FOUR DIARISTS AND THE NEW SCIENCE OF THE SEVENTEENTH CENTURY

by

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PREFATORY NOTE

References to the four diaries studied and to John Evelyn's correspondence are made within the text, in parentheses, and by date. In the early part of Evelyn's diary often only the month and year of an entry can be established. Many of the letters cited are not fully dated.

The editions referred to are:

Diary of John Evelyn, edited by E.S. de Beer, Oxford, 1955.

Diary and Correspondence of John Evelyn, edited by William Bray, F.A.S., London, 1862.

Diary of Samuel Pepys, edited by H.B.Wheatley, F.A.S., London, 1952.

Diary of Cotton Mather, 1681-1708, 1709-1724, Massachusetts Historical Society Collections, Seventh Series, Vol. VII, Boston, 1911.

The Secret Diary of William Byrd of Westover, 1709-1712, edited by Louis B. Wright and Marion Tinling, Richmond, Virginia, 1941.

The London Diary and other Writings, edited by Louis B. Wright and Marion Tinling, New York, 1958.

Another Secret Diary of William Byrd of Westover, 1739-1741, with Letters and Literary Exercises, edited by Maude H. Woodfin. Decoded by Marion Tinling, Richmond, Virginia, 1942.

The last two volumes contain other writings besides the fragments of diaries. These are referred to in footnotes.

INTRODUCTION

"Ends and beginnings -- there are no such things.
There are only middles." [1]

As we stubbornly search for beginnings we are forced to content ourselves with the recognition of significant middles. One man's enmity can change the course of history, and in the seventeenth century one man's humanitarianism changed the outlook of an age. Brahe, Kepler and Gilbert had understood the advances of science better than he, and had known the value of repeated observation. Other dreamers had the idea of a co-operative group of scientists. The push came not directly from science but from social reform and it was Francis Bacon who understood the pessimism of his time and where the stumbling-blocks lay.

But by far the greatest obstacle to the progress of science and to the undertaking of new tasks and provinces therein, is found in this -- that men despair and think things impossible. For wise and serious men are wont in these matters to be altogether distrustful; considering with themselves the obscurity of nature, the shortness of life, the deceitfulness of the senses, the weakness of the judgement, the difficulty of experiment and the like; and so supposing that in the revolution of time and of the ages of the world the sciences have ebbs and flows; that at one season they grow and flourish, at another wither and decay, yet in such sort that when they have reached a certain point and condition they can advance no further.[2]

From the height and influence of his position, and with the

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1 Robert Frost, Complete Poems (New York, 1949), p. 145.

2 Francis Bacon, Works (London, 1870), IV, 90.

grandeur of the Renaissance in his undertaking, he set out to reform; his aim, the benefit of mankind. "Now the true and lawful goal of the Sciences is none other than this; that human life be endowed with new discoveries and powers."[3] To the overly ambitious he issued the injunction that "rightly is truth called the daughter of time, not of authority".[4] Truth was to be established slowly in successive generations and "not within the hour glass of one man's life".[5] The point of despair once turned to a point of departure, while it deprived the few of their dreams of fame, offered each seeker the chance to make his contribution. Bacon taught his age to tolerate doubt and failures of understanding, recommending an attitude "between the presumption of pronouncing on everything and the despair of comprehending anything; . . ."[6] "If a man will begin with certainties he shall end in doubts; but if he will be content to begin with doubts he shall end in certainties."[7]

No special gifts or training were necessary in order to contribute to his Natural History of the Earth. Jack's observations were as good as those of his master, and if man's higher powers

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[3] Bacon, IV, 79.
[4] Bacon, IV, 82.
[5] Bacon, III,329.
[6] Bacon, IV, 39.
[7] Bacon, III, 293.

seemed to be relegated to secondary importance, the constraint to withhold judgement until all the facts were in could give the man of melancholy the impulse to stir himself and add what he saw fit to the undertaking.

