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Some Aspects of the Life and Work of John Ellis, King's Agent for West Florida 1763 to 1776

Julius Groner
Loyola University Chicago

SOME ASPECTS OF THE LIFE AND WORK OF JOHN ELLIS, KING'S AGENT FOR WEST FLORIDA 1763 to 1776

by

Julius Groner

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DEDICATED TO MY DEAR WIFE

RUTH SHERMAN GRONER

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VITA

The author, Julius Groner, born February 26, 1919 is the son of Max Groner and Beatrice Lehrfield Groner, both of blessed memory.

His elementary education was obtained in the public schools of Chicago, Illinois and secondary education was completed in 1936 at John Marshall High School in Chicago. Junior college education was completed in 1938 at Herzl Junior College, also in Chicago. Northwestern University conferred upon him the degree of Bachelor of Science in commerce in 1940.

Mr. Groner enlisted in the Army of the United States in September, 1942 and received his honorable discharge in April, 1946 with the rank of Warrant Officer Junior Grade.

His legal education was completed at De Paul University, Chicago, Illinois in 1947 and he received the degree of Doctor of Jurisprudence. He was admitted to the bar of the Supreme Court of Illinois that same year and was admitted to practice in the Federal District Court for the northern district of Illinois in 1948.

In 1966, Mr. Groner received the degree of Master of Arts in history at Illinois Teachers College Chicago-South.

He is on the staff of Loop College, one of the City Colleges of Chicago, teaching business law.

In April, 1985 he was elected to fellowship of The Linnean Society of London.

He is married to Ruth Sherman Groner and the marriage has been blessed with three daughters and eight grandchildren.

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CHAPTER I

INTRODUCTION

This is the story of John Ellis (1710?-1776) in all his roles: family man, businessman, natural historian, politician and fellow of the Royal Society of London. Little is known of his family history other than that he had an unmarried sister named Martha, a married sister, Mary Ford, and a nephew, Roger Ford. His family connection with Henry Ellis, Governor of Georgia, is not identified and John Ellis referred to Henry Ellis only as "friend." John Ellis's father, also named John Ellis, was described as a "Gentleman." Ellis, Sr., about whom we know very little, was apparently financially unable to provide secondary schooling for his son and so young John apprenticed himself for the sum of £20 on the twelfth day of January, 1721 to Edward Harraden, citizen and clothworker of London, for a period of seven years.

After completing the seven years of apprenticeship, he received the coveted privilege known as "Freedom." With this valuable asset, he could and did become a merchant. He settled on Lawrence Lane in London in the area known as "The City." Lawrence Lane still exists, and is located but a few hundred meters from the

Guildhall and the Guildhall Library. The church Ellis attended during his early years as a merchant, known as St. Lawrence Jewry, was designed by the eminent Sir Christopher Wren. It was destroyed by enemy action on 29 December 1940 during the bombing of London in World War II. However, it was rebuilt by Cecil Brown in the attractive style of the original church in 1957 and is now called "St. Lawrence Jewry-next-Guildhall." It is quite close to the present Stock Exchange and the Bank of England.

Ellis was active in business and modestly successful as a merchant in partnership with one James Fivey. The partnership was formed in 1748 but ended in bankruptcy some ten years later. Ellis made his first contact with Lord Limerick and the Irish Linen Board in 1749 and this contact ripened into a commercial arrangement whereby the partnership, in 1750, acted as selling agent of linen for the account of Lord Limerick and Edward, Bishop of Elphin. Thereafter the partnership functioned not only as merchant, taking title and selling merchandise, but also as factor (selling agent) to the Irish linen trade. Commencing in 1753 until Ellis's death in 1776, Ellis represented the Irish Linen Board as its agent and lobbyist in the English Parliament.

In 1764, with the assistance of Robert Henley,

Earl of Northington, he received the appointment as King's Agent for the Province of West Florida. Sovereignty over Florida had been relinquished by Spain and had come under the control of England in the Treaty of Paris of 1763 as one of the consequences of the conflict of the world powers which ended the French and Indian War. The position of King's Agent was comparable to the modern day corporate comptroller and did not necessitate travel to the new Province. Although the thought and desire to relocate to West Florida did arise in 1758 as a result of personal misfortune, he adjusted to his loss and did not leave London. Subsequently, in 1771, again with the sponsorship of Lord Northington, he received the appointment as Colonial Agent for the Island of Dominica. He effectively represented the interests of Council and Assembly of the Island of Dominica before the Government in London and fulfilled both governmental agencies in a most exemplary manner until his death.

He married Carolina Elizabeth Peers in 1754 and a daughter, Martha, was born to them. There were four years of happy marriage, then tragedy struck. His wife had a premature delivery of twin girls early in May of 1758 and died that June. The twins also died, one shortly after birth, and the other about five months later. Daughter Martha went to live with Martha Peers,

her late mother's sister and, reaching maturity, married Alexander Watt. Through Martha Watt's efforts, the book which became known as "Ellis & Solander, 1786" was brought to publication and reached the scientific community.

Ellis started his scientific work in the 1740s and continued his fruitful research and writing on natural history until his death. This quarter of a century was a period of exploration, discovery, exploitation of peoples and conflict among world powers, principally England, France and Spain. In addition, it was a period of expansion of knowledge of both the physical world and the world of plants and animals. The burgeoning sciences of botany and zoology needed a better way to catalog plants and animals and Linnaeus satisfied that need with his classification and his system of binominal nomenclature. The system was an effective one and Linnaeus, at the request of Ellis and another British naturalist, Peter Collinson, sent his "best" student, Daniel Solander, to London to explain its methodology to the scientific community in the British Isles.

From the 1700s until the 1750s, men of science were pursuing the idea that there was a link between animal life and plant life. Many thought that this link was represented by the hydroids and other zoophytes that

had been discovered in both fresh and and ocean waters. Some thought hydroids were vegetables while others claimed them to be animals. In the ensuing debates that took place in scientific centers in London, Paris, The Hague and St. Petersburg, both schools of thought had ardent support. Ellis achieved a change in thinking: hydroids were no longer considered as plants and the search for the link between the animal and plant kingdoms started to wane.

A most effective vehicle for the exchange of ideas was the Philosophical Transactions published by the Royal Society. Ellis was a frequent contributor to it and ably, patiently, without rancor or bitterness, successfully demonstrated the errors of his opponents and won over the members of the scientific community to accept the idea that hydroids and corals were animals, not plants. While Ellis mastered the basic rules of Linnaean nomenclature and practiced them in his later works, at the same time he called upon Solander for assistance in the naming and classification of the majority of the scleractinian (stony) corals.

Ellis was also very interested in economic botany and in assisting the American colonial farmer by introducing plants from other parts of the world into colonial agriculture. With the cooperation of Henry

Ellis, Governor of Georgia, experiments were initiated and carried to a successful conclusion thereby demonstrating a practical method for the transporting of seeds in a viable state over long distances and time spans. In addition, he promulgated an extensive list of plants that, in his opinion, could survive and flourish in the soil and climate of the American colonies.

During the course of his zoological and botanical investigations, he had recourse to the use of the microscope and ultimately instituted several improvements in that instrument that were of major importance, leading to the development of the dissecting microscope universally used in modern educational institutions.

This dissertation traces the life and works of John Ellis in the many roles he played during a busy life. He was in many ways typical of a number of his contemporaries and peers, in England and abroad, who combined careers in private or public business with active and fruitful interests in natural history. After a chapter sketching Ellis's biography, the milieu in which he did his scientific work as well as his participation in what Brooke Hindle has called the Natural History Circle are addressed in Chapter III.

In addition this chapter presents the reader

with brief biographies of the identity of the persons Ellis dealt with during his scientific career. The biographies are taken from DNB, DSB or other biographical work. This was done for the convenience of the reader and for informational and not prosopographical purpose. The latter would constitute a project far beyond the scope of this paper. However, there is a common denominator that does appear among most of the sketches. The majority of these indicate a personal livelihood other than from working in the field of natural history.

What has been presented by these biographies in addition to the informational aspect, can be described as some supportive evidence for the statement by Jacques Roger (1980) that the category of amateur scientist emerged again in the eighteenth century.

Ellis's work on the microscope is reserved for Chapter IV. His main scientific accomplishments in the field of zoology and his contributions to economic botany are covered in Chapter V. His role as King's Agent for West Florida, together with his involvement with the Irish linen trade and his work as Colonial Agent for Dominica are set forth in Chapter VI.

CHAPTER II

BIOGRAPHY OF JOHN ELLIS

Spencer Savage, who prepared the Calendar of the Ellis Manuscripts, gave a most appropriate sketch when he wrote, "John Ellis, F.R.S. (?1705-76) was an outstanding naturalist in Great Britain during the second half of the eighteenth century, not only because he was one of Linnaeus's best correspondents, but on account of the qualities of mind which made him a very striking example of the non-professional scientific man."[1] One could make no better introduction than that if one were presenting the man to an audience today. However, some of the biographical data including his date and place of birth, early years, business affairs and family life have not been delineated clearly or even accurately. To begin with, not only has his exact date of birth been uncertain, but the year as well. The Dictionary of National Biography shows his dates as (1710?-1776)[2] while the Dictionary of British and Irish botanists and horticulturists gives c. 1705-1776[3] and, finally, the Royal Commission on Historical Manuscripts, The manuscript papers of British scientists 1600-1940 lists item (179) "Ellis, John (1714-1776) FRS, naturalist."[4]

Sir James Edward Smith, who wrote the biographical memoir of John Ellis in A selection of the correspondence of Linnaeus and other naturalists, noted that Ellis "is erroneously supposed to have been born in London where, however, he died Oct. 15, 1776, aged about 66 years."[5] This dates his birth as 1710. However, this is not reliable for not only did Smith fail to offer evidence to support his statement of "aged about 66 years," but his use of the word "about" is an indication of his own doubt as to Ellis's age at time of death. Furthermore, his listing of the date of Ellis's death as occurring on "Oct. 15, 1776" is wrong as will be documented later in this chapter. The correct date is 5 October 1776. The documents relied upon later in the chapter were also available to Smith and his failure to use them casts doubt on the probative value of his statement that Ellis "is erroneously supposed to have been born in London." The Dictionary of National Biography reports this correction of place of birth by stating that Ellis "was born in Ireland about 1710.[6] This is admitted by Smith (Linnean Correspondence, i. 79), in correction of his previous statement in Rees's 'Cyclopaedia' that Ellis was a native of London.[7] Available evidence to be discussed later in this chapter based on a photocopy of an indenture document labeled "Illustration 2" and included

at the end of this chapter shows that Ellis was named after his father, John Ellis, who is described as a "Gentleman" then residing in Hoxton, County of Middlesex, London on 12 January 1724, the time the son signed the indenture agreement. One can infer that the son lived with his father in Hoxton, but the date and place of his birth have yet to be established.

A modern scholar, Rauschenberg (1978a), stated that "on his marriage registration Ellis indicated he was born in 1714."[8] A photocopy of what is presumed to be this document is appended to this chapter as "Illustration 1." Since the document is in the form of an affidavit under oath, describing it as a "marriage registration" is not quite appropriate. In the following discussion the document will be described as an "Affidavit." Rauschenberg, apparently based his conclusion of 1714 as the year of Ellis's birth on the opening phrase in the Affidavit, "Appeared personally John Ellis of the parish of St. Lawrence Jewry aged forty years and upwards." It was signed and sworn to before a Surrogate who identified himself as "And: Coltee Ducarel."[9] Since this was done by Ellis on 29 January 1754, the date the Affidavit was signed, Rauschenberg must have subtracted forty years from 1754 and concluded that Ellis was born in or close to 1714. However, there

is doubt that the year 1714 is accurate and evidence to be presented shortly herein will show that this date is probably erroneous. First, the phrase recited "forty years and upwards." This seems to indicate that he was probably older than forty.

A more serious problem presents itself with the use of 1714 as Ellis's birthdate since the records of the Parish of St. Lawrence Jewry St. Lawrence Precinct Poor Rate Book Ladyday-Michaelmas 1732 show that "Ellis 'late' Gascoigne & Co." was a taxpayer assessed at eight shillings.[10] The names in the Poor Rate Book appear in a fixed order in accordance with the premises being occupied and the use of the word "late" in this context means "formerly." In other words, Ellis took over the premises formerly occupied by "Gascoigne & Co." Such occupancy could have been either as a tenant or as an owner. Six months thereafter, Ellis is listed with the letter "n" preceding his name.[11] The meaning is that not only is he a tenant or owner of a house but now has acquired the additional status of being a "new" resident of the Parish. There was an increase of two shillings in the assessment for poor relief but that was not caused by his new status as "resident," for all taxpayer's assessments were increased by two shillings. The problem with the use of 1714 as the year of his birth is that he

would have been classified as a "minor" until he reached the age of twenty-one, an event which would have taken place in 1735, whereas the tax assessments are for the year 1732. Since a minor had a right to disaffirm all his contracts for personal property during his minority and could disaffirm his contracts and leases on real estate after becoming twenty-one, no adult would deal with a minor on these matters. As a minor he would legally be allowed to disaffirm all his contracts including his lease or purchase contract on the house he occupied in 1732. For such reason alone on this evidence Ellis must have been born in 1711 or prior thereto so that he would have been an adult in 1732. Furthermore, a "Poor Rate Assessment" against a minor would not be logical for there would be no way to enforce collection. Thus, it is likely that Ellis must have been twenty-one years of age or older when he came on the scene in Lawrence Lane in the Parish of St. Lawrence Jewry on Ladyday (25 March) 1732.

The various records of the Parish of St. Lawrence Jewry and the Parish of St. Mary Magdalene[12], and the extant London Directories from 1738 through 1763,[13] indicate that Ellis was a merchant with his place of business in Lawrence Lane. But we are indebted to Rauschenberg (1978a) for establishing that Ellis was a

merchant in the Irish linen trade.[14] Geoffrey Cumberlege, in The Corporation of London: its origin, constitution, powers and duties, expounded on the topic of becoming a "merchant" in the City of London. It is quite clear from his scholarly research that one of the basic needs of a person who wished to exercise a trade or handicraft within the City of London, for centuries prior to and continuing into the early 19th Century, was the "Freedom of the City." The right carried with it certain important privileges and immunities. Among these were freedom from tolls (taxes) at markets and fairs, freedom from being drafted or forcibly pressed into military service, and the right to vote at ward and parliamentary elections.[15] There were only four methods of acquiring this "Freedom" during the period under review.[16] The one most important to this discussion is "servitude", by way of completing a term of years as apprentice to a Freeman of the City. It must also be kept in mind that no person ever was or could have been admitted to the "Freedom" under the age of twenty-one.[17] A more complete expression of the laws pertaining to this requirement of "apprenticeship" is provided in Privilegia Londini: or the laws, customs, and priviledges of the City of London.[18] The laws pertaining to our discussion are the following: 1) "Action of Covenant (contract) was

brought upon the Custom of London, That an Infant above 14 and under 21 may bind himself Apprentice."[19] (It is to be noted that he was still called an "infant" or "minor" when under the age of twenty-one even though he was permitted to bind himself as an apprentice). 2) "That every Citizen and Freeman of London, which hath been an Apprentice in London unto any Trade, by the space of Seven Years, may well and lawfully relinquish that Trade, and exercise any other Trade at his will and pleasure."[20]

3) "That . . . Apprentices that are, or shall be bound by Indenture above the Age of Fourteen Years . . . to Freemen of London, for the full Term of Seven Years, are compellable to serve the full Term, and an Action (lawsuit) will lie against the Apprentice for breach of any of the Covenants; as we have before observed, and of which we shall hereafter set down some Presidents (sic) (precedents). But if the Apprentice shall be under the age of Fourteen years at the Time of his binding, his Indenture is not good."[21]

It is also clear from the work of Alexander Pulling, A practical treatise on the laws, customs and regulations of the City and Port of London,[22] that all of the aforementioned details relating to apprentices and merchants were actively enforced by the London Courts

prior to, during and after the period under review up to the year 1842. The key points mentioned by Alexander Pulling that support this discussion are the following: 1) both wholesale and retail dealers in merchandise were, "with very few exceptions, always compelled, by legal process to become free of this City,"[23] (and although the word "exception" appears, no merchants were listed by Alexander Pulling as being excepted from this requirement), and 2) "mercantile agents, called Brokers . . . Their business is to make bargains between merchant and merchant for commission . . . are consequently always obliged to take up their freedom before admission."[24]

From all of these facts we can now draw the following conclusions: 1) Since all the evidence and writers have indicated that Ellis was a "merchant" at the beginning of his career, it was mandatory that he possess the "Freedom of the City" in order to function as a "merchant"; 2) The only practical way for entry into the "Freedom" was to become an "Apprentice to some person (called a "Master") who already possessed the "Freedom"; 3) Apprenticeship entailed serving this Master for a period of seven years; 4) When the seven years were completed the apprentice must have reached the age of twenty-one to receive the "Freedom" because below that age he was still classified as an "infant"; and 5) Since

Ellis appears as a taxpayer in the parish records of 1732, he must have been a merchant at that location in order to pay those taxes (consisting of a Poor Rate, Church Rate, Workhouse Rate and Tithe Rate). One must conclude that any year after 1711 that is used as the year of Ellis's birth is incorrect as it would be, manifestly, contrary to the existing facts.

It is the further contention of this writer that since Ellis needed the rights contained in the "Freedom of the City" to enter into the "Irish linen trade" or any other business for that matter, as indicated above, he apprenticed himself on 12 January 1724 for a period of seven years. This is shown on the apprenticeship document appearing as "Illustration 2" at the end of this chapter. It is more than likely that Ellis's father wanted his son to become an apprentice so as to have some form of employment or to go into business as a merchant. Mr. D. E. Wickham, Archivist at the Clothworkers' Company, has been very kind to research the records under his supervision and to furnish all extant information pertaining to Ellis's apprenticeship. This is contained in his letter of 29 October 1985 to Miss S. M. Grover, the Archivist at The Royal Society. A photocopy of this letter is included at the end of this chapter as "Illustration 5." The results of Mr.

Wickham's research are especially gratifying in that there was no other person with the name John Ellis who was made Free of the Clothworkers' Company between 1725 and 1800. This eliminates the possibility that the John Ellis on the Indenture document might not be the John Ellis who is the subject of this paper, given the fact that the name is not an uncommon one. As to Ellis's date of birth, Mr. D. E. Wickham points out, "Thus he (Ellis) is likely to have been 21 or more in 1732, 14 in early 1725, and born nearer 1710."

Although Ellis's father lived in Hoxton at the time the indenture took place, Ellis was not born there. A careful search of the parish registers of St. Leonard Shoreditch which covered the Hoxton area at that time failed to turn up an entry of his birth or baptism.

He completed his seven years of service on 11 January 1731 and went into business under his own name by taking over the premises of "Gascoigne & Co"[25] as a merchant with other merchants in Lawrence Lane in 1732 with the knowledge that he would shortly be made "Free", and this was officially accomplished on 5 February 1733.[26] It is further submitted that after his partnership with James Fivey ended in bankruptcy, as detailed later in this chapter, he went into business with Leighs and Vines in 1761 doing business as "Linen-

drapers" on Milk-Street,[27] and again in 1768 with James Hammond under the firm name of "Hammond & Ellis" as Haberdashers at No. 47, Cheapside.[28] He was probably able to do so because of his apprenticeship background as a clothworker.

His early business must have prospered for in the Parish of St. Lawrence Jewry Tithe Rate Book Ladyday 1733 to Ladyday 1734 appears the assessment of 4 shillings against, "Late Jabez Willet now John Ellis."[29] The possible assumptions to be drawn from this are that either Ellis moved from his first location which was the premises of "Gascoigne & Co," to the new location of "Jabez Willet" or that he now occupied two locations. The latter assumption is most likely the correct one for in the Parish of St. Lawrence Jewry Poor Rate Book 1738 appears the assessment of 2 pounds 10 shillings against "Ellis & Co. 2 H."[30] The "H" means "Houses" for in all subsequent assessments against the firm name of "Jn Ellis & Co." shown in the Poor Rate Books of the aforementioned parish from 1738 to 1755, occupancy of two houses is disclosed.[31] Although no confirmation exists that Ellis started in business in 1732 when he took over the premises of "Gascoigne & Co," it would be a normal assumption that such was the case given the subsequent documentation of taking possession of a second house in

1734.

Parish records are the sources for much information about Ellis's business affairs. A photocopy of one of these records is shown in "Illustration 3" and the transcription thereof is shown in "Illustration 4" at the end of this chapter. Assessments were made every six months against the business establishments as well as the inhabitants of the parish. The purpose of the assessment was indicated by its name. Thus, the poor rate assessment was for the purpose of rendering assistance to the poor members of the parish community. The church rate assessment was for the repair and maintenance of the parish church. The workhouse rate was for the repair and maintenance of the poorhouse and the tithe rate was for general charitable contributions. The parish did the assessment, collection and distribution of the money.

The records indicate that Ellis entered into no less than seven partnerships, starting with the first of "Ellis & Co." in 1738 and ending with "Hammond & Ellis" in 1776, the year he died. These associations were as follows:

Ellis & Co.[32]

John Ellis & James Fivey[33]

John Ellis & Fivey[34]

Leighs Vines & Ellis[35]

John Sedgwick Hammond & Ellis[36]

Sedgwick Hammond & Ellis[37]

Hammond & Ellis[38]

The firm of "Ellis and Co." functioned the longest, running from 1738 to 1755.[39] Duration of the other partnerships ranged from six months to ten years. All but two of them were dissolved voluntarily by agreement of the parties who went their separate ways. Of the two, the partnership of "Hammond & Ellis" that was formed in 1766 ended with the death of Ellis in 1776. The second was the partnership of "John Ellis & Fivey" that was formed in September 1758 and ended in bankruptcy. The Bankruptcy Docket Book lists the entry of 11 January 1760 for the bankrupt, "John Ellis and James Fivey of Lawrence Lane London Copartners Merchants and Irish Factors."[40] Unfortunately, the court files for that year have been destroyed and there is no way to determine if the bankruptcy was a voluntary or an involuntary one. However, public confidence in the integrity of John Ellis and James Fivey may have been restored when the announcement appeared in The London Chronicle of 28 October 1760 that on 21 November 1760 dividends were to be paid to the creditors of John Ellis and James Fivey.[41] Since dividends were to be paid it meant that sufficient assets were available over and

above court costs and attorneys fees to be distributed to creditors. The inference to be drawn from this fact was that the bankrupt firm had not dissipated assets willfully and recklessly as so many bankrupt individuals are prone to do when they realize that their business is failing.

This is the background for Rauschenberg's (1978a) statement, "More certainly the fact that Ellis did not consume all his assets before he declared bankruptcy speaks well for his personal integrity."[42] Since it was not a personal bankruptcy but a partnership one, and the evidence as to whether it was a voluntary or involuntary one is no longer available, it was no doubt an oversight that caused Rauschenberg to treat it as a personal voluntary bankruptcy. Less than a year after the termination of the bankruptcy, Ellis entered a new partnership, on 14 October 1761, described as "Leighs Vines & Ellis," at a new location on Milk Street in the Parish of St. Mary Magdalen Milk Street.[43] It is likely that Ellis had moved his residence from Lawrence Lane in the Parish of St. Lawrence Jewry prior to this time, for his wife and new-born twin daughters were later buried in the vaults of the Church of St. Mary Magdalen Milk Street in 1758 as will be discussed below.

Some of the extant London Directories found in

the British Museum and in the Guildhall Library contain business listings that are at variance with Church records and therefore require reconciliation. The principal variance is the listing of the firm of "Ellis and Fivey Lawrence Lane" in the Directories for 1749, 1752, 1754 and 1755 when church records show that Ellis was doing business in those years under the firm name of "Jn Ellis & Co."[44] A possible explanation is that James Fivey was the person with whom Ellis was associated under the "& Co." portion of the business title. The general business community was perhaps aware of the association, and the publisher of the Directory simply picked up what was a matter of common knowledge.

Rauschenberg (1978a) stated that "John Ellis did have ties with Ireland. By 1733 he was firmly established on London's Lawrence Lane in the Irish linen trade."[45] While there is no direct support for the phrase "firmly established" there is evidence pointing towards this conclusion from the fact that he took over the occupancy of a second house in 1734 from "Jabez Willet" as mentioned earlier.[46] The fact that the Directory of 1736 fails to carry a listing of him can be explained from the information contained in its title: Directory containing an alphabetical list of the names & places of abode of the directors of companies, persons in

publick business, merchants & other "eminent" traders in Cities of London, Westminster, & Borough of Southwark. (Quotation marks being supplied for emphasis).[47] The normal inference would be that although he may have been "firmly established in the Irish linen trade" he had not achieved any "eminence" between 1732, his first year in business, and 1736, the year of the Directory. While no Directory for 1737 is available, in 1738 he is listed with the "Eminent Traders" as "ELLIS JOHN. Mercht. LAWRENCE-lane."[48]

It is most unlikely that Ellis was in the Irish linen trade from the inception of his business in 1732 or 1733. The earliest documentation of such activity that has come to light is a hitherto unpublished statement of account showing that the firm of Ellis and Fivey accounted for some linen piece goods sold on behalf of Lord Limerick[49] and the Bishop of Elphin[50] in 1750. A photocopy of this document is presented at the end of this chapter as "Illustration 6." Close examination of this very interesting document discloses the following facts:

1) Ellis and Fivey took physical possession of the goods before any sales took place. This is indicated by the fact that the firm advanced the costs for "whitetenning (sic) etc" (bleaching) the goods. The

legal effect of advancing money by the agent to improve the goods of the principal is to change the ordinary agency to that of an "agency coupled with an interest." Such an agency, unlike an ordinary agency, could not then nor now be terminated at the whim of the owner of the goods until the owner had re-imbursed the agent for the amount of money the agent had spent to improve the goods of the principal.

2) Ellis signed on behalf of himself and his partner, James Fivey. This is indicated by the form of the signature, "For Self & Co." The listing of this document in the archives of the Public Record Office of Northern Ireland, is "Aug.-Sept. 1750 Ellis and Fivey to Lord Limerick and the Bishop of Elphin." Mr. R. W. Strong, Librarian of that office, has called attention to the error in the dating, for the document bears the date "May 7 1751." The business use of the phrase "& Co." has always created a doubt that persons were present in the firm other than the named individual. Ellis's use of that phrase in the present context, however, should serve to dispel that notion. For, had his firm consisted only of himself, he would not have used "For Self & Co" for the avowed purpose of disclaiming liability for the contents of the statement. Instead, he would have signed "Errors Excepted London May 7 1751 John Ellis". That his

firm consisted of himself and another, in this case, James Fivey, is corroborated by the additional fact that the archival listing is "Ellis and Fivey."

3) Lord Limerick must have been a rather frequent visitor to London for he took one of the pieces of bleached linen for himself and deducted the cost of it from his proceeds and took the balance in cash and not in the form of a draft. The Bishop of Elphin, however, must have received his one-half of the proceeds in the form of a draft for the words used are "To Remitt'd the Bishop of Elphin" together with the expense item "To Postal paid."

This document is the earliest piece of hard evidence of Ellis's involvement in the Irish linen trade. To assume that he was in that trade from the inception of his business in 1732 or 1733 without any documentation other than he "did have ties with Ireland," is not a valid assumption and is not tenable as a conclusion. The better assumption, or more reasonable inference, is that when he went into business it was in retail trade dealing in cloth for he had learned the art of a "clothworker" in his apprenticeship. Trade in Irish linen came much later in his business career.

There is a possibility that the numerous short-lived business associations he had were not partnerships but "Joint Ventures." The distinction is that normally a

"Joint Venture" involves but a single transaction, such as the voyage of a ship or the purchase of commodity followed by its gradual sale until all is sold. Thereupon, the expenses are deducted from the sales and the net profit is divided among the participants of the "Joint Venture." In contrast to this arrangement there are usually ongoing purchases in an ordinary partnership. The evidence against identifying the short term associations as "Joint Ventures" is that church assessments against a "Joint Venture" would be difficult to collect because the members would disperse as soon as the purpose of the "Joint Venture" would be completed. Thus, the greater likelihood is that Ellis's associations were partnerships.

As mentioned earlier, the partnership of "Jn Ellis & Co." was the longest of Ellis's associations and lasted from 1742 to 1755. Slightly over a year prior to its termination, on 29 January 1754, Ellis signed the Affidavit shown as "Illustration 1" at the end of this chapter. It is to be noted from this document that neither he nor his intended bride had then yet decided the date or place of the forthcoming wedding. However, this was soon decided and on 19 February 1754 in the Church of St. Mildred Poultry the marriage was solemnized and the following entry appears in that parish's

register: "19 February 1754 John Ellis of the Parish of St. Lawrence Jewry in London Esqr. Batchelor, & Carolina Elizabeth Peers of the Parish of Walthamstow in Essex, Spinster."[51] While the biographical memoir written by Smith that appears in Rees's Cyclopoedia stated, "Of the time of his marriage, or any particulars concerning his wife, we have no account,"[52] additional information relating to his wife has come to light from the Hardwicke Papers in the British Museum. Among these papers is a suit in Chancery filed by the Attorney General on 12 March 1755 against "John Ellis Merchant and Carolina Elizabeth his wife, Martha Peers Spinster, Charles Peers Esq."[53] [and others whose names are not relevant to this discussion]. In the answer filed 27 August 1755 by Defendants John Ellis, his wife and his sister-in-law, Martha Peers, appeared the facts that Carolina Elizabeth Ellis and Martha Peers were the daughters of John Peers, Esq. who was the eldest son and heir of Sir Charles Peers.[54] W. A. Shaw, The knights of England, described Sir Charles Peers as being a merchant and one of the Commissioners for the Lieutenancy of London who was knighted at Windsor Castle on 16 July 1707.[55] The Will of Sir Charles Peers, executed 8 February 1736, named among the legatees his two granddaughters, Carolina Elizabeth Peers and Martha Peers, and granted £1500 to

each upon attaining age twenty-one or upon marriage, whichever event occurred first.[56] Since Carolina Elizabeth must have been at least twenty-five, being the age Ellis indicated for her at the time he signed the Affidavit, she probably had received the £1500 of her inheritance from her paternal grandfather. Apparently, Ellis had become engaged to be married to a wealthy girl from a rather prominent upper class wealthy family.

Parental approval for the forthcoming marriage was not forthcoming. There were many factors against it. He was at least fifteen years her senior. He was not a man of wealth nor regarded of commercial prominence. Though he was listed in the City of London Directory among the men of business eminence, such listing could not be considered as determinative of business prominence or business success. Though his father was a "gentleman", Ellis had entered into the rank of merchant through apprenticeship to achieve Freedom status. Had his father been of the wealthy upper class Ellis could have achieved Freedom status through purchase. One now has a better understanding of the comment of Ellis's friend, Dr Henry Quin, who congratulated Ellis on 4 April 1754, "I am rejoyed beyond measure my Dear Friend that you have surmounted all obstacles, & from Experience I may venture to assure you; that disapprobation of

unreasonable Friends & other such like impediments in the End serve only to give us an higher relish for what we wish to enjoy & more Satisfaction in the Possession of it-& this I doubt not is your Case."[57] The "disapprobation of unreasonable Friends" was possibly related to the disparity in age of the couple while the disapprobation of "other such like impediments" could only refer to the disapproval of Carolina Elizabeth's family.

Carolina Elizabeth evidently did not heed the disapproval of her family or the disapproval of Ellis's friends, and the couple were married 19 February 1754 as indicated earlier. A daughter was born to them on 27 December 1754. She was baptized 24 January 1755 as "Martha d. of John & Carolina Eliz. Ellis" in the Church of St. Mary Magdalen.[58, 59] She was eventually to do great service to science by seeing through publication the book which became known as "Ellis & Solander, 1786" and which will be discussed at length in Chapter V.

The daughter, Martha, is also referred to in some of the correspondence of Ellis's friends. Dr J. A. Schlosser from Amsterdam wrote on 9 September 1755, "My best compliments attend yours'f and Mrs. Ellis and Miss Pearce (sic), not forgetting my dear little sweetheart,"[60] and again in May of 1757, "I hope your

Lady, Miss Peers and the little polype, are in good health."[61] His good wishes for the health of Miss Peers, Ellis's sister-in-law, and Martha, his daughter, were destined to be fulfilled. Not so, however, for Ellis's wife. She was pregnant at the time, had a premature delivery and gave birth to twin daughters, Elizabeth and Mary. The infants were baptized 6 May 1758, the day they were born.[62] Premature babies in those days had little chance for survival, hence the baptism on the day of birth. Mary died on 19 May 1758 and was buried in the Little Vault (used only for infants and children) of the Church of St. Mary Magdalen.[63] A sorrowing Ellis gave some of the tragic details on 11 September 1758 in the draft of a letter to his friend, Dr Alexander Garden, "Poor Mrs. Ellis was brought to bed of Twins 2 months before her time and died the 15 of June, one of the Children is likely to do well the other died a week after it was born."[64] His hopes for the survival of Elizabeth were crushed for on 4 October 1758 Elizabeth Ellis joined her sister in the Little Vault of the same church.[65] It is little wonder that the grieving husband and father wrote to Henry Ellis, Governor of Georgia, on 20 September 1758, "If I was disengaged from the World I would certainly go over to your country."[66]

The engagements he was referring to were his

researches on barnacles and on the preservation of seeds. The work on barnacles was published under the heading, "An Account of several rare Species of Barnacles. In a Letter to Mr. Isaac Romilly, F.R.S." This was read before the Royal Society on 20 December 1758.[67] The work contains no clues as to when he became involved in it. There is, however, a comment in it which demonstrates his reliance on the technical ability of researchers similar to himself: "Fig. 16, is the Cornish Barnacle, shaped like a cone, and with a small mouth. This is described and figured by the Revd William Borlase, F.R.S. in his Natural History of Cornwall, lately published."[68] The book had been published in 1758 and Ellis had been one of the subscribers who had made the publication possible as is explained in Chapter III.[69]

The Rev William Borlase[70] was ordained a priest in 1720 and was assigned to the parish of Ludgvan in Cornwall in 1722. In addition to his clerical duties he became actively engaged in research in natural history and antiquities. He and Ellis were close friends and Ellis described Rev Borlase as, "My learned and reverend friend Dr William Borlase, of Ludgvan, in Cornwall, was so kind as to send me many varieties of this species."[71] Despite his friendship and compliments or possibly because of them, Ellis was greatly disappointed in Rev

Borlase's book in regard to matters of Natural History. Apparently, in response to a request by Dr David Skene of Scotland for Ellis to obtain a copy of the book, on 26 March 1768 Ellis replied, "I shall look out for Borlase's Natural History, you'll pick very little useful knowledge out of it, unless about mines."[72]

Ellis's work on the preservation of seeds had started in 1757 when he had sent Governor Ellis of Georgia some acorns of the cork tree to see if they would germinate. The Governor reported that the acorns spoiled because of putrefaction induced by the heat generated in the hold of the ship carrying them.[73] As a result of this failure Ellis initiated controlled experiments, on germination after long storage, at his quarters in Lawrence Lane between the 25th and 30th of October 1758. He concluded them on 17 January 1759 and rushed to notify the members of the Royal Society of his success on 18 January 1759.[74] He was proud of this success and nine years later retold the story and the recipe for the preservation of these seeds which he identified as acorns in his letter of 26 March 1768 to Skene.[75]

In addition to scientific research and commerce, judging from a remark of Dr William Brownrigg, Ellis was functioning either as an agent or as a lobbyist for the Irish Linen Board.[76] In the former's letter of

18 May 1756 appears the comment: "the Irish . . . have no reason to complain of their Dependency on G. Britain, and the treatment . . . in most particulars has been . . . generous. Of this, the late Linen Bill affords a recent example. I heartily congratulate you on the share you had in obtaining it."[77] Ellis's relationship with the Irish Linen Board is described in some detail in Chapter VI. However, when the bankruptcy, mentioned earlier, was filed on 11 January 1760 Ellis was in fear of losing his connection with the Irish Linen Board and five days later wrote to his friend Dr Henry Quin in Dublin regarding his financial troubles. Dr Quin responded promptly on 26 February 1760 with the following information: "I received yours of the 16 January with your inclosed Paper relative to the business of Agent, which I shall make use of as you direct. I waited immediately on Mr Newburgh, but as he was out of Town I wrote to him, & this moment received his answer which I send you inclosed. I shall be heartily rejoyced when I hear that you have settled your Affairs."[78] Ellis's letter of 16 January is additional evidence that the bankruptcy filing was not voluntary. If it had been, there is little doubt that Ellis would have planned in advance to inform the members of the Irish Linen Board so the information would not come as a shock to them with

the attendant possibility of his losing his connection with that Board. Ellis's "Affairs" were settled favorably, and the Linen Board did not terminate its relationship with him.

The possible familial connection between John Ellis and Governor Henry Ellis of Georgia, has intrigued more than one author. Spencer Savage was of the opinion that the Governor was a "relative"[79] although no source was given for the opinion. Samuel Wood Geiser in Naturalists of the frontier described the Governor as "Henry Ellis, F.R.S. (nephew of the great pioneer zoologist, John Ellis)"[80] He identified the family connection but, he too, failed to give a source for the supposed relationship. Edmund Berkeley and Dorothy Smith Berkeley in John Clayton: pioneer of American botany while mentioning that Ellis had been asked to look over John Clayton's[81] manuscript, made this comment, "Among his (Ellis's) correspondents in America, in addition to Clayton, were his cousin, Robert Ellis, the governor of Georgia, and Alexander Garden."[82] Again, while these authors identify the family connection to be that of "cousin," they offer no evidence of such relationship nor do they offer a source for the governor's different first name of "Robert." This is doubtless a typing or proofreading error.

Rauschenberg (1978a), however, does offer a source for a familial relationship stating "Certainly the two men had close ties and were probably related. But Henry Ellis's genealogy, in Burke's Irish gentry,[83] clearly demonstrates that John Ellis could not have been any closer than a second or third cousin."[84] While the "two men had close ties" and collaborated on methods of preserving seeds,[85] Henry had contributed papers to the Philosophical Transactions on several scientific topics relating to air and sea temperatures.[86] In addition, he, together with John Ellis, gave financial assistance to an amateur scientist George Edwards[87] by subscribing to the publication of Edward's book, Gleanings of natural history Part III.[88] They were also good friends, as indicated in Henry Ellis's letter of 29 November 1776 to William Knox, King's Agent for East Florida. "The reason I now address myself to you is that I learn from my London advices that my old friend Mr. John Ellis died last month."[89]

Ellis's personality has been touched upon by Rea (1963) and by Rauschenberg (1978a). Rea noted that he was "A very humorous, comical old gentleman."[90] Rauschenberg added considerably more: that he had a winsome personality, taste, character, piety, sensibility of mind, personal integrity, friendliness, concern and

respect for family members.[91] This was probably his personality in his later years. In his earlier years, he did arouse the ill will of some of his colleagues in the Royal Society and the hostility was apparent to many. Dr David Skene took note of this in his letter to Ellis of 23 February 1766, "I . . . find you are like to have a number of Enemies upon your hands tho disputes are undoubtedly disagreeable, yet I cannot say I am very sorry for you on the present Occasion. Your Essay (on the Corallines) has made you pretty well known thro' Europe & what it has not done your Enemies will compleat."[92] Ellis did not take it by turning the other cheek; he planned retaliation, albeit mild. The plan involved two forms: 1) a cut off of any further technical assistance to the offender; and 2) displaying the offender's errors for public opprobrium. The following passage from a lengthy letter to Dr David Skene is illuminating: "If Pallas had not been impertinent I should have assisted him; now he has provok'd me to study the nature of these bodies to vindicate myself, and expose his partiality: he may assure himself every volume of our Transactions shall point out some of his errors."[93] This is not exactly the type of response one would expect from a gentleman who exuded sweetness of disposition and love of fellow man. Ellis had also

planned a third form of retaliation, which he described in a letter of 30 June 1766 to Dr David Skene "I shall not only Expose his (Dr Pallas's) ill nature and ungentleman like behaviour in my next book which I believe will travel as far as his."[94] The retaliation proposed earlier did achieve some measure of effectiveness and Ellis was happy to inform Dr David Skene on 31 December 1768, "That Pallas has a party in our Society, but believe me, they are greatly mortified at seeing his blunders exposed in my last papers, and will be more so if you send me a letter on the Subjects containing the hints you have already Sent."[95] Apparently, he was not averse to inciting Dr Skene into joining him in the fight against Dr. Pallas.

Ellis had achieved considerable prominence by October 1776 and a number of publications carried the notice of his death at the time it occurred or shortly thereafter. In the years that followed other dates appeared as follows:

The Ladies Magazine, 3 October[96]

The Gentleman's Magazine, 5 October[97]

The Scots Magazine, 5 October[98]

The London Chronicle, 5 October[99]

Calendar of the Ellis Manuscripts, 15 October[100]

The natural history of zoophytes, 15 October[101]

The London Magazine, 18 October[102]

La Grande Encyclopedie, 5 October[103]

Notes and Records of The Royal Society of London, 18 October[104]

Of all of these publications it is only The London Chronicle that gives corroborating evidence that 5 October 1776 is the correct date of death. The issue for the period 5-8 October 1776 states, "On Saturday died, at his house at Hampstead, John Ellis, F.R.S. Agent for the Province of West Florida, and for the island of Dominica."[105] According to Newton J. Darden, Standard reference calendar, never out of date., the fifth day of October, 1776 fell on a Saturday whereas the 15th did not.[106] It is possible to explain the date of 15 October 1776 given by Spencer Savage in the Calendar of the Ellis manuscripts for he probably took it from The natural history of zoophytes where it appears as the very last item in the "Advertisement" on page vii.[107] There is evidence that Ellis's daughter, Martha, wrote the last paragraph, for the entire contents of this paragraph including the aforementioned date appears as a footnote in George Johnston's, A history of the British zoophytes.[108] George Johnston, using quotation marks for the footnote, ascribes its authorship to Mrs. Watt, the married name of Martha Ellis. It is strange that she

should be inaccurate as to the date of her father's death. Reluctantly, it is preferable to use the date of 5 October 1776 as date of his death for there is corroborative evidence, as indicated supra. John Ellis left no Will and his daughter Martha, was appointed Administratrix on 22 October 1777.[109]

John Ellis's early years as an indentured apprentice in the clothworker's trade were of tremendous benefit to him. It gave him entrance into the business community as a merchant and it enabled him to form business associations related to that trade when the business cycle turned against him. It also served him well in his scientific work despite the fact that he had no formal education beyond age fourteen when he became indentured.

ILLUSTRATION 1

29th January 1754 185

Appeared personally John Ellis of the parish of St Lawrence Jury London aged forty years and upwards and a Batchelor and alledged that He intends to intermarry with Carolina Elizabetha Carr of the parish of Walthamstow in the County of Essex aged twenty five years and upwards and a Spinster

And that he knoweth of no lawfull Let or Impediment by reason of any Precontract, Consanguinity, Affinity or any other lawfull means whatsoever to hinder the said intended marriage Of the truth of which he made Oath and prayed a Licence to solemnize the said marriage in the Cathedral Church of St Paul, St Mildred Poultry, or Parish Church of St Mary Magdalen Old Fish Street London

John Ellis

Sworn before me
And: Coltee Ducarel

Surrogate

SOURCE: List of The Bishop of London's Marriage Allegations (On microfilm in Guildhall Library, London), Ms 10091/94.

