only one known to this researcher.

A second edition of Flora Virginica (Clayton and Gronovius, 1762), enlarged and corrected, and not a Part Three with the new plants sent by Clayton and others to Gronovius, was published in Leiden by the son of Gronovius, Laurens Theodore, in 1762, the year of his father's death. As an indication of the kind of editing performed, the Prinos serves as an example. The notes about the Prinos in Parts One and Two were integrated. New information that the flower bloomed in June and a new citation of a paper by Collinson was added. The entry had a new heading, PRINOS folio longitudinaliter serratis, Linn. spec. 330, not using Linnaeus's binomial (Clayton and Gronovius, 1762; p54). In the second edition, twice as large and handsomer in physical appearance than the earlier octavo edition, a translation of the title page in Latin now stated: "Flora Virginica exhibiting plants that the most noble man, 'D. D. Johannis Claytonus' in Virginia grew, observed, collected and beheld." Gronovius was named as the orderer of the plants.

The Introduction by Laurens was flowery and again gave Clayton credit for his important role. In the younger Gronovius's second edition (1762), Clayton's name was included in the "Citationes Auctorum" as a "Numeri Plantarum" with a reference to Flora Virginica. The first edition of Flora Virginica was listed separately without an author's name, adding to future bibliographic uncertainties for library catalogers.

The 1762 book is the one Thomas Jefferson owned. When Jefferson described an "infinitude of ... plants and flowers" in his Notes on the State of Virginia of 1787 (Peden 1958; p42), he referred his readers to "the Flora Virginica of our great botanist, Dr. Clayton, published by Gronovius at Leyden, in 1762. This accurate observer was a native and resident of this state, passed a long life in exploring and describing its plants, and is supposed to have enlarged the botanical catalogue as much as almost any man who has lived."

Jefferson's instincts were correct even if details were inaccurate: Clayton was born in England and probably was not a medical doctor (Berkeley and Berkeley, 1963; p5, 23).

CONCLUSION

A search of the literature and new evidence shows that Clayton's contribution to the Flora Virginica was well understood in his time. The placement of Clayton's name on the title page along with that of Gronovius appropriately represented the joint roles of the two men. In an age when interest in the dispersal of new knowledge of botany was high, Flora Virginica was a timely publication. John Clayton, isolated in the colonies, had the good luck to be a friend of Catesby, in touch with Collinson, known
to the pre-eminent botanist Linnaeus and recognized and published by a well-placed Dutchman who for 20 years maintained his correspondence and support. No plagiarist, the elder Gronovius made clear all that Clayton contributed to the discovery, description and recording of Virginia flora. The bibliographical mistake made by Linnaeus in the 18th century should be remedied and John Clayton should be cited as the co-author of Flora Virginica.

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LITERATURE CITED

Dallimore, W. 1908. Holly, Yew and Box with notes on other evergreens. John Lane, London.
Feather, J. 1994. From Right in Copies to Copyright: The Recognition of Authors’ Rights in English Law and Practice in the Sixteenth and Seventeenth Centuries.
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Smith, J. E. 1821. A Selection of the Correspondence of Linnaeus and Other Naturalists. 2 vols. London.


Turner, D. 1835. Extracts from the Literary and Scientific Correspondence of Richard Richardson. Printed by Charles Sloman, Yarmouth.