It was not Bacon's scientific view-point which inspired him, for he was still more concerned with qualities than quantities. The advancement of science was his aim and he foresaw its achievement in terms of a change in emphasis and method. Science meant power, but power to alleviate the lot of man. With that ideal he described his man of science. "The day being come, he made his entry. He was a man of middle stature and age, comely of person, and had an aspect as if he pitied man."[8]

The receptive generation was not his own but the succeeding one. The reforming Puritans and the strengthening democratic process throve on Baconian ideals. The realization began to grow that "philosophy", would only progress if it were served by men willing to expend physical energy and develop the skill of their hands. Modern scientific utilitarianism has been called the "offspring of Bacon begot upon Puritanism".[9]

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[8] Bacon, III, 154.

[9] Richard Foster Jones, Ancients and Moderns (St.Louis,1936),p.92.

The extent of the great new stirring of mind can be illustrated from all walks of life. Bishop Sprat writes, "Philosophy has begun to keep the best Company, to refine its fashion and appearance and to become the employment of the Rich and the Great instead of being the object of their scorn."[10] He also points out that it was by the recommendation of the King that Dr. John Graunt, shopkeeper, "and other such tradesmen", were admitted Fellows of the Royal Society. A letter of Mrs. John Evelyn's tells us something of the effect on her life of the increasing emphasis on the use of the English language and the translations of the classics resulting from it. "Learning is become so easy of access by the late industry of some who have removed the bar language put to the illiterate, and make women pretenders to judge of Alexander's valour and conduct."[11]

John Evelyn, Samuel Pepys, Cotton Mather and William Byrd, two of them trans-Atlantic Colonials, became Fellows of the Royal Society. None of them was a man of science, but each kept a diary in which can be found an account of what the new science meant to him and how each in his particular way dealt with the new ideas.

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10 Thomas Sprat, History of the Royal Society of London (London,1702), p.403.

11 Diary and Correspondence of John Evelyn (London,1862),IV,34.

JOHN EVELYN

" . . . the Boyles, the Gales and the Newtons of our Nation: what in God's name is a planter of colewart to do among such worthies!" (Corr. Aug.12, 1689)

John Evelyn, virtuoso, lived his eighty-six years in that generation presided over by Bacon's guiding spirit. During that time, while the advancement of "philosophy" drew away from the mysteries of alchemy towards the exact methods and interpretations of modern science, the word "virtuoso" changed from its old to its modern usage. The old meaning, by which the title was applicable to Evelyn as well as to Robert Boyle, implied a person with a general interest in the arts or in science, or who pursued special investigations in one of these.[12] Bacon is mainly responsible for the shift in interest of the leisured gentry from painting and antiques to science, and as these virtuosi, following his precepts to establish a great body of facts and a natural history, increased their activities and dared to make the public aware of the diversity of their investigations, the lampooners and the satirists seized their opportunity to poke fun at the apparent futility of their activities. Such experiments as the transfusion of a sound dog with the blood of a mangy one lent themselves to ridicule,[13] and Shadwell's play, The Virtuoso,

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12 New English Dictionary, ed., James A.H.Murray. (Oxford 1893).

13 Philosophical Transactions and Collections, Abridged and Disposed under General Heads by John Lowthorp, M.A., F.R.S., 4th ed. (London, 1731) III, 229.

drew a gale of laughter between the years 1667 and 1705, after which it was no longer performed. By then, his character Sharl's opinion, "I believe if the blood of an ass were transfused into a virtuoso you would not know the emittent ass from the recipient virtuoso", was no longer so amusing. The year 1667 brought Bishop Sprat and his History of the Royal Society, defensive and conciliatory, to an attempted rescue. Anti-puritan resentment gathered force against the new science with which the Puritans were associated, and was only mitigated by the interest of the restored king and the evident support of the clergy. While reaction to the fanatic group among the Puritans created the desire for a solid, rational approach in religion and philosophy, the Baconians, emphasizing observation and inductive methods, seemed to disparage the dignity of deductive reason. But in spite of controversy, the role of the serious scientist was developing, and solid proof in matters medical, chemical, or mechanical commanded more and more respect, at least in the circle of immediate witnesses. Boyle's work was among those advances and, acknowledged "a most excellent man ",[14] his capacities and achievements placed him intellectually in the same rank as Newton, and with those striving to create a body of facts with the definition of Bacon's Primary Laws as their ultimate goal. With others the approach was more utilitarian