ILLUSTRATION 2

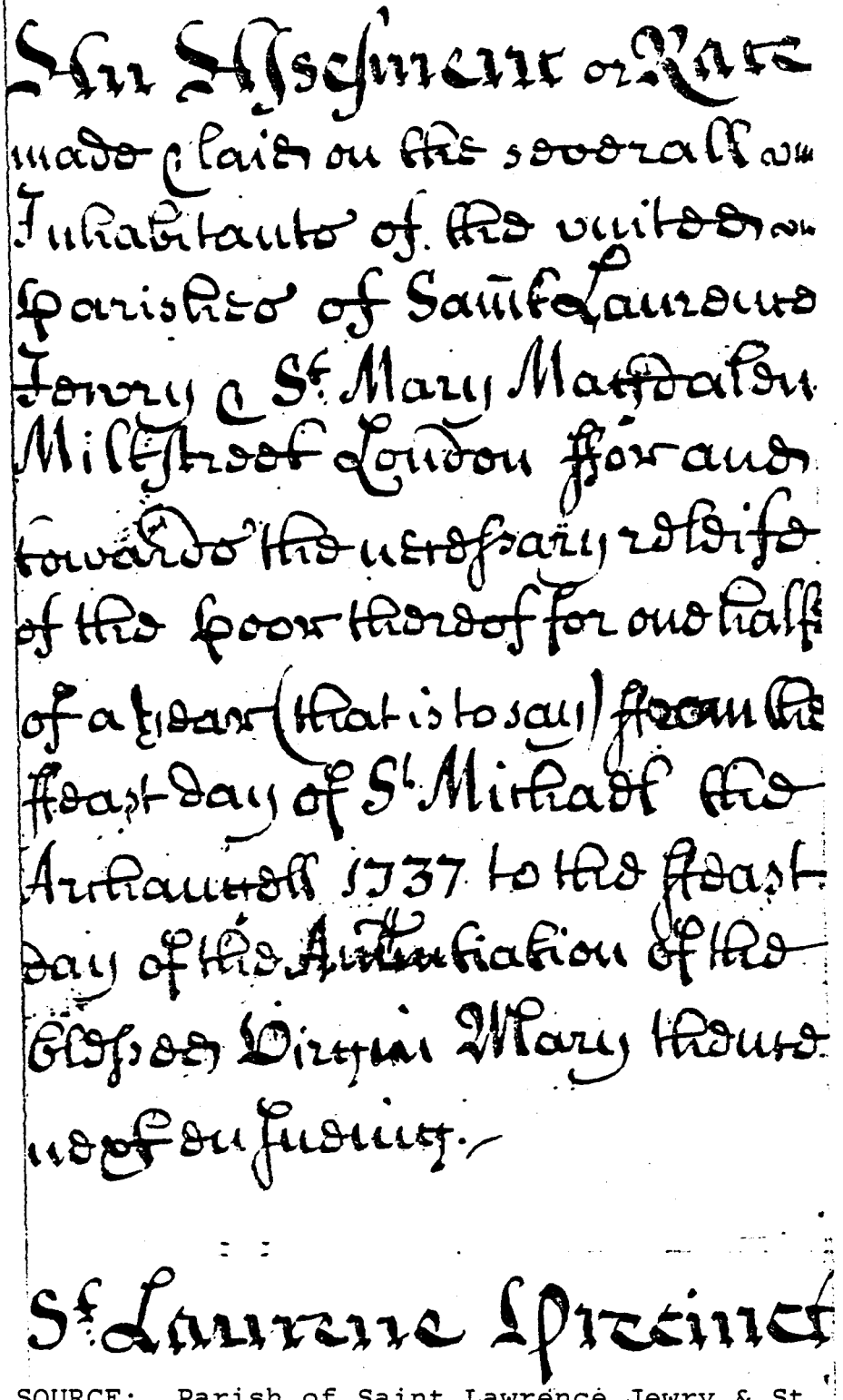
This Indenture Witnesseth, That John Ellis Son of John Ellis of Hoxton in the County of Middx, Gent doth put himself Apprentice to Edward Marsden Citizen and Clothworker of *London*, to learn his Art: And with him (after the manner of an Apprentice) to serve from the Day of the Date hereof, until the full end and term of Five Years, from thence next following, to be fully complete and ended. During which term, the said Apprentice his said Master faithfully shall serve, his secrets keep, his lawful Commands every where gladly do. He shall do no damage to his said Master nor seen to be done of others, but that he to his Power shall let, or forthwith give warning to his said Master of the same, he shall not waste the Goods of his said Master, nor lend them unlawfully to any. He shall not commit Fornication, nor contract Matrimony, within the said term. He shall not play at Cards, Dice, Tables or any other unlawful Games, whereby his said Master may have any loss. With his own Goods or others, during the said term, without licence of his said Master, he shall neither buy nor sell. He shall not haunt Taverns or Play-houses, nor absent himself from his said Masters Service Day nor night unlawfully: But in all things as a faithful Apprentice, he shall behave himself towards his said Master and all his, during the said term. And the said Master in Cons. of Twenty pounds his said Apprentice, in the same Art which he useth, by the best means that he can, shall teach and instruct, or cause to be taught and instructed, finding unto his said Apprentice, Meat, Drink, Apparel, Lodging, and all other Necessaries, according to the Custom of the City of *London*, during the said term. And for the true Performance of all and every the said Covenants and Agreements, either of the said Parties bindeth himself unto the other by these Presents. *In Witness* whereof, the Parties above named, to these Indentures interchangeably have put their Hands and Seals, the First day of January in the Eleventh Year of the Reign of our Sovereign Lord King GEORGE, of *Great Britain, &c. Annoque Dom.* 1724.

Tho. Hancock

John Ellis

SOURCE: Corporation of London Record Office, Apprenticeship Indentures, CF/549, February, 1733.

ILLUSTRATION 3



SOURCE: Parish of Saint Lawrence Jewry & St. Mary Magdalen Milkstreet London St. Lawrence Precinct Poor Rate Book, Ms 2518/19 (Guildhall Library: London).

ILLUSTRATION 4

TRANSCRIPTION OF ILLUSTRATION 3

An Assessment or Rate made & Laid on the severall Inhabitants of the united Parishes of Saint Lawrence Jewry & St. Mary Magdalen Milkstreet London for and towards the necessary releife of the poor thereof for one halfe of a year (that is to say) from the Feast day of St. Michael the Archangell 1737 to the Feast Day of the Annuntiation of the blessed Virgin Mary thence next ensueing.

St. Lawrence Precinct

NOTE: Feast Day of the Annunciation (Lady Day) 25 March.
Feast Day of St. Michael (Michaelmas) 29 September.

ILLUSTRATION 5

THE
CLOTHWORKERS'
COMPANY

Clothworkers' Hall
Dunster Court, Mincing Lane
London EC3R 7AH
Telephone 01-623 7041

DEW/.

29th October 1985

Miss S. M. Grover
The Archivist
The Royal Society
6 Carlton House Terrace
London SW1Y 5AG

Dear Miss Grover,

John Ellis, FRS (c.1710-1776)

Further to my acknowledgement of your enquiry dated 26th April 1985 and our telephone conversation of 12th July 1985, I can at last confirm the following details of the only John Ellis made Free of The Clothworkers' Company between 1725 and 1800.

John Ellis, son of John Ellis of Hoxton in Middlesex, Gentleman, was apprenticed for seven years and in consideration of £20 to Edward Harraden, Packer, of Little St-Helens, on 12th January 17(24/)25 and enrolled on 9th February 17(24/)25.

Made Free on 5th February 17(33/)34. Address not stated.

Not elected to the Livery, the next step in the Company's hierarchy, which unfortunately means that no further details of his career or address(es) are available in the Company's records.

Ellis must have been twenty-one years old or more when he was made Free. In fact he seems to have delayed for some time after the end of his apprenticeship beforebecoming Free. Thus he is likely to have been 21 or more in early 1732, 14 in early 1725, and born nearer 1710, as you said in your letter, than 1705 as stated in the photocopy.

As you may know, Professor John Waterlow, FRS, is a Member of the Court of The Clothworkers' Company.

Yours sincerely,

D. E. Wickham

Archivist

SOURCE: Library of The Royal Society of London, Box File 180.

ILLUSTRATION 6

Sales of 30 ps Brown 2d Lin? Bleached [illegible]
Sold for acco of Lord Limerick & the Bishop of [illegible]

1750							
Apr 30	R Manning 10 ps yd	254½	3/2		40	5	11
31	Dawson & Co 10 ps do	257	3/2		40	13	10
Apr 5	J: Goodchild 10 ps do	254	3/2		40	4	4
	30 ps				121	4	1

Charges Viz

Paid Carriage & Charges at Bristol	0.13.6			
To Jno Goodchild for Whitening &c	13.10			
To porterage out when sold	6.7			
To Comm. for Sale & Risque 3½ p Ct	4.4.8	18	14	9
Nett		£102.9.4		

Errors Excepted

London May 17 1751

For Self & Co

John Ellis

SOURCE: Public Record Office Northern Ireland, (Vol. 17), MIC.147/9, pp. 60-61.

The Right Honourable Lord Limerick ...

...30	To 1 ps Lawn M. 15 5/8 yd. @ 10/	7	16	3
	To Remitted the Bishop of Elphin ~~£55 .. 16 .. 6~~ £22 .. 9 .. 6	52	4	8
	To Postage paid		1	8
	To Cash	42	6	9
		£ 102	9	4

CHAPTER II

NOTES

[1]Spencer Savage, Catalogue of the manuscripts in the library of the Linnean Society of London; Part IV. Calendar of the Ellis Manuscripts, (London: printed for the Linnean Society by Taylor and Francis Ltd., 1948), p. iii.

[2]DNB, s.v. "Ellis, John," (1710?-1776), was not born in Ireland. Place and date of birth, however, have not been established. Sir J. E. Smith, A selection of the correspondence of Linnaeus and other naturalists, 1:79, stated that Ireland was Ellis's birthplace. Smith had written the earlier biography of Ellis in Rees's Cyclopaedia, that Ellis was a native of London. Smith admitted that there was no evidence of that birthplace. Ellis was in business as a merchant in London until 1764 when he obtained his appointment as agent for West Florida, to which was added in 1770 the agency for Dominica. This brought him many correspondents and he used his opportunities to import various American seeds. In 1754 he became a fellow of the Royal Society and in the following year established his reputation as one of the most acute observers of his time by the publication of An essay towards the natural history of the corallines and established by it the animal nature of this group of organisms. His first collection of these animals was placed in the British Museum. In 1768 the Copley medal of the Royal Society was awarded to him for these researches. Much of the material he had collected subsequently, was published by his friend Solander after his death as The natural history of many uncommon zoophytes collected by John Ellis, arranged and described by D. C. Solander, London, 1786. Ellis died in London, 5 October 1776, leaving a daughter Martha, afterwards Mrs. Alexander Watt, by whom her father's correspondence was entrusted to Sir J. E. Smith.

[3]Ray Desmond, Dictionary of British and Irish botanists and horticulturists, (London: Taylor & Francis Ltd., 1977), "John Ellis," p. 208.

[4]Royal Commission on Historical Manuscripts. The manuscript papers of British scientists 1600-1940,

(London: Her Majesty's Stationery Office, 1982), p. 28.

[5]Sir James Edward Smith, A selection of the correspondence of Linnaeus and other naturalists, 2 vols. (London: Longman, Hurst, Rees, Orme and Brown, 1821), 1:79.

[6]DNB, s.v. "Ellis, John," (1710?-1776).

[7]Abraham Rees, The cyclopoedia of arts, sciences and literature, (London: Longman, Hurst, Rees, Orme & Brown, 1819), "John Ellis."

[8]Roy A. Rauschenberg, "John Ellis, F.R.S.: Eighteenth Century Naturalist and Royal Agent to West Florida," Reprinted from, Notes and Records of the Royal Society of London 32 (1978a):151.

[9]DNB, s.v. "Andrew Coltee Ducarel, D.C.L." (1713-1785), was admitted to membership in the College of Advocates at Doctors' Commons in 1743. He was admitted a fellow of the Royal Society of London 18 February 1762. It is possible that Ellis knew Ducarel prior to the signing of the Affidavit because the latter became a member of the Royal Society a number of years after Ellis executed the marriage Affidavit.

[10]Parish of St. Lawrence Jewry, St. Lawrence Precinct Poor Rate Book Ladyday-Michaelmas 1732, Guildhall Library, London, Ms 2518/12. A photostatic copy of the title page of one of these books was made from a photograph and is appended to this chapter as "Illustration 3," together with a transcription thereof as "Illustration 4."

[11]Ibid., Ms 2518/13.

[12]Parish of St. Lawrence Jewry, St. Lawrence Precinct Poor Rate Book, Years available: 1732-68, 1771-1835, Ms 2518/12-52, inclusive; Parish of St. Lawrence Jewry, St. Lawrence Precinct Church Rate Book, Years available: 1723, 1756-60, 1762, Ms 2520/I-II; Parish of St. Lawrence Jewry Workhouse Rate, Years available: 1744, 1756, Ms 2521/1-2; Parish of St. Lawrence Jewry Tithe Rate, Years available: 1707-36, 1749-58, Ms 2519/1-3; Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Poor Rate, Ms 2518/53-73, inclusive. All of the foregoing documents are located at the Guildhall Library, London.

[13]London Directories, Guildhall Library, Years available: 1736, 1738, 1740, 1741, 1744, 1749, 1752, 1754, 1755, 1758, 1760, 1763, 1765, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, and 1777 are all under reference number LDD; 1745, 1755 and 1761 are under reference number SR; 1753, 1759, 1763, 1765, 1767, 1768, 1769, 1770, 1772, 1774, 1775 have no assigned reference number and one directory for 1763 is assigned number A3-3 No. 14. London Directories, British Museum, Years available: 1738, 1754, 1759, are under reference number PP 2505Yb/1; 1744, 1749, 1752, 1755, 1758 and 1760 are under reference number PP 2505Yb/2.

[14]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):151.

[15]Geoffrey Cumberlege, The Corporation of London: its origin, constitution, powers and duties, (London: Oxford University Press, 1950), p. 220.

[16]Ibid.

[17]Ibid.

[18]Privilegia Londini: or the laws, customs, and priviledges of the City of London, (London: printed for D. Brown at the Black Swan and Bible within Temple-Bar and F. Walthoe in the Middle-Temple-Cloysters, 1702), p. 109.

[19]Ibid.

[20]Ibid., p. 115. (Under this privilege, since Ellis completed his seven years of apprenticeship as a clothworker, he could, and did, go into business as a merchant.)

[21]Ibid., p. 303.

[22]Alexander Pulling, A practical treatise on the laws, customs and regulations of the City and Port of London, (London: V. & R. Stevens and G. S. Norton, 1842), p. 481.

[23]Ibid.

[24]Ibid., pp. 416-417.

[25]Parish of St. Lawrence Jewry, St. Lawrence

Precinct Poor Rate Book Ladyday-Michaelmas 1732, Guildhall Library, Ms 2518/12.

[26]See "Illustration 5."

[27]Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Poor Rate Book, Ms 2518/53. (This church record shows "Leighs Vines & Ellis 4 houses 2 pounds 4 shillings"). Henry Kent, Kent's Directory for the year 1761 containing an alphabetical list of the names and places of abode of the directors of companies, persons in publick business, merchants, and other eminent traders in the Cities of London and Westminster, (London: printed and sold by Henry Kent, 1761), Guildhall Library, SR, p. 73. (This entry recites, "Leighs, Vines & Comp. Manchester Warehousemen & Linen-drapers, Milk-Street").

[28]Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Church Rate Poor Rate Book, Ms 2518/63, Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Poor Rate Book, Ms 2518/64, Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Church Rate Poor Rate Book, Ms 2518/65. Kent's Directory For The Year 1767, Guildhall Library [no reference number], p. 73. (This entry recites "Hammond & Comp. Haberdashers, No. 47, Cheapside") and Kent's Directory for the year 1768, Guildhall Library [no reference number], p. 78. (This entry recites "Hammond & Ellis, Haberdashers, No. 47, Cheapside").

[29]Parish of St. Lawrence Jewry Tithe Rate Book Ladyday 1733 to Ladyday 1734, Guildhall Library, Ms 2519/2.

[30]Parish of St. Lawrence Jewry Poor Rate Book 1738, Guildhall Library, Ms 2518/20.

[31]Ibid., 2518/22 to 2518/44 inclusive.

[32]Ibid., see also Parish of St. Lawrence Jewry St. Lawrence Precinct Tithe Rate Books Ladyday 1749 to Ladyday 1758, Guildhall Library, Ms 2519/3; see also Parish of St. Lawrence Jewry Workhouse Rate, Guildhall Library, Ms 2521/1-2.

[33]Parish of St. Lawrence Jewry St. Lawrence Precinct Poor Rate Book Michaelmas 1739 to Ladyday 1740, Guildhall Library, Ms 2518/21 and Ms 2518/51 and 52; see also Parish of St. Lawrence Jewry St. Lawrence Precinct Church Rate Books Ladyday 1758 to Ladyday 1760, Guildhall Library, London, Ms 2520/I-II.

[34]I have indicated a separate business entity because of the absence of Fivey's first name in the business title. The structure of the firm name was usually of importance in the business community, so both of them must have considered the wording of the partnership name. However, London Directories uniformly show the partnership name as "Ellis and Fivey" or "Ellis & Fivey." See London Directories, British Museum for 1749, PP 2505Yb/2, p. 135; for 1752, PP 2505Yb/2, p. 151; for 1754, PP2505Yb/1, p. 36; for 1755, PP2505Yb/2, p. 129; for 1759, PP2505Yb/1, p. 40, for 1760, PP2505Yb/2, p. 132.

[35]Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Poor Rate Books 1761 and 1762, Guildhall Library, Ms 2518/53 and 54; see also Parish of St. Magdalen Milk Street Milkstreet Precinct Church Rate Book Ladyday to Michaelmas 1762, Guildhall Library, Ms 2520/I-II.

[36]Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Poor Rate Church Rate Books Ladyday 1763 to Michaelmas 1764, Guildhall Library, Ms 2518/56, 2518/57 and 2518/58.

[37]Ibid., Guildhall Library, Ms 2518/59 and Ms 2518/60. I have again indicated a separate business entity because of the absence of Sedgwick's first name of "John." It might have been the same partnership as the prior one. However, one should bear in mind that Ellis was forming new partnerships and a new one would require a change in title but not so drastic a change so as to lose former customers. Hence, a small change such as the dropping of a first name would be the most appropriate way to carry out such a change.

[38]Ibid., Guildhall Library, Ms 2518/61, Ms 2518/62 and Ms 2518/63; also see Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Poor Rate Book 1767, Guildhall Library, Ms 2518/64 and Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Church Rate Poor Rate Books Michaelmas 1771 to Ladyday 1776, Guildhall Library, Ms 2518/65, Ms 2518/66, Ms 2518/67, Ms 2518/68, Ms 2518/69, Ms 2518/70, Ms 2518/71 and Ms 2518/72.

[39]See footnote 30.

[40]Public Record Office, Bankruptcy Records, B4. Index 22649, Docket Book 1759-1763.

[41]The London Chronicle for the year 1760 from July 1 to December, London, 8:418.

[42]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):152.

[43]Parish of St. Mary Magdalen Milk Street Milkstreet Precinct Poor Rate Book 1761, Guildhall Library, Ms 2518/53.

[44]London Directories, British Museum, for 1749, PP 2505Yb/2, p. 135; for 1752, PP 2505Yb/2, p. 151; for 1754, PP 2505Yb/1, p. 36; for 1755, PP 2505Yb/2, page 129.

[45]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):151.

[46]See footnote 28.

[47]Henry Kent, Directory containing an alphabetical list of the names & places of abode of the directors of companies, persons in publick business, merchants, & other eminent traders in cities of London, Westminster, & Borough of Southwark, (London: printed and sold by Henry Kent, 1736), Guildhall Library, LDD, title page.

[48]The intelligencer: or, merchants assistant, shewing, in an alphabetical manner, the names and places of abode of all the merchants and considerable traders throughout the Cities of London and West-minster, and Borough of Southwark, (London: printed for W. Meadows, 1738), Guildhall Library, LDD, p. 98.

[49]Lord Limerick. This gentleman was James Hamilton of Tullimore, County Down. He was created Baron Clandeboye, County Down and became Viscount of the City of Limerick on 13 May 1719. He remained Viscount of Limerick until 24 November 1756 when he was elevated to the Earldom of Clanbrassill, a title which passed to his son after his death in 1758. Apart from his interests in the Irish Linen Board, Hamilton pursued an active career in British politics and did in fact distinguish himself as a leading light in the opposition to Sir Robert Walpole. (All of the foregoing details were supplied by Mr. R. W. Strong, Librarian of the Public Record Office of Northern Ireland).

[50]DNB, s.v. "Synge, Edward," (died 27 Jan.1762), received his M.A. in 1712 and D.D. in 1728. Was

chancellor of St. Patrick's, Dublin in 1730 when he was elevated to the bishopric of Clonfert. Subsequently, he was transferred to Cloyne in 1731, to Ferns in 1733 and to Elphin in 1740. See also, Handbook of British chronology, edited by Sir Frederick Powicke and Edmond Boleslav Fryde, Second Edition, (London: Offices of The Royal Historical Society, 1961), p. 377. See also, Rev. James B. Leslie, Ferns clergy and parishes, (Dublin: Printed for the Author, 1936), p.13. (Leslie gave the following additional information: The subject, Edward Synge, was the eldest son of Edward Synge, archbishop of Tuam. Edward, the son, was born in Cork in 1691 and received his B.A. in 1709 at age 18. He was made a Freeman of Dublin in 1722 and married Jane, daughter of Robert Curtis of King's County and had two sons and two daughters with her. Jane died in 1738. He published six Sermons.

[51]Parish Register of the Church of St. Mildred Poultry Marriages 1724-54, Guildhall Library, MS 4429/2; see also Boyd's, Marriage Index, Guildhall Library.

[52]Abraham Rees, The Cyclopoedia of Arts, Sciences and Literature, (London: Longman, Hurst, Rees, Orme & Brown, 1819), "Ellis, John."

[53]Hardwicke Papers, "C. Yorke's Briefs in Chancery," British Museum, Add. MSS 36,189.

[54]Ibid.

[55]W. A. Shaw, The knights of England, 2 vols. (London: 1906), 2:275.

[56]Will of Sir Charles Peers. Public Record Office, London, PROB 11/675, quire 37.

[57]Dr Henry Quin to John Ellis, 4 April 1754, Ellis MSS, Linnean Society of London.

[58]The Register of St. Lawrence Jewry and St. Mary Magdalen Milk Street London 1677-1812, Transcribed and edited by A. W. Hughes Clarke, vol. 71, London: Harleian Society, 1941 (Publications of the Harleian Society [Registers]), p. 63.

[59]Martha Ellis was the eldest and sole surviving daughter of John Ellis. She was born 27 December 1754. When her Mother died in 1758, daughter Martha went to live with her Aunt, Martha Peers, her late Mother's

sister who reared her. Martha married Alexander Watt of Northaw, Herts. It was his second marriage and her first. In her Will dated 29 August 1781 she left him all her property. A Codicil was added to that same Will on 21 December 1794 which introduced the condition that if Alexander remarried after her demise, he would be disinherited and her property would go in trust to Robert Peers (since her Mother's maiden name was Peers, Robert was probably from that side of the family) and George Edwards for use of her children (not named). She died during childbirth at Northaw in the spring of 1795 and her Will and Codicil were proved up on 26 November 1795. From the Probate Record it appears that Alexander Watt survived her but did not enter the estate into probate proceedings. The Will and Codicil were finally probated on 28 February 1814 by Thomas Alexander Watt who also was appointed Administrator of his Father's estate. Date of death of his Father, Alexander Watt, is not given but there is a marginal notation that Alexander Watt "dying a widower without having been married subsequent to the decease of the Testatrix (Martha Watt)". The original Will and Codicil is in the Public Record Office of London, Prob 11/1268. Other information is from Memoir and correspondence of the late Sir James Edward Smith, edited by Lady Smith, in two volumes, (London: Printed for Longman, Rees, Orme, Brown, Green, and Longman, 1832), 1:310-312 and from material in Chapter II of this paper.

[60]Dr J. A. Schlosser to John Ellis, 9 September 1755, Ellis MSS, Linnean Society of London.

[61]Dr J. A. Schlosser to John Ellis, May 1757, Ellis MSS, Linnean Society of London.

[62]The Register of St. Lawrence Jewry and St. Mary Magdalen Milk Street London 1677-1812, vol. 71, p. 641.

[63]Ibid., p. 238.

[64]Draft letter, John Ellis to Dr Alexander Garden, 11 September 1758, Ellis MSS, Linnean Society of London.

[65]The Register of St. Lawrence Jewry and St. Mary Magdalen, Milk Street, London 1677-1812, vol. 71, p. 238.

[66]Draft letter, John Ellis to Governor Henry Ellis, 20 September 1758, Ellis MSS, Linnean Society of London.

[67]Philosophical Transactions, 50:845-855.

[68]Ibid., 50:853.

[69]William Borlase, The natural history of Cornwall, (Oxford: printed for the author, by W. Jackson, 1758), p. xiv.

[70]DNB, s.v. "Borlase, William," (1695-1772), was ordained a priest in 1720 and assigned to the Parish of Ludgvan near Penzance. While he paid close attention to his clerical duties, he found time to do active research in natural history and antiquities. He became a fellow of the Royal Society in 1750.

[71]John Ellis and D. C. Solander, The natural history of many curious and uncommon zoophytes, collected from various parts of the globe by the late John Ellis; systematically arranged and described by the late Daniel Solander, edited by Martha Watt, (London: Benjamin White, 1786), p. 132.

[72]John Ellis to Dr David Skene 26 March 1768, David Skene MSS, Aberdeen University Library, Aberdeen, Scotland, MS.38/105.

[73]John Ellis, "An account of some experiments relating to the preservation of seeds: in two letters to the Right Honorable the Earl of Macclesfield, President of the Royal Society," Philosophical Transactions 51 (1760-1761):206.

[74]Ibid., 51:210.

[75]See footnote 67.

[76]DNB, s.v. "Brownrigg, William," (1711-1800), was a physician and chemist who made investigations on gaseous exhalations from coal mines. He wrote several papers on the subject and was elected to the Royal Society. He learned to foretell explosions in mines by the rapidity of the fall of mercury in a barometer.

[77]Dr William Brownrigg to Ellis, 18 May 1756, Ellis MSS, Linnean Society of London.

[78]Dr Henry Quin to Ellis, 26 February 1760, Ellis MSS, Linnean Society of London.

[79]Savage, Calendar of the Ellis manuscripts, p. b.

[80]Samuel Wood Geiser, Naturalists of the frontier,

(Dallas: Southern Methodist University Press, 1948), p. 243.

[81]Dictionary of American Biography, s.v. "Clayton, John," (c. 1685-1773), was a botanist born in Fulham, England and not to be confused with the Rev. John Clayton. He came to Virginia in 1705 and later became first clerk of the county and held the position until he died. He corresponded with Gronovius, Linnaeus and Dr Alexander Garden. He collected a considerable number of plants in Virginia which form the basis of the work known as Flora Virginica by John Frederick Gronovius. The final identification of the specimens, the arrangement and the nomenclature were Gronovius's work.

[82]Edmund Berkeley and Dorothy Smith Berkeley, John Clayton pioneer of American botany, (Chapel Hill: University of North Carolina, 1963), p. 133.

[83]John Bernard Burke, A genealogical and heraldic history of the landed gentry of Ireland, 9th edition, (London: Harrison & sons, 1899), p. 131.

[84]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):151.

[85]John Ellis, "An Account of some Experiments relating to the Preservation of Seeds," Philosophical Transactions 51 (1760-1761):206-215.

[86]DNB, s.v. "Ellis, Sir Henry," (1777-1855), was a traveller, hydrographer and colonial governor of Georgia from 1758 to 1761 and of Nova Scotia from 1761 to 1763. He contributed papers to the Philosophical Transactions on sea temperatures, the heat of the weather in Georgia and Dr Hale's "Ventilators."

[87]DNB, s.v. "Edwards, George," (1752-1823), was a practising physician and writer on political and social topics. Forty-two of his books are in the British Museum.

[88]George Edwards, Gleanings of natural history, Part III, (London: Printed for the Author, 1764), p. 2.

[89]Henry Ellis to William Knox, Esq., 29 November 1776, William L. Clements Library, Ann Arbor, Michigan. (This letter is set forth in full in chapter 6).

[90]Robert R. Rea, "The King's Agent For British West

Florida," The Alabama Review, 16 (April, 1963):152.

[91]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):152.

[92]Skene to Ellis, 23 February 1766, Ellis MSS, Linnean Society of London.

[93]See footnote 67.

[94]Ellis to Skene, 30 June 1766, David Skene MSS, MS.38/99.

[95]Ellis to Skene, David Skene MSS, MS.38/110.

[96]The Ladies Magazine; or entertaining companion for the fair sex, London: Printed for G. Robinson, 1776), 7:559.

[97]Sylvanus Urban, The Gentleman's Magazine, (London: 1776), p. 483.

[98]The Scots Magazine, (Edinburgh: 1776), p. 567.

[99]The London Chronicle 40 (1776):339.

[100]Savage, Calendar of the Ellis manuscripts, p. 49.

[101]Ellis and Solander, The natural history of zoophytes, p. vii.

[102]The London Magazine, (London: 1776), p. 560.

[103]La Grande Encyclopedie, inventaire raisonne des sciences, des lettres et des arts, Paris: H. Lamirault, 1886-1902), p. 855.

[104]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):162.

[105]See footnote 94.

[106]Newton J. Darden, Standard reference calendar, never out of date. A calendar, comprising 14 finding tables for all dates from September 3-14, 1752 to 2100 anno Domini. . . Copyright, 1935, by Newton Jasper Darden. . ., (Washington, D.C.: Standard Calendar Association, 1935), p. 13.

[107]See footnote 96.

[108]George Johnston, A History of the British zoophytes, 2 vols., 2nd ed. (London: John Van Voorst, 1847), 1:418.

[109]Public Record Office, Administration Act Book of the Prerogative Court of Canterbury, PROB 6/152.

CHAPTER III

THE "CURIOUS" AMATEURS

Brooke Hindle (1956), in The pursuit of science in revolutionary America 1735-1789, introduced the term "The Natural History Circle" and defined it as "an international circle devoted to the cultivation of natural history . . . . Naturalists in England, France, Holland, Sweden, Germany, and Italy kept in frequent correspondence, visited each other, and accepted posts in foreign countries."[1] His delineation and documentation of the members of the circle is a contribution to an understanding of the development of natural history in the western world in the mid-eighteenth century and the remarkable part played by Americans in this expansion of knowledge. However, his use of the word "circle" connoted limits to this elite group as did his carefully worded definition of membership, stated above, for inclusion of persons in it. He was aware of the limits he had imposed in the definition for he wrote, "When Peter Collinson[2] was called upon to name the competent Linnaean botanists in America, he cited Clayton, Colden,[3] and Mitchell,[4] but behind them and behind John Bartram[5] there was a large number of men and women who

occasionally made contributions to the field of botany."[6] Abraham Redwood, [7] Henry Laurens,[8] William Byrd,[9] John Custis,[10] and Charles Read.[11] "Many of these people exchanged seed and occasionally contributed unknown plants to more active members of the natural history circle."[12] From this we see that not only did he seek to limit the membership of the circle to his definition but he felt constrained to mention those who he deemed less active members as compared with those who were more active members of the circle.[13]

However, there existed during this period a much wider participation of persons in the expansion of knowledge of natural history than can be inferred from the term "natural history circle." Rauschenberg (1978a) identified relevant factors when he stated "Furthermore [Ellis's] papers, containing correspondence with well over one hundred different people, provide a clearer picture of the interrelationships which operated in the warp and woof of eighteenth century English and colonial science."[14] In point of fact, Rauschenberg's source for this statement is Savage (1948) who provided a list of one hundred fifty names of Ellis's correspondents arranged alphabetically.[15] The difficulty of drawing inferences such as "a clearer picture of the interrelationships" from the number of correspondents is

that no such inference is logically possible. The fact that Ellis had a certain number of people with whom he corresponded does not lend itself to such interpretation. Furthermore, instead of indicating interrelationships or close contact with other naturalists, it might indicate just the reverse, that naturalists were working in isolation aside from an occasional, infrequent missive from a contemporary. At least, the evidence is subjective and corroboration from other sources is desirable.

A further source for providing a picture of possible interrelationships between scientists inter se and between scientists and the public might be the subscription lists that accompanied many of the books published in England in the mid-eighteenth century.[16] These subscription lists are, admittedly, thin evidence of possible relationships between subscribers and conclusions based thereon must necessarily be carefully drawn. It is quite possible that many persons of wealth bought all kinds of books for the sole purpose of adorning library shelves in town and country mansions. Wallis (1982) "The Maclaurin 'Circle': The Evidence of Subscription Lists" admitted that "It is clear that the Letters (Maclaurin's correspondence) and the lists used together can help to identify members of the Maclaurin

circle, although care has to be taken with both sources to avoid confusion of names."[17] The sum total of the evidence provided by the lists plus the correspondence indicated that Maclaurin, in fact, did support subscription publishing. In the same vein, the following discussion will attempt to demonstrate that quantitatively there were large numbers of members of the upper echelon of society who bought books on natural history. Qualitatively, those that bought such books because of personal interest cannot be ascertained with any degree of precision.

When Rev William Borlase sought financial assistance for the publication of The natural history of Cornwall three hundred and ninety-one persons responded by becoming subscribers. The titles accompanying the names indicate persons from the clergy, legal profession, medical profession, aristocracy, landed gentry, commoners, academics, merchants, booksellers and politicians; and also colleges and libraries. The subscriptions were for the purchase of from one to six copies of the book.[18] Borlase's earlier work published 21 March 1754, Observations on the antiquities historical and monumental of the County of Cornwall, had slightly more subscribers for a total of four hundred and two.[19] The background of the subscribers was the same as for his

first book but the range of the number of books subscribed for was considerably larger, being from one to fifty books, and the subscribers who were Fellows of the Royal Society were but three. Ellis was a subscriber but at that time had not been admitted to fellowship of the Royal Society. By comparing the two lists it was determined that one hundred forty-five persons subscribed to both books. Subtracting these names from total subscribers of four hundred two left two hundred fifty-seven additional persons who also purchased books on natural history.

George Edwards published Gleanings of natural history, Part II on 10 January 1760 with the assistance of two hundred and eleven subscribers.[20] Comparing this list with the two previous ones eliminated nine persons who had subscribed to one or both of the prior mentioned books, providing a net increase of two hundred and two additional purchasers. It is odd that Ellis was not a subscriber to this book for he was a subscriber to the two books by Borlase. A possible reason might be deduced from the date of publication. 1760 was the year that Ellis was struggling with financial problems and the bankruptcy of his firm "Ellis and Fivey" took place later that year (Chapter II). He may not have had enough money to enter into the subscription contract. In 1764, when

George Edwards' Gleanings of natural history, Part III went to press, it contained a list of new subscribers numbering a mere sixty-eight persons of whom Ellis is the only subscriber to be eliminated from the count, having subscribed to both of Borlase's books.[21]

Patrick Browne's[22] The civil and natural history of Jamaica also included a subscription list. It totalled one hundred and forty-eight names. Of these, six appear on one of the other lists leaving a net increase of one hundred and forty-two names.[23] The net grand total of new subscribers is 1,059. Looking at these figures one can conclude that there was some substance to Peter Collinson's remark, quoted by Hindle (1956), "We are very fond of all branches of Natural History; they sell the best of any books in England."[24] One would like to think that the majority of these purchasers bought such books on natural history because of an individual interest in the subject. However, such conclusion cannot be grounded on the lists. All one can say is that out of such large numbers some of them probably bought books on natural history because of personal interest and desire but, this is conjecture. A more demonstrable conclusion is that financial support for the purchase of such books came predominately from the upper echelons of society. In so doing, they made

publication of these books on natural history available to those who were interested in the subject and thereby advanced the spread of knowledge of natural history..

Attention can now be directed to the financial support given by scientists in subscribing to the publications of other scientists. As noted above, Ellis subscribed to both of Borlase's books, to Edwards' Gleanings Part III, and to Browne's book. Linnaeus subscribed to Edwards' Gleanings Part II and to Browne's book. Gustavus Brander[25] appears in the subscription lists of both of Borlase's books. Henry Baker[26], William Bartram[27], Emanuel da Costa[28], Dr James Parsons[29], Isaac Romilly[30] and G.D. Ehret[31] subscribed to Edwards' Gleanings Part II and Emanuel da Costa subscribed to this one and to Borlase's The natural history of Cornwall as well. Dr John Fothergill[32] subscribed to Edwards' Gleanings Part II, and to both of Borlase's book as well as to Browne's book. Dr James Parsons appears as a subscriber in Borlase's Antiquities and Edwards' Gleanings Part II. Thomas Pennant[33] appears as a subcriber to both of Borlase's books, as well as to Edwards' Gleanings Part III. Governor Henry Ellis of Georgia and Dr Alexander Russell[34] also subscribed to the latter book. Dr Johannes Fred Gronovius[35], Arthur Pond[36], the Rev Dr Stephen Hales[37] and Dr James A.

Schlosser[38] were subscribers to Browne's book. Peter Collinson, although not a scientist, was a leading figure in the natural history circle and subscribed to Borlase's The natural history of Cornwall, Edwards' Gleanings Part II, and Browne's book. One may conclude from this evidence that Hindle's (1956) criteria for membership of the natural history circle should possibly also include subscribing to the publication of a book on natural history.

In the search for a suitable word or term to express such wider participation of persons in natural history it was noted that Raymond Phineas Stearns (1951) in "Colonial Fellows of The Royal Society of London, 1661-1788," used the phrase, "colonials with an inquiring turn of mind."[39] While Ellis used the word "naturalist" in his article entitled "An Account of an Amphibious Bipes,"[40] and used the term, "writers on natural history," in his article entitled, "An Account of an Encrinus",[41] he more often used the term "curious" when referring to persons interested in natural history. Several instances of this usage occur in his writings: "Finding the natural history of Cochineal still defective, (notwithstanding the diligent inquiries that have been made by many curious persons . . .)"[42] and "The doubts, that I find still remain on the minds of many

curious and learned men."[43] Another instance is found in a hitherto unpublished letter by Ellis to the President and Council of the Royal Society dated 18 June 1761[44] regarding certain statements made by Dr Job Baster.[45] In the second paragraph appears the sentence "This request is with no other view, than to prevent the curious from being misled." A photocopy of this letter is included at the end of this chapter and is labelled "Illustration 1."

One should not get the idea from these references that Ellis was the only person using the term "curious." Emanuel Mendes da Costa in April of 1755 wrote, "We have nothing new in any branch of Philosophy, but something in your way by Mr. Guettard,[46] who has lately found in the Cabinet of a curious Lady here, A preserved Sea Polype."[47] It is patent from the foregoing that the word "curious" meant a person with an "inquiring" or "penetrating" mind. It is also clear that the persons to whom these published articles were directed understood the word in that sense. However, people of a more recent era were not aware of this meaning and there is an amusing comment related by Swem, in his article on the correspondence between Peter Collinson and John Custis entitled "Brothers of the Spade," wherein he stated, "The use of the word 'curious' by Collinson in reference to Custis has led to some

misconceptions about him" he went on to explain that, "the word as used at that time does not imply eccentricity but inquisitiveness."[48] Furthermore, the use of this word was not restricted to persons. This can be observed from the language of the certificate of election of Edward Wright[49] as a fellow of the Royal Society wherein it referred to "his curious communications."[50] In that context also, it signified "inquiring" or "penetrating". Members of the Royal Society customarily allowed members to bring guests to meetings and extended fellowship to persons of inquiring mind who could further experimental science and Stearns (1951) has ably documented the abilities of all of the Colonial Fellows in this respect.[51]

If membership of the "natural history circle" were opened to the "curious", then every captain of a ship that brought a specimen of natural history to his home port and delivered it or forwarded it to one of the active members of the natural history circle for examination could be deemed to have taken part in the eighteenth century expansion of knowledge in natural history. One would not be restricted to seeking documentation of a captain's contribution to natural history as was Stearns, when he stated, "Included among the promoters of scientific knowledge in and about the

colonies were a number of captains of commercial vessels and officers of the Royal Navy. These men contributed valuable information relating to hydrography, oceanography, navigation, geography, meteorology, astronomy, and natural history."[52] It is clear from Ellis's work alone that there were many others who contributed or otherwise took part in the increase of the human knowledge of natural history even though they did not achieve fellowship in the Royal Society or recognition as being members of the natural history circle. Ellis carefully documented the names of those who gave or sent him specimens and named the contributor in his writings when such name was available to him. For example, one can take note of the description of one of the Sertularia specimems: "This was first discovered by Mr John Evans, a sea-officer in the East-India Company's service, among some sea productions brought from Yarmouth, in Norfolk, in the year 1767."[53] Ellis named it Sertularia evansi in recognition of the finder.[54] Its present name is Synthecium evansi.[55]

As a parenthetical comment to show current interest in hydroid history, Cornelius[56] (1980) discussed the accuracy of the statement that "this specimen was among those 'brought from Yarmouth, in Norfolk'," now Great Yarmouth. The genesis of the doubt is that while

this species "is a large and distinctive hydroid recorded widely in the Mediterranean Sea . . . the species has not been recorded from British waters for 150 years and the Norfolk record is in doubt." His conclusion, therefore, was that "There have been no records of S. evansi from Britain or anywhere else in NW Europe for 150 years. There is only a slim chance that such a large species would have been missed by the many collectors of this period and it seems right to take S. evansi off the British list."[57]

Ellis utilized several methods for the transport of specimens to him. In a letter of 26 March 1765 to Dr David Skene,[58] he recommended for the shipment of small specimens the following procedure: "Small specimens may be convey'd by post where they come under two ounces, by directing the cover to a Member of Parliament. If you please to inclose that Specimen of the Muricated Sertularia to me at N 5 in Cony Court Grays Inn and in a Cover directed to Philip Carteret Webb Esq^{r} in Great Queen Street Lincolns Inn Fields I shall rec. it without expense."[59] For larger packages he recommended that, "The only thing is to fix on a proper person in the City who trades to your parts and can put any thing on board for you or receive any thing by Shipping from you. I know many of them, but particularly Mr W^{m} Todd the

Agent for the British Linen Company."[60] Ellis was not averse to paying freight charges for in another letter to Skene, dated June 1765, appeared the suggestion, "If any specimens that you may have collected are in danger of being spoil'd by inclosing in a letter, pray let them be sent by sea the first convenient oportunity (sic). There are few of your Merch^{ts} in London but know me, as I am Agent to the Linen Board of Ireland: and shall gladly pay a porter and the freight for any thing you are kind to send me: and everybody knows me in Grays Inn Holborn."[61]

Further review of Ellis and Solander, The natural history of many curious and uncommon zoophytes, revealed considerable information on the source of Ellis's specimens. John Greg[62] was the most prolific contributor with eleven specimens sent directly to Ellis[63] and six sent to the Earl of Hillsborough[64] and from him to Ellis.[65] Unknown contributors sent him twelve specimens.[66] One specimen came into his possession through an odd sequence of events. An East-India ship had put into a port on the coast of Mauritius in 1767 to refit there.[67] The surgeon of the ship was presented with specimens that had lately been collected on that coast, perhaps by natives. He then presented the specimens to Dr John Fothergill who gave them to Ellis.

Among them was the Isis coccinea that Ellis described, identified and distinguished from the so-called Dichotomous Isis. In addition to this one, Dr Fothergill gave him four specimens he had received from unknown persons.[68] Other unknown personnel on East-India ships gave him specimens.[69] Sir Joseph Banks[70] and Daniel Solander[71] furnished him with specimens from their voyage with Captain Cook on the "Endeavour."[72, 73] The British Museum made available to Ellis specimens[74] from the collection of Sir Hans Sloane[75] and a specimen[76] from the collection of Lord Pigot.[77] The Duchess Dowager of Portland[78] maintained a cabinet of specimens and Ellis, who was given access to the cabinet, listed two specimens from the cabinet in the book. The list of the rest of his contributors reads like a who's who of the amateurs and professionals among the "curious": Dr Jean-Baptiste Bohadsch,[79, 80] Rev Dr William Borlase,[81, 82] Gustavus Brander,[83] Mark Catesby,[84, 85] Rev Mr Clarke,[86] Vitaliano Donati,[87, 88] Joseph Gaertner,[89, 90] Corbyn Morris,[91, 92] Dr Peter Simon Pallas,[93, 94] Dr James Parsons,[95, 96] Thomas Pennant[97] and William Webber.[98, 99]

The major portion of the Ellis & Solander book comprises the description and identification, in accordance with the Linnean system, of many of the species Ellis had written up in his first book, An essay

towards a natural history of the corallines[100] together with species found subsequent to that publication.

In summation of this material it is apparent that while some of the persons mentioned in Ellis & Solander, such as the Rev Borlase, Dr Pallas, Bohadsch, Donati, Parsons and Pennant, were actively engaged in correspondence and research, others were not. Hence, the numbers of persons in the ranks of the "curious" is somewhat greater than the few among the "natural history circle" who corresponded or did actual research. This may also be inferred from the fact that captains of ships, whether engaged in the East India trade as shown from Ellis's work or in coastal Colonial commerce as researched by Raymond Phineas Stearns,[101] were interested in natural history when they brought back to London unusual specimens of marine life. British commercial interests thus assisted in the support of this expansion of knowledge. It might also be stated that the owners of these vessels favored and no doubt commended such captains for their contributions to the knowledge of natural history of these species.

It should be observed that the footnotes to this chapter present the reader with brief biographies of the persons Ellis dealt or communicated with during his scientific career. The sketches are taken from DNB, DSB

or other biographical work. This was done for the convenience of the reader and for informational rather than prosopographical purpose for the latter would constitute a project far beyond the scope of this paper. However, there is a common denominator that does appear among most of the sketches and that is the information relating to the source of income or livelihood of the person involved. These sources of income are wide in range and include business, political office, medicine, bureaucratic office, agriculture, family fortune, gardening, draughting, writing, legal practice, judicial office, protrait painting, church ministry, chemistry and teaching. Those who derived an income working in the field of natural history were relatively few in number. These can be identified as Linneaus, Solander and Pallas with the possible addition of Gaertner, Bohadsch and Reaumur.

What has been presented by these biographies in addition to the informational aspect and reader convenience, can be described as some supportive evidence for the statement by Jaques Roger (1980).