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14 Diary of Samuel Pepys. (London, 1952), June 2, 1667.

and among those was Evelyn. His character and intellect mark him more as a virtuoso in that primary sense which was obsolescent in his lifetime.

If we follow the changing word a little further, the strand of meaning which strengthened can be found in use in the middle of the seventeenth century. In 1656 in her True Relation in Life the Duchess of Newcastle uses the word "virtue" in the sense of "accomplishment", "Tutors . . . for all sorts of virtues, singing, dancing, playing on music . . ." and so, as the old meaning fell somewhat into bad company, this element narrowed to imply technical excellence in the arts and in 1764 Handel is referred to as a virtuoso.

Evelyn's way of life brought him continually in contact with the highest ranking people of his time, among whom were many of the most distinguished scientists. He was a man of independent means, never continuously employed, and one who earned a salary only when he became Commissioner for the Sick and Wounded during the first war with the Dutch in 1664. The strongest bulwark of his life was the Church of England and all his life he was closely in touch with ecclesiastical politics, although he was never personally involved in them. The Bishops Sancroft, Tillotson, and Tenison were his friends and as the years rolled on and the outer world receded, the diary shows us an aging man ever more and more absorbed in the details of the Sunday sermons. His religion set the key of his daily life, and from it he

may have derived a conviction of himself as a good and faithful servant of the Church and also of the King. The overwhelming nature of his royalist bias is well illustrated by his comments on Milton, whose political views blinded Evelyn to his other qualities. Milton's nephew, Edward Philips, came to be tutor to Evelyn's son. "This Gent: was Nephew to Milton who writ against Salmasius Defensio, but not at all infected with his principles, and though brought up by him, yet in no way tainted." Twenty-three years later the poet is still referred to as "the Milton who wrote for the regicides" (Oct. 18,1663: June 9, 1686).

Staunch royalist, there was, however, in him some quirk of character or belief which absolved him from openly taking a stand on religious and political questions. In a tight corner, he simply removed himself, as he did when the Puritans governed England, and when, as one of three Commissioners of the Privy Seal under James II, he would have had to lend his support to James' concessions to the Catholic bishops. All through the diary soulsearchings and judgements are rare, and although he is capable of referring to the King's natural children as "catell of that sort" (Jan.24,1682), there are no self-doubts expressed on questions of ethics. He was not ambitious, for we know he could have been knighted for his unending, manifold labors, and if we consider his hopes for his grandson we may perhaps see in them a reflection of his own way of life. "I do not much encourage his poetry, in which he has yet a pretty vein; my desire being to make him an honest

useful man of which I have great hopes, being so grave, steady, and most virtuously inclined" (Corr. Sept.12,1703). It may be that Bacon's guiding precept spurred him on, "But man must know that in this theatre of life it is reserved only for God and the Angels to be lookers on",[15] but Evelyn, with a marked passive trait in his character, was compelled to action, and for forty years his name can be found linked with those who strove towards the betterment of mankind in the most important social changes of the time. It is a name rarely in the first rank of those whose services were acknowledged, and it could be said that the unofficial influence of this grave, steady man represents his best contribution to the life of his day. In the diary and his letters, some of his unobtrusive good deeds can be distinguished. It was Evelyn who rescued the Howard library and collection of ancient stones from neglect and saw these treasures established in the appropriate places (Jan. 9,1667). While this service was duly acknowledged (Corr. March, 1669), the initiative in rescuing the library in the first place was his own. He was sought out by the Page of the Back Stair to help arrange and catalogue the King's treasures and this discriminating skill was later used by the Royal Society (Corr. 1661). There is a careful letter in 1666, after the fire had ravaged the Stationers' buildings, concerning the reprinting of classical texts for schools. Evelyn had a twofold purpose in this; first, that the young might not store in their minds one printer's error on top of another, and second,

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15 Bacon, V,8.

that scholars might obtain better texts at home instead of having to send currency abroad to obtain them. As always, Evelyn is concerned for the prestige and economy of the country (Corr. Nov. 1666). Hard-pressed for money while Commissioner for the Sick and Wounded, he, through Oldenburg, the Society's secretary, made the suggestion in 1672 that Chelsea College be used as a prison during the war.[16] It was he who brought Christopher Wren to Dr. Tenison who had sought Evelyn's help in planning the first of the public libraries in connection with the church of St.Martins-in-the-Fields. But, if he had performed no other service to his own and succeeding generations, the fact that he brought Grinling Gibbons to the notice of Christopher Wren stands fully to his credit (Feb.12,1671). In February 1671 he brought Wren and Pepys to see Gibbons, and a month later saw to it that Gibbons showed his carving to the King at Whitehall. Concluding his undertaking he notes, "Mr. Wren faithfully promising me to employ him for the future." His visual observation was acute, his judgment on it sound, and his action unhesitating.

Such instances as these were minor activities in the life of a continuously busy man who must have considered his writing among the foremost of his accomplishments and duties. Throughout his life he wrote prolifically on matters of art, architecture, gardening, London's smoke and London's replanning, a defence of the nation's action

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16 Thomas Birch, History of the Royal Society. (London, 1756-7), III, 41.

in the Dutch war and a myriad of other topics. We have Pepys to thank for the information that he also wrote plays and poems.[17] Besides writing, and his social responsibilities, he served on commissions examining the work of the Royal Mint, the production of salt-petre and the management of foreign plantations. Yet his only hard-pressed years were those in which he served as Commissioner for the Sick and Wounded in charge of Kent and Sussex. After the wars with the Dutch, he continued to serve the interests of Greenwich Hospital and of Chelsea Hospital which was established in Wren's new building after these wars.

Church and State we have seen to be his concern, and the arts his natural bent, but all through his life ran a continuous interest in the new science of his day, and for more than forty years he was associated with the Royal Society. One of the original forty-one members, he was elected to the Society on November 28, 1660, after Wren's lecture at Gresham College, and it is appropriate here to enquire more closely just how the self-designated "planter of Solewart" came among these men.

It has already been shown that Evelyn's economic and social background was similar to that of many of the men engaged in this work, but in order to understand his association with them further, it is necessary to look at the early years of the diary and see what

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17 Pepys' Diary, Nov. 4,1665.

in his early days, and on his travels in Europe, caught his attention and held his interest.

For nine years during the Civil War and during part of Cromwell's Protectorate, Evelyn remained abroad making a grand tour, sight-seeing as it seemed proper to him and studying in a leisured fashion matters which continued to interest him all his life. The European virtuosi were visited and the objects of interest among their collections noted. In Rome, Cavalliero Pozzo's treasures afford a characteristic list of a great virtuoso's collection: a "pretty" folding ladder, antique bas-reliefs of Rome, medals, drawings, "the stone which Pliny called Enhydros", a carbuncle "larger than a diamond", " pretty things painted on crimson velvet designed in black and shaded, heightened with white" (Nov.21, 1644). Mechanical curiosities are constantly remarked on: a chair which locked the sitter in it (Nov.19, 1644), an astonishing chandelier which spouted water like a fountain (Aug.1641), and, as with all people of his time, the abnormal or monstrous always affords him interest (Aug. 1641). Evelyn is best known, apart from the diary, for his sustained and knowledgeable interest in growing things, and wherever he went in Europe, gardens received his careful scrutiny (Feb.1644: July 1645). In Paris in 1649 he must have found much satisfaction in the company of Dr. William Davison who as gardener, chemist and physician, met Evelyn's interests in several subjects. While he was in Padua the study of physics and anatomy had held him for several months, and the diagrams of veins, nerves, lungs,