> Since the new (eighteenth-century) professional scientists, in the universities and elsewhere were not prepared to embark upon studies in the new fields of research, such as entomology

> or plant physiology, which became fashionable at the beginning of the eighteenth century, the category of amateur scientist emerged again. What these amateurs had in common was the fact that they were self-taught and did not belong to the traditional medical profession. They had learned natural history through reading and direct observation; but this did not prevent them from making some of the most striking discoveries of the century.[102]

Jaques Roger was commenting only on the re-emergence in the eighteenth century of the medical practitioner as an amateur scientist. From the biographical material presented herein, one can reasonably extend that statement to include persons from other economic areas of livelihood in addition to medicine.

While the data from the subscription lists is not conclusive that the ranks of the social elite were personally interested in natural history, the financial support to the publication of such books on this topic enabled those who were to obtain and use them. It is also clear that the ranks of the "curious " supported the amateur scientists in natural history, be they writers or researchers, by financially contributing to the

publication of their books.

It is noteworthy that there was considerable enthusiasm engendered in the acquisition and development of a collection of marine animals. Ellis, in a letter to Skene 22 October 1765, instructed him and stated, "It will be worth your while to put some of the common Coralline of the Shops into vinegar to see the minute internal ramifications."[103] It is not clear from this statement whether there were shops whose stock in trade was various species of zoophytes. Zoophytes did attach themselves to the shell of an oyster and the reference may have been to the purchase of oysters that did have such attachments of marine life. In any event it is patent that there was sufficient interest whether by the members of the natural history circle or by the "curious" in the acquisition and enhancement of a collection of Zoophytes to look for them in a retail store.

In addition to acquiring specimens by purchase, it was of course an avenue open to all to go to the sea shore and find specimens. A mutual friend of Ellis and Skene had requested of Ellis certain species of corallines. In recounting the episode to Skene, Ellis candidly remarked, "I have recommended him to get a drudge and a Trawl to fish on your coasts to get Sea animals."[104] In addition to these two methods, a very

common method for enlarging a collection was to engage in trading extra or duplicate specimens for desired species from other collectors. A collector accomplished this by writing to another collector indicating what he required or desired for adding to his collection. Skene engaged in such trading activities with Ellis.[105] Dr Alexander Garden also did the same with Ellis. It is most interesting to read Ellis's recommendation to Skene in the proper manner to engage in trading activities in a letter to the latter dated 24 February 1767. "I have found, that I always receiv'd greater collections, and more valuable specimens of natural history, where I sent most liberally. I mention our Friend D^{r} Garden for Instance, I studied every thing that would be of use to him and accordingly in return he made that New World of Plants from Carolina known to me, by the attention he saw I paid to him."[106] In addition to the purchase of books on natural history and engaging in the building of a collection of sea animals, was the intangible moral support provided by the large numbers of the "curious" who were interested in the expansion of knowledge.

When Stearns (1951) identified the colonials that had been admitted to membership in the Royal Society, he was quick to point out that "many colonial Fellows of the Royal Society in the list which follows

owed their selection entirely or in part to the support of Peter Collinson or John Ellis, or both."[107] Since this paper is primarily concerned with Ellis, only those Colonial Fellows whose certificates were signed by Ellis are abstracted from his article and now presented. Since Stearns included a biographical sketch of each no further biographical detail is deemed necessary and they are presented as follows: John Morgan, M.D., John Greg, Alexander Garden, M.D., John Coakley Lettsom, M.D. and William Wright.[108]

It is appropriate at this juncture to point out that Ellis was well known and highly respected not only for his technical competence but for his kindness and assistance to others. He supported not only American colonials to Fellowship in the Royal Society, but also supported Europeans and native Britons. The work that Stearns started can now be advanced by listing the non-Colonial Fellows whose election was supported by Ellis. They are the following: Peter Ascanius M.D.,[109] John Albert Schlosser M.D., Monsieur Peysonnel M.S.,[110] Isaac Romilly, Mr George Dyonisius Ehret, Edward Wright M.D., Doctor David van Royen,[111] John Fothergill M.D., Peter Simon Pallas M.D., Daniel Solander, William Webber, Revd Mr Henrick Putman,[112] John Hunter,[113] Peter Woulfe,[114] Sir Thomas Fludyer,[115] Mr Daniel Harris,[116] Mr William

Hewson,[117] Sir William Duncan Baronet,[118] Charles Blagden,[119] Humphry Jackson M.D.,[120] John Lauder,[121] Charles Irving,[122] Richard Blyke[123] and John Bradby Blake.[124]

John Ellis, himself, was elected a Fellow of the Royal Society on 14 February 1754 and a photocopy of his certificate made from a photograph is included at the end of this chapter marked "Illustration 2."

Any presentation of the history of botany and zoology in the mid-eighteenth century must of necessity draw heavily upon the work of George Johnston, A history of the British zoophytes,[125] and this dissertation is no exception. More than 100 years before Brooke Hindle wrote his "Chapter Three The Doctors: Naturalists and Physicians,"[126] George Johnston had observed, "It was gratifying to remark that most of my predecessors in this field of inquiry (zoophytes) were members of the medical profession. How largely natural science, in all its branches, has been indebted for its progress to this body is too notorious to be insisted on; but it has been less noticed, that the men who occupied themselves in acquiring and forwarding a knowledge, which many may deem purely ornamental, were the same individuals who were most engaged in the active discharge of the duties of their profession, and the most instrumental to its

advance."[127]

Hindle, however, ascribed the large numbers of doctors in natural history as deriving from, "The eyes of the medical student were particularly directed toward botany because of the predominance of vegetable remedies and this bias served to increase the great attention that was lavished upon that branch of natural history," and he cited references for such conclusion.[128]

On the other hand, George Johnston (1847), writing in a considerably more prolix style, declared just as positively "Zoophytes present to the physiologist, the simplest independent structures compatible with the existence of animal life, enabling him to examine some of its phenomena in isolation, and free from the obscurity which which greater complexity of anatomy entails." Of course, he also cited references for such conclusion.[129] Obviously, these analyses differ fundamentally.

It may be suggested that both are correct in that a third force was in operation during that period which provided an amalgam of the two theories, namely, that many of those engaged in natural history during the mid-eighteenth century were of the opinion that there was a space or missing link between the animal and vegetable kingdoms that could be occupied by what was called in

those days, "zoophytes".[130] Today, the former zoophytes are known as the sessile forms of coelenterates, sponges and bryozoans. In turn, coelenterates include stony corals (Scleractinia), soft corals (Alcyonacea), sea-fans and sea-whips (Gorgonacea), black corals (Antipatharia), hydroids and their medusae or the small jellyfish (Hydroida), the larger jellyfish (Scyphozoa) and some minor groups.

It may further be suggested that there might have been yet another explanation for the predominance of medical doctors engaged in natural history because of the operation of educational forces. During the mid-eighteenth century it should be noted that the only form of scientific education was medicine. Hence, the large numbers of doctors in natural history is but a reflection of the basic scientific education available at that time.

Johnston traced the controversy over the animal versus vegetable nature of corals and other marine productions and states that, "in the works of Tournefort and Ray, the leading naturalists of the age immediately antecedent to the discoveries which led to the modern doctrines, the zoophytes . . . were arranged and described among sea-weeds and mosses without any misgivings concerning the propriety of doing so."[131] He then went through with considerable detail the findings

of the mineralogists who were the only ones in the period immemdiately subsequent to Tournefort and Ray who were in opposition to the botanical theory. He acknowledged the discoveries of Jean-Andre Peyssonnel, in 1727, that these marine organisms were animals. He pointed out that the entire community of naturalists ignored Peysonnel and his discoveries until the experiments of Abraham Trembley[132] in 1741. These experiments on the reproductive powers of some fresh-water polyps recalled to the mind of Reaumur,[133] a friend of Peyssonnel, the discoveries of his friend. Interest in finding a solution then ran very high and in 1741-1742 Bernard de Jussieu[134] and Guettard together visited different parts of the coast of France and satisfied themselves of the truth of the animal theory.

Bernard de Jussieu presented his findings to The Academie Royale des Sciences[135] in 1742. The work did not arouse the interest of the members and although Dr Donati presented an accurate description of a coral and its polyps his botanical language tended to support the plant theory. Finally, Peyssonnel in 1751 sent the Royal Society a manuscript on corals and other marine productions. Dr James Parsons reviewed the manuscript and in 1752 published his observations that what Peyssonnel was calling animals were only the temporary

settlers who had invaded the coral edifice. At the same time Henry Baker, using a microscope, reinstated the mineral theory, that corals are simply the accretion of mineral salts over time. It was at this time (1752) that Ellis became interested in the controversy and started his inquiries leading to the analysis and description of these 'marine productions' and the publications of his articles in the Philosophical Transactions.

He continued his research and in 1755 published his first major work on corallines. Spencer Savage (1948) who prepared the Calendar of the Ellis Manuscripts cautioned that Ellis was not the first to discover the animal nature of corals. This is attested to also by Johnston (1847), but that Ellis is to be credited for demonstrating the genera and species of corals in a most convincing way. That he had opposition despite this is quite evident from reading his letter of 18 June 1761 set forth in "Illustration 1" at the end of this chapter on the position of Dr Job Baster that corals are vegetable in nature. He also differed from Pallas as indicated in the Skene correspondence set forth in Chapter II. It should be made clear at this point that Ellis had no personal animosity toward Pallas. As a matter of fact in a letter of 26 November 1765 to Skene he remarked that "Dr Pallas, a Russian Physician now at the Hague, begs of

me a Specimen of the first Coralline or Sertularia which I call the Tamarisk coralline, if you have any plenty of it, I should be glad to oblige him, for he is one of my very kind benefactors."[136] Ellis was very complimentary of Pallas's ability. This is shown in a letter by Ellis to Skene dated 24 February 1767 where he wrote, "I have not yet got Pallas's book I mean since he finished it. . . I think it is a book worth having: I long to see the Latter part of it. I have seen the first, he is excellent at description, but I do not agree with him in classing the Isis and the true red Coral together."[137]

Linnaeus, in a letter to Ellis 16 September 1761, was also of the opinion that zoophytes were not animals and stated, "Zoophyta are constructed very differently, living by a mere vegetable life, and are increased every year under their bark, like trees, as appears from the annual rings in a section of the trunk of a Gorgonia. They are therefore vegetables, with flowers like small animals, which you have most beautifully delineated."[138] According to the view of Linnaeus, zoophytes were midway between plants and animals. George Johnston acknowledged the greatness of Linnaeus and admitted that many persons held this same view. Nonetheless, he concluded his observations on the controversy between the advocates of botany and zoology

for the placement of zoophytes by pointing out that Ellis's arguments swept the field, "and zoophytes including the sponges and corallines, have been ever since enumerated among the subjects of the animal kingdom."[139] His summation of Ellis is a beautiful one, "Ellis had indeed effected a revolution in the opinions of scientific men."[140]

In terms of summarizing the milieu in which Ellis worked, one can say that the controversy over the animal or vegetable nature of zoophytes engaged the attention of naturalists in the mid-eighteenth century to a considerable degree. These naturalists were mostly amateurs who earned their livelihood from activities unrelated to the sciences of botany or zoology. During this period in England the first professional biologist was Solander who got his job at the British Museum in 1763. Many of the upper echelon of society were interested in the expansion of knowledge in natural history. This interest manifested itself in the areas of collecting and forwarding specimens and making specimens in their own collections available to amateur scientists for observation, description, dissection and analysis.

To a significant degree those from the upper echelons of society supported by subscription the publications of the findings and the writings of the

naturalists of the period. In doing so, they participated in the expansion of the knowledge of natural history. From all of this data one can conclude that there was a larger group of persons who participated in this expansion of such knowledge than could be inferred from the term "natural history circle."

ILLUSTRATION 1

Mr. John Ellis begs the favour of the President and Council of the Royal Society that they will please to desire their Secretary to write to Doctor Job Baster FRS to send them a Specimen of each of the Corallines which he mentions in his paper read before the Royal Society the 22 of March and 2 of April last.

The Doctor there calls those bodies Corallines which have been hitherto called Corallines by Mr. Ray. Dr. Dillenius and Dr. Linnaeus.

This request is with no other view, than to prevent the Curious from being misled, and to illustrate a subject so much controverted of late. Besides, the Doctor's drawings are so extreamly bad, that it is impossible to find out what he means by them.

Mr. Ellis on his part has always produc'd his Specimens with his Memoirs before the Society for their inspection, and, that every one may be certain of what he has already describ'd, has presented his collection of these Bodies, with his Names annex'd to them, to the British Museum, where they are free for the Observation of the Curious.

Mr. Ellis observes, that Doctor Baster, who formerly affirm'd (see Phil: Transact. Vol: 50. p 258) that Corallines were no otherwise animals, than the Mushrooms, which are accidentally infested in the summer time with insects, are animals; is now convinc'd, that the inside of these Corallines call'd Sertularia, is indeed an animal, and grows up from an Egg with its arms, which he still insists is a vegetable; and thus he forms between them both, a new and middle order of beings, connecting the animal and

SOURCE: John Ellis to President and Council of the Royal Society of London, 18 June 1761, The Royal Society, MM.3.18.

ILLUSTRATION 1 (Continued)

and vegetable kingdoms together——

Perhaps some expressions in Dr. Linnæus's definition of a Zoophyte may have led the Doctor into this Mistake; but as Mr. Ellis is going soon to the sea side with Doctor Solander to demonstrate to him the animal nature of the external as well as internal parts of these bodies, he does not doubt, but that the Celebrated Professor will alter his Definition, and that he shall be able to convince Doctor Baster and many other Gentlemen, that the crustaceous or membranaceous, skins or coverings of these Animals, called Corallines or Sertularias, are as much of an animal Nature as the different exterior coverings of other sea or land animals.

London. June 18. 1765

ILLUSTRATION 2

68 Mr. John Ellis of Laurence Lane Merchant. No. 20

Having Expressed his Desire of being admitted into this Society, is Recomended by us upon our Personal knowledge as a Gentleman well Deserving of that Honour, by his — Eminent Skill in Several Branches of Natural knowledge of which he has given the Society Repeated Proofs, by his Communications.

Philip Carteret Webb
Peter Collinson
[illegible]
[illegible]
John Robertson
Arth. Pond
[illegible]
Cha Cavendish
[illegible]
[illegible]

London 15th. November 1753.

1 Novr. 22
2 — — 30
3 Decr. 6
4 — — 13.
5 — — 20.
6 Jany. 10. 1754
7 — — 17.
8 — — 24.
9 — — 31.
10 Febr. 7

Balloted and Elected Feby. 14. 1754

SOURCE: Certificates II.68, The Royal Society.

CHAPTER III

NOTES

[1]Brooke Hindle, The pursuit of science in revolutionary America 1735-1789, (Chapel Hill: University of North Carolina Press for the Institute of Early American History and Culture, 1956), p. 17.

[2]DNB, s.v. "Collinson, Peter," (1694-1768), was a naturalist and antiquary. While in a partnership with a brother, he became a prosperous Quaker merchant and had a large trade with the American colonies. In 1728 he was elected a Fellow of the Royal Society and had a high reputation as a botanist. He urged the American colonists to cultivate flax, hemp, silk and wine which led to the introduction of these items in some areas. He had a close connection with the scientific men in the colonies.

[3]DNB, s.v. "Colden, Cadwaller," (1688-1776), was a botanist, author and Lieutenant Governor of New York. He was educated at the university of Edinburgh and became an M.D. in 1705. His favorite study was botany and he sent between three hundred and four hundred descriptions of American plants to Linnaeus. He maintained a regular correspondence with the most eminent men of science in Europe and America.

[4]DNB, s.v. "Mitchell, John," (d. 1768), was a botanist and M.D. in England. Came to America about 1700 and resided at Urbana, Virginia. He devoted himself to botanical and other scientific studies and discovered several new species of plants. He returned to England in 1747 or 1748 and was elected to fellowship in the Royal Society in 1758.

[5]Encyclopedia Americana, international ed., s.v. "Bartram, John," (1699-1777), was born near Darby, Pennsylvania and became interested in botany as a young farm boy. He founded a botanical garden at Kingsessing, Pennsylvania and began there what were probably the first experiments in hybridization. He was not especially interested in the details of classification. He is frequently called the "father of American botany." He was in constant correspondence with European botanists

and sent them plant specimens.

[6]Hindle, The pursuit of science, p. 30.

[7]DAB, s.v. "Redwood, Abraham," (1709-1798), was born into wealth. His father married the daughter of a wealthy planter on the island of Antigua and the son, by age forty, had established an ample fortune. At his estate near Portsmouth he developed a large botanical garden and by means of hot-houses introduced all kinds of tropical fruits and flowers.

[8]DAB, s.v. "Laurens, Henry," (1724-1792), was a merchant, planter and Revolutionary statesman. He had extensive overseas trade consisting of rice, deerskins, indigo, wine, slaves and indentured servants as a member of a Charleston partnership with George Austin and George Appleby. Laurens later withdrew from the slave business. His landholdings totalled some 20,000 acres and his main farm was a three thousand acre estate some thirty miles above Charleston where he raised rice and indigo. He was active in the political affairs of South Carolina and in all colonial affairs. He was elected to the Continental Congress in 1777 and served on several important committees.

[9]DAB, s.v. "Byrd, William," (1674-1744), was a planter, author and colonial official. He studied in London and returned to Virginia in 1692 when he was elected to the House of Burgesses. In 1698 he acted as agent for the colony. He was a fellow of the Royal Society. In 1728 he served as one of the commissioners to survey the dividing line between Virginia and North Carolina.

[10]"Custis, John," of Williamsburg was born in Northampton in 1738. Little is known about him other than what can be derived from the correspondence between him and Peter Collinson. This correspondence has been published by E. G. Swem in the article, "Brothers of the Spade, Correspondence of Peter Collinson, of London, and of John Custis of Williamsburg, Virginia, 1734-1746," Proceedings of the American Antiquarian Society, 58:17-75. These letters reveal a strong interest in gardening, the receipt of plants and flowers from friends in England, the sending of seeds and plants to Collinson and the reciprocal shipment of roots and plants from Collinson to Custis.

[11]DAB, s.v. "Read, Charles," (c. 1713-1774), was a

lawyer, landowner who attained prominence as a jurist and statesman in colonial New Jersey. He was also greatly interested in agriculture and carried on experiments to improve farm practices. His manuscript on the various phases of farming ranks among the most fruitful known sources of information on agriculture in the American colonies.

[12]Hindle, The pursuit of science, p. 30.

[13]Ibid., pp. 30-31.

[14]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):149.

[15]Savage, Calendar of the Ellis manuscripts, pp. 1-4.

[16]F. J. G. Robinson and P. J. Wallis, Book subscription lists, (Newcastle-Upon-Tyne: printed by Harold Hill & Son Ltd., for The Book Subscriptions List Project, 1975), Preface and Introduction.

[17]P. J. Wallis, "The MacLaurin 'circle': the evidence of subscription lists," Bibliotheck, 1982:45.

[18]Borlase, The natural history of Cornwall, pp. xiii-xvi.

[19]Borlase, Observations on the antiquities historical and monumental of the County of Cornwall, (Oxford: printed for the author by W. Jackson, 1754), pp. viii-xi.

[20]Edwards, Gleanings of natural history, Part II., (London: printed for the author at the Royal College of Physicians, 1760), pp. b-e.

[21]Edwards, Gleanings of natural history, Part III., London: printed for the author at the Royal College of Physicians, 1764), pp. 2-3.

[22]DNB, s.v. "Browne, Patrick," (1720?-1790), author of The civil and natural history of Jamaica, was born about 1720. Obtained the degree of M.D. in Leyden in 1743. While there he made the acquaintance of Gronovius and began a correspondence with Linnaeus which continued till his death.

[23]Patrick Browne, The civil and natural history of

Jamaica, (London: B. White and Son, 1789), A list of subscribers.

[24]Hindle, The pursuit of science, p. 12.

[25]DNB, s.v. "Brander, Gustavus," (1720-1787), was a wealthy merchant and antiquary having inherited the fortune of his uncle, Mr. Spicker. He was born in London, became a fellow of the Royal Society, a curator of the British Museum and one of the first supporters of the Society for the Encouragement of Arts. He collected fossils and later presented them to the British Museum.

[26]DNB, s.v. "Baker, Henry," (1698-1774), was a naturalist and a poet. In 1740, he was elected a fellow of the Royal Society and began to make experiments on polyps which were published in the Philosophical Transactions. He also published a work called The microscope made easy. In 1744 he was awarded the Copley medal for his microscopical experiments on the crystallizations and configurations of saline particles.

[27]Encyclopedia Americana, international ed., s.v. "Bartram, William," (1739-1823), the son of John Bartram was a traveler and naturalist. Born in Kingsessing, Pennsylvania in 1739. He corresponded with European naturalists and after the death of his father, he and his brother, John, managed the Kingsessing Gardens.

[28]DNB, s.v. "Costa, Emanuel Mendes da," (1717-1791), was the son of a Jewish merchant who intended to go into the legal profession. He served his articles of apprenticeship in the office of a notary. In his early years was an enthusiastic student of natural history and excelled in conchology and minerology. Was elected a fellow of the Royal Society in 1747 and enriched the Philosophical Transactions with many papers on his favorite subjects. Was in correspondence with many of the most celebrated naturalists of Europe.

[29]DNB, s.v. "Parsons, James," (1705-1770), physician and antiquary was born at Barnstaple, Devonshire and educated in Dublin. He was elected a fellow of the Royal Society in 1741 and made numerous contributions to the Philosophical Transactions.

[30]Roll of the Fellows of the Royal Society, manuscript compiled by William Bulloch, M.D., F.R.S., in the Library of the Royal Society, London, Folio 1653, s.v. "Isaac Romilly," was the 2nd son of Stephen Romilly

of Montpellier, France and afterwards of Hoxton, Middlesex where he settled about 1701 after the revocation of the Edict of Nantes. He was elected a fellow of the Royal Society in 1757 and died in 1759.

[31]DNB, s.v. "Ehret, Georg Dionysius," (1710-1770), was a botanic draughtsman born at Erfurt. He received little education, but as a boy began to draw the plants in the fine garden his father cultivated. He met Linnaeus near Haarlem in the Netherlands and contributed the drawings which illustrated the fine folio published by Linnaeus as Hortus Cliffortianus in 1737. He came to London about 1740 and illustrated Browne's Jamaica, and contributed some of the illustrations in Ellis's Corallines and Ellis & Solander's Zoophytes.

[32]DNB, s.v. "Fothergill, John M.D.," (1712-1780), was a physician in London from 1740 until 1778. A most competent and successful medical practitioner of his day. He was a Quaker and a great philanthropist. He was keenly interested in science and spent much money and effort in attempting to introduce coffee, tea and bamboo into the American colonies. He was a close friend of Ellis and a letter of his containing certain medicinal recommendations to Ellis is in the Ellis MSS in the Linnean Society of London.

[33]DNB, s.v. "Pennant, Thomas," (1726-1798), attributed his early taste for natural history to having received a copy of Francis Willoughby's Ornithology when he was twelve. In 1746, while an undergraduate at Queen's College, Oxford, he made a trip to Cornwall where Dr Borlase encouraged him in the study of minerals and fossils. In 1755 he began a correspondence with Linnaeus and at his instance was elected a member of the Royal Society of Upsala in 1757. In 1767 he was elected fellow of the Royal Society of London. The publication of the first part of his British zoology was in 1766. The sale of the complete work produced profits which he donated to the Welsh school near Gray's Inn Lane, London. At the Hague he met Pallas the Dutch naturalist to whom he became much attached. His favorite work was the History of quadrapeds. His name stands high among the naturalists of the eighteenth century.

[34]DNB, s.v. "Russell, Alexander," (1715?-1768), born in Edinburgh was a physician and naturalist. He was educated at the University of Edinburgh. Came to London in 1740 and that same year went to Aleppo as physician to the English factory. Sent seeds of the true scammony to

his fellow-student and correspondent, Dr John Fothergill. Returned to London in 1755 and at the suggestion of Dr Fothergill published Natural history of Aleppo. Elected a fellow of the Royal Society in 1756.

[35]Biographie Universelle, Ancienne et Moderne, 1817 ed., s.v. "Gronovius, Johann Friedrich," (1690-1760), applied himself to the study of jurisprudence and became a magistrate. He was successful in botanical studies and was a friend of Clayton and Linnaeus. He published Flora Virginica based on the work of John Clayton.

[36]DNB, s.v. "Pond, Arthur," (1705?-1758), was educated in London and made a short stay in Rome for purposes of studying art. He became a successful portrait painter. He was elected a fellow of the Royal Society in 1752 and died in 1758.

[37]DNB, s.v. "Hales, Stephen," (1677-1761), physiologist and inventor was educated at Corpus Christi College, Cambridge and received an M.A. in 1703 and B.D. in 1711. In 1733 he was created D.D. by diploma of the University of Oxford. In 1718 became a fellow of the Royal Society and in 1739 received the Copley medal of that society. The plant Halesia was named in his honor by the naturalist, John Ellis (the subject of this paper). In 1751 he was appointed clerk of the closet to the Princess-Dowager, and chaplain to the prince, her son. He was distinguished as a botanical and animal physiologist. His most important book, Statical Essays, deals with both subjects. He did many experiments on gases and led the way for the work of Priestly and others to manipulate gases by collecting them over water. His work on blood pressure may rank second in importance to Harvey's in founding the modern science of physiology. His best known invention was that of artificial ventilators.

[38]Roll of the Fellows of the Royal Society, Folio 1632, s.v. "Jan Albert Schlosser M.D.," (1733-1769), was graduated at Leiden 1753 with a thesis "De sale urinae humanae nativo." He lived in Utrecht and in Amsterdam. Became a fellow of the Royal Society 22 January 1756 and died 1769, aged 36. Folio 1632.

[39]Raymond Phineas Stearns, "Colonial Fellows of The Royal Society of London, 1661-1778," Notes and Records of the Royal Society of London, 8 (1951):190.

[40]John Ellis, "An Account of an Amphibious Bipes,"

Philosophical Transactions, 56:189.

[41]John Ellis, "An Account of an Encrinus, or Starfish with a jointed Stem, taken on the Coast of Barbadoes, which explains to what kind of Animal those Fossils belong, called Starstone, Asteriae, aand Astropodia, which have been found in many Parts of this Kingdom," Philosophical Transactions, 52:357.

[42]John Ellis, "An Account of the Male and Female Cochineal Insects, that breed on the Cactus Opuntia, or Indian Fig, in South Carolina and Georgia," Philosophical Transactions, 52:661.

[43]John Ellis, "A Letter from Mr. John Ellis, F.R.S. to Mr. Peter Collinson, F.R.S. concerning the animal Life of those Corallines, that look like minute Trees, and grow upon Oysters and Fucus's all round the Seacoast of this Kingdom," Philosophical Transactions, 48:627.

[44]Ellis to President and Council of the Royal Society, London, 18 June 1761, Library of the Royal Society of London, MM.3.18.

[45]Enciclopedia Universal Ilustrada, Hijos de J. Espasa, Editores, s.v. "Baster, Job," (1711-1775), was a naturalist from Holland. He received the M.D. degree from Leiden in 1731 and wrote an erudite thesis called De osteogenia. He had an especial attraction for the study of natural science and published a monograph on opium.

[46]DSB, s.v. "Guettard, Jean-Etienne," (1715-1786), was a versatile scientist trained in medicine and chemistry. He gradually acquired knowledge of the various branches of natural history. Most of his career was devoted to geology. His reputation rests upon his discovery of the volcanic nature of Auvergne, France and his attempt to construct a geological map of France.

[47]Emanuel Mendes da Costa to Ellis, 17 April to 1755. Ellis MSS in the Library of the Linnean Society of London.

[48]E. G. Swem, "Brothers of the Spade," Proceedings of the American Antiquarian Society, 58 (1949):36.

[49]Roll of the Fellows of the Royal Society, Folio, s.v. "Edward Wright M.D.," was in practice in Edinburgh and died at Kersie, Scotland 20 August 1761. He was admitted as a fellow of the Royal Society 5 April 1759

and his certificate described him as of "Kersey in the County of Stirling." He made a number of contributions to the Philosophical Transactions.

[50]Certificates II.176. Library of the Royal Society of London.

[51]Stearns, "Colonial Fellows," Notes and Records of the Royal Society of London, 8 (1951):190.

[52]Ibid., 8 (1951):192-194.

[53]Ellis and Solander, The natural history of zoophytes, p. 59.

[54]Ibid., p. 58.

[55]Cornelius, "Notes on the hydroid, Synthecium evansi," Bulletin British Museum Natural History (Zoology), 38 (1980):7.

[56]Dr Paul F. S. Cornelius (Head of the Cnideria Section) of the Department of Zoology of the British Museum (Natural History).

[57]Cornelius, "Notes on the hydroid, Synthecium evansi, Bulletin British Museum Natural History (Zoology), 38 (1980):7.

[58]B. P. Lenman and J. B. Kenworthy, "Dr. David Skene, Linnaeus, and the Applied Geology of the Scottish Enlightenment," Aberdeen University Review, xlvii (1977), pp. 32-44. "Dr. David Skene, who was born in Aberdeen on 13 August 1731, into a family of eminent physicians, is an underestimated figure in the history of the Scottish Enlightenment. This derives largely from his early death in 1770 at the age of thirty-nine, for he left behind him papers on natural history which leave little doubt he would eventually have published work calculated to establish him as a significant thinker." "Skene, who so far lacks an adequate modern biography, would appear to have been introduced to Linnaeus as a correspondent by John Ellis". Skene received his M.D. from King's College in 1753. He died in 1770. See also, Ray Desmond, Dictionary of British and Irish botanists and horticulturists, (London: Taylor & Francis, Ltd., 1977), p. 562 and Proceedings of The Royal Society of Edinburgh, (Edinburgh: printed by Neill and Company, 1762), 4:164-167.

[59]Ellis to Skene, 26 March 1765, David Skene MSS, MS.38/91.

[60]Ibid.

[61]Ellis to Skene, 1765, David Skene MSS, MS.38/94.

[62]Roll of the Fellows of the Royal Society, Folio 2020, s.v. "John Greg," was of Dominica. He was elected a fellow of the Royal Society, 9 July 1772 and his certificate was signed by Joseph Banks and Daniel Solander. He died in 1795.

[63]Ellis and Solander, Natural history of zoophytes, pp. 17, 65, 81, 82, 83, 87, 92, 95, 109, 114 and 180.

[64]DNB, s.v. "Hill, Wills, first Marquis of Downshire," (1718-1793), was the second and only surviving son of Trevor, first viscount Hillsborough. He became active in politics and represented the boroughs of Warwick and Huntingdon from 1741 until he was created an English Peer and took his seat in the House of Lords in 1756. In 1763 he was appointed President of the Board of Trade and Plantations in place of Lord Shelburne and resigned this post in 1765. He was re-appointed to the Board of Trade in 1766 as a member and became president again in 1782 but occupied the position for only several months. He was elected a fellow of the Royal Society in 1764. He took an active part in American colonial affairs.

[65]Ellis and Solander, Natural history of zoophytes, pp. 5, 6 (mentions two specimens), 7, 82 and 92.

[66]Ibid., pp. 37 (two specimens), 42, 44, 54, 63, 86, 93, 96 (two specimens), 101 and 102.

[67]Ellis and Solander, Natural history of zoophytes, p. 107.

[68]Ibid., pp. 30, 75, 149 and 181.

[69]Ibid., pp. 58 and 80.

[70]DNB, s.v. "Banks, Sir Joseph," (1743-1820), became interested at an early age in botany and attracted attention while at Oxford for his knowledge of natural history. In 1766 he was elected a fellow of the Royal Society, was chosen president of that society in 1778 and held that post until his death in 1820. He became close

friends with Daniel Solander, an outstanding student of Linnaeus. Banks's father had died in 1761 leaving the son a considerable fortune. Because of his influence with Lord Sandwich, First Lord of the Admiralty, Banks obtained permission to accompany Cook's expedition in the Endeavour. He took Solander with him.

[71]DNB, s.v. "Solander, Daniel Charles," (1736-1782), was born in Norrland, Sweden and his father was a clergyman. He studied under Linnaeus who called him his 'much loved pupil,' and later, recommended him as envoy for his ideas on classification. He came to London at the request of John Ellis and Peter Collinson. He soon learned English and introduced the Linnaean learning. He was engaged, on Collinson's recommendation, to catalogue the natural history collections in the British Museum and was appointed assistant librarian there in 1763. He accompanied Sir Joseph Banks on Cook's expedition in the Endeavour. In 1773 he was made keeper of the Natural History Department at the British Museum. He was elected a fellow of the Royal Society in 1764. He edited Linne's Elementa Botanica, described the fossils in Gustavus Brander's Fossilia Hantoniensia, and among many other activities assisted in places with John Ellis's Natural history of zoophytes.

[72]Ellis and Solander, Natural history of zoophytes, p. 140. Divers had fished up these species near islands in the "South Sea".

[73]Ibid., pp. 144-145. Banks and Solander saw large quantities of this species on the coast of New South Wales. In connection with this species called Tubipora musica, Ellis reported a strange native use which is quoted in full as follows: "They are likewise found in great plenty in the Red Sea, and among the Molucca islands, where the natives call them, in the Malay language, Batu-Swangi, that is, the Magicians stone; for the inhabitants of those islands think they have a magical virtue in them, and, for that reason, hang them on trees, to keep thieves from the fruit; it being a prevailing opinion among them, that those who attempt to steal, where they are hung up, will be seized with a breaking out full of red pimples. They are also careful not to sit on them for fear of the strangury. On the contrary, the people of Java and Malacca give both old and young the powder of this Red Coral against the strangury. The inhabitants of the Celebes put some of the powder on any wound that is made by a venomous creature, and for this purpose always carry a small piece

of it about them."

[74]Ibid., p. 142.

[75]DNB, s.v. "Sloane, Sir Hans," (1660-1753), studied at the university of Orange and became an M.D. in 1683. He learned botany under Pierre Magnol and Tournefort and was elected a fellow of the Royal Society in 1685. He went to the West Indies in 1687 as physician to the Duke of Albemarle, governor of Jamaica and stayed there fifteen months making many natural history observations and collections. He was elected Secretary of the Royal Society and held office till 1712. The publication of the Philosophical Transactions which had been suspended since 1687 was revived by him and he contributed papers to it. He served as President of that Society from 1727 to 1741. He wrote A voyage to the Islands of Madeira, Barbadoes, Nieves, St. Christopher's, and Jamaica and the Natural history of Jamaica. In 1732 he was one of the promoters of the colony of Georgia.

[76]Ellis and Solander, Natural history of zoophytes, p. 86.

[77]DNB, s.v. "Pigot, George, Baron Pigot," (1719-1777), entered the service of the East India Company in 1736 as a writer. He was a member of the council at Madras, became governor in 1755, and resigned in 1763 to return to England. He became a baronet in 1764. In 1775 was again appointed governor of Madras and became involved in a power struggle between the nabob of Arcot and the raja of Tanjore. He was ordered in 1777 to give up his post and return to England but he died in 1777 while still under arrest. (Although there is nothing in his biography to suggest that he was interested in natural history, the fact remains that he was a collector of zoophytes).

[78]DNB, s.v. "Cavendish, Lady Margaret," (1715-1785), was the only daughter and heiress of the last Earl of Oxford. In 1734 she married William Bentinck, second duke of Portland. Their eldest son, William Henry Cavendish was the third duke of Portland (1738-1809) who became Prime Minister in 1793. See also Paul-Emile Schazmann, The Bentincks: the history of a European family, (London: Weidenfeld and Nicolson, 1976), p. 174-175. Margaret Cavendish Bentinck collected corals, rare plants and fossils. She invited Daniel Solander to supervise the design and care of the gardens at her estates at Bulstrode and Welbeck and employed him as the

curator of her magnificent museum.

[79]Biographie Universelle, Ancienne et Moderne, 1811 ed., s.v. "Bohadsch (Jean-Baptiste)," (d. 1772), was professor of botany and natural history in Prague. He published several works in German, of which the most important deal with domestic economy. In one of them entitled Description de quelques plantes de la Boheme qui neuvent etre utiles dans l'economie domestique et l'art de la teinture, Prague, 1755 in 8° (Description of some plants of Bohemia useful in domestic economy and the art of dyeing), he recommended the Bohemian cow-parsnip as food for the poor as well as Lathyrus tuberosus or tuberous vetch (an herbaceous twining leguminous plant). He also suggested of substitution of the sour juice of the sorrel plant in place of lemon and to give sheep and pigs chopped rushes as food as was done in Sweden. Finally, he set out the advantages of growing woad (an herb of the mustard family) for dye. He also published De quibusdam animalibus marinis, Dresden, 1761 (on certain marine animals).

[80]Ellis and Solander, Natural history of zoophytes, p. 64.

[81]See footnote 70 in Chapter II for the biography of William Borlase. Although Ellis described him as "Rev Dr William Borlase" his highest academic degree was M.A. and he did not attend medical school.

[82]Ellis and Solander, Natural history of zoophytes, pp. 117 and 132.

[83]Ibid., p. 27.

[84]DNB, s.v. "Catesby, Mark," (1679?-1749), was born, probably, in London. He studied natural science and went to America in 1710. He traveled extensively in the colonies and returned to London in 1719, with, reputedly, the most perfect collection of plants ever brought from America. This attracted the attention of Sir Hans Sloane who financed Catesby to return to America in 1722, where he stayed four years. He returned to London and wrote his best known work, Natural history of Carolina, Florida, and the Bahama Islands.

[85]Ellis and Solander, Natural history of zoophytes, p. 15.

[86]Ibid., p. 21. The Rev Mr Clarke who contributed

this specimen cannot be identified. In all of Ellis's writings this is the only place he is mentioned and he does not appear in the Ellis MSS. There are several persons named "Clarke" listed in the DNB but none of them can be identified as the one Ellis referred to.

[87]Enciclopedia Universal Ilustrada Europeo-Americana, s.v. "Donati, Vitaliano," (1713-1763), was born in Padua into the family of Corso Donati. He studied at the University of Padua and was much attached to natural history. He traveled in Italy, Bosnia and Albania in order to augment the collections Pope Benedicto XIV had encouraged him to form. He was a member of the Swiss Academy and the Royal Society of London. Linnaeus named a plant in his honor.

[88]Ellis and Solander, Natural history of zoophytes, pp. 88 and 91.

[89]DSB, 1974 ed., s.v. "Gaertner, Joseph," (1732-1791), was the son of a court physician and originally was destined for the church, then law and finally medicine. He received the M.D. degree from Tubingen in 1753 but did not practice medicine. He became professor of anatomy at Tubingen, professor of botany at St. Petersburg, cataloger of the empress' cabinet of curiosities and botanical traveler with Count Grigory Orlov in the Ukraine where he discovered many undescribed plants. He is best known for his De fructibus et seminibus plantarum which describes the fruits and seeds of 1,050 genera. See also Biographie Universelle, Ancienne et Moderne, 1816 ed., wherein it is reported that he wrote a dissertation in 1753 under the supervision of Jean-George Gmelin on the urinary tract. He became occupied in experimental physics and constructed a fine telescope, solar microscope and various optical and astronomical instruments. He became a member of the Royal Society of London.

[90]Ellis and Solander, Natural history of zoophytes, pp. 2, 3 and 4.

[91]DNB s.v. "Morris, Corbyn," (d. 1779), was appointed secretary of customs and salt duty in 1751. He was an able administrator and submitted several suggestions for the better regulation of the customs and salt duties. His salary was £500 per annum. He was a competent statistician and his economic works are valuable. He was elected a fellow of the Royal Society in 1757.

[92]Ellis and Solander, Natural history of zoophytes, p. 103. This specimen was brought from South Carolina by an unidentified person who presented it to Corbyn Morris who in turn gave it to Ellis. The species had never been described prior to Ellis's description.

[93]Encyclopaedia Britannica, s.v. "Pallas, Peter Simon," (1741-1811), displayed at an early age a strong interest in natural history and at the age of fifteen had outlined new classifications of certain groups of animals. He was the son of Simon Pallas, professor of surgery in Berlin and had intended going into the medical profession. In 1761 he came to England to study natural history collections and was elected a foreign member of the Royal Society when he was but twenty-three. He was appointed professor of natural history in the Imperial Academy of Science, St. Petersburg in 1768 and in that year was appointed naturalist of a scientific expedition to Russia and Siberia. (Although the biographical sketch does not indicate that he became a doctor of medicine, some of his published works indicate in the title that he was an M.D. See, P.S. Pallas Medicinae Doctoris, Miscellanea Zoologica, (Hagae Comitumm, Apud Petrum van Cleef, 1766) and Dierkundig Mengelwerk Door Den Hooggel Heer P.S. Pallas, M.D., (Teutrecht, by Abraham van Paddenburg en J. van Schoonhover, 1770). See also Roll of the Fellows of the Royal Society, Folio 1807. He became at M.D. at Leiden and went to Russia at the request of the Empress Catherine II and made extensive travels in Siberia, Altai and Lower Volga. He published large works on his travels. He finally returned to Berlin where he stayed until his death.

[94]Ellis and Solander, Natural history of zoophytes, pp. 55 and 181.

[95]DNB, s.v. "Parsons, John," (1742-1785), was born at York and was admitted as a King's scholar at Westminster in 1756. He received his B.A. in 1763 and M.A. in 1766, both from Christ Church, Oxford. Later, he studied medicine at Oxford, London and Edinburgh and showed a preference for natural history and botany. He received the degree of M.B in 1769 and M.D. in 1772 also from Oxford.

[96]Ellis and Solander, Natural history of zoophytes, p. 14. While Ellis called him "my worthy friend Mr. Parsons, M.B. professor of chemistry at Christ College, in Oxford," he is without doubt the same person as the aforementioned Dr John Parsons.

[97]Ibid., p. 14. Ellis addressed him as "my learned friend Thomas Pennant, Esq. F.R.S."

[98]Roll of the Fellows of the Royal Society, Folio 1872, s.v. "William Webber," (d. 1796), was living in Queen Square, Bloomsbury, at the date of his election as a fellow of the Royal Society. This occurred 5 June 1766. At the time of his death on 30 November 1796 he lived at Vanburgh House Blackheath, Kent.

[99]Ellis and Solander, Natural history of zoophytes, pp. 66 and 101. Ellis stated that these specimens [curious animals] were brought from Batavia by William Webber, Esq. F.R.S. Batavia is now called Jakarta which is a city and port of Indonesia in NW Java.

[100]John Ellis, An essay towards a natural history of the corallines, and other marine productions of the like kind, commonly found on the coasts of Great Britain and Ireland. To which is added the description of a large marine polype taken near the North Pole by the whale-fishers, in the summer of 1753, (London: printed for the author; sold by A. Millar, 1755). The volume in the Library of the Royal Society bears the hand written date "March 6, 1755" together with the handwritten notation "Ellis's Handwriting." This fixes the approximate publication date.

[101]Stearns, "Colonial Fellows," Notes and Records of the Royal Society of London 8 (1951):192-194.

[102]Jacques Roger, "The living world," The ferment of knowledge, eds. G. S. Rousseau and Roy Sydney Porter, (London: Cambridge University Press, 1980) p. 261.

[103]Ellis to Skene, 22 October 1765, David Skene MS.38/96.

[104]Ellis to Skene, 14 July 1766, David Skene MS.38/100.

[105]Ellis to Skene, 26 November 1765, David Skene MS.38/95.

[106]Ellis to Skene, 24 February 1767, David Skene MS.38/103.

[107]Stearns, "Colonial Fellows," Notes and Records of the Royal Society of London 8 (1951):105.

[108]Ibid., Notes and Records of the Royal Society of London 8 (1951):222-239.

[109]Roll of the Fellows of the Royal Society, Folio 1628, s.v. "Peter Ascanius M.D.," was a Swedish scientist who lived in the first half of the 18th century. For a long time he was Inspector of mines in Norway and made a special study of mineralogy. He published papers in the 'Philosophical Transactions' and visited London in 1755. (This was probably for the purpose of being admitted as a fellow of the Royal Society for the date of his election is 11 December 1755).

[110]DSB, s.v. "Peyssonnel, Jean Andre," (1694-1759), studied medicine at the University of Aix. He began practice in Marseilles, which in 1720 suffered a plague epidemic. For his services on behalf of the victims, he was rewarded with a royal pension. He was interested in marine natural history and studied corals. He confirmed the work of Count Luigi Marsigli of the "flowering" of corals that had been established by the latter twenty years earlier. Did research on corals in 1726 and reported that corals were animals not plants. The text of his findings was read by Reaumur in 1726 to the French Academy but Reaumur did not reveal the author's name for fear of the consequent ridicule. He continued his research in Guadeloupe from 1727 to 1733. His results provided complete confirmation of his earlier assertions and this fact was communicated in a letter to Antoine de Jussieu in 1733. He sent a manuscript on corals to the Royal Society 1752 which was published in the Philosophical Transactions. See also, Roll of the Fellows of the Royal Society, Folio 1633. He was admitted as a fellow of the Royal Society on 5 February 1756.

[111]Roll of the Fellows of the Royal Society, Folio 1702, s.v. "David van Royen, M.D.," was a nephew of Adrianus van Royen F.R.S. 1728. He was born in Leiden in 1729 (1727?) and studied under his uncle. He became an M.D. in 1752. In 1754 he succeeded his uncle as Professor of Botany in Leiden and retained the post till 1786. He was an excellent botanist and conducted an extensive correspondence with Linneaus. He was elected as a fellow of the Royal Society, 6 December 1759, and died in 1799.

[112]Roll of the Fellows of the Royal Society, Folio 1878, s.v. "Rev Henry Putnam," was one of the ministers of the Dutch Church at Austin Friars, London, from 1751-

1797. Was elected a fellow of the Royal Society, 8 January 1767. See also, Sylvanus Urban, The Gentleman's Magazine, (London: 1797), printed the following eulogy: "His learning and piety were eminently conspicuous . . . He was, from principle, a sincere Christian; and, though bred a Calvinist detested that spirit of bigotry and intolerance with which many of its followers were actuated. No man was more firmly attached to the present Government; and few men have passed through this malevolent world better beloved and less censured than he. He died in his house at Austin Friars 1 March 1797." p. 256.

[113]Encyclopaedia Britannica, s.v. "Hunter, John," (1728-1793), was an outstanding surgeon who also carried out many highly original and important studies and experiments in many areas of comparative biology, anatomy, physiology and pathology. He was born in 1728 and never completed a course of studies in any university. He studied anatomy under his brother William Hunter, a distinguished medical teacher and practitioner. He was admitted a member of the Corporation of Surgeons in 1768 and excelled in surgery. He was keenly interested in natural history and was elected a fellow of the Royal Society in 1767.

[114]DNB, s.v. "Woulfe, Peter," (1727?-1803), was a chemist and mineralogist. He was elected a fellow of the Royal Society in 1767. That same year he contributed a paper to the Philosophical Transactions in which he described an apparatus for the passing of gases through liquids which has since then carried the name of "Woulfe's bottle." Prior to that no convenient method had been known for obtaining concentrated solutions of soluble gases or for purifying insoluble gases from soluble impurities.

[115]DNB, s.v. "Fludyer, Thomas," (d. 1769), was the brother of Sir Samuel Fludyer, Lord Mayor of London. Both brothers began their careers with very limited finances but by extraordinary industry, and good fortune acquired inordinate wealth. Thomas became a common councillor in London for Aldgate. He succeeded his brother for one year as M.P. for Chippenham in 1768 when the latter died. See also, Roll of the Fellows of the Royal Society, Folio 1886. Thomas Fludyer was the son of Samuel Fludyer, a clothier of London. His mother, Elizabeth, was the daughter of Francis de MonSallier of Shoreditch a French Protestant refugee. Thomas received his Knighthood 9 November 1761 from George III when that

monarch honored his brother, Sir Samuel Fludyer, then Lord Mayor with his presence at a banquet. Sir Thomas sat in Parliament for Great Bedwin and after that for Chippenham.

[116]Roll of the Fellows of the Royal Society, Folio 1926, s.v. "Daniel Harris," (d. 1775), was mathematics master at Christ's Hospital. He was elected unanimously as a fellow of the Royal Society 24 March 1768.

[117]DNB, s.v. "Hewson, William," (1739-1774), was born at Hexham, Northumberland. He came to London in 1759 and lived with John Hunter and attended the anatomical lectures of Dr. William Hunter. In 1762 he entered into partnership with Dr. William Hunter to give lectures at the latter's anatomical school. In 1768 he did research on the lymphatic system in fishes, gave a paper on the subject to the Royal Society and received the Copley medal for it. In 1770 he was elected a fellow of the Royal Society. In 1772 he broke with Dr. William Hunter and began to lecture on his own account. He contributed many papers to the Philosophical Transactions.

[118]Roll of the Fellows of the Royal Society, Folio 1996, s.v. "Sir William Duncan Bart.," (1715?-1774), was the younger son of Alexander Duncan of Lundie and the uncle of Admiral Adam Duncan, Viscount Camferdown. Received the M.D. at St. Andrews in 1751 and was admitted a Licentiate of the College of Physicians in 1756. He was physician in ordinary to George III and was created a Baronet in 1764. Was elected a fellow of the Royal Society 14 November 1771. He died at Naples in 1774 and was buried at Hampstead when the Baronetcy became extinct. See also William Munk, The Roll of the Royal College of Physicians of London, (London: published by the College, Pall Mall East, 1878), Second Edition, 2:211-212.

[119]DNB, s.v. "Blagden, Sir Charles," (1748-1820), was graduated M.D. at the university of Edinburgh in 1768. For fifty years he enjoyed the friendship of Sir Joseph Banks, president of the Royal Society and owed his election as Secretary to the society in 1784 as a result of this friendship. He was elected fellow of the Royal Society in 1772. He was a careful worker in physical research and contributed many papers to the Philosophical Transactions.

[120]Roll of the Fellows of the Royal Society, Folio 2022, s.v. "Humphry Jackson, M.D.," (1717-1801), was

elected a fellow of the Royal Society 19 November 1772. At the date of his election he was described as "Of Tower Hill" and as the discoverer of a method of making isinglass from British materials and also as the inventor of a method of preserving naval timber from decay.

[121]Roll of the Fellows of the Royal Society, Folio 2024, s.v. "John Lauder," was elected a Fellow of the Royal Society 24 December 1772. In his certificate he was described as "Of Hampstead," and no other data are available.

[122]Charles Irving. His certificate of recommendation for fellowship in the Royal Society stated that he was a "Surgeon in Scotland Yard, Westminster." However, when the balloting took place for admittance he was rejected on 28 January 1773. No evidence is available as to why this occurred. It can only be surmised that he lacked support from the membership. Certificates of candidature of the Royal Society, III/144.

[123]DNB, s.v. "Blyke, Richard," (d. 1775), was the son of Theophilus Blyke, deputy secretary-at-war. He was a native of Hereford and an antiquary. He became deputy-auditor of the office of the Imprest and was a fellow of the Royal Society and the Society of Antiquaries. See also Certificates of candidature of the Royal Society, III/153.

[124]DNB, s.v. "Blake, John Bradby," (1745-1773), was a naturalist and received his education at Westminster School. In 1766 he was sent out to China by the East India Company and lived in Canton. There he devoted all his spare time to the advancement of natural science. His plan was to procure the seeds of all vegetables found in China which are used in medicine or food or in any way useful to mankind and to send these plants and seeds to be propagated in Great Britain, Ireland and the British colonies. The plan was successful and Cochin-China rice was grown in Jamaica and South Carolina and the tallow tree prospered in Jamaica and Carolina. By too close attention to these pursuits he contracted a disease of which he died at Canton in 1773. See also Certificates of candidature of the Royal Society, III/182. "News of his death having come to his Father, his petition for admission as a Fellow of the Royal Society was withdrawn 19 May 1774".

[125]George Johnston, A history of the British zoophytes, (London: John van Voorst, 1838) and A history

of the British zoophytes, 2nd ed., 2 vols. (London: John van Voorst, 1847).

[126]Hindle, The pursuit of science, p. 36.

[127]Johnston, British zoophytes, 1:vii.

[128]Hindle, The pursuit of science, pp. 36-37.

[129]Johnston, British zoophytes, 1:xiii-xiv.

[130]Ibid., 1:1.

[131]Ibid., 1:408-409.

[132]DSB, s.v. "Trembley, Abraham," (1710-1784), was educated at the Academy of Geneva and later found employment as a tutor in Holland. His career was greatly influenced by his residence at Leiden. It was near here, at the Hague, that he carried out his researches on Hydra that gained him fellowship of the Royal Society in 1743 and made him famous.

[133]DSB, s.v. "Reamur, Rene-Antoine Ferchault de," (1683-1757), was of an illustrious Vendee family, the Ferchaults, who prospered in trade. Concerning his early education nothing is known with certainty. In 1699 an uncle summoned him to Bourges to study law and he stayed for three years. He did work in mathematics in 1708-9. Between 1720 to 1723 he did significant research on steel metallurgy for the French Government. In 1717 he did successful research in the making of soft paste porcelain. His pupil Jean-Etienne Guettard discovered French sources for kaolin and petuntse, needed for the making of hard-paste porcelain. In 1715 he became interested in natural history and rose to become one of the greatest naturalists of his day. He was the first to describe ambulacral feet, the method by which echinoderms (starfish, sea-urchins and their allies) move about. In 1740 when Abraham Trembley communicated his findings on the regeneration of fresh water Hydra to Reaumur, the latter was convinced that they were animals and announced this to the scientific community in 1741.

[134]DSB, s.v. "Jussieu, Bernard de," (1699-1777), took a degree in medicine at Montpellier and another at Paris in 1726. He was appointed sous-demonstrateur de l'exterieur des plantes at the Jardin du Roi in 1722. His field trips were famous and he inspired many students including Buffon and Linnaeus. His influence on

eighteenth-century French botany was unequaled. He was one of the great protagonists of a natural classification of plants.

[135]James E. McClellan III, "The Academie Royale des Sciences, 1699-1793: a statistical portrait," Isis, 72 (1981):541-542. This institution was created by Colbert and Louis XIV in 1666 and became one of the most important centers for science in the eighteenth century. Its prestige and influence in that century were shared by the Royal Society of London, the Prussian Academie Royale des Sciences et Belles-Lettres, the Imperial Academy of Science at St. Petersburg and the Swedish Kungl. Vetenskapsakedie.

[136]Ellis to Skene, 26 November 1765. David Skene MS.38/95.

[137]Ellis to Skene, 24 February 1767. David Skene MS.38/103.

[138]Johnston, British zoophytes, 1:424.

[139]Ibid., 1:432.

[140]Ibid., 1:425.

CHAPTER IV

THE IMPACT OF THE MICROSCOPE ON THE 18th CENTURY NATURAL HISTORIAN

John Ellis was among those whose interest in the mid-eighteenth century in the use of the microscope as a tool of scientific inquiry and for popular amusement led to its refinement and development. It should be borne in mind that, in the absence of electrical gadgets, the microscope was one of the most sophisticated scientific devices available. As mentioned earlier, Henry Baker used one for research, as did Abraham Trembley and Ellis. But the general public, although interested and fascinated by the instrument, did not use it as a tool for the expansion of scientific knowledge. G. L'E. Turner (1980) noted in an observation on Henry Baker, "During Baker's lifetime (1698-1774) science became a popular pastime, and people bought scientific instruments to use in their homes. The most common was the microscope, used for looking at fleas, hair, and wood . . . and it provided a very considerable market for instruments among the many wealthy English of the later 18th century."[1] As an additional comment on the popular

use of the microscope, Bradbury (1967) reported, "It has already been emphasized that the majority of the microscopy carried out in the eighteenth century was for amusement only."[2] He called attention to its use by naturalists and stated, "The studies of Ellis on the natural history of the hydrocorallines, of Trembley on the Hydra . . . all demonstrate that some enquiring spirits were aware of the potentialities of the microscope."[3]

Precisely when Ellis started using the microscope is a matter of conjecture. Rauschenberg (1978a) indicated that Ellis's scientific interests started in the 1740's and cited a letter of April 1744 from Ellis to Rev William Borlase, one of Ellis's early friends, as the source for such finding. At the same place he reported that, "The big event in Ellis's development as a scientist came between the fall of 1751 and the spring of 1752, when Ellis received a collection of plants and corallines from Anglesey and Dublin. Impressed by the seascape Ellis made of them, the Reverend Mr Stephen Hales, F.R.S., and leading figure in the development of the study of physiology, asked Ellis to arrange a similar display for the Princess of Wales to whom Hales was Clerk of the Closet. To arrange the items systematically, Ellis made microscopic examinations which

convinced him the corallines were animals."[4]

From that point on, until Ellis's death in 1776, his published work indicated the use of the microscope in his research. For such reason, after approximately nineteen years of experience with the microscope, his statement in the draft letter of 26 December 1770, to Dr David Skene, "I never could see the smallest animalcules (Protozoa) in the Double or Compound microscope,"[5] presents an interesting problem. Ellis's ability in the use of the microscope was noted by Gosse (1860) who described him as having a "keen eye."[6] In 1767 Ellis perceived himself as being very competent with the microscope, "I think I shall be able, please God I live till summer comes to try these curious experiments (he referred to Linnaeus's experiments with corn affected with smut fungus), being <u>well used to the highest magnifiers.</u>"[7] (Underlining mine). A possible explanation of his statement to Skene three years later might be that by 1770 his eyesight was failing. Rauschenberg (1978a) reported that, "As early as March 1771, he suffered a major illness after which his health declined; by 1774 he could barely see well enough to write and his eyesight continued to deteriorate. In 1774, to help his health, Ellis moved from Gray's Inn out to the country air of Hampstead where he spent the last years of his life."[8]

There is some additional support for the theory of the failing eyesight in that the final draft of the letter which went to Skene in 1770 does not contain the aforementioned comment.[9] Ellis, perhaps, decided not to include the comment in order to conceal the fact of his failing vision from his close friend who was always concerned about his health. These concerns appear in Skene's letter of 5 July 1765, "In your next I beg to know particularly how your health is an unform'd gout is a very disagreeable attendant particularly if the Stomach & Bowels are much distressed with flatus & the Spirits depress'd."[10] and again, in his letter of 5 December 1765, "I am truly glad Your health is so much better."[11]

There is considerable difficulty with this explanation from several standpoints. The comment in the draft letter indicated that Ellis had been having difficulty using the compound microscope in his study of protozoa and this difficulty had been of more than a recent duration. In point of fact his letter of 26 March 1768 to Skene stated, "I could perceive millions of animalcules attacking the soft farinaceous part."[12] Rauschenberg's (1978a) statements on Ellis's health are contradicted to some degree by documentary evidence. "Illustration 2" dated 22 June 1776 included with Chapter VI reveals that although the text of the letter was not

written by Ellis, he signed this document with a well formed script in keeping with a person of competent vision either without glasses or corrected with glasses. Furthermore, when Ellis on 3 July 1776, reported to the Chairman and Members of the Committe of Correspondence on his recent activities as Agent for Dominica he was still at Grays Inn, not Hampstead. A photocopy of this report is also included at the end of Chapter VI as "Illustration 1." Although the report and the signature are not in Ellis's handwriting, the contents indicated that he was quite active in carrying out his agency assignment.

A better and more likely explanation of Ellis's difficulty is that compound microscopes, using more than one lens, at that time were scarcely better than the good single lens microscopes (which Ellis used). Second and subsequent lenses, being imperfect, introduced and in fact "compounded" each others' optical errors, so that although high magnifications were obtained it was "empty magnification" in that the image was not concomitantly improved. Reading power increased only later, when lens-grinding techniques improved, and die-hard Ellis perhaps resisted the new-fangled compound microscope. His leaving the comment out of the final draft could then be explained on the basis that he did not want to decry the

new invention and thereby discourage Skene from using it.

Henry Baker (1740) analyzed the Leeuwenhoek[13] single-lens microscopes (twenty-six in number) possessed by the Royal Society. He came to the conclusion that the majority were quite similar to each other and only one had the capacity of magnifying the diameter of an object as much as one hundred and sixty times. All the others fell short of such capability. He went on to examine microscopes made by John Cuff[14] and others and noted that one of them was capable of magnifying the diameter of an object a staggering four hundred times. From this, one can derive some measure of the improvement in design made by John Cuff, James Wilson[15], John Marshall[16], Edmund Culpeper[17], and Edward Scarlet[18] over the period of sixty years prior to 1740. Henry Baker described the very latest improvements created by Dr Liberkhun[19], as consisting of the Solar microscope and the microscope for opaque objects and concluded that the latter one looked and functioned so much like one of Leeuwenhoek's that Leeuwenhoek could be called its inventor.[20]

R. J. Rowbury (1981)[21] discussed the mid-eighteenth century field requirements for a botanical microscope. After deciding that it ought to be a sturdy, portable, low power instrument, preferably with facilities for dissection, he reviewed a few of the

available types and mentioned the popularity of the Wilson screw-barrel microscope designed by James Wilson that was used extensively in 1740. An illustration of a Wilson microscope made by Adams[22] is shown as "Illustration 1" at the end of this chapter.[23] R. J. Rowbury called attention to its limited usefulness because it was designed originally to be a hand-held instrument and could not be used for good illumination and dissecting purposes. He gave tentative credit to John Cuff for the creation of an "aquatic" microscope in 1744. This was a type of microscope that Ellis and Trembley were using in the 1750s when examining living zoophytes. For botanical work it gave stability because it could be attached to a tree stump for use in the field, although the "aquatic" movement was not needed for such purpose.[24]

The concept of an "aquatic" microscope was a simple one. Its purpose was to enable the viewer to observe minute living organisms contained in a body of water. Abraham Trembley, who published a first account of his discoveries relating to the fresh water Hydra in 1739, described the instrument that he used for the study of minute sessile organisms and his modus operandum to be as follows: Inside a glass of water he put a bent peacock feather. The elasticity of the feather

maintained firm pressure against the inside of the glass. On one of the barbs of the feather he attached a stalk of aquatic horse-tail on which was a Hydra polyp. The polyp was placed as close to the side of the glass as possible. Outside the glass he positioned a single lens microscope which was screwed into a ring. The ring was supported by a string of "Musschenbroek nuts" fastened to a firm support, either a window ledge or a flat board.[25] An illustration of the application of this microscope is shown in "Illustration 2" at the end of this chapter. The "Musschenbroek nuts" holding a lens at one end and being firmly affixed at the other was also the part of Joblot's[26] "Porte Loupe" of 1718 and the Lyonet[27] microscope of the same period.[28] Illustrations of each of these are shown at the end of the chapter and are marked "Illustration 3" and "Illustration 4," respectively. According to John R. Baker (1952), "This arrangement (of "Musschenbroek nuts") was of the utmost importance in Trembley's work on multiplication and colony-formation in Protozoa, because the organisms were held in a large body of water and thus survived well, while at the same time it was possible to follow what was happening to a single specimen or colony over a period of days, with quite high magnification."[29] Ellis and Baker, on the other hand, who studied mainly individual

organisms looked for a different type of aquatic microscope.

Bradbury (1968) noted that the last two individuals performed a type of microscopical work that imposed demands on the instrument that led to certain innovations. As the slightest jar or vibration could cause the Hydra to contract and withdraw its tentacles, the tank in which they were kept had to remain quite stationary. Since they were observing a single polyp, the lens required constant movement and the tank was, unavoidably, touched by the lens from time to time. Therefore, the lens had to be moved over the tank, horizontally, rather than perpendicularly from the surface of the water down to the base of the tank, as had been the custom demonstrated by Trembley, earlier, (see "Illustration 2"). In addition, since the tanks were often of considerable size, the microscope required a large stage for the placement of the tank. The microscope lens required that it be attached to an arm which was fixed at a right angle to the pillar of the microscope and thereby enabled the lens to be traversed over any part of the tank. Such microscopes with this type of movement became known as "aquatic" microscopes and the prior ones with "Musschenbroek nuts" that could only move up and down became known as "botanical"

movements.[30] Bradbury concluded by stating, "Ellis's aquatic microscope may be regarded as the direct ancestor of the standard low-power dissecting monocular in use today in schools."[31]

Ford (1985) has questioned the foregoing historical development of the "aquatic" microscope, that the slightest movement of the microscope would make the polyps contract. He has stated that "Hydra is not as sensitive as all that. Preparations of the living organisms can be gently moved around without causing them all to contract into little spheres." In his view, the "Ellis Aquatic Microscope" was not invented by Ellis but "was a simple design by Cuff, based on Baker's recommendations drawn from practical difficulties encountered during the use of conventional single-lens microscopes. It seems likely that the swivelling lens bracket resulted from manufacturing convenience."[32] Ford's conclusions are based on his personal experience with examining specimens of Hydra and do not take into account the experience of others working in the area. Trembley (1739), mentioned above, the first to examine fresh water Hydra noted "One day I jogged ever so slightly the vessel holding the polyps in order to see how the ensuing movement of the water would affect their arms. I was completely unprepared for the result. I

expected to see their arms and even their bodies merely shaken and dragged along with the motion of the water. Instead I saw the polyps contract so suddenly and so forcefully that their bodies looked like mere particles of green matter and their arms disappeared from sight altogether."[33] Most of the modern workers think hydroids contract their hydranths (polyps) when disturbed (e.g. Cornelius, in press[34]). It is thus a considerable advantage to be able to move the lens rather than the specimen. Furthermore, by introducing the word "all" into the statement "without causing them all to contract into little spheres," Ford has deliberately introduced an ambiguity which, substantially, reduces the validity of his premise. In addition, his statement that the swivelling lens bracket was likely the result of manufacturing convenience is totally unsupported by any evidence of manufacturing process and should be dismissed as conjecture.

The figure of the microscope that bears the legend "Mr. Ellis's aquatic microscope", as depicted in Bradbury (1968)[35], is shown as "Illustration 5" at the end of this chapter. It is similar in appearance to the figure of the instrument that Ellis included at the end of his book on Corallines. A photocopy of the latter appears as "Illustration 6" at the end of this chapter

and its description, by Ellis, is shown in "Illustration 7." While Ellis characterized this instrument with the legend, "The Description of Mr. Cuff's Aquatic Microscope, used in the Discoveries made in this Essay," as shown in this illustration, it was really Ellis's invention made by John Cuff under Ellis's direction. This is corroborated by George Adams (1787)[36] and Bradbury (1968).[37] At this juncture, it is most important to note that the microscope figured by Ellis, Adams and Bradbury was created sometime between 1752 and 1755. It, therefore, does not contain the further improvement initiated and discussed by Ellis in his correspondence after 1755.

One is now in a better position to understand Ellis's comment, that discussed his improvements to the microscope. This appeared in his letter of 26 December 1770 to Dr David Skene, "The glass I make use of is the 2nd. of Wilson's. I have lately contrived to join in one case Wilson's single microscope to <u>my aquatic</u> (underlining mine) one, as one stem and illuminator serves both. Mr. Dollond[38] in St. Paul's Churchyard makes them and has sold a great many of them as they are very portable and answer all the purposes that one would wish from a microscope, except the Solar, to which the Wilsons is adapted, and the Solar apparatus may be had in

a separate box. The price without the Solar is 3 Guineas and a half. With the Solar 6 Guineas."[39] It is now clear that Ellis, with pride, took credit in his creation of an "aquatic" microscope and his further improvement of it by the addition of the Wilson one to it.

Clay and Court (1932)[40] depicted both Ellis's first "aquatic" microscope and the unmounted Wilson modification of this instrument ("Illustration 8" at the end of this chapter). Ellis's first "aquatic" that he used for his research on corallines is shown to the left and the Wilson modification is lying on its side in the left portion of the picture on the right. Clay and Court relied on a pamphlet issued by Dollond in 1764 in which Dollond described a microscope called "'The Aquatic Microscope as improved by John Ellis, F.R.S.'"[41] It should be noted that the normal Wilson microscope had a handle as depicted in "Illustration 1." This handle has been removed and replaced with a flat rod anchored to the barrel by two screws. Since this rod is of the same dimensions as the rod which holds the lens of the "aquatic" microscope, the rod holding the lens can be removed and the rod holding the Wilson barrel can be inserted in its place in the vertical stem. Dr D. Vaughan, Keeper of Microscopes at The Science Museum, London, succeeded in depicting the Wilson microscope

mounted in position on the vertical stem of an Ellis type Aquatic microscope as is shown in "Illustration 9." This is what Ellis meant by his statement of joining the Wilson to his aquatic microscope. A minor variation consists in the use on the platform of a flat piece of glass as depicted in "Illustration 9" rather than a watch glass as described by Ellis and depicted in "Illustration 6," and marked as item "M." According to the evidence presented, the creation by Ellis of this improvement in the single-lens microscope can be said to have taken place in 1764 or shortly before this.

Rowbury (1982)[42] was of the opinion that an 18th century microscope that he examined may have been originally designed by John Ellis. It is a Martin or Jones-type non-folding Botanical microscope and a photocopy is included at the end of this chapter as "Illustration 10". He had suggested previously (Rowbury, 1981)[43] that this instrument may have been derived from the Cuff-Ellis "aquatic" type and if so, Ellis may have turned to Benjamin Martin[44] to make it. R. J. Rowbury pointed out that, "The striking feature of this instrument is that the name 'I. Ellis' is stamped on the oval hardwood base."[45] His conclusion, however, is that further research is needed to establish Ellis's creation of this instrument.

To summarize the main points of this chapter, it can be stated with certainty that Ellis created two versions of an "aquatic" microscope. There is a further possibility that he created a new type of "botanical" microscope. In addition to these accomplishments there is adequate evidence that his first "aquatic" microscope was the forerunner for the current dissecting monocular microscope commonly used in schools today. Without exaggeration, Ellis's impact on the history of the development of the microscope was significant and enduring.

ILLUSTRATION 1

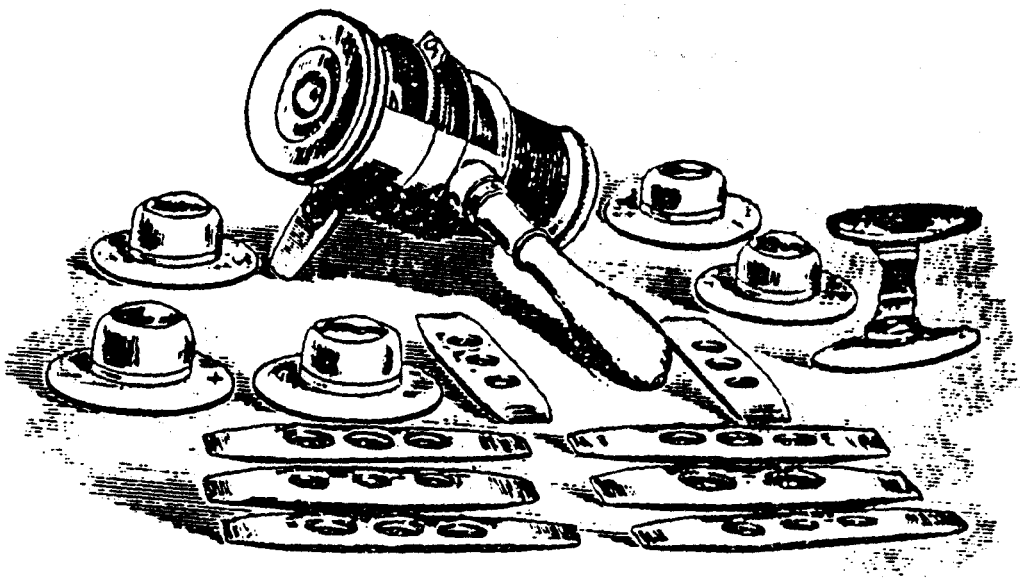


FIG. 3.10. A later model of Wilson's screw-barrel microscope, probably made by George Adams around 1746. At the extreme right of the picture is the lens holder for use when examining opaque objects; extra lenses and ivory sliders are shown in front of the actual microscope.

SOURCE: S. Bradbury, The microscope past and present, (Oxford: Pergamon Press, 1968), p. 77.

ILLUSTRATION 2

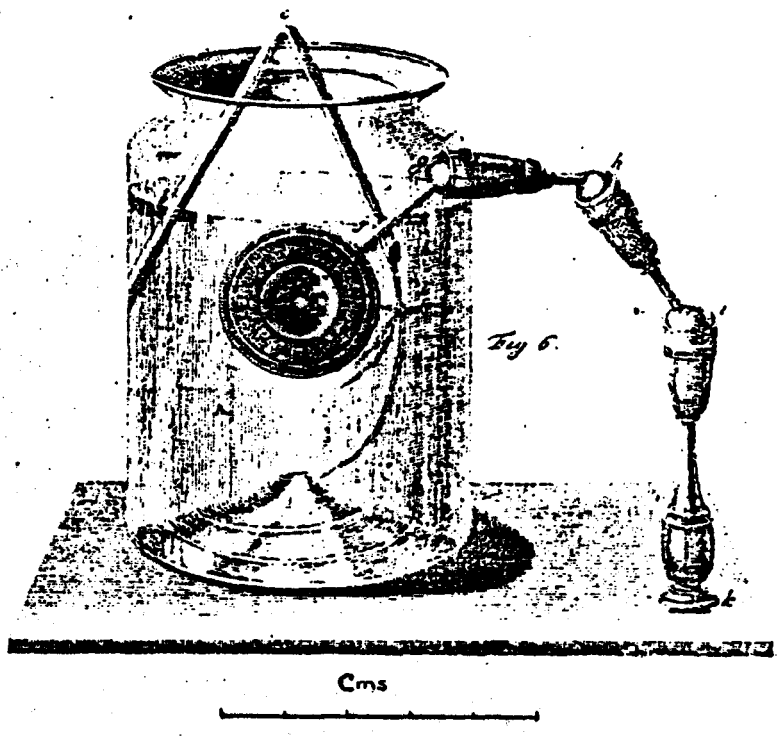


FIG. 46.—Trembley's apparatus for the microscopical examination of minute sessile organisms contained in a large body of water.
(*From Needham, 1747.*)[881]

SOURCE: John R. Baker, Abraham Trembley of Geneva, (London: Edward Arnold & Co., 1952), p. 173.

ILLUSTRATION 3

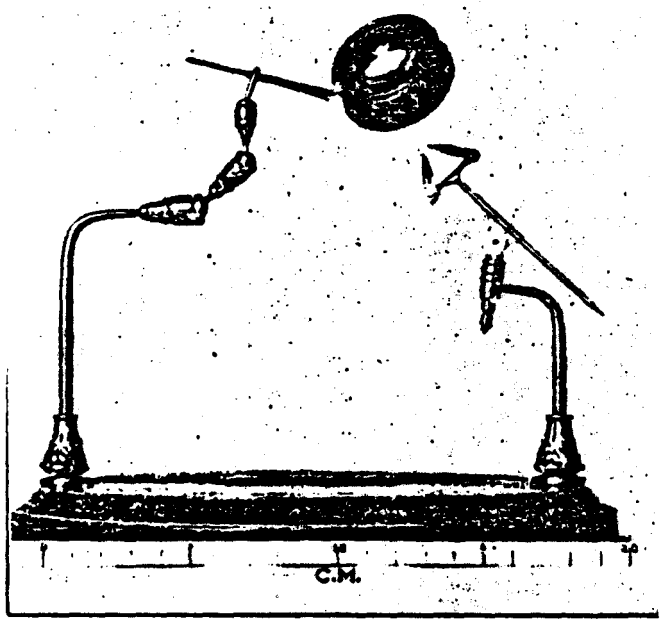


Fig. 37.—Joblot " Porte Loupe " (Unsigned).

SOURCE: Reginald S. Clay and Thomas H. Court, The history of the microscope, (London: Charles Griffin and Company, Limited, 1932), p. 61.

ILLUSTRATION 4

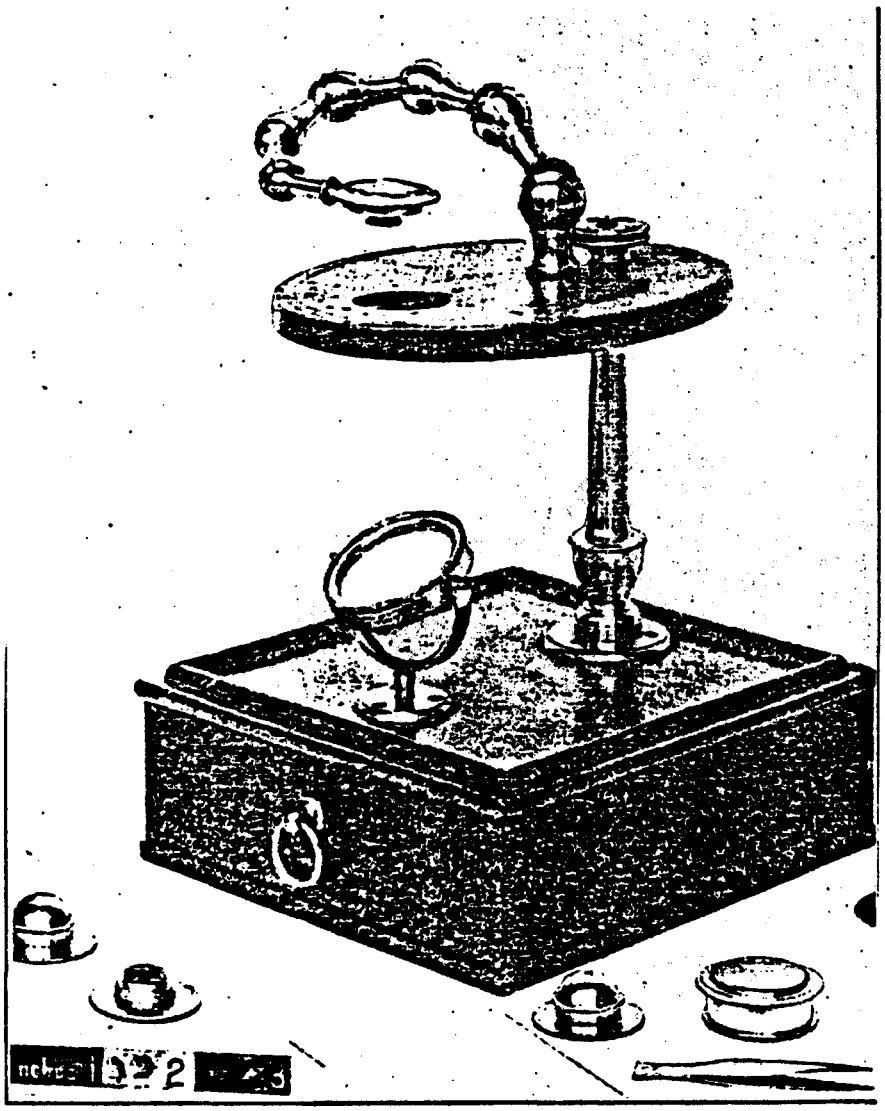


Fig. 36.—Lyonet Microscope (Unsigned).

SOURCE: Reginald S. Clay and Thomas H. Court, The history of the microscope, (London: Charles Griffin and Company, Limited, 1932), p. 60.

ILLUSTRATION 5

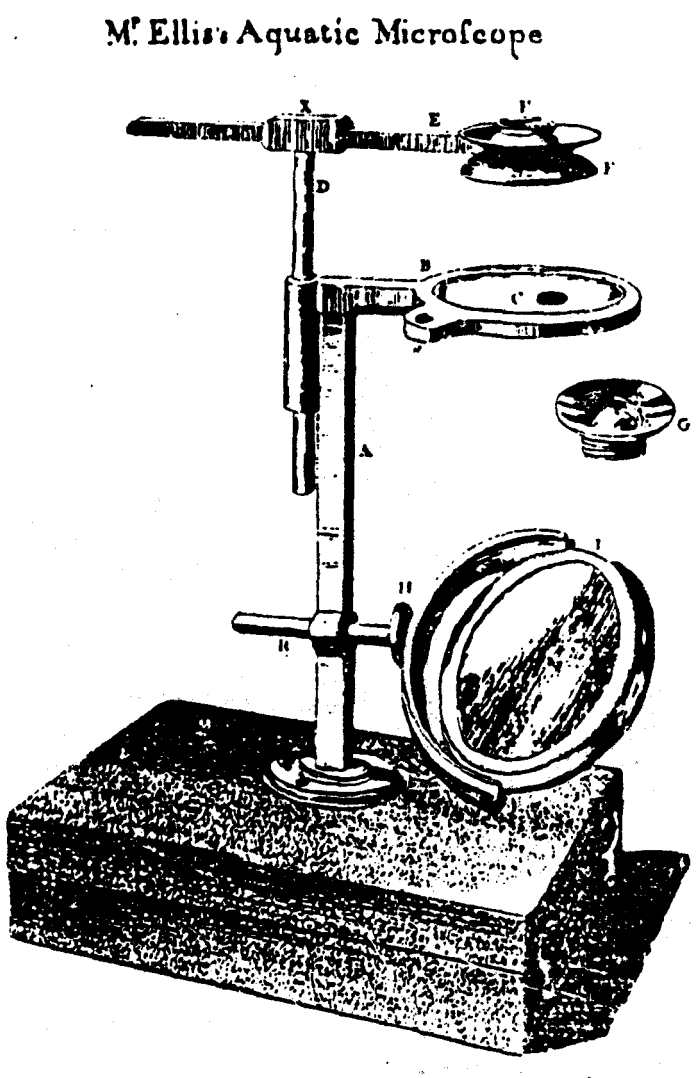
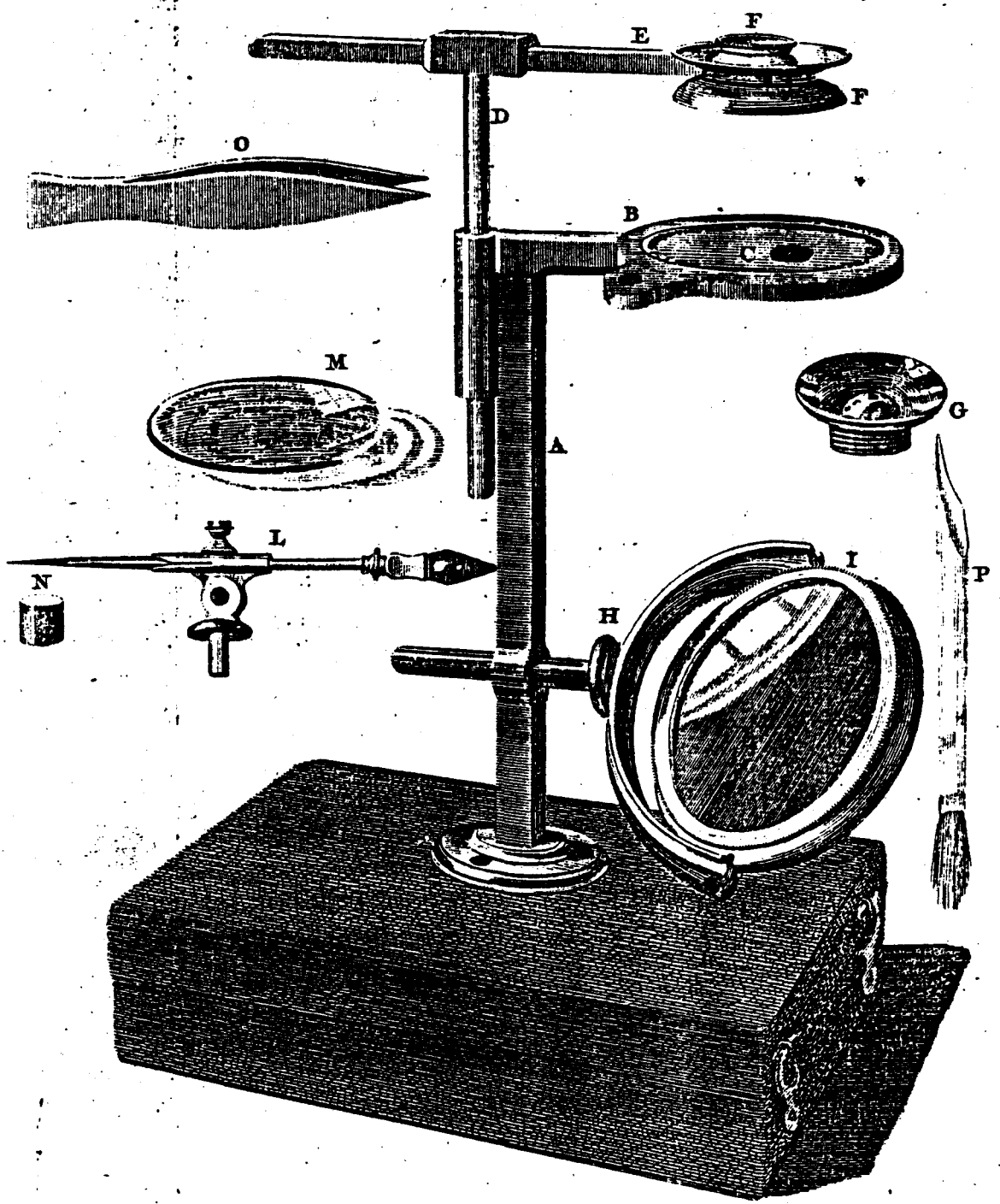


FIG. 3.11. "Mr. Ellis's aquatic microscope". The aquatic motion was provided by sliding the arm E in the socket X, and by swivelling the rod D in the mount attached to the main pillar labelled A. The stage (C) and the mirror are also shown. The lenses, one of which is drawn separately, are provided with Lieberkühn reflectors.

SOURCE: S. Bradbury, The microscope past and present, (Oxford: Pergamon Press, 1968), p. 80.

ILLUSTRATION 6



SOURCE: John Ellis, An essay towards a natural history of the corallines, (London: printed for the Author, 1755).

ILLUSTRATION 7

The DESCRIPTION *of Mr.* CUFF'S AQUATIC MICROSCOPE, *uſed in the* DISCOVERIES *made in this* ESSAY.

A, The braſs Pillar, that ſcrews into the Top of the Box *K*, which Box contains the whole Apparatus.

H, The Shank, with the Semicircle carrying the Concave Mirror, that moves on two Pivots, at *I*, *I*.

D, The ſliding Pillar to adjuſt the ſilver Diſh, with its Lens at *F F*, to the proper focal Diſtance.

G, Another ſilver Diſh, with a higher Magnifier.

E, The Shank (ſupporting the ſilver Diſh) made to ſlide to and fro, to view all Parts of the Stage *B*.

C, The plain Glaſs placed on the Stage, with a black Patch on it for opake Objects.

M, The Watch-glaſs, to be placed in the Room of the plain Glaſs *C*, for aquatic Objects.

L, The Pliers, pointed at one End for different Objects, or to receive on the pointed End the ivory Cylinder *N*, for opake Objects.

O, Pincers to take up ſmall Objects.

P, The Bruſh to clean the Glaſſes.

SOURCE: John Ellis, An essay towards a natural history of the corallines, (London: printed for the Author, 1755).