and the liver which he had had made there were duly sent home (Feb. 1646), and later presented to the Royal Society (Nov.27,1667). In Paris in 1647 he studied chemistry with M. Febure, and in 1662 visited him again in London with the King to watch him prepare Sir Walter Raleigh's cordial. In 1650 he notes having watched an operation for the stone at the Charité in Paris. In 1645, in Rome and in Bologna, began his lifelong curiosity and interest in the mystery of phosphorus, and as late as 1681 he was still regretful that he did not find out how the mountebank in Rome contrived to make a flame as "bright as a small candle" shoot from his ring (May 1645).

After his return to England in 1652, Evelyn met Wilkins and Wren in Oxford and by 1654 refers to Wilkins as "my excellent and dear friend" whose collections of curiosities is noted with care: the transparent apiaries adorned with little statues and vanes, one of which was given to Evelyn, a hollow statue which spoke, "shadows", "dials", "perspectives", a "way-wiser, thermometer, a monstrous magnes, conic and other sections, a balance on a demi-circle, most of them his own and that prodigious young scholar Mr. Christopher Wren" who at that time gave Evelyn a piece of marble stained red (July 13, 1654).

So began a steady association with these men to whom he must always have appeared interested and knowledgeable. In 1656 began his lifelong friendship with Robert Boyle to whom he wrote in 1659 outlining his proposal for a scientific college. Evelyn's scheme has a fairy tale atmosphere about it -- a design one might find woven

in a tapestry, since his visual concept of the establishment is the strongest and most detailed -- the handsome pavilion, the walled gardens, the physic garden. His scheme has none of the moral ruggedness which Hartlib outlined in his "Famous Kingdom of Maccaria", and it is not to Evelyn's plan but to Cowley's "Proposals" for such a society that Bishop Sprat refers in his history, but, as happened so often in Evelyn's life, his was another supporting voice in a notable undertaking. Involved from the beginning with the idea and its fulfillment, with the aims and the fortunes of the Society, for thirty years Evelyn did not miss a St. Andrew's Day anniversary dinner. In the years of attack and controversy he sought, and acknowledged in its support, the help of more outspoken and forceful friends. To Cowley he writes,

> Sir we have a library, a repository and an assembly of as worthy and great persons as the world has any; and yet we are sometimes the subject of satire and the songs of the drunkards; have a king to our founder, and yet want a maecenas and above all a spirit like yours to raise up benefactors, and to compel them to think the design of the Royal Society as worthy of their regards, and as capable to embalm their names, as the most heroic enterprise or anything antiquity has celebrated (Corr. March 1667).

The next year, acknowledging a copy of "Plus Ultra", he writes to Joseph Glanvill,

> . . . but let the moon dogs bark on, till their throats are dry; the Society everyday emerges, and her good genius will raise up one or other to judge and defend her; whilst there is nothing which does more confirm me in the nobleness of the design than this spirit of contradiction which the devil (who hates all discoveries of those false and pestiferous ways that have hitherto obtained) does incite to stir up men against it (Corr. June 24, 1668).

Evelyn's own position in regard to the new science is well

illustrated by his conflicting thoughts roused by the appearance of the comet of December 1680. Harking back to the accepted explanation of natural phenomena as dispensations of God, and looking forward towards a rational explanation of the universe and its laws he records, "We have had of late several comets, which though I believe appear from natural causes and of themselves operate not, yet I cannot despise them. They may be warnings from God, as they commonly are forerunners of his Animadversions." And yet Evelyn's calculations as to its position and course were identical with those of the Astronomer Royal (Dec. 12,1680). With Boyle, Wren and Newton, Evelyn did not foresee any conflict between science and revealed religion and stood with them in the opinion "that two of God's principal aims in the creation were the manifestation of his own glorious attributes and the welfare of the noblest visible creature, man; . . . those who labour to deter man from sedulous inquiries into nature . . . do take a course which tends to defeat God of both those mentioned ends."[18] Before Boyle died, he appointed Evelyn one of four trustees for a course of lectures to be delivered annually on the proofs of Christianity.