ILLUSTRATION 8

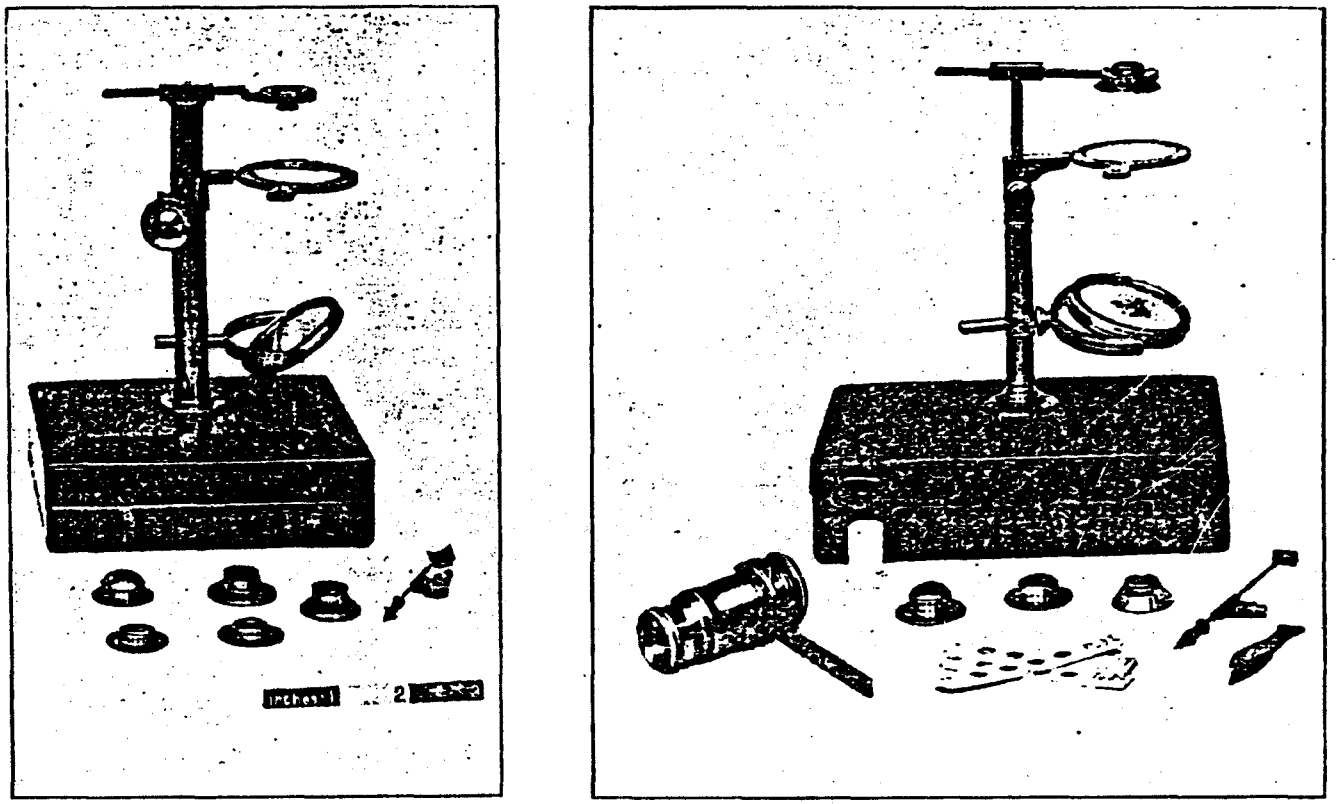
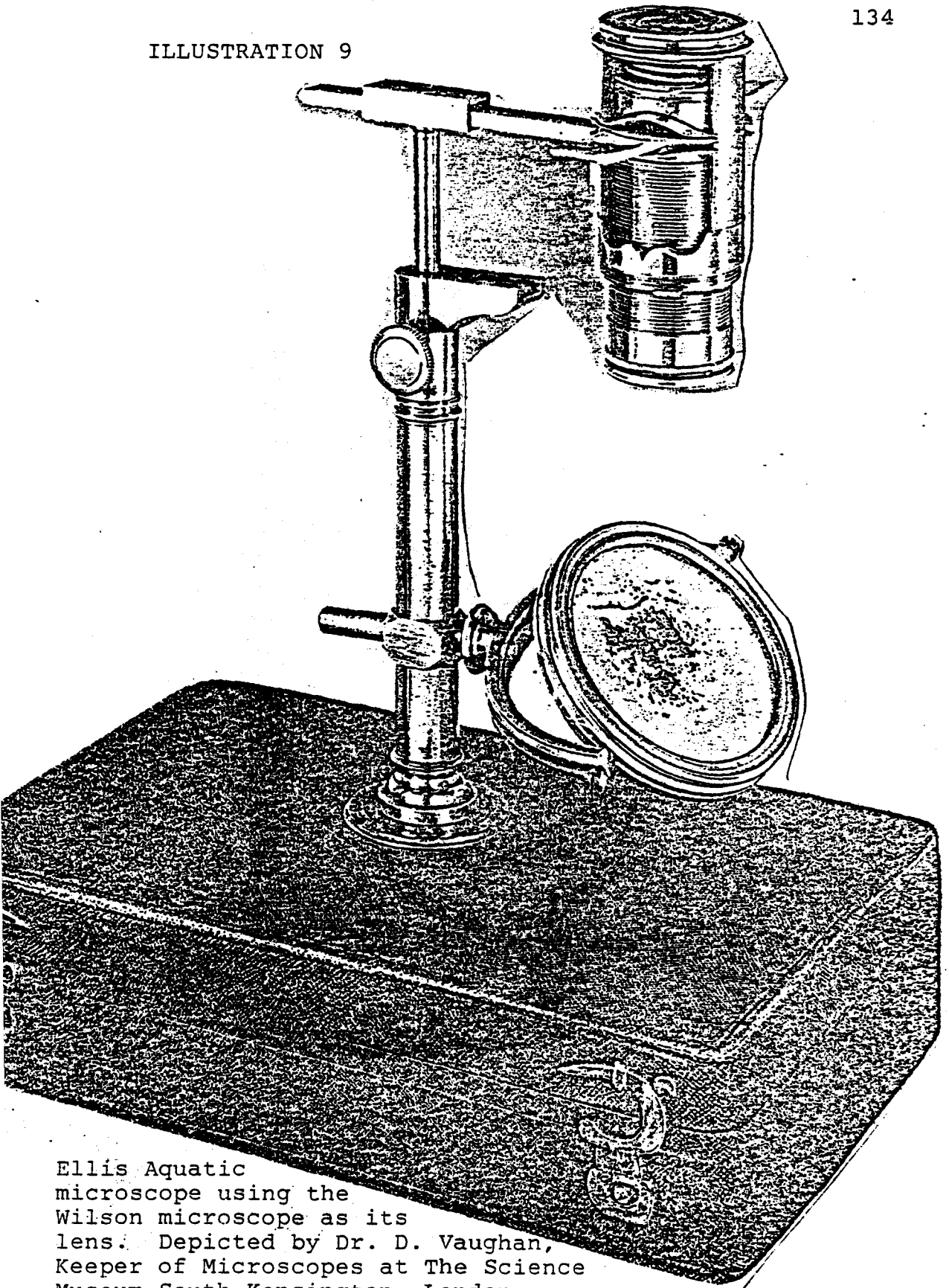


Fig. 43.—" Aquatic " Microscope (right) with Screw-barrel and (left) with Rack Focussing.

SOURCE: Reginald S. Clay and Thomas H. Court, The history of the microscope, (London: Charles Griffin and Company, Limited, 1932), p. 69.

ILLUSTRATION 9



Ellis Aquatic microscope using the Wilson microscope as its lens. Depicted by Dr. D. Vaughan, Keeper of Microscopes at The Science Museum South Kensington, London.

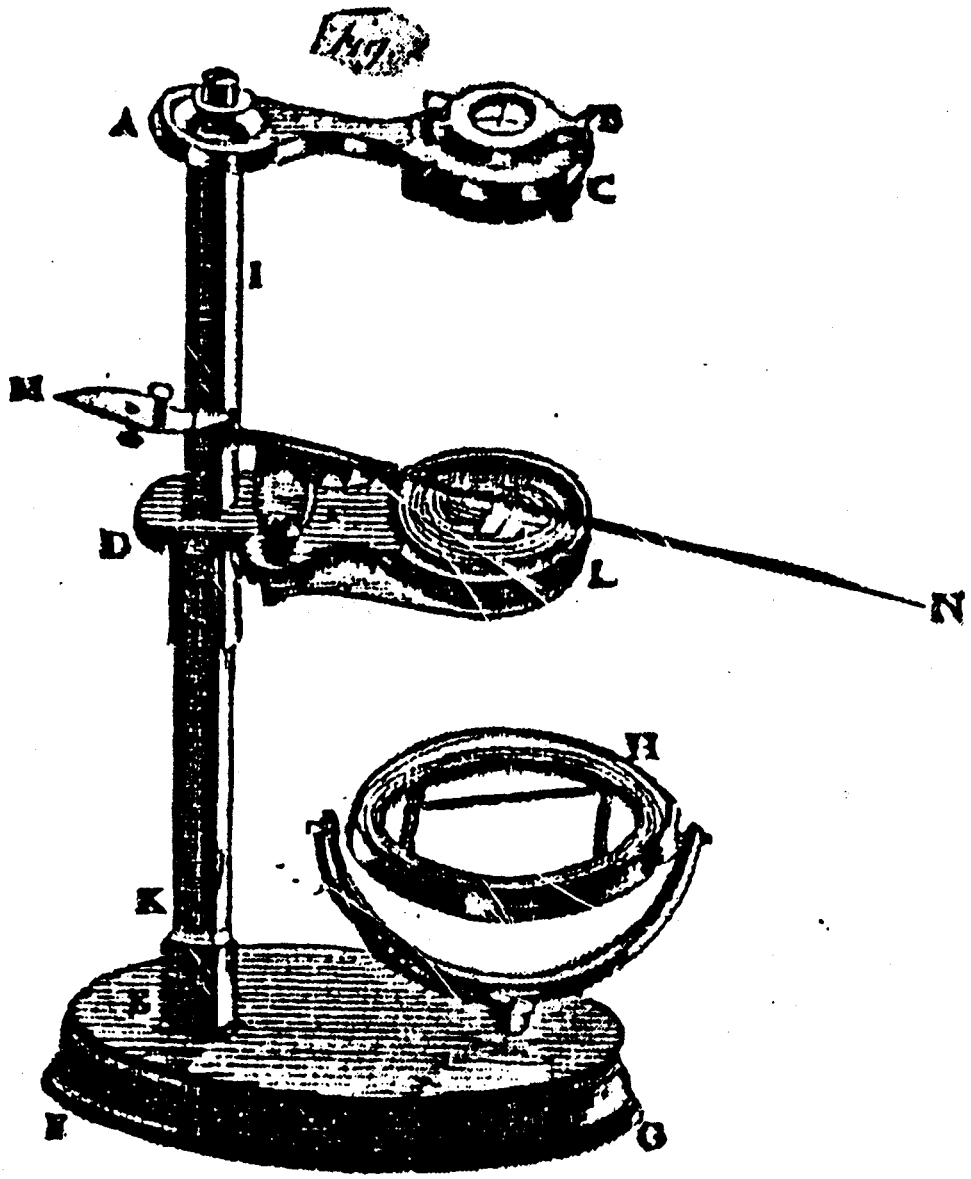


FIG. 1. The Martin-type Botanical Microscope. The instrument is ca. 5 in. high. This Figure is reproduced from Adams (1787) by permission of the British Library.

SOURCE: R. J. Rowbury, "The naturalist John Ellis and the development of the botanical microscope," Microscopy, 34 (1980-1982):419.

NOTES

[1]Gerard L'Estrange Turner, Essays on the history of the microscope, (Oxford: Seneca Publishing Co., 1980), p. 12.

[2]Savile Bradbury, The evolution of the microscope, (Oxford: Pergamon Press, 1967), p. 150.

[3]Ibid.

[4]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):153.

[5]Savage, Calendar of the Ellis manuscripts, p. 78.

[6]Philip Henry Gosse, A history of the British sea-anemones and corals, (London: van Voorst, 1860), p. 114.

[7]Ellis to Skene, 24 February 1767, David Skene MSS, MS.38/103.

[8]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):161.

[9]Ellis to Skene, 26 December 1770, David Skeene MSS, MS.38/113.

[10]Savage, Calendar of the Ellis Manuscripts, p. 26.

[11]Ibid.

[12]Ellis to Skene, 26 March 1768, David Skene MSS, MS.38/105.

[13]DSB, s.v. "Leeuwenhoek, Antoni van," (1632-1723), completed grammar school at age sixteen. His scientific career began about 1671 when he constructed his first simple microscope to inspect the quality of cloth. It was a minute lens ground by hand from a globule of glass clamped between two small perforated plates. During his life time he ground about 550 lenses ultimately achieving high quality. He never attended university but acquired considerable information from friends and from

correspondence with the Royal Society. His most important discovery was the recognition of the true nature of microorganisms in 1674. In letters to the Royal Society he described bacteria, protozoa and rotifers and in 1680 he was elected a fellow of the Royal Society.

[14]"John Cuff," (d. 1772), was apprenticed to James Mann II and published descriptions of various microscopes in the 1740s. His name was the most frequently occurring one if not among the contemporary writers at least among the later writers. A few surviving instruments bear his signature. His microscope enjoyed outstanding success. This biographical material is derived from Maurice Daumas, Scientific instruments of the seventeenth and eighteenth centuries and their makers, (London: B. T. Batsford, 1972), p. 229.

[15]"James Wilson," (dates unknown), constructed a considerable number of the screw-barrel microscopes which met with much acclaim during the first half of the eighteenth century. He published a description of this microscope in the Philosophical Transactions, for 1702. He had his workshop at the Sign of the Willow Tree. There are specimens of his microscope in almost all collections. He was an outstanding optician and enjoyed an excellent reputation. This biographical material is from Daumas, Scientific instruments of the seventeenth and eighteenth centuries and their makers, p. 69.

[16]"John Marshall," (d. 1725), was an apprentice to a turner and maker of telescope tubes. He was reputed to have constructed his first microscope for Boyle. The earliest reference to his workshop dates from 1687-8 and he began advertising microscopes for use in medical practice in 1688. Although his "Double Microscope" was not published until 1704, it appears to have been invented in 1693. A number of instruments bearing his signature are in existence and include telescopes as well as microscopes. This biographical material is derived from Daumas, Scientific instruments of the seventeenth and eighteenth centuries and their makers, p. 228.

[17]"Edmund Culpeper," (dates unknown) was the son of Edward Culpeper and like his father, a member of the Spectaclemakers Company. In 1706 or earlier he took over the workshop of Walter Hayes, the scientific instrument maker to whom he had been apprenticed. The location of the workshop was at the sign of the Cross Daggers in Moorfield where he remained until about 1731.

Thereafter, he gave his address as Black-White House, Middle Moorfields. He produced his own tripod microscope as well as several screw-barrel microscopes bearing his signature. All makers of his and succeeding generations constructed tripod microscopes on his model both in England and on the Continent. This biographical material is derived from Daumas, Scientific instruments of the seventeenth and eighteenth centeuries and their makers, p. 228.

[18]"Edward Scarlet," (d. 1743), served his apprenticeship with Christopher Cock and probably began work on his own about 1700 with the opening of his workshop at The Archimedes and Globe, Dean Street, Soho. He was often mentioned by contemporaries and enjoyed a high reputation. He has left but a few instruments behind him as evidence of his skill. He constructed apparatus for Desaguliers and for Smith and brought about several modifications in the Culpeper microscope. A few rare instruments bear his signature, among them a Gregorian telescope, screw-barrel and Culpeper microscope. This biographical material is derived from Daumas, Scientific instruments of the seventeenth and eighteenth centuries and their makers, p. 228-9.

[19]DSB, 1973 ed., s.v. "Lieberkuhn, Johannes Nathanael," (1711-1756), was one of the most skillful German anatomists of the eighteenth century. He was the son of a goldsmith but his father insisted he plan for a career in theology and sent him to the Halle Magdeburg Gymnasium at Jena. There he came under the influence of G. E. Hamberger, a physician and mathematician. He also studied chemistry, anatomy and physiology with H. F. Teichmeyer and J. A. Wedel. He went on to become a preacher but he had no desire to continue in theology. The Prussian King, Frederick William I, released him from his theological obligations and Lieberkuhn returned to Jena in 1735 where he had already been admitted as a fellow of the Berlin Academy of Sciences. He became interested in anatomical structures and their mechanisms and devised special microscopes to observe the motion of fluids within the living animal. He also made an adaptation to the solar microscope. It consisted of a small, concave, highly polished silver speculum, later termed a "Lieberkuhn" that provided intense reflection of the sun's rays directly upon the object. The noted English microscope maker John Cuff adapted Lieberkuhn's model by adding a mirror to it which provided better control by reflecting the sun's rays to the speculum and then to the object.

[20]Henry Baker, "An Account of Mr. Leeuwenhoek's Microscopes," Philosophical Transactions, 41 (1744):518-519.

[21]R. J. Rowbury, "William Withering of Birmingham and the Botanical Microscope," Microscopy, 34 (1981):245.

[22]"George Adams," (1704-1773), began his career as workman and was self-taught. His career is fairly typical of many microscope makers of his period. His workshop at the sign of Tycho Brahe's Head was in Fleet Street. In his early days he was a purveyor to the East India Company. Shortly after, he started to produce microscopes for which he invented a number of mechanical improvements which enjoyed a certain success. In 1746 he published Micrographia illustrata which ran into four editions in each of which appeared new models of his own invention and the description of methods employed for measuring the magnifying power of his microscopes, a subject to which he devoted considerable attention. This biographical material is derived from Daumas, Scientific instruments of the seventeenth and eighteenth centuries and their makers, p.237.

[23]Bradbury, The microscope past and present, (Oxford: Pergamon Press, 1968), p. 77.

[24]Rowbury, "William Withering," Microscopy 34 (1981):248.

[25]John R. Baker, Abraham Trembley of Geneva, (London: Edward Arnold & Co., 1952), pp. 172-173.

[26]DSB, 1973 ed., s.v. "Joblot, Louis," (1645-1723), was the fourth of six children of Nicolas Joblot and Anne Guilly. Nothing certain is known of his early life prior to his thirty-fifth year. In 1680 he was appointed assistant professor of mathematics at the Ecole Nationale des Beaux-Arts. During the summer of 1702 he read to the Royal Academy of Painting and Sculpture a series of lectures on optics and the anatomy of the eye. In 1718 his Descriptions et usages de plusieurs nouveaux microscopes was published. This established him as the first French microscopist. He designed the first porte loupe, a simple preparation microscope in which the lens is supported by a string of "Musschenbroek nuts," forming a ball-and-socket jointed arrangement.

[27]DSB, 1973 ed., s.v. "Lyonet, Pierre," (1706-1789), was born in Holland to a Calvinist family that came

originally from France. He entered Leiden University destined for the clergy. He studied mathematics, physics and anatomy as well theology and was admitted to the pastorate in 1728. He was not satisfied with this vocation, returned to Leiden to study law, and in 1731 set up his practice. In 1736, he started the serious study of insects after reading Reaumur's Memoires, which was published in 1734. His reputation as a micro-anatomist was established by his Traite anatomique de la chenille qui ronge le bois de saule, which is devoted wholly to the anatomy of the caterpillar and the plates, drawn and engraved by Lyonet, portray the muscles, nerves, bronchia, heart, viscera, silk vessels and the internal parts of the head with astonishing precision.

[28]Reginald S. Clay and Thomas H. Court, The history of the microscope, (London: Charles Griffin and Company, Limited, 1932), pp. 60-61.

[29]Baker, Abraham Trembley, p. 173.

[30]Bradbury, The microscope past and present, p. 97.

[31]Ibid., p. 99.

[32]Brian John Ford, Single lens, (London: Heinemann, 1985), pp. 112-113.

[33]S. G. Lenhoff and H. M. Lenhoff, Hydra and the birth of experimental biology-1744, Abraham Trembley's memoirs concerning the natural history of a type of freshwater polyp with arms shaped like horns, (Pacific Grove, CA.: The Boxwood Press, 1986), First Memoir, p. 6.

[34]Cornelius, "Taxonomic characters from the Hydranths of thecate hydroids," Modern trends in the systematics, ecology and evolution of hydroids and hydromedusae, eds. J. Bouillon, F. Boero, F. Cicogne, and P. F. S. Cornelius, (London: Oxford University Press, [In press]).

[35]Bradbury, The microscope past and present, p. 80.

[36]George Adams and Frederick Kanmacher, Essays on the microscope, 2nd ed., (London: printed by Dillon and Keating for the editor and for W. & S. Jones, 1798), pp. 119-120.

[37]Bradbury, The microscope past and present, p. 98.

[38]DSB, s.v. "Dollond, John," (1706-1761), was born in London of French Protestant parents who came from Normandy. Originally he became a silk weaver but was inclined to the study of mathematics, astronomy and the classical languages. He influenced his eldest son Peter to study mathematics and optics and Peter took up the trade of optical instrument maker. Son, Peter was successful and in 1752, John left the weaving trade and joined his son as a partner. John Dollond was popularly known as the inventor of the achromatic telescope although this was contested by Chester More Hall who had invented an achromatic lens combination earlier. The Dollond patent was upheld in 1766 because Dollond was the first to publish the invention and develop it commercially. The Royal Society conferred upon him the Copley medal for his papers and also conferred membership upon him.

[39]Ellis to Skene 26 December 1770, David Skene MSS, MS.38/113.

[40]Clay and Court, The history of the microscope, p. 69.

[41]Ibid.

[42]Rowbury, "The naturalist John Ellis and the development of the botanical microscope," Microscopy 34 (1980-1982):419.

[43]Ibid., 34 (1980-1982):420.

[44]"Benjamin Martin," (1714-1782), was an assistant of Desaguliers until the latter's death in 1744. He produced a large number of microscopes, one of which, a pocket microscope, enjoyed considerable popularity. The object was placed between a simple lens and a condensing lens. It fitted into a cardboard tube and had a micrometer with a dial. Martin was one of the first to employ on his microscopes all the known mechanical improvements at that time. He held courses and public demonstrations and wrote more than thirty popular scientific works. Among them, the Young gentleman and lady's philosophy and Micrographia nova were very successful. This biographical material is derived from Daumas, Scientific instruments of the seventeenth and eighteenth centuries and their makers, pp. 238-239.

[45]Rowbury, "The naturalist John Ellis," Microscopy 34 (1980-1982):420.

CHAPTER V

ELLIS'S WORK IN SYSTEMATICS

While Ellis performed significant work in the field of botany, as will be described later in this chapter, his major efforts in biology were in the systematics of "zoophytes". This development is reflected in his earlier work, An essay towards a natural history of the corallines, published 6 March 1755, and in his later work, The natural history of many curious and uncommon zoophytes, published posthumously in 1786. The latter work was published with Daniel Solander named also as author. Ellis (1755) recounted the events that inspired him to start work on his first book: that he had received a collection of "sea plants" and corallines and made a landscape of them; this had impressed his friend, the Reverend Mr Stephen Hales, who had suggested that he make a similar one for the Princess Dowager of Wales. Hales made the further request that Ellis collect all of the varieties of "sea productions" found on British shores. Because of the great variety of specimens that came to him, Ellis realized the necessity of setting up a classification to accommodate all of them.

For classification methods, initially, he consulted Ray, Synopsis stirpium Britannicarum. Apparently, Ray's book was not much of a help in the task of classification so Ellis started examining the specimens with a microscope to ascertain the physical characteristics of each in order to set up categories or classes. He soon discovered differences in form and texture and it was in the texture that he found indications of animal rather than vegetable life.[1] Rauschenberg (1978a), inadvertently, gave a misleading impression of Ellis's introduction to the problems of taxonomy by his (Rauschenberg's) juxtaposition of sentences. "(Hales) asked Ellis to arrange a similar display for the Princess of Wales to whom Hales was Clerk of the Closet. To arrange the items systematically, Ellis made microscopic examinations which convinced him the corallines were animals."[2] The close position of these sentences has created the unfortunate inference that Ellis used the microscope to arrange the corallines systematically for purposes of making a landscape for the Princess Dowager. This is a significant misunderstanding because Ellis's work on these species of "sea productions" was in the category of pure systematics or taxonomy and was not for the purpose of making landscapes or sea-scapes for members of the British royal family.

In point of fact, his setting up of categories of specimens in 1751 dates his introduction to the practice of the science of taxonomy and should be so recognized today.

Determining the events that inspired the beginning of the second book is most intriguing. The earliest incontrovertable evidence available appeared in his letter of 26 March 1765 to Dr David Skene, "I shall be much obliged to you for the specimen you promise of the Sertularia or Coralline, you call Muricata: because I am at this time going to collect materials for a second volume: indeed I have already sufficient for 6 plates as large as my frontispiece, and the royal society have oblig'd me with the use of those plates that belong to the Papers I have at different times laid before them."[3] The published papers he referred to in this letter were the following:

1. "An Account of a curious, fleshy, coral-like Substance; in a letter to Mr. Peter Collinson, F.R.S. from Dr. John Albert Schlosser, M.D. F.R.S. with some Observations on it communicated to Mr. Collinson by Mr. John Ellis, F.R.S.," Philosophical Transactions, 49:449. This description later found its place in Ellis and Solander, Natural history of zoophytes, p. 177, as the species Alcyonium schlosseri.

2. "An Account of a Red Coral from the East-Indies, of a very singular Kind: In a Letter from Mr. John Ellis, F.R.S. to Mr. Peter Collinson, F.R.S.," Philosophical Transactions, 50:188. This description later found its place in Ellis and Solander, Natural history of zoophytes, p. 105, as the species Isis ochracea.

3. "An Account of several rare Species of Barnacles. In a letter to Mr. Isaac Romilly, F.R.S. from John Ellis, Esq., F.R.S.," Philosophical Transactions, 50:845. A description of one of these barnacles, Gorgonia verrucosa, later found its place in Ellis and Solander, Natural history of zoophytes p. 89.

4. "An Account of the Sea Pen, or Pennatula Phosphorea of Linnaeus; likewise a Description of a new Species of Sea Pen, found on the Coast of South-Carolina, with Observations on Sea-Pens in general. In a Letter to the Honourable Coot Molesworth, Esq; M.D. and F.R.S. from John Ellis, Esq; F.R.S. and Member of the Royal Academy at Upsal," Philosophical Transactions, 53:419. Descriptions of these sea-pens later found their place in Ellis and Solander, pp. 61-66, as species, Pennatula britannica, Pennatula italica, Pennatula spinosa, Pennatula mirabilis, Pennatula antennina, Pennatula sagita, Pennatula cynomorion and Pennatula reniformis.

The following month, on 25 April 1765, he wrote to Skene and referred to his plan: "I received your favour of the 17th. of April inclosing a specimen of your Sertularia muricata. It is entirely new to me and shall certainly have a place in the 2nd. Vol:"[4] It would thus appear from these two letters that Ellis's plans for the second volume were already developed in March or April of 1765. However, there is another letter of two pages from Ellis to Skene that bears two different inscriptions in the upper portion of the left hand margin of the first page as follows: "Mr Ellis July 65" and "Mr Ellis June 65." A photocopy of this letter is included at the end of this chapter as "Illustration 1." Close examination of this document reveals that while it bore Ellis's signature at the bottom of the second page it lacked a date where Ellis normally would put one, namely, at the upper right hand corner of the first page. Furthermore, the dates written in the margin, "June 65" and "July 65" are both in a different handwriting and, obviously, not in Ellis's clear, firm, script. It is, therefore, respectfully suggested that this letter should be re-classified as an undated one written sometime after 5 July 1765 and before 22 October 1765. On the latter date Ellis wrote to Skene and mentioned, "It is so long since I have had the pleasure of hearing from you that I begin

to fear my letter with some specimens of Corallines that I sent you in answer to yours of the 5th of July has miscarried."[5] Moreover, Ellis made a strange statement in this undated letter. In the third paragraph appeared a reference to Job Baster, one of Ellis's critics, "You make me smile with your animadversions on honest 'Job Baster's Opera subseciva.' My opponents in the Royal Society persuaded this Dutch genius to write against me, particularly Miller, Watson and some more very self sufficient folks. I answered his first letter, and when he sheltered himself under the mistakes of the Great Linnaeus, in the second he thought himself secure. But I am now translating his Memoirs to the Royal Society into English, which I shall publish in my second volume with an answer to each in which I shall take ample satisfaction of him for his pertness." The problem with this information is that Ellis had long since translated and published in 1757 Job Baster's remarks and his, Ellis's, detailed answers to each objection raised in the remarks.[6] It is difficult to believe that Ellis could have forgotten that he had published his answer to the remarks of his detractor, Job Baster, eight years prior to this letter to Skene. A possible explanation might be that his correspondence with Skene had just started in March of 1765 and Ellis may not have wanted to rehash his

problems with Baster with a new correspondent. In any event, the material on Job Baster was not included in the published second book.

However, by 23 July 1768, various delays had set in. In his letter of that date to Skene, he lamented, "I have done little or nothing lately in the Zoophytes having been otherwise engaged. Indeed getting the plates executed is so troublesome that I am quite disheartened. I have had a few which you sent me drawn and am in hopes to tempt a good engraver to live near me for I grow too old to walk 3 miles a day after them."[7] Indeed, by 31 December 1768 he was even having second thoughts about his general health and the physical ability needed to complete the second volume. In his letter of that date to Skene appeared the discouraging information, "I shall send you all the characters of the genera of the Zoophytes for your observations on them. I will do the best I can, but I am too sensible of my own inabilities in going through a work, that requires good health and the vigour of youth, instead of the attempts of one that is past the grand climacteric."[8] It is a tribute to his tenacity that he continued to work on the second volume until his death in 1776.

This writer was most fortunate to have had several conferences with Dr Paul F. S. Cornelius (Head of

the Cnidaria Section of the Department of Zoology of the British Museum [Natural History]) on the topics of the authorship of Ellis's last work and Ellis's contributions to the field of zoology. I was delighted to find that Professor John W. Wells of the Department of Geological Sciences at Cornell and Dr Cornelius are co-authors of a soon to be published work about several aspects of Ellis & Solander's The natural history of many curious and uncommon zoophytes.....1786: Unpublished plate and other aspects. Their conclusion, based on technical evidence, is that Ellis wrote the major portion of the book and that Solander only wrote a large part of the Madrepora coral section starting on page 151 and ending on page 173. Since the entire book consists of 206 pages, Ellis thus wrote 183 pages of it. The genus "Madrepora" included all the true or stony corals and the modern name, collective for these animals is Order Scleractinia.

A superficial distinction can be noted between the Madrepora section and the rest of the book in that there appears to be a different style of writing in these two sections. Pages 151 through 173 contain the Linnean nomenclature for each species with descriptions that are decidedly terse. In addition, there is a noticeably different page format and an absence of a common or colloquial name for any species in this section. The

material in the rest of the book also contains the Linnean nomenclature for each species. However, the format is slightly different in that the Linnean nomenclature is on the left side of the page paralleled by the common or colloquial name for that species on the right. The rest of the book contains a significant number of details but not for each species delineated. The details that are presented include a description for each species listed, together with one or more items such as location of find, surrounding ecological data and name of prior describer, if any. This information provided scientists with insight as to geographical dispersion, morphological characteristics, ecological factors and possible reproductive isolation of a species. This information was also useful to modern researchers in evaluating and determining species delineation. Credit was also given to the first author to describe or identify the species under consideration. This was not done for purposes of praise but rather to identify the first describer of the species, regardless of the quality or lack of quality of the description.

Cornelius and Wells (In press) have documented the two hundred year historical debate as to whether Solander or Ellis should be credited with authorship of the book. Their conclusion of a joint authorship by

crediting Solander with writing pages 151 through 173 and Ellis with writing the balance of 183 pages is, surprisingly, a unique one. Because the thrust of the present paper is rather narrowly directed toward an analysis of the quality of Ellis's work, references herein to coral or hydroid species described in Natural history of zoophytes will be concluded to be references to Ellis's work if the species described is found in Ellis's portion of the book as determined by Cornelius and Wells (In press). This restriction is not intended to denigrate the contribution of Daniel Solander nor is it intended to offer a so-called change in the bibliographical listing from "Ellis & Solander" to just "Ellis." Its purpose is to provide a basis or justification for certain relevant conclusions to be set forth later, herein.

Rauschenberg (1968) reported that Daniel Solander, an outstanding student of Linnaeus, came to London in 1760 following requests by Ellis and Peter Collinson to Linnaeus that he send one of his students to England to help establish the Linnean system there.[9] Frans A. Stafleu (1971) noted the same as being factual,[10] and this information also appeared in a letter of eulogy on Solander written by Sir Joseph Banks on 16 November 1784 in reply to a request by Johan Alstroemer,

President of the Swedish Royal Scientific Society, for some unpublished items about Solander.[11]

The International code of zoological nomenclature has established the arbitrary date of 1 January 1758 as the starting date of zoological nomenclature because two fundamental works are taken to have been published on that date: Linnaeus's Systema Naturae, 10th Edition and Clerck's Aranei Svecici.[12] The Code has incorporated the Linnean system into its Principle of Binominal Nomenclature and defined it as "The scientific name of a species, and not of a taxon of any other rank, is a combination of two names (a binomen), the first being the generic name and the second the specific name; the specific name must always begin with a lower-case letter."[13] The detailed rules for the establishment of the nomenclature of animals are set forth therein with great precision. One of the rules relevant to this discussion is the "Identity of Authors," meaning that, "The author of a name is the person who first publishes it."[14]

Askell Love (1964) has pointed out that the field of biology started out as taxonomy since the basic approach was descriptive. Biologists, starting with the ancient Greeks, had set out to describe the variety of organisms, and the phenomena they display. As a matter

of course, categories were arbitrarily chosen.[15] At the time of the ancient Greeks, there was a listing of about five hundred species of animals and perhaps a like number of plants.[16] The work that Ellis did was to provide an accurate, precise description of the various species of corals, hydroids and sponges that are delineated in his two books. A species can be generally described as a group of living organisms that can mate freely among themselves and, thereby, bring forth young organisms like themselves which can likewise mate and bring forth another identical generation. However, the number of known organisms had increased dramatically since the time of Aristotle and by 1700 the number had grown to a minumum of 70,000.[17] Richard A. Pimentel (1963) has estimated that, "There are over a million known species of living organisms in the world today."[18] The English naturalist John Ray (1628-1705) was the first to make a major attempt to set up a systematic method of grouping all the known organisms. Ray's system did not last very long and was supplanted by that of the Swedish naturalist, Carl von Linne (1707-78), usually known outside Scandinavia as Carolus Linnaeus. He grouped similar species into a higher category called "genus." Genera (the plural of genus) were grouped into the next higher category called "family." Families were grouped

into an "order;" orders were grouped into a "class;" classes were grouped into a "phylum;" and phyla were grouped into a "kingdom." To each species he gave a double or binominal name in Latin. First he assigned the genus name followed by a species name.[19] This methodology was and still is accepted by the scientific community and is the basis for the Code of nomenclature mentioned earlier.

Edward T. Schenk and John H. McMasters (1956) Procedure in taxonomy, pointed out that the problems of the systematist in zoology have been steadily increasing. The causative factors of the problems were identified as the tremendous increase in numbers of forms of animals known, together with changes in the concepts of classification brought about with the acceptance of the theory of evolution.[20] The Introduction to the Code offered a more comprehensive or expanded explanation of the problems of the systematist. Of course, the great increase in known species resulting from the growth of science was recognized. However, an equally important factor was the growth of active scientific exploration in countries outside Europe. Both of these factors resulted in a multiplicity of names and synonyms and were the origin for the internationally accepted Code of Zoological Nomenclature. The present third edition of

the Code is the culmination of the effort to provide rules so that zoologists are enabled to arrive at names for taxa that are correct under particular taxonomic circumstances.[21] Pursuant to such rules, opinions are sometimes rendered on the work of prior taxonomists.

Of these opinions, some were directed to the taxonomic efforts of Ellis's contemporaries as follows:

> Opinion 89 . . . "the following works or papers are declared eliminated from consideration as respects their systematic names as of their respective dates: . . . Catesby, 1771, Browne, 1789 . . ."[22]
>
> Opinion 259 "Rejection of the names used by Mark Catesby in the Natural history of Carolina, as republished by Edwards in the edition of 1771, but acceptance of names formed in accordance with the Linnean system inserted by Edwards."[23]
>
> Opinion 332 "Rejection for nomenclatorial purposes of the work of William Borlase entitled The natural history of Cornwall published in 1758."[24]

Thus, the nomenclature introduced by these early amateur scientists, all contemporaries of Ellis, had to be bypassed for whatever reasons were involved in the cited Opinions. Schenk & McMasters have also pointed out that the aforementioned tenth edition of Systema Naturae of 1758 "which was the first to use consistently

the system of binary nomenclature, represents the starting point of zoological nomenclature as we know it today."[25] (underlining mine). A logical inference of the reason for bypassing the nomenclature of the aforementioned scientists was the lack of consistency in the application of binominal nomenclature. Nonetheless, their work was of high standard.

At the same time it should be kept in mind that Ellis published his Natural history of corallines in 1755, five years before he became "well" aquainted with the Linnean method from Daniel Solander who arrived in London in 1760. Some eight years later, Ellis admitted his inadequacies in the methodology of Linnean nomenclature in a letter to Dr David Skene of 12 November 1768, "My pleasure does not consist in arrangement but in discovery of new genera and species of zoophytes. What little description will be in English for I shall only be laugh'd at if I attempt what Linnaeus or Pallas has done so accurately. If I can give my friends an idea equal to what I have myself of them I shall be satisfied."[26] It was along these lines that he offered his observation that, "The proper distinguishing character of the Isis is, and should be, its joints."[27] His ability to recognize and identify those characteristics which were common to the organisms in the group and those which

distinguished one from the others in the group and to adequately describe these characteristics so that future taxonomists could evaluate them are the reasons behind the enduring quality of his work. He fulfilled his stated goal not only for his generation of scientists but for succeeding ones as well. In addition, his is the credit of being first with the description.

While Ellis was aware of the need for accurate description of the characteristics that were common to each species, he also noted the possibility that future scientists might introduce a new species name as a result of the expansion of knowledge. This idea of change in species identification was reflected in the statement, "I have some doubt, whether the animal which I have called Actinia sociata, or Cluster'd animal flower, properly belongs to this genus, as it produces its offspring from an adhering tubulous base, and the construction of the inner parts upon dissection seem to differ from the rest. At the present I shall rank it as a species, till future discoveries inform us better."[28]

Rauschenberg (1978a) noted, "Perhaps the most prestigious accolades Ellis received were from Carl Linnaeus," and he also documented the praise of others.[29] George Johnston evaluated Ellis's abilities from the Natural history of corallines, "a work so complete and

accurate, that it remains an unscarred monument of his well-earned reputation as a philosophical inquirer, and is even to this day (1847) the principal source of our knowledge in this department of natural history."[30] Perhaps, because very few additional British forms were included, George Johnston did not include Ellis's Natural history of zoophytes as additional source for commendation. His opinion of Solander's part in the work can be inferred from the imprecise statement, "Solander, in arranging the materials of Ellis . . ."[31] He considered Solander as only the "arranger" of the Ellis material. Philip Henry Gosse, in A history of the British sea-anemones, referred to Ellis as "the father of English Zoophytology"[32] and commented on "The keen eye and scientific zeal of old Ellis."[33]

S. F. Harmer and A. E. Shipley, editors of The Cambridge natural history, reported that "About the middle of the eighteenth century, authors, especially Peyssonnel, suggested that sponges were but the houses of worms, which built them much as a bee or wasp builds nests and cells. This was confuted by Ellis in 1765, when he pointed out that the sponge could not be a dead structure, as it gave proof of life by 'sucking and throwing out water.' To Ellis, then, is due the credit of first describing, though imperfectly, a current set up

by sponges."[34] It should be noted that in addition to these facts, Ellis identified and described thirteen species of sponges.[35]

It would be proper at this point in the narrative to count the hydroids, corals and sponges described and identified by Ellis in Natural history of zoophytes. There is a total of two hundred and four species described and identified. Included therein is the total number of marine invertebrates described in Ellis's Natural history of corallines, which amounted to seventy-eight in all. This indicates that from the time of publication of his first work in 1755 until his death in 1776 he had identified and described another one hundred and twenty-six species. Cornelius and Wells (In press) have noted that Linnaeus incorporated in the Systema Naturae of 1758, twenty-six hydroid species in the genera Sertularia and Tubularia that were based almost solely on Ellis's 1755 work.

A current assessment of the quality of Ellis's work will be attempted by way of citations of systematists. While many have cited Ellis's description of a species under review, they are not thereby indicating the quality of his work. They are merely acknowledging the priority of his description under the Code rule of first authorship. Occasionally, however, a

taxonomist may make comments from which a possible inference may be drawn as to the quality of the prior description. It is to these references that attention is to be drawn in the following discussion.

John Edward Gray wrote a paper describing some new genera of stony zoophytes that was published in 1859. In his remarks on the genus Solanderia he quoted from Ellis's 1755 work in regard to the species Gorgonia suberosa and stated that Ellis described this as "having a pale red axis 'of the substance of cork,' striated externally and subcylindrical, 'a fleshy, spongy bark, with the cells on all sides disposed in a quincunx order,' would appear to be allied to the family Annellidae."[36] While Gray had described a new species, his quote could be interpreted as an inference of the high quality of Ellis's work since Gray accepted the description without modification of any kind.

Philip Henry Gosse, A history of the British sea-anemones and corals, described the Plumose Anemone which he labeled Actinoloba dianthus and commented, "The specific name, dianthus, is due to a pretty fancy of Ellis, the father of English Zoophytology. Observing the resemblance which the Actinia bore to composite or many petaled flowers,-a resemblance which is perpetuated in the popular appellation, Sea-Anemones, he named such as

were known to him after those lovely objects; bellis the daisy; mesembryanthemum, the fig-marigold; dianthus, the pink."[37] From this quotation one can recognize the high regard Gosse had of Ellis and of the latter's ability to select a name appropriate to the description of the species under discussion. Along the same line, Gosse noted Ellis's description of the studded Sea Star-flower, Actinia gemmacea,[38] and commented that such name as given by Ellis was "well fitted to suggest the delicate beauty of this pretty little species."[39]

It is of interest to note that while Ellis credited his friend Dr Joseph Gaertner with the first description of the species Actinia cereus, Actinia bellis, Actinia gemmacea and Actinia mesembryanthemum,[40] Gosse, in his discussion of these species, does not acknowledge the primacy of Gaertner's descriptive work at all.[41] Dr Paul F. S. Cornelius has suggested two possible explanations: 1) that Ellis's descriptions were superior to Gaertner's; 2) that perhaps Gaertner did not use binominal nomenclature. Hence, the specific name would date from Ellis, even though Gaertner had described the species earlier.

J. E. Gray (1870), in the Catalogue of lithophytes or stony corals in the collection of the British Museum in his discussion of Isis made the

statement "(Isis Hippuris) is figured by Solander, Zooph. t. 3. Ellis has justly observed that the sailors generally take it off (the flesh of the specimen) during the passage to this country (England) to show the black joints."[42] Apparently, Gray was of the opinion that plate 3 was prepared by Solander and the description from which the quote was taken was written by Ellis.[43] It is suggested that this comment may be indicative of the importance Gray placed on Ellis's description. Purely as a peripheral observation, it can be noted in Gray's book that the names are, haphazardly, reversed in the citations and "Solander & Ellis" appears as frequently as "Ellis & Solander."

In 1863, L. Agassiz, then Director of the Museum of Comparative Zoology in Cambridge, Massachusetts, issued a Bulletin regarding the names adopted for specimens in the collections of the Museum to explain certain changes in the nomenclature of specimens sent to other institutions by the Museum. In that Bulletin he stated a Caveat "in order to give proper credit to all those connected with our progress, it is recorded in this Bulletin with the date at which the investigation was made, although no claim of priority is intended. It is merely a matter of justice to those concerned in the arrangement of the collections."[44] This

warning could only apply to authors on taxonomic matters working in or after 1863 as they might be involved in possible conflicts or questions of priority. The Caveat could not be applied to authors who were deceased, such as Ellis. Hence, any first listing of a deceased author could be accepted as a "claim to that person's priority". Among the new names that were adopted appeared the species, Plexaura crassa. As to this species, Agassiz stated that Ellis & Solander receive credit for first discovery under the description of Gorgonia crassa.[45] He made the further pronouncement, "There is no American species known to us, except the present (one), to which the description of Ellis can apply, while it agrees perfectly with this. The character of having a very black axis, very small at the extremities, is especially characteristic, and, also of having 'long fleshy branches that bend a little out and then grow upright,' and, in addition, the 'violet flesh,' and 'scattered arrangement of the cells' can leave no question of its identity. The figure quoted above, of which Ellis gave no explanation, agrees perfectly with his description and with alcoholic specimens in the Museum."[46] This is a definitive expression of the quality of Ellis's work by a renowned author of the nineteenth century. Agassiz also noted that, "The Gorgonia americana of Gmelin was based upon

the figure of Ellis and Solander (Pl. 14, fig. 3),[47] which is a good representation of the species when preserved in alcohol with the polyps expanded."[48] From this, one can infer that Johann Georg Gmelin[49], a contemporary of Ellis and a naturalist from Russia, relied upon Ellis's skill of accurate description.

A recent authoritative work covering those hydroids of Ellis (1755) which were listed by Linnaeus (1758) is Cornelius and Ryland, Hydrozoa, eds., Ryland and Hayward, An introduction to the marine fauna of the British Isles (In press).[50] Cornelius and Ryland have accepted, and regard as valid, all but one of the twenty-six species which were listed by Linnaeus under the two genera Sertularia and Tubularia which had earlier been described by Ellis (1755) and later included in Linnaeus (1758). The single exception is the species Sertularia argentea which Ellis was first to regard separate from Sertularia cupressina. Ellis had noted in his discussion of these two species that, "though supposed by Linnaeus to be the same, when they come to be compared, have quite a different habit and manner of growing."[51] As to Sertularia argentea, Cornelius (1979) summarized the arguments pro and con the separation and concluded that they were finely balanced.[52]

That Ellis was the first author to describe

many of the species delineated in both the 1755 work and the 1786 work is not widely known outside the fraternity of taxonomists. The following list of first discoveries is, therefore, presented here but is not to be considered exhaustive. The species now mentioned are in addition to the ones discussed earlier, herein:

Abietinaria filicula, redescribed for example, in Naumov. 1960.[53] Syn. Sertularia filicula.[54]

Halecium muricatum, redescribed for example, in Naumov. 1960.[55] Syn. Sertularia muricata.[56]

Zoanthus sociatus, redescribed for example, in Lamarck. 1801.[57] Syn. Actinia sociata Ellis.[58]

Eunicea calyculata, redescribed for example, in Lamouroux. 1816.[59] Syn. Gorgonia caliculata.[60]

Titanideum suberosum, redescribed for example, in Agassiz, MS.[61] Syn. Gorgonia suberosa.[62, 63]

Fungia patella, redescribed for example, in M. Edwards and Haime. 1851.[64] Syn. Madrepora patella.[65]

Gorgonella umbraculum, redescribed for example, in Verrill, MS. 1862.[66] Syn. Gorgonia umbraculum.[67]

A summary of the foregoing discussion of material including authors and citations is now in order and the following conclusions can be drawn:

1) In the Natural history of zoophytes by Ellis and Solander, the work of each can be distinguished following

Cornelius and Wells (In press).

2) Ellis's descriptions in both books have been relied upon in the past, are referred to in the present and stand as an enduring monument to his genius. The superior quality of his descriptive work, while noted by his contemporaries, has heretofore not been updated. It is most rare in taxonomy for such work to stand so long a test of time.

3) The science of nomenclature has outstripped most, if not all, of the eighteenth century writers on taxonomy including Ellis not because of any particular inability or lack of comprehension on their part but basically because of the discovery of large numbers of new species in all parts of the world, the wide acceptance by the scientific community of the Darwinian theory of evolution and the need to fit all of the new species into workable categories.

4) Ellis has the honor of first discovery of a significantly large number of species of hydroids, corals and sponges.

Ellis also did significant work in botany. His first botanical publication had an interesting title, "A Letter from Mr. John Ellis, F.R.S. to Philip Carteret Webb, Esq; F.R.S. attempting to ascertain the Tree that yields the common Varnish used in China and Japan; to

promote its Propagation in our American Colonies; and to set right some Mistakes Botanists appear to have entertained concerning it."[68] It is obvious from the title that Ellis was deeply concerned with economic botany for the advancement of colonial agriculture. It can be presumed that his motives were altruistic for no personal gain showed in his actions or his writings. As early as 25 November 1756 when the article was first read to the members of the Royal Society, Ellis described his experiments with three species of Toxicodendron including the pinnated Toxicodendron of the North American colonies and concluded that none of them was the true varnish tree of Japan. Then, he proceeded to prove that Philip Miller,[69] gardener of Chelsea, was in error when the latter insisted that the pinnated Toxicodendron of the North American colonies was the true varnish tree of Japan.[70] Rauschenberg (1978b) established that Ellis was proposed for membership of "The Society for the Encouragement of Arts, Manufactures, and Commerce"[71] on 14 May 1755, was elected to membership the following week, and was an active member of the Society for the next six years.[72] Ellis's article on the true varnish tree contained a reference to the Society, "the use I would propose to you from the remarks I have made, is, that as our Premium Society for the encouragement of Arts

and Sciences have a scheme on foot to promote the growth of many really useful vegetable productions, which are at present brought to us, at a great expence, from Spain, France, Italy, the Levant, Africa, and the East-Indies."[73] This statement constituted a verification of Ellis's early activity on behalf of the Premium Society. It is also evidence of his altruistic motives.

Ellis had noted in his article on the true varnish tree the benefits that would accrue to colonial agriculture if vegetables coming from foreign lands could be introduced into the colonies. He had also noted the main problem connected therewith, "The chief difficulty will be the preserving of its vegetative quality during two so long voyages (being one from a foreign land to London and the forwarding of the vegetable to the colonies from London); but by many contrivances I am persuaded it will at last be effected; however the very attempt is laudable."[74] He was not loath to make the attempt himself and the following year saw him sending many useful seeds including some acorns of the cork-tree which he put into a sand box. These boxes he shipped to Governor Ellis of Georgia. The Governor, in due course, responded by letter of the total destruction of the seeds caused by high temperatures in the cargo portion of the ship in the warm climate. Thereupon, John Ellis engaged

in a series of experiments in October 1758 at his residence in London designed to simulate conditions during such an ocean voyage and reported the success of the experiments in a letter read to the members of the Royal Society 18 January 1759.[75] He immediately put the experiment to the test of a voyage. He prepared seven parcels of the cork-bearing oak using different methods and materials for each parcel and sent them to Governor Ellis of Georgia. The Governor informed him of the complete success of germination of the seeds in the parcel that encased the seeds in beeswax which was covered with a paste of loam and dissolved gum arabic. The details and the success of this experiment were read on 20 December 1759.[76]

Rauschenberg, (1978a,[77] 1978b[78]) placed great emphasis on Ellis's proposal to the Premium Society submitted on 2 November 1758 calling for premium grants to foster colonial gardens. Rauschenberg described it as "his (Ellis's) most significant contribution through the Society."[79] Rauschenberg was no doubt influenced in this judgment by the fact that "The idea of promoting colonial gardens was picked up by the Society in 1760. Also several of the plants listed by Ellis were granted Society premiums. These included such things as opium, olives, cotton, rhubarb, spices and logwood."[80] Edmund

Berkeley and Dorothy Smith Berkeley (1969) have reviewed substantially the same source material and have concluded "The subject of such gardens crops up in Garden's correspondence with Ellis as late as 1773, but nothing appears to have been actually done to start one."[81]

P.S. Dixon (1960) has reported the current awareness in algal taxonomy that, as in other branches of taxonomy, accurate typification is most important if names of taxa are to be applied with any degree of precision. Ellis had included certain algae together with animal corals in his publications.[82] From the zoological point of view this was a decided error. This slipup was mentioned by Cornelius and Wells (In press) who noted that such errors were most unusual in his work and, fortunately, did not detract from his high standing in the scientific community either then or now. Oddly enough, from the point of view of typification, "while the Ellis collections are by no means as important as those of some of the other early authors, in that the number of species involved is relatively small, but the collections are nevertheless of considerable interest and importance."[83] A most intensive search has been undertaken for the Ellis collections in the hope of finding the original algal specimens. Unfortunately, the outcome of the search has led to naught. They are

presumed lost.[84]

Cornelius and Wells (In press) have discussed in great detail the search for Ellis's zoological material. Their conclusion is, "Sadly it is almost certain that, with the exception of a single non-type specimen, all of Ellis's hydroid collection is lost." As of 1877, nineteen specimens of corals were listed as being in the Hunterian Museum as figured in Ellis and Solander[85] and these are still extant (Cornelius and Wells, in press). As to the remaining specimens, Cornelius (1975) reported that, "the bulk of the Ellis material was destroyed during the Second World War."[86] This view has been confirmed by Cornelius and Wells (In press).

After publication of his book on Corallines on 6 March 1755, Ellis started a new project. On 8 July 1755 in a letter to Professor Charles Alston,[87] Professor of Botany in the university of Edinburgh he introduced himself as the author of the recently published Essay on corallines and offered a copy to Professor Alston for the latter's opinion of the work. There is no mention of payment for the book so one assumes it was a gift. His reason for writing was simple enough. In looking at Ray's classification of plants he had noticed many varieties described by Ray that grew mainly in the

northern part of the British Isles and were only rarely to be found in the south. He wanted Professor Alston to send him specimens:

> "If I could be supplied with some specimens of these I believe my collection would be nearly compleat." His plan was, "When my Collection of British Marine Plants is compleat, I propose to get them neatly drawn and engrav'd with a new description of each, by this means I hope to be able to make the Knowledge of them more familiar to us than hitherto they have been; Description by words alone not being sufficient to express our Ideas of them from the great likeness that many of them bear to one another, and where the external appearance differs but little, I shall introduce the microscopical drawing of a small branch to make the distinction the clearer."[88]

Basically, he intended to do a botanical volume similar to the one he had just finished on corallines. The letter was sent free of postal charges under the aegis of Philip Carteret Webb and Ellis instructed Professor Alston to send specimens to him via Mr William Todd, Secretary to the Linen Company in Edinburgh, Capital of Scotland, who would act as forwarding agent. There is no

record of any reply by Professor Alston to be found in Ellis's correspondence at the Linnean Society of London and none has been found in any other manuscript collection mentioned herein. It is possible that Professor Alston never answered the letter. Ellis didn't mention the plan again in any other letter. The idea of a botanical book was apparently abandoned, perhaps because more material pertaining to zoological species was at his hand. Ellis was not the only one whose letters went unanswered by Professor Alston. Dr Alexander Garden had attempted to establish a correspondence with the latter in 1754 and again in 1757.[89] However, no answer by Professor Alston has been found to these letters either.

Ellis's interest in advancing the economic interests of his country by promoting the introduction of new crops into the agricultural economy of the colonies was presented in his An historical account of coffee. He plainly stated, "The objects of this performance are, the promotion of science, national advantage, and the prosperity of the Island (Dominica) for which I have the honour to be the Agent. The description of Coffee, with the exact delineation of all its parts, together with the History of its introduction and progress, will contribute to the first. In respect to the two last, I own myself

obliged to my friend Dr Fothergill. The importance of giving encouragement to the growth of this article for home consumption, and exportation, had often been the subject of our conversation, and I begged he would seize some opportunity to give me his sentiments in writing."[90]

Another illustration of such economic interest was manifested by Ellis in the account of "a new Species of Illicium linnaei, or Starry Aniseed Tree, lately discovered in West Florida."[91] Even before he discussed the botanical characteristics of the plant, Ellis mentioned the possible economic uses to which the plant could be put. "The medicinal properties of this tree are certainly worth enquiring into. The leaves afford a most agreeable bitter," and the young blossoms showed evidence of astringent qualities. In addition to the foregoing economic benefits, in comparison to the seed vessels of the Chinese species seen in collections of the Materia Medica which have a disagreeable odor, "our Florida seed vessel is agreeably aromatic."[92]

To the same end he closed his letter read to the members of the Royal Society 10 March 1768, on the success of his experiments for preserving acorns "the success of which, if properly followed, may in a few years put us in possession of the most rare and valuable seeds in a vegetating state from the remotest parts of

the world, which in time may answer the great end of the improvement and advancement of our trade with our American Colonies."[93]

Ellis's, A description of the mangostan and the bread-fruit, was also a presentation of the economic utility of these plants. "The design of the following sheets, is to incite the attention of the public, to some circumstances in which they are deeply interested. There are two trees, natives of the East Indies, which, could they be introduced into our West India islands, would be signally useful to their inhabitants."[94] In addition to recounting the manifold benefits of the fruit of these trees, Ellis presented a unique opportunity for all world travelling Englishmen to participate in promoting the science of botany, the expansion of knowledge and the introduction of useful plants in British colonies in America. All who read the descriptions must have noted his "Observations and Instructions for Captains of Ships, Surgeons, Super-cargoes, and others, who are unacquainted with Botany; but wish to be assisting in promoting that Science, and the more general Cultivation of useful Plants in the British West Indies."[95]

Benefit to mankind as well as economic utility was always present in Ellis's thinking and was not confined to plants. In 1768 and 1769 he was

experimenting with hempseed, potato, tea-seed and a variety of pulse and grain from the East Indies, namely, lupins, kidneybeans, vetches, millet, guinea corn and the sesamum or oily grain. The technique he used was to add water from different sources to the particular vegetable being examined and allow it to become putrid. The resulting scum was then examined under the microscope and the various species of protozoa that appeared were duly figured and described. It is germane to this discussion to observe Ellis's reaction to the experiment on hempseed. "I come now to a singular property, which I have discovered in hempseed, of producing an indissoluble salt, when infused for some time in water: and as hempseed is known to be an efficacious medicine in some particular cases, these experiments may demand a stricter enquiry from the professors of physic, which may possibly turn to the benefit of mankind."[96]

The evaluation of a fact by historians is a matter of great interest. Ellis as a member of the Premium Society had gathered a list of ninety-four plants which could be grown in Georgia and the Carolinas. According to Rauschenberg (1978a) this occurred on approximately 2 November 1758 at about the same time that Ellis had proposed that provincial research gardens be established.[97] E. Berkeley and D. S. Berkeley (1969) had

noted the same data in their publication.[98] Neither one of them attributed much significance to Ellis's list of plants. Brooke Hindle (1956), however, looked at this list and drew a totally new conclusion, namely, "The natural history circle had been founded in considerable measure upon the desire to introduce American plants to Europe, but a reversal in emphasis was effected when the American Philosophical Society reprinted John Ellis's pamphlet on foreign plants that might be profitably introduced into the colonies."[99] Ellis had included his list of plants in his Directions for bringing over seed and plants from the East-Indies and other distant countries in a state of vegetation.[100] Apparently, the American Philosophical Society had picked up this list from the Philosophical Transactions. Brooke Hindle's conclusion is, definitely, more in keeping with Ellis's philosophy of economic agriculture, and is in harmony with the surrounding facts and circumstances.

To summarize Ellis's botanical work, it would be fair to state that is was done with the same degree of precision and attention to detail as his zoological work, but with the added dimension of calling attention to the possible advancement of the economic interests of England and her colonies. Of course, with the inclusion of the finding of Brooke Hindle stated above, Ellis should be

credited as the first English naturalist to give ideas in some tangible form for the assistance of the American colonial agriculturalist.

Mr Ellis July 65

Dear Sir 94

Your kind letter of the 15 Inst afforded me as much pleasure in reading as you had in making the discoveries on your excursion. I own I never rec^d more pleasure than when I made my first trip to the sea side, this new scene of Nature will continue to afford us new varieties, consequently new pleasures as long as we live; now as to your discoveries. Your Cellaferous Coralline is quite new, your Sertularia I had before and it is in one of the plates I have now by me engraved, as are 2 others which I send you very small specimens but you have discovered the vesicles of this Elegant one, which I had not seen which I shall order the engraver to put in. I have sent you inclosed a few of what you want, and as soon as I can get the remainder will inclose them to you.

If any specimens that you may have collected are in danger of being spoiled by inclosing in a letter, pray let them be sent by sea the first convenient opportunity. There are few of your Merch^ts in London but know me, as I am Agent to the Linen Board of Scotland and shall gladly pay a porter and the freight for any thing you are so kind to send me; and every body knows me in Grays Inn Holborn. I have sent you a small specimen of the Snail bearing Coralline; for your opinion; it is one of the Birds head Coralline. I am well satisfied these animals approach each other very nearly and it is often a difficult matter to distinguish between ~~two~~ Species: but if we are too nice we shall never get forward, I shall soon send you some of my new plates, wherein I have taken in some of the foreign cellaferous Corallines & Lichens which will please you.

You make me smile with your animadversions on honest Job Baster Opera subseciva. My opponents in the Royal Society persuaded this Dutch Genius to write against me particularly Miller, Watson & some more very selfsufficient Folks, I answered his first letter, and when he sheltered himself under the mistakes of the great Linnaeus in the second he thought himself secure; but, I am now translating his Memoire to the Royal Society into English, which I shall publish in my second Volume with an answer to each in which I shall take ample satisfaction of him for his pertness. Your Observation is very just that Linnaeus is quite wrong in his whole article of the Sertularias. I have long ago told Solander it is pity, but he never set it to rights. Indeed he repeated it of [illegible] in his last letter.

I do not know that there are two different sorts of Polypes in one Coralline unless those that we call ~~the~~ breeding polypes which produce the young, which we have found in kinds of the sea oak Coralline & the great tooth Coralline of which I have given figures.

SOURCE: John Ellis to Dr David Skene, 1765, Dr David Skene MSS in the Aberdeen University Library, King's College, Aberdeen Scotland, MS 38/94.

July 1765 944

I have never seen any animals alive in the Corallina of Linnaeus, but their Animal nature as yet depends on their Structure and Chemical Analysis — Nothing newer than what I have observ'd has occurr'd relating to Sponges, which is that they are animals sui generis, without any polype-like heads or suckers, as in some of the Corals and Alcyonia, the rows of holes in some, in others the holes irregularly plac'd on the Surface of these bodies, act as so many mouths, sucking in and throwing out the Sea water, this Dr. Solander has seen in company with me and Dr. Knight at another time, and I am convinc'd, that what Peyssonel has wrote in regard to them is intirely false and that he never saw any animal as he describes it in the Phil. Transactions, which he absurdly says goes in and comes out of them so as to be intirely detached from them

I got a very Ingenious Chemist, one Mr. Wolfe, who was in the Government Service for above 2 years in Guadaloupe to examine them fresh taken out of the Sea and he declares, he got many varieties of them and never could discover any appearance of a polype or any animal like it, on their Surfaces, only the holes on the Surface to open & Shut while they remain'd in vessels of Sea Water ———

I have not heard of such a person as the Comte de Lauraguais. ——

I told Dr. Solander this day that you would be glad to hear from him and he has promis'd to write to you. Pray use my name when you write to Linnaeus. I mention'd yours to him in a letter last night

I should be glad to know if there is a Flora Scotica in hand

I hate distinctions under one Government and wish Hudson had been as universal as the Great Ray. If Solander would be persuaded by me he would write a new Flora Britannica but he says he knows so few Scots plants that it would not answer.

I have a long Letter from Dr. Garden of Charles town with sev.l new genera of Plants for Linnaeus and an animal between the Lacerta & Muraena, but believe it is no more than the first state of the Iguana Lacerta of Linnaeus. The animal is a foot long like an Eel with 2 small forefeet and 3 little divided lobes on each side where the gills of fish are plac'd. There is something very similar in the young water Lizards of these parts which occasions my suspicion that my Friend is not quite clear

I wish you all desireable Success & am truly J Ellis

CHAPTER V

NOTES

[1]Ellis, An essay towards a natural history of the Corallines, pp. v. to vii.

[2]Rauschenberg, "John Ellis, F.R.S", Notes and Records of the Royal Society of London 32 (1978a):153.

[3]Ellis to Skene, 26 March 1765, David Skene MSS, MS.38/91.

[4]Ellis to Skene, 25 April 1765, David Skene MSS, MS.38/92.

[5]Ellis to Skene, 22 October 1765, David Skene MSS, MS.38/96.

[6]Ellis, "Remarks on Dr. Job Baster's Observationes de Corallinis, &c. In a Letter to the Right Honourable George, Earl of Macclesfield, President of the R.S. from Mr. John Ellis, F.R.S.," Philosophical Transactions, 50:280.

[7]Ellis to Skene, 23 July 1768, David Skene MSS, MS.38/108

[8]Ellis to Skene, 31 December 1768, David Skene MSS, MS.38/110.

[9]Rauschenberg, "Daniel Carl Solander Naturalist on the 'Endeavour'," Transactions of the American Philosophical Society, 58(8) (1968):14.

[10]Frans A. Stafleu, Linnaeus and the Linnaeans: the spreading of their ideas in systematic botany, 1735-1789 (Utrecht: Oosthoek for the International Association for Plant Taxonomy, 1971), pp. 151, 136.

[11]Rauschenberg, "A Letter of Sir Joseph Banks Describing the Life of Daniel Solander," Isis, 55 (1964):63.

[12]International Union of Biological Sciences, International code of zoological nomenclature, 3rd ed.,

(London: International Trust for Zoological Nomenclature in association with British Museum [Natural History], 1985), p. 7.

[13]Ibid., p. 9.

[14]Ibid., p. 91.

[15]Askell Love, "The biological species concept and its evolutionary structure," Taxon, 13 (1964):33.

[16]Isaac Asimov, A short history of biology, (Garden City, N.Y.: The Natural History Press, 1964), p. 35.

[17]Ibid., p. 35.

[18]Richard A. Pimentel, Natural history, (New York: Reinhold Book Corporation, 1963), p. 95.

[19]Asimov, A short history of biology, pp. 35-37.

[20]Edward T. Schenk and John H. McMasters, Procedure in taxonomy, 3rd ed., (Standford: Stanford University Press, 1956), p. 1.

[21]Code, p. xiii.

[22]Schenk and McMasters, Procedure in taxonomy, p. 58.

[23]Ibid., p. 74.

[24]Ibid., p. 80.

[25]Ibid., p. 1.

[26]Ellis to Skene, 12 November 1768, David Skene MSS, MS.38/106.

[27]Ibid.

[28]Ellis and Solander, Natural history of zoophytes, pp. 1-2.

[29]Rauschenberg, "John Ellis, F.R.S.", Notes and Records of the Royal Society of London 32 (1978a):150-151.

[30]Johnston, A history of the British zoophytes, 1:419-420.

[31]Ibid., 1:441.

[32]Philip Henry Gosse, A history of the British sea-anemones and corals, p. 14.

[33]Ibid., p. 114.

[34]The Cambridge natural history, eds. S. F. Harmer and A. E. Shipley, vol. 1, (London: Macmillan and Co., Limited, 1906), p. 167.

[35]Ellis and Solander, Natural history of zoophytes, pp. 182-191.

[36]John Edward Gray, "Description of some new genera of lithophytes, or stony zoophytes," Proceedings of the Zoological Society of London, 27 (1859):482.

[37]Gosse, A history of the British sea-anemones, p. 14.

[38]Ellis and Solander, Natural history of zoophytes, p. 3.

[39]Gosse, A History of The British sea-Anemones, p. 192.

[40]Ellis and Solander, Natural history of zoophytes, pp. 2-4.

[41]Gosse, A history of the British sea-anemones, pp. 27, 160, 175, 191.

[42]Gray, Catalogue of lithophytes or stony corals in the collection of the British Museum, (London: by order of the Trustees, 1870), p. 20.

[43]Ellis and Solander, Natural history of zoophytes, p. 107.

[44]Bulletin of the Museum of Comparative Zoology, ed. L. J. R. Agassiz, 1 (1863-1869):1.

[45]Ellis and Solander, Natural history of zoophytes, p. 91.

[46]Bulletin of the Museum of Comparative Zoology, 1 (1863-1869):34.

[47]Agassiz referred to Table 14, figure 3 in Ellis

and Solander, Natural history of zoophytes p. 87. This is the description of the species Gorgonia pinnata.

[48]Bulletin of the Museum of Comparative Zoology, 1 (1863-1869):31.

[49]DSB, s. v. "Gmelin, Johann Georg," (1709-1755), was extremely gifted and graduated in medicine at age eighteen. One of his teachers was the botanist and anatomist, Johann Duvernoy, and the two of them went to St. Petersburg in 1725. There he became professor of chemistry and natural history in 1731. In 1733, he took part in an imperial scientific expedition to eastern Siberia. The expedition was a long dangerous one of nine and one-half years of travel. Upon his return he wrote and published his four volume Flora sibirica which contains descriptions of 1,178 species.

[50]An introduction to the marine fauna of the British Isles, eds. J. S. Ryland and P. J. Hayward, (London: Oxford University Press, [In press]).

[51]Ellis and Solander, Natural history of zoophytes, p. 38.

[52]Cornelius, "A revision of the species Sertulariidae (Coelenterata: Hydroida) recorded from Britain and nearby seas," Bulletin of the British Museum (Natural History), (Zoology) 34 (1978-1979):295-296.

[53]D.V. Naumov, Hydroids and hydromedusae of the USSR, Available from the U.S. Department of Commerce Clearinghouse for Federal Scientific and Technical Information, (Springfield, Virginia: Copyright by Israel Program for Scientific Translations Ltd., Jerusalem: and printed by IPST Press, 1969), p. 492.

[54]Ellis and Solander, Natural history of zoophytes, p. 57.

[55]Naumov, Hydroids of the USSR, p. 492.

[56]Ellis and Solander, Natural history of zoophytes, p. 59.

[57]Bulletin of the Museum of Comparative Zoology, 1:56.

[58]Ellis and Solander, Natural History of Zoophytes, p. 157.

[59]Bulletin of the Museum of Comparative Zoology, 1 (1863-1869):35.

[60]Ellis and Solander, Natural history of zoophytes, p. 95.

[61]Bulletin of the Museum of Comparative Zoology, 1 (1863-1869):39.

[62]Ellis, Essay on corallines, p. 63.

[63]Ellis and Solander, Natural history of zoophytes, p. 93.

[64]Bulletin of the Museum of Comparative Zoology, 1 (1863-1869):50.

[65]Ellis and Solander, Natural history of zoophytes, p. 148.

[66]Bulletin of the Museum of Comparative Zoology, 1 (1863-1869):37.

[67]Ellis and Solander, Natural history of zoophytes, p. 80.

[68]Ellis, "A letter to Philip Cartaret Webb, Esq; F.R.S. attempting to ascertain the tree that yields the common varnish used in China and Japan; to promote its propagation in our American colonies; and to set right some mistakes botanists appear to have entertained concerning it," Philosophical Transactions, 49 (1756-1759):866.

[69]DNB, s.v. "Miller Philip," (1691-1771), was born either at Depford or Greenwich in 1691. His father, a gardener, commenced business as a market gardener near Depford and Philip assisted him after leaving school. After a short while and still at an early age, Philip went in business for himself. He attracted the attention of Sir Hans Sloane and others and was induced by them to give up his business and assist other gardeners. On Sloane's recommendation he was appointed to the post of foreman of the Chelsea Gardens in 1722. In 1724 he published his first work, The gardener's and florist's dictionary. In 1731 appeared the first volume of The gardeners dictionary, which went through eight editions. He possessed the reputation of being a skilled gardener. He became a correspondent of Linnaeus who visited Chelsea Gardens in 1736. He published a number of works

including The gardeners kalendar, which went through twelve editions and also contributed articles to the Philosophical Transactions.

[70]Ellis, "An answer to the preceding remarks, [answer to Philip Miller's remarks on Ellis's letter on the Toxicodenron], Philosophical Transactions, 50 (1758-1759):441.

[71]Henry Trueman Wood, A history of the Royal Society of Arts, (London: John Murray, 1913), pp. 17-18. The original title of the Society as formally adopted 5 February 1755 was "The Society for the Encouragement of Arts, Manufactures, and Commerce." This proved to be too cumbersome and shortly thereafter the shorter name, "Society of Arts" was adopted. This shorter version of the name was in popular use and appeared in the Gentleman's Magazine of July 1755. Sometimes it is referred to as the "Society of Arts and Sciences." Oddly enough, in its own early books of account the title of "The Premium Society" appears. The word "Royal" was added to the title in 1908 by permission of King Edward VII.

[72]Rauschenberg, "John Ellis, naturalist: an early member of the Society," Journal of the Royal Society of Arts, 126 (1978b):577-579.

[73]Ellis, "A letter attempting to ascertain the tree that yields the common varnish,"Philosophical Transactions, 49 (1756-1757):874.

[74]Ibid.

[75]Ellis, "an account of some experiments relating to the preservation of seeds: In two letters to the Right Honourable the Earl of Macclesfield, President of the Royal Society," Philosophical Transactions, 51 (1760-1761):210.

[76]Ibid., Philosophical Transactions 51 (1760-1761):211.

[77]Rauschenberg, "John Ellis, F.R.S.", Notes and Records of the Royal Society of London 32 (1978a):153-154.

[78]Rauschenberg, "John Ellis, naturalist: an early member of the Society," Journal of the Royal Society of Arts, 126 (1978b):577-579.

[79]Rauschenberg, John Ellis, F.R.S.", Notes and Records of the Royal Society of London, 32 (1978):153.

[80]Rauschenberg, "John Ellis, naturalist: an early member of the society", Journal of the Royal Society of Arts 126 (1978):578.

[81]Edmund Berkeley and Dorothy Smith Berkeley, Dr. Alexander Garden of Charles Town, (Chapel Hill: The University of North Carolina Press, 1969), p. 85.

[82]P.S. Dixon, "The Herbarium of John Ellis (1710?-1776)," British Phycological Bulletin, 2 (1960):28.

[83]Ibid.

[84]Ibid., 2 (1960):30.

[85]Annals and Magazine of Natural History, 9 (1877):116.

[86]Cornelius, "The Hydroid Species of Obelia (Coelenterata, Hydrozoa: Campanularidae), with notes on the medusa stage," Bulletin of The British Museum (Natural History) (Zoology), 28 (1975):267, 273.

[87]DNB, s.v. "Alston, Charles (1683-1760)," studied under Boerhave at Leyden. He returned to Edinburgh and was appointed lecturer in Botany and materia medica and also in 1716 became superintendent of the botanical gardens. He held these posts until his death. In 1740 he compiled an index of plants in the Edinburgh gardens in which he attacked the Linnaean system of classification.

[88]Ellis to Dr Charles Alston letter 8 July 1755, Edinburgh University Library, La.III.375.

[89]Berkeley and Berkeley, Dr. Alexander Garden of Charles Town, p. 85.

[90]Ellis, An historical account of coffee, with botanical description of the tree; to which are added sundry papers relative to its culture and use, as an article of diet and of commerce, (London: John Ellis for Edward & Charles Dilly, 1774), p. iii.

[91]Ellis, "The copy of a letter to Mr William Aiton, Botanic Gardener to her Royal Highness the Princess Dowager of Wales, at Kew, on a new Species of Illicium

Linnaei, or starry aniseed tree, lately discovered in West Florida," Philosophical Transactions, 60 (1770):527-528.

[92]Ibid., Philosophical Transacations, 60 (1770):528.

[93]Ellis, "A letter to the President, on the success of his experiments for preserving acorns for a whole year without planting them, so as to be in a state fit for vegetation, with a view to bring over some of the most valuable seeds from the East Indies to plant for the benefit of our American colonies," Philosophical Transactions, 58 (1769):78.

[94]Ellis, A description of the mangostan, and the bread-fruit. To which are added directions to voyagers, for bringing over these and other vegetable productions, which would be extremely beneficial to the inhabitants of our West India islands, (London: printed for the author, and sold by Edward and Charles Dilly, 1775), p. 5.

[95]Ibid., p. 26.

[96]Ellis, "Observations on a particular manner of increase in the animalcula of vegetable infusions, with the discovery of an indissoluble salt arising from hemp-seed put into water till it becomes putrid," Philosophical Transactions, 59 (1770):144-145.

[97]Rauschenberg, "John Ellis, F.R.S.", Notes and Records of the Royal Society of London 32 (1978a):153.

[98]Berkeley and Berkeley, Dr. Alexander Garden of Charles Town, p. 112.

[99]Hindle, The pursuit of science, p. 197.

[100]Ellis, Directions for bringing over seeds and plants from the East-Indies and other distant countries, in a state of vegetation; together with a catalogue of such foreign plants as are worthy of being encouraged in our American colonies; to which is added the description of a new sensitive plant, called "Dionaea muscipula" or Venus's fly-trap, (London: printed and sold by L. Davis, 1770), pp. 22-33.

CHAPTER VI

ELLIS AS KING'S AGENT FOR WEST FLORIDA, HIS INVOLVEMENT WITH THE IRISH LINEN TRADE AND AS COLONIAL AGENT FOR DOMINICA

The Treaty of Paris in 1763 brought an end to the French and Indian War. England had not only subdued France on the North American Continent, but had also captured Havana from Spain. News of the success of the British Fleet at Havana reached London 23 August 1762 while peace preparations were in progress and the respective governments were giving instructions to their ambassadors and plenipotentiaries. A wave of national exuberance swept England and the British cabinet raised its demands for the settlement of the conflict. The Spanish Monarch, Carlos III, knew that his continuance of the war for the purpose of denying England a foothold on the gulf of Mexico was a losing proposition, for England was militarily quite capable of taking both Florida and Louisiana. He was, therefore, in favor of peace but with reservations. News of the fall of Havana coupled with a personal appeal from his cousin Louis XV to end the

conflict, caused the Spanish monarch to drop the reservations and subscribe to a complete peace treaty. Despite the fact that England had only captured Havana, part of her demands centered on the acquisition of Florida from Spain as compensation for Cuba. France, having persuaded Spain to enter the conflict, sought to deflect this portion of England's demands and offered England all of Louisiana west of the Mississippi, if England would drop Florida from its demands. England, however, refused this proposal and insisted upon taking Florida. In order to compensate Spain for the loss of Florida, France gave her all of Louisiana west of the Mississippi together with the town of New Orleans.[1]

Subsequently, Lord Bute's ministry was criticized for having taken Florida in exchange for Cuba.[2] That island was far more developed agriculturally than Florida and was, in fact, self sustaining. Florida, on the other hand, was not self sustaining and had been completely dependent while under Spanish control on the <u>situado</u> (support funds) for survival.[3] Rea (1975) pointed out that "Charles Townshend[4] told the King, Florida 'was an uninhabited country and could not be look'd on as any . . . but a useless territory'"[5]. The explanation offered by the ministry in justification of this decision was that the Bay of Pensacola was valuable

to the British fleet.[6]

The British Government acted quickly to consolidate its new possessions and, on 7 October 1763, George III proclaimed the plans for the area. Florida was to be divided into two portions, East and West. The reason for such division has been touched upon but not clearly delineated by writers on the topic. Clarence E. Carter (1914-15) pointed out that the Lords of Trade in June 1763 made a preliminary report and suggested the division of Florida into east and west provinces. However, this report was only tentative because of the lack of reliable data pertaining to the coast line, harbors, natural resources and the native population.[7] In a later article, "The Beginnings of British West Florida", Carter restated the lack of requisite authentic knowledge on the part of the Lords of Trade on the question of the division of Florida. In addition he noted that, "With the knowledge available, however, it was deemed indispensable that this country should be divided into two distinct governments, and that for the present the chief residence of the governor of the one should be St. Augustine, and that of the other, Pensacola."[8]

Verner W. Crane wrote "Hints Relative to the Division and Government of the Conquered and Newly

Acquired Countries in America." The "Hints" about which he wrote were suggestions whose authorship Crane ascribed to the Earl of Egremont,[9] Secretary of State for the southern department. These suggestions were made to the Board of Trade. One was, "All the Peninsula Southward of this Line ought to be comprized in the Province of Florida, and the Country situated between S^{t}. Mark's and the River Mississippi, should be formed into another province."[10] Outside of this "Hint" no reason was stated for making such division. The material utilized by both writers came from Documents relating to the constitutional history of Canada, 1759-1791, eds. Adam Shortt and Arthur G. Doughty. A careful reading of the source material disclosed a letter of 8 June 1763, from the Lords of Trade to Egremont which stated, "The great Tract of sea Coast from St. Augustine, round Cape Florida, along the Gulph of Mexico, to the Mouth of the Mississippi makes it, we apprehend, indispensably necessary that this Country should be divided into two distinct Governments."[11] Based on this passage there can be little doubt that the decision to divide Florida into east and west provinces was attributable to the vast length of the coastline. At the same time that the division was recommended, the Lords of Trade suggested that two distinct governments be established to be

distinguished by the names of East and West Florida and gave the boundaries of each.[12] The type of government proposed for these two areas was to be similar in manner and form to any crown colony or province in colonial America.[13]

Cecil Johnson (1943), British West Florida 1763-1785, pointed out that in one major respect West Florida was different from the typical crown colony and that was in the parliamentary support fund for the maintenance of the civil government of the province.[14] It was his opinion that the presence of this support fund negated any possible mercantilist motive on the part of the government in the acquisition of Florida. Basic tenets of mercantilism concerning a British colony were that the colony should supply raw material to manufacturers in England and should also function as a market for the finished goods of English manufacturers. If these facts and circumstances relating to the movement of raw materials and finished goods were not present in a colony, mercantilism could not be considered a factor in the economy of that colony. Neither East Florida nor West Florida possessed these traits and both provinces had to rely on the government for financial support. Johnson's conclusion apropos the support fund was, "government aid to a province unable to support itself

was never a mercantilist principle."[15] Instead of a mercantilist motive, Johnson saw imperialism as the true motive for the government's financial support of the province. As evidence for this conclusion, he pointed to the extension of sea power by the building of a naval base at Pensacola.[16]

Clinton N. Howard found that the Parliamentary appropriation started 22 May 1764 with a grant of £5700 placed under the control of "John Ellis, Esq. Agent of the King in behalf of the Publick for the Province of West Florida."[17] Ellis with his background in business and his work in Natural History now assumed the additional role of political appointee in a difficult assignment coupled with potential personal financial liability for himself and kinsman, Governor Henry Ellis, who signed as surety on Ellis's bond of office.

It was Robert Henley, Earl of Northington,[18] who obtained for John Ellis the appointment as Agent For West Florida as indicated in a draft letter of 28 November 1764 from Ellis to Thomas Fitzhugh, his friend in Canton, China, "Fortune has smil'd and My Good Lord Northington the present Chancellor has got me the Agency of West Florida and taken me under his protection."[19] Robert Henley was a lawyer and successful politician. He corresponded frequently with Ellis and sought Ellis's

advice and help in the selection and cultivation of new plants for the Chancellor's garden.[20] There is little doubt that Ellis's prior relationship with Robert Henley led to his appointment as Agent, representing the government, to the province of West Florida.

There is no information relative to the duties of the office of King's Agent or requisites for the position other than what can be gleaned from manuscripts. But we do know, or can infer, the following: Ellis had orders to protect the public funds from being misapplied;[21] he undertook the obligation to request the funds from the treasury after they had been appropriated; a bond with a personal surety was required; he signed the bond; Henry Ellis, Governor of Georgia, also signed the bond as his surety; and John Ellis delivered the bond to the government. Some added information might be inferred from the work of Dora Mae Clark, The rise of the British Treasury. She concluded that the unusual status of the provinces of Nova Scotia and Georgia gave rise to a new type of colonial agent, appointed by patent under the royal sign manual, countersigned by the Treasury and paid by public funds. She also found that, "The agents received and dispersed (disbursed) funds appropriated for their respective provinces, and were accountable according to the forms of the Exchequer. They were

subject to instructions from both the Treasury and the Board of Trade."[22] The situation in respect to West Florida was comparable. A budget was established for the civil administration of the province, money was appropriated by Parliament for this purpose and Ellis supervised the disbursements in accordance with budget allotments. The mechanics of the disbursements were by way of his approval of drafts,[23] a procedure which is detailed later in this chapter together with the budget details and documents showing Ellis going to the Treasury and the Board of Trade for instructions relating to payment of sums for questionable purposes. From this discussion, it would be fair to assume that the status of "King's Agent for West Florida" was comparable to the colonial agents for Nova Scotia and Georgia as described by Dora Mae Clark.

Rea (1963) may have created a slight variance as to the surety when he stated "He (Henry Ellis) certainly provided the £1500 security required of the holder of the agency."[24] Such a sum would be quite excessive for an individual such as Governor Henry Ellis to be delivering to a governmental agency in view of the limited salary of a colonial governor. We do not know the yearly salary of Governor Henry Ellis but a reference to George Johnstone's salary as first Governor of West

Florida is appropriate. The latter's salary was only a modest £1200 per year as is shown later in this chapter where the budget for the province is listed. The salary of Governor Henry Ellis, one can infer, would be similar to, or possibly the same as, that of Governor George Johnstone, given the comparability of the two provinces as discussed above.

Furthermore, if cash was actually delivered at the time of the giving of the bond, the bondsman would be seeking the return of his funds at the termination of the bond. Instead of seeking return of his money or worrying about the loss of it, Governor Henry Ellis in a letter to William Knox[25] was concerned with his reponsibility under the bond when he learned of the death of friend and kinsman John Ellis. The pertinent portion of the letter is given in full at the end of this chapter and attention is directed to these words, "Now, as I am his security."[26] This seems to indicate a personal rather than a money security. Based on the foregoing observations and with no derogation intended to Rea who has done masterful work in this area, Governor Henry Ellis should be treated as a bondsman who signed a personal surety without putting up any money. The necessity of a bond requirement for the office was probably a routine one because of the involvement of such

an Agent with the disbursement of public funds.

It is interesting to note Ellis's attitude towards the obligations of the new position from his undated draft letter of 1763 to Lord Hillsborough. The latter had been appointed President of the Board of Trade and Foreign Plantations on 10 September 1763. "All the pay I demand from the Province is to be in rare plants and seeds for the Royal Garden at Kew and Your Lordship."[27] One can make a fair assumption from this letter that there may not have been any formal duties set forth for the position. It is difficult to ascertain with any degree of accuracy when he started to receive plants and seeds from West Florida, although there are indications in Ellis's correspondence. As early as 26 March 1765, Ellis wrote to his friend Dr David Skene in Scotland, "I expect some thing curious from West Florida having the honr. to be King's Agent for That Province."[28]

Another indication appeared in Ellis's correspondence with Mary, Duchess of Norfolk.[29] In a letter to her on 11 October 1768 was the sentence, "Mr. Clifton, Chief Justice of West Florida, knows the tree (this referred to Illicium anisatum), and I am in hopes will procure us the seeds this autumn."[30] Chief Justice William Clifton was actively searching for such tree and succeeded in sending a specimen to Ellis in July of 1765.

This information appeared in draft letter to Lord Hillsborough dated 16 November 1769, "In July 1765 among many curious new Species of plants he (Justice Clifton) sent me 2 Specimens of this tree (Illicium anisatum); from his acct of its escaping the severe frosts that now & then happen there it may prove an agreeable acquisition to the lovers of Gardening."[31] Ellis published an account of this tree in the Philosophical Transactions, in the form of a letter to William Aiton[32] at Kew, botanic gardener to the Princess Dowager of Wales. In it, he supplied the additional information that he had received about the tree in July of 1765 and that it was found growing in a swamp near the town of Pensacola by a negro servant of Justice Clifton. Ellis claimed a modest bit of credit in the discovery because Justice Clifton had sent the servant "to collect specimens of all the rarer plants by his master, at my (Ellis's) request."[33]

In the draft letter of 1763 to Lord Hillsborough, mentioned earlier, appeared an obscure sentence, "As soon as I get into my new office your Lordship will find me as troublesome a Sollicitor (sic) as Dennis Deberts."[34, 35] This remark was, without doubt, intended to convey a very clear meaning at the time it was written and it probably did do so. Today, however, one can only guess at the meaning. The

biography of Dennys De Berdt set forth in the footnote is definitely the same Dennis Deberts mentioned in the draft letter. He was widely known and respected as a man of integrity and ability. The difficulty lies in the interpretation of the phrase "as troublesome a Solicitor as." A possible interpretation can be developed from Dora Mae Clark's discussion on how the British Treasury handled colonial claims. Prior to 1757 the Treasury reimbursed colonial governments for their military expenditures and in so doing relied upon the Board of Trade, which utilized the services of the Secretary at War and the Paymaster General, to audit colonial accounts. Clark noted a subsequent change in procedure, "Beginning with the grant of 1757, however, the secretaries to the Treasury negotiated colonial claims directly with the colonial agents."[36] This change in procedure resulted in many disappointments when claims were disallowed. In addition, even when claims were allowed and payment was promised, long delays ensued before the money was actually delivered.[37] It is possible that Dennys De Berdt, as colonial agent for Delaware and Massachusetts had established a reputation for pursuing the Board of Trade and the Treasury on colonial claims until final payment was achieved. It is also possible that Ellis thought, albeit mistakenly, that

pursuing claims on behalf of West Florida was to be one of his agency duties.

The position of King's Agent was aptly described by Rea (1963). "The Royal Agent's primary function was the disbursement of money allotted to West Florida for the payment of salaries and the fulfillment of the various requirements of civil government."[38] Rauschenberg (1978a) provided a similar description: "the Royal or Crown Agent was essentially controller of funds granted by the Crown to sustain the colonial government."[39] One might quibble with this description on the ground that the appropriation was by Parliament not by the Crown, but that is of no importance. The important concept is that the office of King's Agent was comparable to that of the modern day corporate comptroller. In that capacity, Ellis was in charge of, and supervised, all disbursements from the budget.

Ellis performed the work of King's Agent from his residence at Gray's Inn, London and at the same time was occupied with many scientific inquiries, business interests and lobbying on behalf of the Irish Linen Board. An evaluation of the sheer mass of work performed by him as demonstrated by his scientific publications alone, led to the understandable conclusion that anything else that he did must have been routine in nature and

could, perforce, not have required much time, effort or attention. In accordance with this observation, Rea (1963) stated, "The office which Ellis filled from April 2, 1764 until his death in 1776 entailed no weighty obligations, and its business was transacted from Gray's Inn, London."[40] Rauschenberg (1978a) indicated that somewhat more work was being performed, "Carrying on his work from London, Ellis authorized payments to meet the salaries of the Governor and other members of the administration in Pensacola, to pay the stipends of schoolmasters and preachers, to buy gifts for the Indians, to make surveys of the colony, to develop a colonial research garden, etc. As his primary duty consisted of disbursing salaries to the civil servants, he carried on a routine correspondence with the Treasury, the Board of Trade and Plantations, and officials of the West Florida government."[41] The conclusion, albeit inferred, was that routine correspondence and authorization of salary payments did not take much time. In addition Ellis working from his home, carried the automatic implication that the work could be fitted into his daily activities with no great drain on his available time.

However, if one accepts Ellis's remarks as being credible, and in fact there was no valid reason for

disbelieving him, quite a different picture emerged. In a letter to Dr David Skene on 14 July 1766, Ellis closed with the statement, "I intend to write to you soon again by post being at present very busy about my Agency affairs."[42] On 2 December 1766, "I have not time to get another (drawing of a coral) finish'd as I am very busy both about West Florida and your Glasgow Gentlemen who are here petitioning to be heard against the taking of the prohibition of Cambrick."[43] Conferences on Linen matters continued to occupy his available time and on 29 January 1767 his opening sentence to Dr Skene was, "Having a leisure hour after a busy day with some of your Glasgow Gentlemen about the absolute prohibition of French Cambrick being even imported for exportation."[44] But, by 10 July 1767 the leisure hours had dwindled and duties of being Agent for the Irish Linen Board plus the work involved in discharging the obligations of the office of King's Agent caused a measurable hiatus in his scientific activities. His letter to Dr Skene on that date was quite specific, "I have had so much to do about Linen and West Florida that I have wrote but one letter since on Natural History."[45] The letter referred to was the one to Dr Linnaeus that was read to the members of the Royal Society on 9 July 1767 that established the animal nature of the genus Corallina.[46] Clearly the

onset of his duties as King's Agent, coupled with his activities as Agent for the Linen Board, did create a definite, demonstrable drain on his available time at the expense of his scientific inquiries.

Without doubt, Ellis must have set up some simple form of accounting system for his own protection so as to prevent his possible authorization of drafts that might overdraw the budgeted amounts. The discussion on disbursements that is contained later in this chapter indicates such a variety of amounts and accounts to be charged, therewith, that record keeping was mandatory. Since Ellis was the one to approve the disbursement, it would only be logical to infer that he kept some sort of running account for each budgeted item, whether it be for the salary of a colonial official or for some budgeted expense of the colony. Of necessity, any time, regardless how little, devoted to record keeping constituted an additional drain on his time and energy.

Another facet of his duties as King's Agent involved dealing with the Treasury and the bureaucratic red tape. Henry Roseveare, The Treasury, noted, "The Treasury remained a rather leisurely place until the French Revolutionary and Napoleonic Wars . . . in 1776 the February reorganization arranged that one under-clerk dealt with the routine relations with the Army, Navy,

Ordinance, America . . . while another concentrated on such responsibilities of the Civil List as the royal woods and forests . . . the salaries of the great officers of state, the judges and law officers."[47] In light of the foregoing state of Treasury procedures one is better able to understand the urgency of the memorial of 12 June 1770 by Ellis to the Lords Commissioners of the Treasury, "That the sum of four thousand eight hundred Pounds was granted in the last Sessions of Parliament upon Account of defraying the charges of the Civil Establishment of his Majesty's Colony of West Florida and other incidental Expenses attending the same from the 24 of June 1769 to the 24 of June 1770. That your Memorialist has had several bills of Exchange (drafts) drawn on him for the said service and is in daily expectation of more, and therefore prays your Lordship's Direction for issuing to him the said sum of 4800 pounds."[48]

Ellis's first contact with linen affairs can be documented from his letter of 12 September 1749 requesting certain information from Lord Limerick at Dundalk, Ireland. "We received Mr. Trimbles letter of the 19th ult. informing us, that Mr. Drapier advised him that several French Families were arrived here at their own expense, being deterred by their Countrymen in

Spittal Fields from going to Ireland." Ellis, immediately, thought of getting them to Ireland to work in the manufacture of cambric (fine thin white linen fabric) together with a method to accomplish this result. "I have been this day introduced to their French Protestant Minister . . . he has assured me he will undertake to find them out . . . that if I can give them a security of their being well treated . . . he does not doubt of succeeding." His request of Lord Limerick was of a practical nature, "It will be proper for me to know what wages are given at Dundalk, and what encouragements these people are to expect, that when I come to talk to them I may assure them of a certainty from my own mouth."[49] There is no record of response by Lord Limerick and nothing materialized of this plan.

Ellis's appointment as general agent in London representing the Irish Linen Board was, possibly, contrived by Edward, Bishop of Elphin, and Lord Limerick. The background for the appointment was simple. As of 25 May 1753, Edward, Bishop of Elphin in Dublin, Ireland reported to Lord Limerick that the last Parliament had made so many changes in the Linen Bill before it that "we must have a Linen Bill next Session or we are undone, the astonishing alterations in the last (Linen Bill) will make it necessary to send a person over to take care of a

new one transmitted." Lord Limerick had already described the necessary qualifications (although those qualifications were not stated in the letter), but had not selected a person for the position. Neither Lord Limerick nor the Bishop had, at that time, determined upon Ellis to be the agent. This is revealed in the P.S. to that same letter, "If you(r) Lordship thinks my project at all feasible, I submit it to you, where it will not be right to stop Ellis from saying anything to the Board about an agent and to order him to stop Lord Hertford." The "project" the Bishop referred to was "I think I have formerly told your Lordship that our Board must be surprised into (doing) what is right." The beginning of the "project" was the stampeding of the Linen Board into the appointment of an agent with the limited assignment of steering a Linen Bill through the next session of Parliament without the making of alterations by the members thereof. The balance of the project was the granting of more wide ranging powers to the agent once he was appointed. This was also disclosed by the Bishop, "If then one can be found fit for the other purposes it will be easy to get him appointed for them as a thing by the by, and which coincides with the principal. Thus we may have the benefit of an agent secure for the next Session in Britain: and if he

manages cleverly, I fancy it will be no difficult matter to get him continued."[50]

By 7 June 1753, the Bishop had selected the agent that he wanted and notified Lord Limerick. "I am much pleased that your Lordship approves the person I chose." The person chosen by the Bishop and thereafter by the Linen Board was Ellis. On 8 December 1753, the Bishop wrote Lord Limerick and urged him to "give yourself the trouble of advising Mr. Ellis from time to time, & encourage him to act upon intimations from you . . . I wish you would begin, with ordering him to solicite (sic) the Linen Bill."[51] The Linen Bill was passed and Ellis's friend, Dr William Brownrigg, wrote of Ellis's share in that accomplishment, "I heartily congratulate you on the share you had in obtaining it."[52] The good Bishop, however, laconically stated, "My comfort is the Bill is passed."[53] Ellis's appointment as agent for the Linen Board was only for that session of Parliament. The Bishop further suggested to Lord Limerick that the latter remind Ellis of his (Ellis's) limited powers and that if any incident arose that indicated a need for the enlargement of those powers, Ellis should not go to the Board but should first discuss it with Lord Limerick.[54] Ellis was astute enough a politician to handle Linen Board politics and upon his death on 5 October 1776, was

still agent for the Linen Board. On 28 October 1776, Sir John Blacquire[55] recommended to Lord Harcourt[56] that William Knox's brother be appointed as agent for the Irish Linen Board in London.[57]

An accurate and comprehensive summary of West Florida disbursements has already been provided by Rea (1963).[58] However, since these disbursements gave considerable information on colonial administration of a crown colony and life in a frontier society, it was deemed worthwhile to present some of the detail here. The initial budget for the period 24 June 1763 to 24 June 1764 for the civil administration of West Florida listed the following officers and salaries:[59]

George Johnstone Esqr Govr	£1200
William Clifton Esqr Chief Justice	500
Edmund Rush Wegg Esqr Secy & Clerk of Council	150
Simon Amory Esqr Register	100
Elias Durnford Esqr Surveyr of Lands	120
Clark Durnford Esqr Assistant Surveyr	30
John Ellis Esqr Agent	200
Revd Wm Dawson Ministr at Pensacola	100
Revd Sam Hart Ministr at Mobile	100
School Masters at each of the above places at per annum each-none appointed	25

These positions and salaries remained the same

during the period of Ellis's tenure in office, ending with his death in 1776. Colonial Office records from 1772 to 1776 indicate that additional positions were added subsequent to 1763 to meet the expanded needs of the Province as follows:[60]

1768 to 1776	Provost Marshall	£100
1772 to 1776	Deputy Provost Marshall	30
1772 to 1776	Messenger to the Govr & Council	30
1772 to 1776	Cryer of the Court of Common Pleas	10
1772 to 1776	Clerk of the Crown	30
1772 to 1776	Clerk of the Pleas	20
1772 to 1776	Curate at Pensacola	25
1774 to 1776	Receiver General of Quit Rents	100

Governor Johnstone did not get along with his Attorney General, Edmund Rush Wegg, and suspended him. Wegg complained of this action in his letter of 24 October 1766 to the Earl of Shelbourne and wrote "His Excellency Geo: Johnstone Governor of the Province of West Florida, having some-time since suspended me from the Execution of the Office of His Majesty's Attorney General for that Province, upon the general Charges of Negligence and Incapacity."[61] Wegg, though suspended, had considerable political influence in London for he continued in office for the entire period under review. Since he had not been fired he was entitled to receive

his yearly stipend. In addition to that, he received the sum of £312.2.1 for the period 8 July 1772 to 24 April 1776 for "Retaining and Other Fees as Attorney General."[62] Fees were, probably, a perquisite of office for living overseas.

All posts other than King's Agent in the civil administration called for residency in the Province. Some of the office holders, however, did not move to West Florida, but drew pay, nonetheless. Clinton N. Howard pointed out that James McPherson, who occupied the position of provincial secretary and registrar, "was one of the outstanding absentee office holders of West Florida."[63] He also drew attention to government efforts in 1770 to eliminate colonial absentee office holders from their jobs. The government had little success in this project since Ellis's accounts reflected that McPherson was paid his salary for the four year period ending in 1776 even though he was not then in West Florida.[64] Ellis must have been aware of McPherson's absence from the province from the fact that the negotiation of the draft indicated its place of origin, but there is no record of complaint on Ellis's part.

At the same time that the government tried to get rid of absentee office holders, it had difficulty getting persons to go to West Florida at the salaries set

in the budget. London school teachers in 1763 were not willing to go to either Pensacola or Mobile for £25 per year, hence the absence of appointments for these two positions in that year. In 1764, however, teacher John Firby was willing to go to Pensacola and served there until 1776.[65] In 1770, after becoming interested in natural history, he sent a package to the Princess Dowager of Wales and a similar one to Lord Hillsborough. Each package contained seeds of the Star Aniseed and an apple of the Swamp Magnolia. After sending the packages, he notified Ellis.[66] There is no record of a response, if any, by Ellis. No teacher was found for Mobile until 1772 when Reverend William Gordon arrived there. Not only did he function as Minister at £100 per year and school teacher at £25 per year, but he also performed the services of Curate at Pensacola for £25 per year. Despite these three salaries he was, apparently, having difficulty maintaining himself, for Ellis paid his house rent at Mobile in the amount of £31.10 for the four years ending 24 June 1776.[67]

Housing was probably not a perquisite for all personnel on the civil list for there would have been considerably more evidence of it in the audited accounts. Ellis paid house rent to Philip Livingston most likely because of his political connections. Cecil Johnson

documented that "Livingston at that time (1779) held, either directly or indirectly, nine provincial offices and that the governor and his secretary had greatly increased the number and amounts of the fees exacted (by Livingston)."[68] Ellis also paid £25 for rent of General Haldimand's house from 24 March 1776 to 24 June 1776.[69]

In addition to the perquisites of fees and rent, Ellis paid substantial amounts for services outside or beyond the scope of official duties. Elias Durnford was paid £586.3.7 "in consideration of his labour and expense in making surveys of several parts of West Florida between the years 1765 and 1774."[70] Durnford was extremely active in promoting the interests of the Colony and was paid £52.17.3 "for making sundry plans of the rivers Mississippi, Amit and Comit and hire of a barge and canoe, for provisions given to sundry settlers, etc. in the year 1772 as by account of particulars and receipt."[71]

Ellis must have had approval for all of the foregoing disbursements although they were not listed in the budget. To say otherwise, would have made a mockery of his performance bond and would have rendered the auditing procedure a nullity. The audited accounts, however, do not indicate the person on the Board of Trade or at the Treasury who must have given approval for such

disbursements. John D. Ware reported that Bernard Romans received an annual grant of £50 from Ellis starting in 1772 after Governor Chester recommended to Ellis that Romans be appointed botanist for the Province.[72] There were no funds budgeted for the grant, however, and Ware did not indicate the source for the approval of the disbursement. Furthermore, Governor Chester had no authority to approve disbursements. This is another instance, among many, of Ellis obtaining approval for a non-budgeted disbursement.

Ellis's payment of the first £50 granted in 1772 to Romans is typical of the general method of payments. The process was initiated by the drawing of a draft by Romans. In the case at hand, he drew a draft ordering Ellis to pay the £50 to Ennis Graham as payee. The reason for the drawing of the draft could have been stated on the face of the instrument, but this was strictly optional on the part of the drawer and had no bearing on the validity of the instrument. However, one is at liberty to essay a guess as to the reason Romans had for drawing the draft in such fashion by reviewing the general reasons anyone had for drawing a draft. The customary reasons were: 1) Graham may have cashed the draft for Romans; 2) Graham may have sold merchandise to Romans and took the draft in payment; or 3) Graham may

have taken the draft in payment of a pre-existing debt. There is some evidence of the last possibility. In an undated letter to Ellis in 1774, Romans lamented, "I lead a very neglected Life and am very hard put to it to maintain myself & as I have no friend in Europe to whom to apply, I once more take the freedom to address you on that head."[73] At the same time that Romans drew the draft, he had written to Ellis asking him "to honor" it when the draft would be presented to Ellis in London for payment.[74] Drafts commonly circulated from the payee to his transferee and from that person to the next transferee and were considered as money by the members of the business community. In those days as well as today, "to honor" a draft meant that the drawee accepted the draft and paid it to the last transferee, namely, the person who presented it to him.

The audit records of the Colonial Office did not contain the draft document and did not indicate the name of the person who presented it to Ellis for payment. The records only stated that Ellis paid the draft for the grant of £50 for the year 1772 and the grant of a like amount the following year of 1773. The payment was recorded in Ellis's accounts as "Barnarda (sic) Romans for his care and skill in the collection of rare and useful productions in Physick and Botany at £50 per Annum

for two years to the 24th of June 1774 as by Bills of Exchange and Receipts £100.0.0."[75] Ellis's accounts also reflect an additional payment to Romans, "for drawing a General Map of the Province and for Surveying and finishing a plan of certain lands in West Florida as by his receipts £46.12.4 1/2."[76] This payment was approved despite the fact that the Province had an official Surveyor, Elias Durnford, and an Assistant Surveyor, Clark Durnford, both of them on the payroll and residing, at that time, in the Province. Bernard Romans thought very highly of Ellis as noted above in his letter to Ellis in 1774. In addition, the dedication of Romans' book stated, "To John Ellis Fellow of the Royal Society of London and Upsal (Sweden) Agent for the Province of West Florida This Work is with the greatest Respect most humbly Dedicated."[77]

It has already been noted that the new province required considerable surveying. The work was extensive and surveyors were hired by the government on a project basis. The records indicated that one Francis Miller surveyed the fork of the Amit and Iberville Rivers and one William Wilton marked the Indian line in West Florida. Both were paid for their labors by Ellis.[78] According to Cecil Johnson, the government was concerned with encroachment by settlers on Indian lands at the

frontier. By the close of the French and Indian War, desirable land in the English colonies was becoming scarce. The population of the colonies was increasing due to immigration and natural increase and the backwoodsmen and pioneers were roaming on Indian land. Indian tribes challenged the encroachments and incidents of conflict were common occurrences. The need for an Indian line was obvious to settlers, pioneers, Indians and the British Administration in England and in America. Such an Indian line would provide for a separation of peoples and a cooling of tensions. Hence, one of the objectives of the Proclamation of 1763 was to quiet the fears of the Indian population by diverting the tide of westward expansion to the South and Southwest into the new provinces of East and West Florida.[79] A cursory review of some of the provisions of the Proclamation indicated the government's concern.

> And whereas it is just and reasonable and essential to our interest and the security of our colonies, that the several nations or tribes of Indians with whom we are connected, and who live under our protection, should not be molested or disturbed in the possession of such parts of our dominions and territories as, not having been ceded to or purchased by us, are reserved to them, or any of them, as their

> hunting grounds; And we do further strictly enjoin and require all persons whatever, who have either wilfully or inadvertently seated themselves upon any lands within the countries above described, or upon any other lands which, not having been ceded to or purchased by us, are still reserved to the said Indians as aforesaid, forthwith to remove themselves from such settlements.[80]

John Richard Alden, John Stuart and the southern colonial frontier, commented that, "As early as 1700 supplies of presents for distribution to the Indians were sent from England to the governors, and this practice continued until the closing years of the Revolution."[81] In light of this long established practice, and the concern exhibited in the Proclamation for improving relations with the Indians, one can understand the importance of "Indian Presents" in the West Florida budget. This was scheduled for £1500 for the first fiscal year ending 24 June 1763 and £1000 for the second fiscal year ending 24 June 1764.[82] Out of the first appropriation, presents for Indians were purchased for approximately 1180 and were placed on board the ship carrying West Florida's first Governor, George Johnstone, to the province.[83] Alden has stated that Governor Johnstone "had brought out a supply worth £1,500."[84]

This amount is contrary to the audited record. Alden's error was, no doubt, based on the assumption that Governor Johnstone brought the entire budgeted appropriation of £1,500 with him since the matter of Indian Presents was such an important one. Governor Johnstone supervised the distribution of the presents and on 27 September 1764 completed the task and drew a draft on Ellis for £100 for his services. The draft was payable to Foord & Delprat, merchants at Jamaica, and Ellis did not quibble as to whether such services should be considered within the ambit of the duties of Governor and hence not compensable, but simply paid it out of the Indian Presents Fund.[85]

It should be pointed out that distribution of Indian Presents out of the foregoing budgeted appropriations was strictly an operation of the civilian administration of the Colony. The military administration of Indian affairs in the Floridas in 1763-64 entailed distribution of a considerable quantity of presents to the Creek Indians. The purpose of the giving of these presents was to reduce the threat of an Indian attack at Fort Appalachie and to secure their attendance at a planned conference at Pensacola to decide upon a boundary between settlers and Creeks in the West Florida area. Although a series of conferences was held in

September of 1764 and some matters were agreed upon, the resulting treaty was voided. Alden related that the senior British officer had exceeded his negotiating powers and probably, more to the point, the Indian leader representing the Creeks did not represent the bulk of his constituency.[86]

The quantity of goods and trinkets in the first civilian shipment was more than enough to satisfy the needs of the Indians at the time, for the subsequent appropriation of £1000 budgeted in 1764 was not used in 1765.[87] In subsequent years lesser sums were expended for Indian presents and other goods as recited in the accounts, "For a Cargo of Goods sent by the Ship 'Peggy' Captain Alexander Hardy in September 1773 consigned to Governor Chester for presents to Indians, and for Insurance, Charges of Shipping, etc. of the sd goods as by Bills of Particulars, the Policy of Insurance and Receipts £328.2.3." In the following year, 1774, a similar shipment appeared in the accounts in the total sum of £425.4.9.[88]

While the phrase "presents for Indians" connoted "trinkets" or ornaments to beguile both Indian men and women it included also goods and implements of a practical nature. One of Ellis's Indian presents accounts mentioned that, "John Simpson was reimbursed the

sum of £19.5.11 for corn and pork delivered to Indians and for airing (drying) gunpowder for them." Another account showed that John Pigg was reimbursed for "Strouds, Shirts and sundry other articles." Repairing of guns was a service needed by both colonists and Indians. Women were just as skilled as men in that capacity and were accepted as competent gunsmiths by the community. Catherine Battison and her co-worker, Leonard Wisner, submitted a joint bill to Ellis for repairing guns belonging to Indians. The practice of the gunsmith trade perhaps exposed Catherine Battison to working with iron products, in general, for another account pertaining to her services recited, "for Iron Work done and materials furnished at the gaol of Pensacola between 9 February 1773 and 15 March 1773." The record also showed that William Block supplied wood, coopered the wood into "Keggs," filled the kegs with gunpowder and delivered the kegs to Indians. Bread and other provisions were supplied by John Southwell and John Stephenson to Indians, Indian interpreters, sundry prisoners, needy residents of the Province and even to an unnamed store keeper whose income was insufficient to provide food for himself.[89]

The local civilian and military administrations of West Florida needed the services of interpreters in

its day to day operations to explain government policy, administer the boundary line and to insure continuing support for its colonial settlement aims. To fulfill these needs, the British, upon taking possession of the area, utilized the services of French traders who could communicate with the Indians.[90] They were replaced in 1764 by English traders who had come into West Florida from Georgia and South Carolina.[91] Of course, traders working for the military administration were paid from military funds. Traders working for the civilian administration were paid by Ellis from the Indian presents fund.[92] In addition to receiving pay for doing services as an interpreter some traders had house rent paid as well.[93]

The conditions under which the civilian population, both European and Indian, lived and carried out their daily activities were difficult. Both groups looked to the colonial administrations, civilian and military for food, supplies and general assistance. However, the situation in regard to the conditions of the British soldier on garrison duty at Pensacola, Mobile and Ft. Conde, was far worse. Rea (1969) has documented his findings on that topic and his conclusions are briefly stated. British garrisons in West Florida during the period 1763-1781 were places of fever, pestilence and

death for the soldier. Rea pointed out in his summation that the combination of inclement climate, fever and the "penurious policy imposed by the government upon the American command" produced the final result "the fever-ridden refugee camp that surrendered to Bernardo de Galvez was indeed a notable 'graveyard for Britons'".[94]

Notwithstanding all efforts at the local level of government to help Indians and the expressed intent of the Proclamation of 1763, Clinton N. Howard (1947) cited two major complaints Indians had against the British during the period 1763 to 1776: 1) colonial settlers were hunting on Indian lands; and 2) colonial traders were bringing rum in excessive quantities to Indians. His conclusion on these complaints was based on a letter from Deputy Superintendent Charles Stuart that was read at a meeting of the West Florida Council. Stuart had written that the Chickasaw complained of encroachment on their lands and of the actions of the traders, particularly in bringing rum so freely among their people, while the Choctaw especially objected to the importation of rum.[95] Despite Stuart's knowledge of the complaints of the Chickasaw and the Choctaw concerning rum, Stuart, himself, may have contributed to the problem by serving rum together with "beef, corn, potatoes, rice and beans" to the Choctaw at Mobile in April of 1764.

The meeting was called for the purpose of persuading the Choctaw chiefs to give up medals they had received from the French and accept English insignia in place thereof. Alden reported that the meeting was successful but neglected to pinpoint the item or items on the dinner menu that produced the desired result.[96]

When Stuart's draft for reimbursement for delivery of forty gallons of rum to the Arkansas Indians in September 1773 came to Ellis, it was promptly paid and no advice was sought on the matter.[97] Since Stuart was reimbursed from budgeted funds, one can but conclude that serving rum either with food or without at Indian meetings for political purposes was not frowned upon by the government. On the other hand a merchant of Mobile, who sold rum to Indians had his entire stock of liquor destroyed by Major Farmer.[98] Indeed, in 1772, in response to Indian complaints about the behavior of traders, Stuart counselled both the Choctaw and Chickasaw that any trader who brought more than fifteen gallons of rum into one of their Indian towns in any three month period should be stripped of his complete stock in trade. This was probably mere rhetoric for at the same time he scolded both tribes for their misbehavior.[99]

Since a major portion of all money payments was handled by drafts, it was found necessary to establish

regulations regarding their collection and to establish the liability of the drawer of the draft when the drawee refused to pay. Among the first fifteen acts passed by the West Florida Assembly was one that established the interest rate for money and ascertained the damages of protested drafts. It will be recalled that Ellis's main obligation as King's Agent was to protect the government's money from being disbursed for an unauthorized purpose. Lieutenant Governor Montfort Browne was well aware of budgetary limits on disbursements when he sought reimbursement for travel expenses on a visit to the Mississippi. He knew that such travel expenses might not be reimbursable. Therefore, when he drew two drafts on Ellis for these expenses he inserted a phrase in each one, "to be paid as the Earl of Hillsborough shall direct."[100] In this manner he hoped to circumvent a possible dishonor of the drafts by Ellis and get payment through Lord Hillsborough's approval. Ellis brought the drafts to the Earl whose brief answer was, "There is no fund for such expenses"[101] and refused to approve payment. Browne was shrewd enough to have anticipated this possibility and dispatched a letter to Ellis dated 15 August 1768 instructing Ellis not to dishonor the drafts, but to pay them out of his (Browne's) salary which was still unpaid

and under Ellis's control. In accordance with these instructions, Ellis paid the drafts, charged them against Browne's salary and reported the incident.[102]

In view of the many sums that were approved and paid to colonial officials even though the stated purpose was not covered in the budget, one wonders if Lord Hillsborough acted in an overly bureaucratic manner in this instance. It is not possible from the records available to deduce a chain of command for Ellis's position. In this instance he went to Lord Hillsborough for guidance, possibly because of the phrase Browne had placed on the drafts. In another situation involving Browne, he went to The Lords Commissioners of the Treasury with the query, "That the sum of Three Hundred and fifteen Pounds for a years Expense in maintaining the Provincial Sloop of West Florida ending the 1st of January 1768 has been drawn on your Memorialist by Montfort Browne Esqr Lieutenant Governor of said Province. Your Memorialist having no money in his hands for that Service humbly prays your Lordship's direction for issuing the same."[103] No reply to this memorial has been found and the records available have not reflected such disbursement by Ellis.

In summation of the preceding material we may say that the Government did indicate considerable concern

for the inhabitants of West Florida, both settlers and Indians, and much less concern for the common soldier. It is also apparent that the Government did provide West Florida with the machinery for self government. This machinery was used effectively for the regulation of commercial practices in the collection of drafts. However, it is not possible to evaluate from these records of the Colonial Office the extent to which the manifold needs of the settlers and Indians were met by government money. We do know that each and every voucher and draft that Ellis approved for payment was audited and certified as being a proper payment of public funds. Since the audit took place after his death, in effect it was a tribute to his years of faithful, competent and dedicated service as King's Agent for the province of West Florida.

However, at the time of Ellis's death the audit had not yet started and one can well understand the anxiety of Governor Henry Ellis as expressed in his letter of 29 November 1776 to William Knox, King's Agent for East Florida. "The reason I now address myself to you is that I learn from my London advices that my old friend Mr. Jn. Ellis died last month. Now, as I am security to Government in the sum of £1500 for the Agency of W. Florida, it behoves me to know, in what state his

affairs stand with respect to the Publick. You my Dear Sir may possibly be able to give me some light in these matters & point out what step it may be requisite for me to take to free myself from the inconvincening (sic) of this responsibility."[104] No response of William Knox to this letter has been found. Since the audit certified that all of Ellis's disbursements were correct and properly substantiated the bond must have been cancelled and Henry Ellis's potential liability thereunder ended.

Before closing this chapter, a few words must be written on Ellis's appointment as Colonial Agent for the Island of Dominica. Ellis stated in a draft letter dated 2 January 1771 to Governor Tryon of New York, "Lord Northington has made the Grainge a most elegant place. . . By his goodness I have been made agent of W. Florida & lately have got the Agency [for] Dominica."[105] Rauschenberg (1978a) although utilizing the same source material has concluded that the year of appointment was 1773. "Ellis sought to promote a provincial public garden for agricultural experimentation, and by 1773 he had one started. In this same year because of his work for West Florida and with the help of Lord Northington and Henry Ellis again, John Ellis obtained the post of Colonial Agent for Dominica."[106] It is obvious that the year of appointment was 1771 not 1773. Furthermore,

since Henry Ellis was not mentioned in the draft letter, coupling his assistance to that of Lord Northington is an unwarranted conclusion. Finally, it is debatable as to whether Ellis's work for West Florida was a factor in the new appointment. The available evidence does not point to this at all.

The need of the Island of Dominica for an agent to represent it before the Government in London appeared in the minutes of the meetings of its Council (the upper house of the Legislature) and in the minutes of the meetings of its Assembly (the lower house of the Legislature, comprising representatives of the parishes). Grievances had arisen against the Government and it was decided that the best method to address such grievances was to appoint an agent based in London to present the grievance to the appropriate governmental body or official that had the authority to redress or correct it. The lower house (Assembly) on 29 July 1770 initiated legislation entitled, "An Act for appointing an Agent to negotiate the affairs of this Island in Great Britain, appointing a recompense for his Trouble, and settling a Method for the better Management of that Trust and now send it up to your Honorable Board for your Concurrence."[107] Subsequent meetings of both houses finalized the salary of the Agent at £150 per year.[108]

It is interesting to note that Ellis's name was not brought up at any of these meetings. Although, on 13 December 1770, the Council appointed a committee, "to join the Committee of your Board (Assembly) to confer on the Agent, Fee and Militia Bills,"[109] the Assembly did not concur in this first assignment to the Agent and presented a different one.[110] Agreement of Council and Assembly on the first assignment for the Agent did not take place until 27 September 1771. At that time it was decided that a "Memorial, addresss'd to His Majesty or His Secretary of State be sent to our Agent and by him delivered representing our several grievances in this Island, particularly with respect to the Free-port Act as it now stands."[111] It would appear from the documents presented that the Island of Dominica possessed the power of appointment of an agent to present its grievances and other interests before the appropriate governmental body or official. Further, it would appear that this power of appointment was exercised by the Legislature of the Island of Dominica, utilizing the recommendation of Lord Northington, sometime between 29 July 1770 and 2 January 1771.

It appears that Ellis may have fulfilled the duties of this agency competently for the Council Minutes of 9 April 1777 contain the statement, "the late Mr.

Ellis who discharged his Duty to the Satisfaction of his Constituents".[112] What may have been his last official act dated 3 July 1776 is indicated in "Illustration 1" included at the end of this chapter.

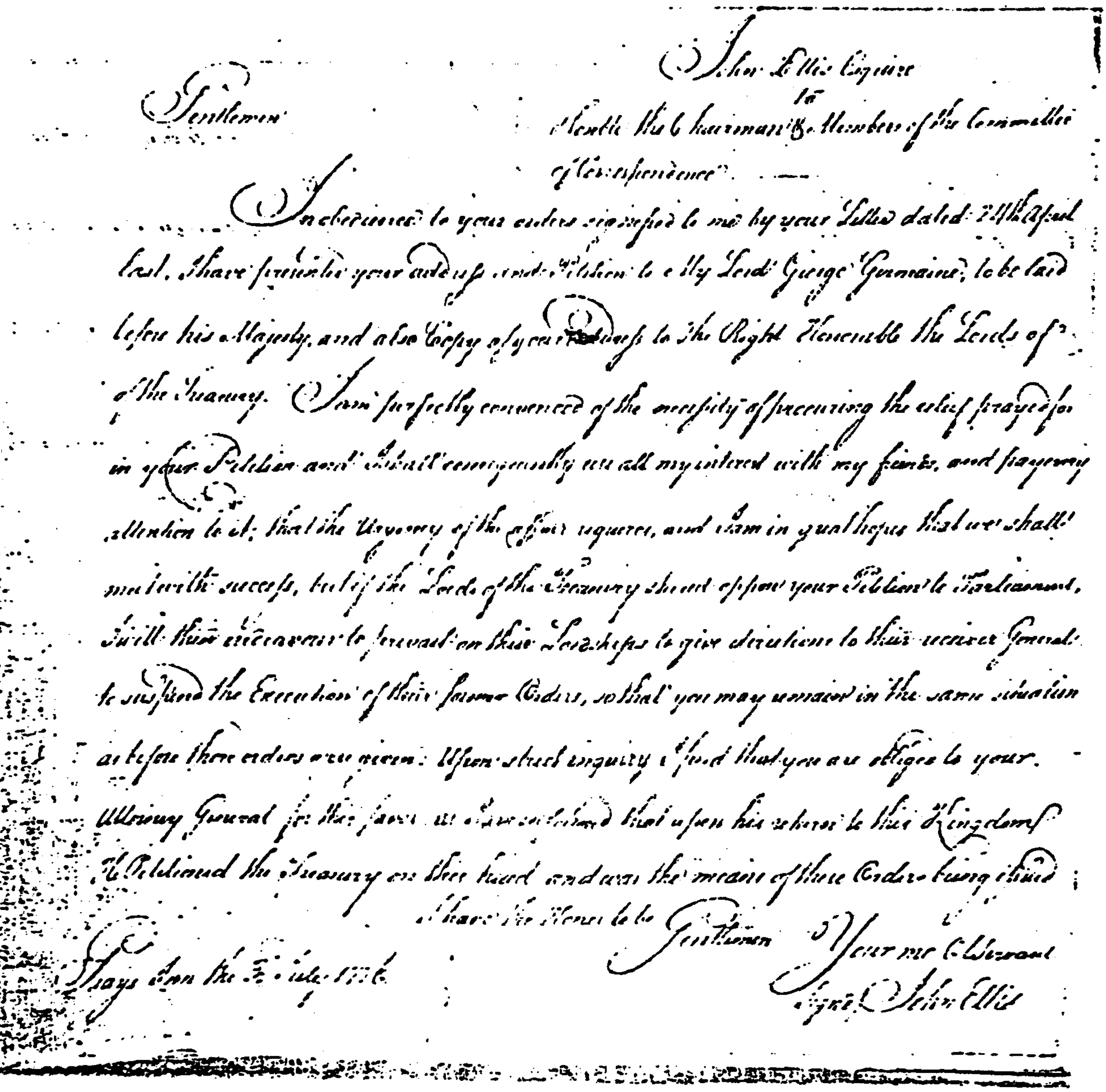
It should be noted from this document that Ellis did not, personally, sign it. His signature was appended possibly by a clerk under his direction. This is indicated by the use of the word "signed" immediately before the signature. Ellis never used that method of signing on any official document bearing his signature. The document was probably dictated by Ellis who may not have been physically able to write or sign at the time.

What may have been his last personal signature appears in "Illustration 2" which is dated 22 June 1776. Again, the text of the letter appears to be in a different script, no doubt dictated by him. His signature appears to be well formed but somewhat labored and definitely not the free flowing signature of earlier years.

In summation of Ellis's activities as King's Agent, it has been documented herein that his records and accounts were audited and found in order. A comparison of his capabilities with that of other Agents in similar positions has not been attempted and could be the focus of another paper. His involvement with the Irish linen

trade was considerably more that heretofore known in the published literature. It appears from the source material utilized in this paper that the Irish Linen Board was satisfied with his efforts to represent it before the British Parliament when legislation pertinent to Irish linen was being considered. Finally, his work as Colonial Agent for Dominica might be evaluated as "well done" even though the evidence is brief.

ILLUSTRATION 1


John Ellis Esquire
to
Gentle the Chairman & Members of the Committee
of Correspondence

Gentlemen

In obedience to your orders expressed to me by your Letter dated 24th April last, I have presented your address and Petition to My Lord George Germaine, to be laid before his Majesty, and also Copy of your Address to the Right Honourable the Lords of the Treasury. I am perfectly convinced of the necessity of procuring the relief prayed for in your Petition and I shall consequently use all my interest with my friends, and paying attention to it; that the urgency of the affair requires, and I am in great hopes that we shall meet with success, but if the Lords of the Treasury should oppose your Petition to Parliament, I will then endeavour to prevail on their Lordships to give directions to their Receiver General to suspend the Execution of their former Orders, so that you may remain in the same situation as before those orders were given: Upon strict enquiry I find that you are obliged to your Attorney General for this favor as I am informed that upon his return to this Kingdom he Petitioned the Treasury on this head and was the means of those Orders being issued.

I have the Honor to be Gentlemen Your most obt Servant

Grays Inn the [illegible] July 1776

Signed John Ellis

SOURCE: Public Record Office, Minutes of the Council of Dominica, CO 74/5.

Sir

50

In obedience to the orders which I have received from the Legislature of Dominica I take the liberty of inclosing to you the address, Memorial, and humble Petition of the Representatives of the People of Dominica to His Majesty.

I must intreat the favor of you Sir to communicate the same to My Lord George Germaine, and that His Lordship will be pleased to lay the same before His Majesty.

I have the Honor to be with due Respect

Sir

your most obedient and most Humble Servant

June the 22d 1775

John Ellis

To William Knox Esqr
Under Secretary of State for America

SOURCE: Public Record Office, Despatches from Dominica, CO 71/6.

NOTES

[1]Max Hicks Savelle, The origins of American diplomacy: the international history of Angloamerica, 1492-1763, (New York: The Macmillan Company, 1967), pp. 504-509. See also, Robert R. Rea, "British West Florida: stepchild of diplomacy," Eighteenth century Florida and its borderlands, eds., Samuel Proctor and Robert R. Rea, (Gainesville: University Presses of Florida, 1975), pp. 61-68.

[2]Robert R. Rea, "British West Florida: stepchild of diplomacy," Eighteenth century Florida and its borderlands, eds. Samuel Proctor and Robert R. Rea, (Gainesville: University Presses of Florida, 1975), p. 67.

[3]John J. TePaske, The Governorship of Spanish Florida 1700-1763, (Durham: Duke University Press, 1964), passim.

[4]DNB, s.v. "Townshend, Charles," (1725-1767), obtained a post in the office of the Board of Trade in 1748 and distinguished himself in its affairs. Went into politics in 1754 and in 1761 became Secretary-at-war. He was opposed to the war with Spain and in 1762, soon after Bute became prime minister, was succeeded as Secretary-at-war by Welbore Ellis. In 1766 was appointed chancellor of the exchequer.

[5]Proctor and Rea, Eighteenth century Florida and its borderlands, p. 68.

[6]Richard L.Campbell, Historical sketches of colonial Florida, (Cleveland, Ohio: Williams Publishing Co., 1892) p. 60.

[7]Clarence E. Carter, "Some aspects of British administration in West Florida," Mississippi Valley Historical Review 1 (1914-15):364.

[8]Carter, "The Beginnings of British West Florida," Mississippi Valley Historical Review 4 (1917-18):318.

[9]DNB, s.v. "Wyndham, Sir Charles, second Earl of Egremont," (1710-1763), was son and heir of Sir William Wyndham, bart. Went into politics and was elected to the House of Commons for Bridgewater in 1735. In 1740 succeeded to his father's baronetcy and in 1750 inherited the estates of his maternal uncle, Algernone, and succeeded to his titles as well, Earl of Egremont and Baron Cockermouth. In 1761 was appointed secretary of state for the southern department. He had disputes with both Bute and Shelburne

[10]Verner W. Crane, "Hints relative to the division and government of the conquered and newly acquired countries in America," Mississippi Valley Historical Review 8:367.

[11]Adam Shortt and Arthur G. Doughty, Documents relating to the constitutional history of Canada, 1759-1791, (Ottawa: 1907, (Canada Archives, Sessional Papers, no. 18), pp. 93-119.

[12]Ibid., pp. 105-106.

[13]American history leaflets No. 15, eds. Albert Bushnell Hart and Edward Channing (New York, 1892), pp. 11-12.

[14]Cecil Johnson, British West Florida 1763-1785, (New Haven: Yale University Press, 1943), pp. 223-224.

[15]Ibid., p. 225.

[16]Ibid., p. 225.

[17]Clinton N. Howard, The British development of West Florida, 1763-1769, (Berkeley; Los Angeles: University of California Press, 1947, (University of California Publications in History, vol. 34)), p. 119.

[18]DNB, s.v. "Henley, Robert, first Earl of Northington," (1708?-1772), was an effective lawyer and successful politician. In 1757 he was installed as Lord High Chancellor of Great Britain and three years later was advanced to the peerage with the title, Lord Henley, Baron of Grainge, in the County of Southampton.

[19]Savage, Calendar of the Ellis manuscripts, p. 61

[20]Smith, A selection of the correspondence of Linnaeus, 2:66-71.

[21]Rea, "The King's Agent for British West Florida," The Alabama Review 16 (1963):144.

[22]Dora Mae Clark, The rise of the British Treasury: colonial administration in the eighteenth century, (New Haven: Yale University Press, 1960), p. 98.

[23]A draft, sometimes called a bill of exchange, is a three party instrument wherein one party, called the drawer, signs the draft, names the person who is to receive the money, called the payee, and designates the person who is to pay, called the drawee. A check is a form of draft wherein the drawee is a bank.

[24]Rea, "The King's Agent for British West Florida," The Alabama Review 16 (1963):143.

[25]DNB, s.v. "Knox, William," (1732-1810), was born in Ireland. Lord Halifax appointed him 'one of his majesty's council and provost-marshal of Georgia,' when Henry Ellis was made governor of the colony. Knox lived in the colony from 1757 until 1761, when he returned to England. Lord Grosvenor became his friend and it was, probably, through his influence that he became agent in Great Britain for Georgia and East Florida. Georgia dispensed with his services as agent in 1765 after he wrote two articles in defence of the Stamp Act. He was under secretary of state for America from 1770 to 1782.

[26]Henry Ellis to William Knox, Esq., 29 November 1776. William Knox, MSS. William L. Clements Library, The University of Michigan, Ann Arbor, Michigan.

[27]Savage, Calendar of the Ellis manuscripts, p. 23.

[28]Ellis to Skene, 26 March 1765. David Skene MSS, MS.38/91.

[29]Duchess of Norfolk. James Edward Smith identified her as Mary Duchess of Norfolk who died 27 May 1773. She was married to Edward Howard, ninth Duke of Norfolk (1686-1777). See James Edward Smith, A selection of the correspondence of Linnaeus, 2:71 (footnote). She was buried at Arundel and was 71 years of age when she died. See George Edward Cokayne, Complete Peerage of England, Scotland, Ireland, Great Britain and the United Kingdom . . ., 8 vols., (London: G. Bell & Sons, 1887-98). John Martin Robinson, characterized her as being talented, forceful, gregarious and hospitable. Moreover, she was intelligent, charmilng, the possessor of good taste, an

amateur of the arts, an ardent Catholic and a francophile who visited the Continent frequently and was recived at the French Court by Louis XV. She was the daughter and co-heiress of Edward Blount of Blagdon. See J. R. Robinson, The Dukes of Norfolk: a quincentennial history, (Oxford: Oxford University Press, 1982), pp. 154-155.

[30]Smith, A selection of the correspondence of Linnaeus, 2:71-72.

[31]Savage, Calendar of the Ellis manuscripts, p. 74.

[32]DNB, s.v. "Aiton, William," (1731-1793), was born at a village near Hamilton, Lanarkshire and broughht up as a gardener. He came to London in 1754 seeking employment and was hired by Philip Miller to assist him at the Botanic Garden at Chelsea. In 1759 he was appointed manager of the Botanic Garden at Kew which was then in the possession of the Princess Dowager of Wales. He published Hortus Kewensis, being a catalogue of the plants cultivated in the Royal Garden at Kew. This book is of historical value because of the care with which the dates of the introduction of the plants enumerated were ascertained by Aiton not only from books but from personal inquiry among his contemporaries. Although no indication is given in the book, the descriptions of the new species contained in it were contributed by Solander and are so recognized by botanists.

[33]Ellis, "The copy of a letter to Mr William Aiton, botanic gardener to her Royal Highness the Princess Dowager of Wales, at Kew, on a new species of Illicium Linnaei, or starry aniseed tree, lately discovered in West Florida, Philosophical Transactions 60 (1771):526.

[34]Savage, Calendar of the Ellis manuscripts, p. 23.

[35]DAB, s.v. "De Berdt, Dennys," (c.1694-1770), was a member of a family which emigrated from Ypres in Flanders to England to escape religious persecution. After reaching England some of the family left off the "De" and others spelled the name "Bert." Almost nothing is known of his connections with the Massachusetts leaders. In 1766, in one of the pamphlets relating to the founding of the Rev. Wheelock's Indian School, the forerunner of Dartmouth College, it was stated that English donations might be left with Dennys De Berdt, "Merchant, in Artillery-Court, Chiswell-Street." In 1765, the lower house of the General Court at Boston, while considering the nomination of an agent for the colony in London,

agreed on the name of De Berdt. His election was determined by a very large majority.

[36]Clark, The rise of the British Treasury, pp. 95-96.

[37]Ibid., p. 96.

[38]Rea, "The King's Agent for British West Florida," The Alabama Review 16 (1963):144.

[39]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):161.

[40]Rea, "The King's Agent for British West Florida," The Alabama Review 16 (1963):144.

[41]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):161.

[42]Ellis to Skene, 14 July 1776. David Skene MSS, MS.38/100.

[43]Ellis to Skene, 2 December 1766. David Skene MSS, MS.38/101.

[44]Ellis to Skene, 29 January 1767. David Skene MSS, MS.38/102.

[45]Ellis to Skene, 10 July 1767. David Skene MSS, MS.38/104.

[46]Ellis, "Extract of a Letter to Dr Linnaeus on the animal nature of the genus of zoophytes, called Corallina, Philosophical Transactions, 57 (1768):404-420.

[47]Henry Roseveare, The Treasury: the evolution of a British institution, (London: Allen Lane, 1969), p. 106.

[48]Public Record Office, Treasury papers, T.1/478.

[49]Ellis to Lord Limerick, 12 September 1749. Public Record Office Northern Ireland, Linen Board records, Vol. 17, MIC.147/9, p. 54.

[50]PRONI, Vol. 17, MIC.147/9, pp. 88-89.

[51]PRONI, Vol. 17, MIC.147/9, pp. 101-102.

[52]Savage, Calendar of the Ellis manuscripts, p. 15

[53]PRONI, Vol. 17, MIC.147/9, pp. 112-113.

[54]PRONI, VOL. 17, MIC.147/9, pp. 116-117.

[55]DNB, s. v. "Blaquiere, John, Baron de Blaquiere," (1732-1812), was the fifth son of a French emigrant who settled in London as a merchant. His first official employment was as secretary of legation in France with Lord Harcourt. When that nobleman went to Ireland in 1772, Blaquiere accompanied him as his chief secretary.

[56]DNB, s. v. "Harcourt, Simon, first Earl Harcourt," (1714-1777), received his education at Westminster School, later traveled abroad with a tutor and returned to England in 1734. In 1772 he was appointed lord-lieutenant of Ireland. His chief secretary was John Blaquiere who did most of the work of the office. He resigned his office in 1777.

[57]Letter of 28 October 1776 from Sir John Blacquire to Lord Harcourt. (The original letter was in the Knox manuscripts in the possession of Captain H.V. Knox. The present location is unknown. An abstract of this letter is quoted in the Historical Manuscripts Commission: Reports on manuscripts in various collections, Vol. VI., (1909), p. 126. This information was received from D. O. Luanaigh, Keeper of Printed Books, National Library of Ireland.)

[58]Rea, "The King's Agent for British West Florida," The Alabama Review 16 (1963):145.

[59]Howard, British development West Florida, p. 119.

[60]Ibid., p. 123.

[61]Dunbar Rowland, Mississippi provincial archives 1763-1766, (Nashville: Brandon Printing Company, 1911), pp. 532-533.

[62]Public Record Office, Audit Office Records, A.O.1/1262.

[63]Howard, "Colonial Pensacola: the British period, Part III. The administration of Governor Chester, 1770-1781," Florida Historical Quarterly 19 (1939):374.

[64]Public Record Office, Audit Office Records, A.O.1/1262.

[65]Howard, British development West Florida, p. 123 and Public Record Office, Audit Office Records, A.O.1/1262.

[66]John Firby to Ellis, 26 September 1770, Ellis MSS at Library of The Linnean Society of London.

[67]Public Record Office, Audit Office Records, A.O.1/1262.

[68]Johnson, British West Florida, p. 228.

[69]Public Record Office, Audit Office Records, A.O.3/119.

[70]Public Record Office, Audit Office Records, A.O.1/1262.

[71]Ibid.

[72]John D. Ware, "The Bernard Romans-John Ellis letters, 1772-1774," The Florida Historical Quarterly (July, 1973):53.

[73]Bernard Romans to Ellis, 14 May 1774, Ellis MSS at Library of The Linnean Society of London.

[74]Ware, "The Romans-Ellis Letters," p. 59.

[75]Public Record Office, Audit Office Records, A.O.1/1262.

[76]Ibid.

[77]Romans, A concise natural history of East and West Florida, (New York: sold by R. Aitken, 1776), Dedication page.

[78]Public Record Office, Audit Office Records, A.O.1/1262.

[79]Johnson, British West Florida, pp. 116-117.

[80]Shortt and Doughty, Documents relating to the constitutional history of Canada, 1759-1791, p. 121.

[81]John Richard Alden, John Stuart and the southern colonial frontier, (New York: Gordian Press, 1966) p. 5.

[82]Howard, British development West Florida, p. 120.

[83]Ibid., p. 121.

[84]Alden, John Stuart, p. 200.

[85]Howard, British development West Florida, p. 121.

[86]Alden, John Stuart, p. 194.

[87]Howard, British development West Florida, p. 122.

[88]Public Record Office, Audit Office Records, A.O.1/1262.

[89]Ibid. (All of the references in this paragraph are from this source).

[90]Alden, John Stuart, pp. 194-195.

[91]Ibid., p. 200.

[92]Public Record Office, Audit Office Records, A.O.1/1262.

[93]Ibid.

[94]Rea, "'Graveyard for Britons,' West Florida, 1763-1781," The Florida Historical Quarterly 47 (1969):364.

[95]Howard, "Colonial Pensacola, Part III," The Florida Historical Quarterly 19 (1939):375-376.

[96]Alden, John Stuart, p. 201.

[97]Public Record Office, Audit Office Records, A.O.1/1262.

[98]Alden, John Stuart, p. 195.

[99]Ibid., p. 323.

[100]Public Record Office, Treasury papers, T.1/484.

[101]Ibid.

[102]Ibid.

[103]Public Record Office, Treasury papers, T.1/463.

[104]Henry Ellis to William Knox, Esq. 29 November 1776. William L. Clements Library, Ann Arbor, Michigan.

[105]Savage, Calendar of the Ellis manuscripts, pp. 78-79.

[106]Rauschenberg, "John Ellis, F.R.S.," Notes and Records of the Royal Society of London 32 (1978a):161.

[107]Public Record Office, Minutes of the Council of Dominica, 1767-1777, CO 74/1, pp. 244-245.

[108]Public Record Office, Minutes of the Council of Dominica, 1767-1777, CO 74/4, pp. 5-6.

[109]Ibid., p. 32.

[110]Ibid., p. 33.

[111]Ibid., p. 45.

[112]Public Record Office, Minutes of the Council of Dominica, 1767-1777, CO 74/5.

CHAPTER VII

OVER-VIEW AND CONCLUSION

Ellis has been commended in the past for his many accomplishments. It is appropriate at this time to sort out the various encomiums and establish an over-view as of today. In so doing, while the intent to be objective is present, the judgment process, of necessity, introduces an element of subjective choice. While it seems clear to this writer that Ellis's main career was in the field of zoology there are many references to his botanical research, especially in the area of economic botany. This is giving due regard to his successful experiments with the transportation of seeds in a viable, vegetative state, over long distances and long periods of time. His efforts towards introducing new products into colonial agriculture have been noted. From the historical point of view his rank as an eighteenth century British botanist devoted to the improvement of economic agriculture in his government's colonies is indeed a high one.

His improvements in the rude microscopes of his day are also worthy of note for they led the way to an improved dissecting microscope of the kind often still

used in classrooms today. Moreover, his success with the microscope stimulated other amateur natural scientists. The result was that his efforts contributed to the expansion of knowledge into the nineteenth century. The ramified extent of this contribution does not lend itself to any form of objective measurement.

Another facet of his brilliance was his demonstrated success in creating a change in thinking in the contemporary scientific community of his day, both the amateur and the professional. This was achieved by his patient demonstration of the animal nature of zoophytes, the publication of his research, his clarity of reasoning and his willingness to subject his findings to the criticism of the scientific community. Their value cannot be overstated for others were led, through his efforts, in the proper path of research so that scientific truth could be established and used as a base for the further expansion of the knowledge of natural history. This is another accomplishment that cannot be measured. Any person who achieves such a level of accomplishment is to be reckoned as one of the geniuses of any age of science.

His then unsurpassed ability in the description of corals and other cniderians or coelenterates was recognized by Linnaeus as well as other members of the

scientific community. This can easily be attested by the quick acceptance of his first book by scholars in Europe as well as in England and its translation into Dutch, French and German. The modern evaluation was best stated by Cornelius and Wells (In press), "There can be few eighteenth century naturalists whose species lists are virtually accepted today, and still fewer who were at the same time pioneers in their fields. It may be that in this respect none has a better record than Ellis in his major research field, the hydroids." His works on "corallines" (Ellis, 1755) and "zoophytes" (Ellis & Solander, 1786) after two hundred years are still consulted by specialists in the field of taxonomic zoology.

His work as governmental employee supervising the disbursement of the budget of West Florida can be assessed together with other governmental employees of the British bureaucracy. In so doing, it can be noted that he discharged the duties of his office in an exemplary way. He was accurate and left a record that satisfied his auditors. His work as agent for the Island of Dominica was so appreciated because of his effective and successful representation of the interests of the Island that upon his death, it was with difficulty that a successor was sought that might possibly be equal to him.

This dissertation has explored the work of John Ellis and has sought to establish his place in the development of natural history and the improvement in the microscope in the middle years of the eighteenth Century. At the same time due regard has been given to his work as King's Agent for West Florida, his involvement with the Irish linen trade and his work as Colonial Agent for Dominica. In so doing, this study has sought to establish his place in British Colonial Administration in the middle years of the eighteenth Century.

New evidence has been brought to the forefront which indicates that he was probably born in London, not Ireland and that his birthdate was in 1710 or prior thereto but definitely not later than 1710. His parents were not from the merchant class nor were they financially well to do. Nonetheless, his father started him on the road to business success via the apprenticeship route as a clothworker. The details of his business affairs have been expanded and clarified with the aid of church records and manuscripts from the Public Record Office of Northern Ireland.

The milieu in which he did his scientific work as well as his participation in what Brooke Hindle called the "Natural History Circle" have been enlivened and enriched with documents from the Ellis-Skene manuscripts

from the university of Aberdeen. His involvement as Colonial Agent for Dominica has hitherto not been discussed to any great extent. This has been elaborated upon, somewhat, with the aid of documents from the Public Record Office, Minutes of the Council of Dominica.

Of necessity some facts had to be addressed and either substantiated or challenged. In so doing, the total picture of Ellis's life and times has been enhanced. This is not to say that this study is a definitive or a final one. Indeed, there are considerable areas where further research could be fruitful. However, sufficient data has been here presented which suggests that John Ellis carved his own niche in the history of science in the middle years of the eighteenth Century.

SELECTED BIBLIOGRAPHY

I. PRIMARY SOURCES

A. COLLECTIONS OF ELLIS MSS

University of Aberdeen
Library and Archives Section
King's College
Aberdeen AB9 2UB

Correspondence between John Ellis and David Skene

Ellis to Skene, 1765, 26 March, (MS.38/91); 25 April, (MS.38/92); 27 June, (MS.38/93); undated letter, (MS.38/94); 26 November, (Ms.38/95); 22 October, (MS.38/96); Ellis to Skene, 1766, 4 January, (MS.38/97); 22 March, (MS38.98); 30 January, (MS.38/99); 14 July, (MS.38/100); 2 December (MS.38/101); Ellis to Skene 1767, 29 January (MS.38/102); 24 February, (MS.38/103); 11 July, (MS.38/104); Ellis to Skene 1768, 26 March, (MS.38/105); 23 July, (MS.38/108); 24 September, (MS.38/109); 12 November (MS.38/106); 31 December, (MS.38/110); Ellis to Skene, 1769, 19 June, (MS.38/107); 26 June, (MS.38/111); 19 October, (MS.38/112); Ellis to Skene, 26 December 1770 (MS.38/113).

Scottish Record Office
HM General Register House
Edinburgh EH8 9LJ

2 letters from Ellis to John Hope, 1766, 1768 (GD 253/144/10/2; GD 253/144/9/3)

University of Edinburgh
Library, Department of Manuscripts
George Square
Edinburgh EH8 9LJ

Letters from John Ellis to Charles Alston (La.III.375).

British Library Reference Division
Department of Manuscripts
Great Russell Street
London WC1B 3DG

Ellis to T. Birch, Secretary to the Royal Society, 1757-

1759 (Add. 4305 ff 147-161)

Ellis to T. Birch 15 March 1753/4 (Add. 4439 f 223).

An answer by John Ellis, F.R.S., to remarks by Philip Miller, F.R.S., on the Toxicodendron, 19 January 1758 (Add. 4440 ff 1-11).

Letters from John Ellis to Daniel Solander, 1760-1763 (52 ff) (Add. 29533).

Linnean Society of London
Library
Burlington House, Piccadilly
London W1V 0LQ

Correspondence and papers, including a chemistry notebook 1751, 5 natural history notebooks 1755-76, notes for his Natural history of many curious and uncommon zoophytes (1786), drafts of letters and c400 letters addressed to him 1744-1776, see Savage, Spencer, Catalogue of the manuscripts in the library of the Linnean Society of London; Part IV. Calendar of the Ellis manuscripts (1948).

Royal College of Surgeons of England
35-43 Lincoln's Inn Fields
London WC2A 3PN

About 100 pencil or water-colour drawings of corals prepared by a number of artists to illustrate Ellis's Natural history of corallines (1755) and The natural history of many curious and uncommon zoophytes (1786).

The Royal Society of London
6 Carlton House Terrace
London SW1Y 5AG

27 Scientific papers submitted to the Society, some published in the Philosophical Transactions 1752-1775.

Royal Society of Arts
Library
6-8 John Adam Street
London WC2N 6EZ

Correspondence and papers, including letter on rhubarb.

Warwick County Record Office
Priory Park, Cape Road

Warwick CV34 4JS

7 letters from Ellis to T. Pennant, 1749-1769 (TP 225/1-7).

B. PUBLISHED MATERIAL BY ELLIS

BOOKS BY JOHN ELLIS

An essay towards a natural history of the corallines, and other marine productions of the like kind, commonly found on the coasts of Great Britain and Ireland. To which is added the description of a large marine polype taken near the North Pole by the whale-fishers, in the summer 1753. London: printed for the author; sold by A. Millar, 1755. pp. i-xxviii, 1-104, pls 1-37, frontis., plus unnumbered pl. of Cuff's microscope and in most copies a pl. 38 tipped in at the end of the book.

Directions for bringing over seeds and plants, from the East-Indies and other distant countries, in a state of vegetation; together with a catalogue of such foreign plants as are worthy of being encouraged in our American colonies; to which is added the description of a new sensitive plant, called "Dionaea muscipula" or Venus's fly-trap. London: printed and sold by L. Davis, 1770.

Directions for bringing over seeds and plants from the East-Indies and other distant countries in a state of vegetation [with: The method of catching and preserving insects for collections]. London: [s.n.], 1771.

Copies of two letters from John Ellis; 1. To Dr Linnaeus, F.R.S.; 2. To Mr William Aiton, Botanic Gardener to her Royal Highness the Princess Dowager of Wales, at Kew. Read before the Royal Society, December 13 and 20, 1770. London: Printed by W. Bowyer and J. Nichols, [reprinted from Philosophical Transactions], 1771.

Some additional observations on the method of preserving seeds from foreign parts, for the benefit of our American colonies. With an account of the Garden at St Vincent, under the care of Dr George Young. London: printed for W. Bowyer and J. Nichols, 1773.

An historical account of coffee, with botanical description of the tree; to which are added sundry papers relative to its culture and use, as an article of diet

and of commerce. London: John Ellis for Edward & Charles Dilly, 1774.

A description of the mangostan and the bread-fruit. To which are added directions to voyagers, for bringing over these and other vegetable productions, which would be extremely beneficial to the inhabitants of our West India islands. London: printed for the author and sold by Edward & Charles Dilly, 1774.

Ellis, J. and Solander, D. C. The natural history of many curious and uncommon zoophytes, collected from various parts of the globe by the late John Ellis, Esq. F.R.S. Soc. Reg. Upsal. author of the natural history of English corallines, and other works. Systematically arranged and described by the lateDaniel Solander, M.D. F.R.S. &c. with sixty-two plates engraven by principalartists. London: Benjamin White and Son and Peter Elmsly, 1786. pp. i-xii,1-206,pls 1-63, followed by numbered pp. 207-208 (publishers' advertisements). 63 plates appear in all copies, despite the wording on the title page.

TRANSLATIONS

Essai sur l'histoire naturelle des corallines, et d'autres productions marinesdu meme genre, qu'on trouve communement sur les cotes de la Grande-Bretagne et d'Irlande; auquel on a joint une description d'un grand polype de mer, pris aupres du Pole Arctique, par les pecheurs de baleine, pendant l'ete de 1753. par Jean Ellis; traduit de l'anglois. La Haye: Pierre de Hondt, 1756. pp.1-xvi, 1-125, pls 1-39, frontis. Translation of Ellis, with pl. 38 included as in the English edition and pl. 39 that of the Cuff microscope, numbered in manuscript.

Natuurlyke historie van de koraal-gewassen, en andere dergelyke zee-lighamen,die men gemeenelyk vind op de kusten van Groot-Brittanien en Ierland: benevens eene beschryving van een grooten zee-polyp, in den zomer van't jaar 1753. by den Noord-Pool door de walvis-vangers gevonden. The Hague: De Hondt, 1756. pp. 1-xvi, 1-118, pls 1-38, frontis, plus another showing the Cuff microscope numbered 39 in manuscript. Translation of Ellis, 1755, by J. Tak.

Versuch einer Natur-Geschichte der Corall-Arten und anderer dergleichenMer-Korper, welche gemeiniglich an den Kusten von Gross-Britannien und Irrlandgefunden werden; nebst der Beschrei bung eines grossen Buschel-Polypen,

welcherin dem Eis-Mere gefangen worden. Aus dem Englischen und Franzosischen ubersezt,und mit Anmerkungen, auch einem Anhange funf hieher gehoriger Abhandlun-gen der Herren Schlosser, Baster und Ellis begleitet von Dr Johann Georg Kruniz. Nurnberg: Gabriel Niklaus Raspe, 1767. pp. 1-168, pls 1-46. Translated from Ellis, by Dr J. G. Kruniz. The plates are redrawn, plss 39-45 are additional to those in the earlier editions, and the illustration of the Cuff microscope appears on pl. 46.

Ellis de Dionaea Muscipula planta irritabilinuper detecta; Beschreibung der"Dionaea Muscipula" einer neu entdeckten merkwurdigen empfindlichen Pflanze von Herrn Iohann Ellis. Aus dem Englischen ubersezt und herausgeben von Christian Daniel Schreber. Erlangen: Verlag Wolfgang Walthers, 1771. In Latin and German

Beschreibung der "Dionaea Muscipula" einer merkwurdigen empfindlichen Pflanze, in einem Schreiben an den Herrn Archiater und Ritter von Linne von Iohann Ellis; zwote Auflage mit der beschreibung einer neuentdeckten Pflanze von Iohann Christian Schreber. Erlangen: Verlag Wolfgang Walthers, 1780.

Exposition methodique des genres de l'ordre des polypiers, avec leur desscription et celle des principales especes, figurees dans 84 planches; les 63 premieres appartenant a l'histoire naturelle des zoophytes d'Ellis et Solander. Paris: Veuve Agasse, 1821. Translated by J. Lamouroux.

PAPERS PUBLISHED IN PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY

"Observations on a remarkable coralline, to the Rev Thomas Birch, D.D. Sec. R.S." 48 (1754):115-117.

"A letter to Mr Peter Collinson, F.R.S., concerning a cluster-polype, found in the sea near the coast of Greenland." 48 (1754):305-308.

"A letter to Mr Peter Collinson, F.R.S., concerning a particular species of coralline." 48 (1754):504-507.

"A letter to Mr Peter Collinson, F.R.S., concerning the animal life of those corallines, that look like minute trees, and grow upon oysters and fucus's all round the sea-coast of this kingdom." 48 (1754):627-633.

"An account of a curious, fleshy, coral-like substance; in a letter to Mr Peter Collinson, F.R.S., from Dr John Albert Schlosser, M.D., F.R.S., with some observations on it communicated to Mr Collinson by Mr John Ellis, F.R.S." 49 (1757):449-452.

"A letter to Philip Carteret Webb, F.R.S., attempting to ascertain the tree that yields the common varnish used in China and Japan; to promote its propagation in our American colonies; and to set right some mistakes botanists appear to have entertained concerning it." 49 (1757):866-876.

"An account of a red coral from the East-Indies, of a very singular kind: in a letter to Mr Peter Collinson, F.R.S." 50 (1758):188-194.

"Remarks on Dr Job Baster's Observationes de corallinis, &c. In a letter to the Right Honourable George Earl of Macclesfield, President of the R.S." 50 (1758):280-287.

"An answer to the preceding remarks."
[Answer to Philip Miller's remarks on Ellis's letter on the Toxicodendron]. 50 (1758):441-456.

"An account of the heat of the weather in Georgia: in a letter from Henry Ellis, Governor of Georgia and F.R.S., to John Ellis, F.R.S." 50 (1758):754-756.

"An account of several rare species of barnacles. In a letter to Mr Isaac Romilly, F.R.S." 50 (1759):845-855.

"An account of some experiments relating to the preservation of seeds: In two letters to the Right Honorable the Earl of Macclelsfield, President of the Royal Society." 51 (1760):206-215.

"An account of the plants Halesia and Gardenia: In a letter to Philip Cartaret Webb, F.R.S." 51 (1761):929-935.

"An account of the male and female cochineal insects that breed on the Cactus opuntia or Indian fig, in South Carolina and Georgia: In a letter to Peter Wych". 52 (1763):661-666.

"An account of the sea pen, or Pennatula phosphorea of Linnaeus; likewise a description of a new species of sea pen, found on the coast of South Carolina, with observations on sea-pens in general. In a letter to the

Honourable Coote Molesworth, F.R.S." 53 (1764):419-428.

"On the nature and formation of sponges: In a letter to Dr Solander, F.R.S." 55 (1766):280-289, pls 10-11.

"An account of an amphibious bipes." 56 (1767):189-192.

"A letter to the President on the Coluber cerastes, or horned viper of Egypt." 56 (1767):287-290.

"Extract of a letter to Dr Linnaeus, of Upsal, F.R.S. on the animal nature of the genus of zoophytes, called Corallina." 57 (1768):404-427.

"An account of the Actinia sociata, or clustered animal-flower, lately found on the sea-coasts of the new-ceded islands: In a letter to the Right Honourable the Earl of Hillsborough, F.R.S." 57 (1768):428-437.

"A letter to the President on the success of his experiments for preserving acorns for a whole year without planting them, so as to be in a state fit for vegetation, with a view to bring over some of the most valuable seeds from the East Indies, to plant for the benefit of our American colonies." 58 (1769):75-79.

"Observations on a particular manner of increase in the animalcula of vegetable infusions, with the discovery of an indissoluble salt arising from hemp-seed put into water till it becomes putrid." 59 (1770):138-152.

"A copy of a letter to Dr Linnaeus, F.R.S.&c. with the figure and character of that elegant American evergreen-tree, called by the gardiners the loblolly-bay, taken from blossoms blown near London, and shewing that it is not an hibiscus, as Mr Miller calls it; nor an hypericum as Dr Linnaeus supposes it; but an intire new genus, to which Mr Ellis gives the name of Gordonia." 60 (1771):518-523.

"The copy of a letter to Mr William Aiton, botanic gardener to her Royal Highness the Princess Dowager of Wales, at Kew, on a new species of Illicium Linnaei, or starry aniseed tree, lately discovered in West Florida." 60 (1771):524-531.

"On the nature of the Gorgonia; that it is a real marine animal, and not of a mixed nature, between animal and vegetable in a letter to Daniel Solander, M.D., F.R.S." 66 (1776):1-17.

C. MS RECORDS

Public Record Office of Northern Ireland
66 Balmoral Avenue
Belfast BT9 6NY

Linen Board records, PRONI vol. 17.

Public Record Office
Ruskin Avenue
Kew
Richmond
Surrey YW9 4DU

Minutes of the Council of Dominica, 1767-1777, CO 74/1; CO 74/4; CO 74/5.

Journal of the proceedings of the Assembly of Dominica, 1768-1776, CO 74/2-3.

Despatches from Dominica, 1773-1776, CO 71/4-6.

Audit Office Records, A.O.1, A.O.3.

Treasury papers, T.1/463, T.1/478, T.1/4884, T.1/493, T.1/511.

British Library Reference Division
Department of Manuscripts
Great Russell Street
London WC1B 3DG

Hardwicke Papers, Add. 36189.

British Library Prints and Drawings Room

A catalogue of the library of Solomon Dayrolles, also of John Ellis, together with many other libraries and well chosen collections of books... which will begin to be sold cheap, this day, 1786d, by James Robson, bookseller. Catalogues to be had of Mr. Becket [and others] [1786]. Previous ownership of individual titles not given.

Corporation of London Record Office
Guildhall
London EC2P 2EJ

Apprenticeship indentures, CF/549, February 1733.

Guildhall Library
Aldermanbury
London EC2P 2EJ

Parish of St Lawrence Jewry, Poor Rate Books, 1732-68, 1771-1835, Ms 2518/12-52.

Parish of St Mary Magdalen, Milk Street Precinct, Poor Rate Books, 1761-1777 Ms 2518/53-73.

Parish of St Lawrence Jewry, St Lawrence Precinct, Church Rate Books, 1723; 1756-60; 1762, Ms 2520/I-II.

Parish of St Lawrence Jewry, Workhouse Rate Books, 1744; 1756, Ms 2521/1-2.

Parish of St Lawrence Jewry, Tithe Rate Books, 1707-36; 1749-58, Ms 2519/1-3.

List of The Bishop of London's Marriage Allegations, Ms 10091/94.

Public Record Office
Chancery Lane
London WC2 1AH

Will of Sir Charles Peers, PROB 11/675.

Will of Martha Watt, PROB 11/1268.

Administration Act Book of the Prerogative Court of Canterbury, PROB 6/152.

Bankruptcy Records, B4. Index 22649, Docket Book 1759-1763.

The Royal Society of London
6 Carlton House Terrace
London SW1Y 5AG

Roll of the Fellows of the Royal Society. Compiled by William Bulloch, M.D., F.R.S.

Certificates of candidature, vol. 1- 1731-.

William L. Clements Library
The University of Michigan
Ann Arbor, Michigan

Shelburne Papers. "Catalogue of such useful Foreign Plants as will thrive in the American Dominions" dated 1767.

William Knox Papers. Henry Ellis to Knox, 29 November 1776; Henry Ellis to Knox, 7 August 1770; Henry Ellis to Knox, 29 November 1776; Sir John Blacquire to Lord Harcourt, 28 October 1776.

D. PRINTED SOURCE MATERIAL

A compleat guide to all persons who have any trade or concern with the City of London and parts adjacent. London: printed for J. Osborn, 1740 [and subsequent years].

Baker, Henry. The microscope made easy. London: R. Dodsley, 1742.

Borlase, William. Observations on the antiquities, historical and monumental, of the county of Cornwall. Oxford: printed for the author by W. Jackson, 1754.

---------. The natural history of Cornwall. Oxford: printed for the author by W. W. Jackson, 1758.

Browne, Patrick. The civil and natural history of Jamaica. London: B. White and Son, 1789.

Catalogus bibliothecae historico-naturalis Josephi Banks. Auctore Jona Dryander. Tomus III. Londini: Typis Gul. Bulmer et soc., 1797.

Catesby, Mark. The natural history of Carolina, Florida and the Bahama Islands. 2 vols. London: the author, 1731-43.

Dierkundig mengelwerk door den hooggell heer P. S. Pallas, M.D.. Teutrecht: Abraham van Paddenburg en J. van Schoonhover, 1770.

Edwards, George. Gleanings of natural history, exhibiting figures of quadrupeds, birds, insects, plants, &. 3 vols. London: for the author at the Royal College of Physicians, 1758-60-64.

Kent, Henry. Directory containing an alphabetical

list of companies, persons in publick business, merchants, & other eminent traders in the Cities of London, Westminster, & Borough of Southwark. London: printed and sold by Henry Kent, 1736 [and subsequent years].

Linnaeus, Carl. Systema naturae. Tenth edition. Holmiae (Stockholm): L. Salvii, 1758.

Pennant, Thomas. British zoology. 3 vols. London: Benjamin White, 1768-68-69.

--------. History of quadrupeds. 2 vols. London: Benjamin White, 1781.

Privilegia Londonini: or the laws, customs and priviledges of the City of London. London: printed for D. Brown at the Black Swan and Bible within Temple-Bar and F. Walthoe in the Middle-Temple-Cloysters, 1702.

Philosophical Transactions: giving some account of the present undertakings, studies, and labours, of the ingenious, in many parts of the World. vol. 1-. London: printed for the Royal Society, 1665-.

Pullein, Samuel. An essay towards a method of preserving the seeds of plants in a state fit for vegetation, during long voyages for the improvement of the British colonies in America. London: sold by A Millar and T. Pote, 1759.

Pulteney, Richard. Historical and biographical sketches of the progress of botany in England from its origin to the introduction of the Linnaean system. 2 vols. London: printed for T. Cadell, 1790.

Romans, Bernard. A concise natural history of East and West Florida. New York: sold by R. Aitken, 1776.

Royal Commission on Historical Manuscripts. Reports on manuscripts in various collections. vol. 1-. London: 1870.

Savage, Spencer. Catalogue of the manuscripts in the library of the Linnean Society of London; Part IV. Calendar of the Ellis Manuscripts. London: Taylor and Francis Ltd., for the Linnean Society, 1948.

Shortt, Adam and Doughty, Arthur G. Documents relating to the constitutional history of Canada, 1739-1791. Ottawa: 1907. (Canada Archives, Sessional Papers, no. 18).

Smith, James Edward. A selection of the correspondence of Linnaeus and other naturalists, from the original manuscripts, 2 vols. London: Longman, Hurst, Rees, Orme and Brown, 1821.

Swem, E. G. "Brothers of the spade, correspondence of Peter Collinson of London and of John Custis of Williamsburg, Virginia, 1734-1746." Proceedings of the American Antiquarian Society 58 (1948-49): 17-75.

The compleat compting house companion: or young merchant and tradesman's sure guide. London: printed for William Johnston, 1763.

The Gentleman's Magazine by Sylvanus Urban. vol. 1-103. London: 1731-1833.

The intelligencer: or, merchants assistant, shewing, in an alphabetical manner, the names and places of abode of all merchants and considerable traders throughout the Cities of London and West-minster, and Borough of Southwark. London: printed for W. Meadows, 1738.

The Lady's Magazine; or Entertaining Companion for the Fair Sex. vol. 1-49. London: printed for G. Robinson, 1770-1818.

The London Chronicle. London: 133 vols. 1757-1823.

The London Magazine. London: 1776.

The Register of St. Lawrence Jewry and St. Mary Magdalen, Milk Street, London 1677-1812. Transcribed and edited by A. W. Hughes Clarke. vol. 71. London: Harleian Society, 1941 (Publications of the Harleian Society [Registers].

The Scots Magazine. vol. 1-65. Edinburgh: 1739-1803.

The universal pocket companion. London: printed for J. & J. Fox, 1741.

The universal pocket companion. 3rd ed. London:

printed for C. Hitch and L. Hawes, 1760.

Thompson of Banchory and contributed by Professor Balfour. "Extracts from correspondence between Dr Skene and Linnaeus and John Ellis, about the year 1765." Transactions Botanical Society 6 (1860).

Ware, John D. "The Bernard Romans-John Ellis letters, 1772-1774." Florida Historical Quarterly. 52 (1973): 51-61.

II. SECONDARY SOURCES

A. BOOKS

Adams, George & Kanmacher, Frederick. Essays on the microscope. 2nd ed. London: printed by Dillon and Keating for the editor and for W. & S. Jones, 1798.

Alden, John Richard. John Stuart and the southern colonial frontier. New York: Gordian Press, 1966.

Allen, David Eliston. The naturalist in Britain. London: Allen Lane, 1976.

American history leaflets. eds. Albert Bushnell Hart and Edward Channing. No. 5. New York: Lovell & Co., 1892.

An introduction to the marine fauna of the British Isles. eds. J. S. Ryland and P. J. Hayward. London: Oxford University Press. (In press).

Andrews, Charles McLean. Guide to the materials for American history to 1783, in the Public Record Office of Great Britain, Volume II. Departmental and miscellaneous papers. Washington, D.C.: Carnegie Institution of Washington, 1914.

Annals and Magazine of Natural History. vol. 6-. London: 1841-.

Asimov, Isaac. A short history of biology. Garden City, N.Y.: Natural History Press, 1964.

Bailey, L.H. How plants get their names. New York: Dover Pulbications, Inc., 1963.

Baker, John R. Abraham Trembley of Geneva. London: Edward Arnold & Co., 1952.

Bulletin of the Museum of Comparative Zoology. vol. 1. Cambridge, Mass.: Harvard University, 1863-1869.

Berkeley, Edmund and Berkeley, Dorothy Smith. Dr. Alexander Garden of Charles Town. Chapel Hill: University of North Carolina Press, 1969.

--------. John Clayton: pioneer of American botany. Chapel Hill: Univ. of North Carolina Press, 1963.

Bibliography of British history, the eighteenth century, 1714-1789 issued under the direction of the American Historical Association and the Royal Historical Society of Great Britain. eds. Stanley Pargellis and D. J. Medley. Hassocks: Harvester Press, 1977.

Biographie Universelle, Ancienne et Moderne. 85 vols. Paris: Michaud Freres, 1811-62.

Blunt, Wilfrid. The compleat naturalist. London: Collins, 1971

Bradbury, Savile. The evolution of the microscope. Oxford: Pergamon Press, 1967.

--------. The microscope past and present. Oxford: Pergamon Press, 1968.

Britten, James, ed. The Journal of Botany. Vol. 57 London: Taylor and Francis, 1919.

Burke, John Bernard. A genealogical and heraldic history of the landed gentry of Ireland. 9th ed. London: Royal Historical Society, 1961.

Campbell, Richard L. Historical sketches of colonial Florida. Cleveland, Ohio: Williams Publishing Co., 1892.

Chalmers-Hunt, J. M. Natural history auctions 1700-1972. A register of sales in the British Isles. London: Sotheby Parke Bernet, 1976.

Clark, Dora Mae. The rise of the British Treasury: colonial administration in the eighteenth century. New Haven: Yale University Press, 1960.

Clay, Reginald S. and Court, Thomas H. The history of the microscope. London: Charles Griffin and Company, Limited, 1932.

Coats, Alice M. The quest for plants. London: Studio Vista, 1969.

---------. The plant hunters, being a history of the horticultural pioneers, their quests and their discoveries from the Renaissance to the twentieth century. New York: McGraw-Hill Book Company.

Cokayne, George Edward. Complete Peerage of England, Scotland, Ireland, Great Britain and the United Kingdom. 8 vols. London: G. Bell & Sons, 1887-98.

Cornelius, P. F. S. and Wells, John W. Sir Joseph Bank's unique copy of Ellis & Solander's 'The Natural History of Many Curious and Uncommon Zoophytes.....1786. (In press).

Cumberlege, Geoffrey. The Corporation of London: its origin, constitution, powers and duties. London: Oxford University Press, 1950.

Darden, Newton Jasper. Standard reference calendar, never out of date. A calendar, comprising 14 finding tables for all dates from September 3-14, 1752 to 2100 anno Domini. Washington, D.C.: Standard Calendar Association, 1935.

Daumas, Maurice. Scientific instruments of the seventeenth and eighteenth centuries and their makers. London: B. T. Batsford, 1972.

Desmond, Ray. Dictionary of British and Irish botanists and horticulturalists. London: Taylor & Francis, 1977.

Dictionary of American biography. ed. A. Johnson. 20 vols. London: Oxford University Press, 1943.

Dictionary of scientific biography. ed. C. C. Gillespie. 15 vols. New York: Charles Scribner's Sons, 1970-80.

Eighteenth century Florida and its borderlands. ed. Samuel Proctor and Robert Rea. Gainesville: University Presses of Florida, 1975.

Enciclopedia Universal Ilustrada Europa-Americana. 70 vols. Barcelona: J. Espasa, [?1907-30].

Encyclopaedia Britannica; A Dictionary of Arts, Sciences, Literature and General Information. 11th ed. 29 vols. Cambridge: at the University Press, 1910-1911.

Ford, Brian John. Single lens. London: Heinemann, 1985.

Geiser, Samuel Wood. Naturalists of the frontier. 2nd ed. Dallas: Southern Methodist University Press, 1948.

Gosse, Philip Henry. A history of the British sea-anemones and corals. London: van Voorst, 1860.

Gourlie, Norah. The prince of botanists. London: H. F. & G. Witherby Ltd., 1953.

Gray, John Edward. Catalogue of lithophytes or stony corals in the collection of the British Museum. London: by order of the Trustees, 1870.

Hadfield, Miles. A history of British gardening. London: John Murray, 1979.

Hindle, Brooke. The pursuit of science in revolutionary America, 1735-1789. Chapel Hill: University of North Carolina Press for the Institute of Early American History and Culture, 1956.

Howard, Clinton N. The British development of West Florida, 1763-1769. Berkeley; Los Angeles: University of California Press, 1947 (University of California Publications in History, vol. 34.)

International Union of Biological Sciences. International code of zoological nomenclature. 3rd ed. London: International Trust for Zoological nomenclature in association with the British Museum (Natural History). 1985.

Jackson, Benjamin Daydon. Guide to the literature of botany. New York: Hafner Publishing Company, 1964.

Joblot, Louis. Descriptions et usages de plusieurs nouveaux microscopes, tant simples ques composez. Paris: Chez J. Collombat, imprimeur, 1718.

Johnson, Cecil. British West Florida, 1763-1785. New Haven: Yale University Press, 1943.

Johnston, George. A history of the British zoophytes. London: John van Voorst, 1838.

--------. A history of the British zoophytes. 2nd ed. 2 vols. London: van Voorst, 1847.

Kastner, Joseph. A species of eternity. New York: Alfred A. Knopf, 1977.

Korn, Bertram Wallace. The early Jews of New Orleans. Waltham, Mass.: American Jewish Historical Society, 1969.

La Grande Encyclopedie, inventaire raisonne des sciences, des lettres et des arts. Paris: H. Lamirault, [1886-1902].

Landsborough, D. A popular history of British zoophytes, or corallines. London: Reeve and Co., 1852.

Leslie, James B. Ferns clergy and parishes. Dublin: printed for the author, 1936.

Lemmon, Kenneth. The golden age of plant hunters. London: Phoenix House, 1968.

Mackay, David. In the wake of Cook, exploration, science & empire. London: Croom Helm, 1985.

Memoirs of The National Academy of Sciences. vol. 8. Washington: Government Printing Office, 1902.

Milne-Edwards, Henri and Haime, Jules. A monograph of the British fossil corals. London: Paleontological Society, 1850-54.

Munk, William. The roll of the Royal College of Physicians of London, comprising biographical sketches of physicians from 1518 to 1825. 2nd ed. 3 vols. London: the College, 1878.

Naumov, D. V. Hydroids and hydromedusae of the USSR. Available from the U.S. Department of Commerce Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia. Jerusalem: Israel Program for Scientific Translations Ltd., 1969.

Neill, Robert M. Microscopy in the service of man. London: Williams & Northgate, Ltd., 1926.

Newman, Charles. The evolution of medical education in the nineteenth century. London: Oxford University Press, 1957.

Nordenskiold, Erik. The history of biology. New York: Tudor Publishing Co., 1927.

Pimentel, Richard A. Natural history. New York: Reinhold Book Corporation, 1963.

Proceedings of The Zoological Society of London. Part 27. London: printed for the Society, 1859.

Pulling, Alexander. A practical treatise on the laws, customs and regulations of the City and Port of London. London: V. & R. Stevens and G. S. Norton, 1842.

Rees, Abraham. The cyclopoedia of arts, sciences and literature. 39 vols. London: Longman, Hurst, Rees, Orme & Brown, 1819.

Robinson, F. J. G. and Wallis, P. J. Book subscription lists. Newcastle-upon-Tyne: printed by Harold Hill and Son Ltd., for The Book Subscription List Project, 1975.

Robinson, John Martin. The Dukes of Norfolk: a quincentennial history. Oxford: Oxford University Press, 1982.

Roseveare, Henry. The Treasury: the evolution of a British institution. London: Allen Lane, 1969.

Rowland, Dunbar. Mississippi provincial archives 1763-1766. Nashville: Brandon Printing Company, 1911.

Royal Commission on Historical Manuscripts. The manuscript papers of British scientists 1600-1940. London: HMSO, 1982 (Guides to Sources for British History based on the National Register of Archives, 2).

Savelle, Maxwell Hicks. The origins of American diplomacy: the international history of Angloamerica, 1492-1763. New York: The Macmillan Company, 1967.

--------. Empires to nations, expansion in America, 1713-1824. London: Oxford University Press, 1975.

Schazmann, Paul-Emile. The Bentincks: the history of a European family. London: Weidenfeld & Nicolson, 1976.

Schenk, Edward T. and McMasters, John H. Procedure in taxonomy. 3rd ed. Stanford: Stanford University Press, 1956.

Shaw, W. A. The knights of England. 2 vols. London: Sherratt & Hughes, 1906.

Simpson, George Gaylord. Principles of animal taxonomy. New York: Columbia University Press, 1961.

Singer, Charles. The story of living things. New York: Harper & Brothers, 1931.

Smith, Pleasance. Memoir and correspondence of the late James Edward Smith. 2 vols. London: Longman, 1832.

Stafleu, Frans A. Linnaeus and the Linnaeans: the spreading of their ideas in systematic botany, 1735-1789. Utrecht: Oosthoek for the International Association for Plant Taxonomy, 1971 (Regnum Vegetabile, 79).

Stearn, William T. The Natural History Museum at South Kensington. A history of the British Museum (Natural History) 1753-1980. London: Heinemann, 1981.

Swainson, William. A preliminary discourse on the study of natural history. London: printed for Longman, Rees, Orme, Brown, Green & Longman, 1834.

Taylor, E. G. R. The mathematical practitioners of Hanoverian England 1714-1840. Cambridge: at the University Press, 1966.

Te Paske, John J. The Governorship of Spanish Florida 1700-1763. Durham: Duke University Press, 1964.

The Annals and Magazine of Natural History. Vol 19.- Fourth Series. London: printed and published by Taylor and Francis, 1877.

The Cambridge Natural History. ed. S. F. Harmer and A. E. Shipley. vol. 1. London: Macmillan and Co., Limited, 1906.

The Encyclopedia Americana. International ed. 30 vols. Danbury, Conn.: Americana Corp., 1979.

The ferment of knowledge. Studies in the historiography of eighteenth-century science. eds. G. S. Rousseau and Roy S. Porter. London: Cambridge University Press, 1980

The papers of Benjamin Franklin. ed. William B. Willcox. vol. 19. New Haven and London: Yale University Press, 1975.

--------. vol. 20. New Haven and London: Yale University Press, 1976.

--------. vol. 21. New Haven and London: Yale University Press, 1978.

Transactions of the Connecticut Academy of Arts and Sciences vol. 11, Part I. New Haven: Published by the Academy, 1901-1902.

Turner, Gerard L'Estrange. Essays on the history of the microscope. Oxford: Seneca Publishing Co., 1980.

Wood, Henry Trueman. A history of the Royal society of arts. London: John Murray, 1913.

B. ARTICLES

Carter, Clarence E. "Some aspects of British administration in West Florida." Mississippi Valley Historical Review 1 (1914-15):364-365.

--------. "The beginnings of British West Florida." Mississippi Valley Historical Review 4 (1917-18):314-341.

Cornelius, Paul F.S. "The hydroid species of Obelia (Coelenterata, Hydrozoa: Campanulariidae), with notes on the medusa stage." Bulletin of the British Museum (Natural History) (Zoology) 28 (1975):251-290.

--------. "A revision of the species of Sertulariidae (Coelenterata: Hydroida) recorded from Britain and nearby seas." Bulletin of the British Museum (Natural History) (Zoology) 34 (1978-1979):243-316.

--------. "Notes on the hydroid, Synthecium evansi." Bulletin of the British Museum (Natural History) (Zoology) 38 (1980):7-8.

Cox, Isaac J. "The American intervention in West

Florida." American Historical Review 17 (1912): 290-293.

Crane, Verner W. "Hints relative to the division and government of the conquered and newly acquired countries in America." Mississippi Valley Historical Review 8:367-373.

Dixon, P.S. "The herbarium of John Ellis (?1710-1776)." British Phycological Bulletin 2 (1960):28-31.

Gray, John Edward. "Description of some new genera of lithophytes, or stony zoophytes." Proceedings of the Zoological Society of London 27 (1859):479-486.

Howard, Clinton N. "Colonial Pensacola: the British period, Part I." The Florida Historical Quarterly 19 (1939):109-127.

--------. "Colonial Pensacola: the British period, Part II." The Florida Historical Quarterly 19 (1939):246-269.

--------. "Colonial Pensacola the British period, Part III. The administration of Governor Chester, 1770-1781." The Florida Historical Quarterly 19 (1939):368-401.

--------. "Early settlers in British West Florida." The Florida Historical Quarterly 24:45-55.

Johnson, Cecil. "Expansion in West Florida, 1770-1779." Mississippi Valley Historical Review 20:481-496.

Lenman, B. P. and Kenworthy, J. B. "Dr David Skene, Linnaeus, and the applied geology of the Scottish enlightenment." Aberdeen University Review 47 (1977):32:44.

Love, Askell. "The biological species concept and its evolutionary structure." Taxon 13 (1964):33-45.

McClellan, James E. III. "The Academie Royale des sciences, 1699-1793: A statistical portrait." Isis, 72 (1981):541-567.

Rauschenberg, R.A. "A letter of Sir Joseph Banks describing the life of Daniel Solander." Isis 55 (1964):62-67.

--------. "Daniel Carl Solander, naturalist on the 'Endeavour.'" Transactions of the American Philosophical Society 58(8) (1968):1-66.

--------. "John Ellis, F.R.S.: eighteenth century naturalist and Royal Agent to West Florida." Notes and Records of the Royal Society of London 32 (1978):149-164.

--------. "John Ellis, naturalist: an early member of the Society." Journal of the Royal Society of Arts 126 (1978):577-581.

--------. "John Ellis, Royal Agent for West Florida." Florida Historical Quarterly 62 (1983):1-24.

Rea, Robert R. "Science and Empire: John Ellis, King's Agent for West Florida." The Journal of the Alabama Academy of Science 28 (1956):138.

--------. "The King's Agent for British West Florida." The Alabama Review 16 (1963):141-153.

--------. "'Graveyard for Britons,' West Florida, 1763-1781." The Florida Historical Quarterly 47 (1969):345-364.

--------. "Exploring his Britannic Majesty's Imperial Gardens of East and West Florida." El Escribano (1986):79-98.

Rees, W. J. and Rowe, Mary. "Hydroids of the Swedish west coast." Acta Regiae Societas Scientiarum et Litterarum Gothoburgensis (Zoological) 3 (1968): 4-22.

Robischon, Mary Margaret. "Scientific instrument makers in London during the seventeenth and eighteen centuries." Ph.D. dissertation, University of Michigan, 1983.

Rowbury, R.J. "William Withering of Birmingham and the botanical microscope." Microscopy 34 (1980-1982): 244-253.

--------. "The naturalist John Ellis and the development of the botannical microscope." Microscopy 34 (1980-1982):419-421.

Stearns, Raymond Phineas. "Colonial Fellows of the Royal

Society of London." Notes and Records of the Royal Society of London 8 (1951):178-246.

Taylor, Garland. "Colonial settlement and early revolutionary activity in West Florida up to 1779." Mississippi Valley Historical Review 22 (1935): 351-360.

Thomson, A. "Biographical memoir of the late Dr D. Skene of Aberdeen." Proceedings of the Royal Society of Edinburgh 4 (1862):164-167.

Wallis, P. J. "The MacLaurin 'Circle': The evidence of subscription lists." Bibliotheck, 1982:38-54.

Wilson, Edward O. "A mass extinction without asteroids." Science vol. 234 (1986):14-15.

APPROVAL SHEET

The dissertation submitted by Julius Groner has been read and approved by the following committee:

Dr. Robert W. McCluggage, Director
Professor, History, Loyola

Dr. Alice B. Hayes
Professor, Natural Science and
Associate Academic Vice President, Loyola

Dr. Jo N. Hays
Associate Professor, History, Loyola

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

9 Apr 1987
Date

Robert W. McCluggage
Director's Signature