As one considers the many practical matters on which Evelyn wrote, their number and variety suggest the work of a dilettante without goal or direction, but this seemingly random activity may be understood in the light of a letter written to William Wotton on

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[18] Robert Boyle, Works. (London, 1772), II, 18.

September 12, 1703. Evelyn there refers to himself in the early days of his friendship with Boyle as being occupied in compiling a History of Trades according to Bacon's plan for a History of Nature Wrought and Mechanical, "myself then intent on collections of notes in order to an History of Trades and other mechanical furniture which he (Boyle) earnestly encouraged me to proceed with."[19] W.E. Houghton points out that Samuel Hartlib had recommended William Petty for that work and suggests that, when the necessary money was not forthcoming for Petty's support, Hartlib was unlikely to have missed seeing Evelyn as a good substitute in that he was a man of private means and considerable public zeal. However, two other letters of Evelyn's to Boyle show how a marked fastidiousness stood in the way of his ever accomplishing this monumental undertaking which was the concern of the members of the Society for nearly a hundred years. In May 1657 he writes that he has refrained from publishing his treatises on engraving, oil painting, miniatures, etc. "not knowing whether I should do well to gratify so barbarous an age with curiosities of that nature." He expresses some anxiety lest he should "debase much of their esteem by prostituting them to the vulgar." Two years later he writes again to Boyle that the work is at a standstill. "In the History of Trades I am not advanced a step; finding (to my infinite grief) my great imperfections for the attempt and the many

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19 Roots of Scientific Thought, ed., Philip P. Wiener and Aaron Noland (New York, 1957), p.354.

subjections which I cannot support of conversing with mechanical capricious persons, and several other discouragements" (Corr. Aug. 9, 1659). And so the early specimen of his work on the History of Trades, the essay on gardens, became part of Sylva. The Panificium, and the Parallel of Architecture may also be regarded as parts of the projected history.

If Evelyn withdrew from dealing with "mechanical and capricious persons" he immediately established himself among the members of the Royal Society as a man of perception and of a certain social finesse. In his dedication to the Lord Chancellor of his translation of Naudé and in his panygeric to the newly crowned king, he first called the group of philosophers a "Royal" Society, thus paying respect to an already interested monarch and acquiring for the Society the manifestation of royal approval. In the account of the meeting of December 4, 1661 it is entered as follows: "the Society were so sensible of the great favor done them by this worthy person that they ordered their thanks to be given him, and in order to make these thanks the more solemn, appointed them to be entered into their journal book."[20] In the face of opposition to their association with puritanism, this was a well timed gesture and if the Society was duly impressed, their acknowledgement seemed to Evelyn "too great an honour for a trifle" (Dec. 1661). His next, lasting service to the

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20 Birch, I, 67.

Society was one which is rarely acknowledged and not clearly claimed by Evelyn himself. He designed a coat of arms and suggested the motto "Nullius in Verba" as appropriate to the anti-authoritarian outlook of the new science. His sketches can be found in C.J. Smith's Historical and Literary Curiosities, but it does not seem to have been a matter of pride or pleasure to him that his design was accepted (Sept. 17, 1662).

Nominated to the first council, he served on it at least ten times, the last time much against his will in 1698. Three times he was offered the presidency and three times he managed to evade the honor. Known for his particular interests, he was chosen for committees where his knowledge would be most useful. The one on which he first served in September 1662 was appointed at the request of the Commissioner of the Navy to study the problem of re-foresting land depleted of timber by the expansion of shipbuilding. The discourse which Evelyn delivered on October 15 was a compilation of papers given by other members of the committee, Dr. Goddard, Dr. Merret, and Mr.John Winthrop, governor of Connecticut, with his own work added. This foundation was later elaborated and resulted in the publication of Sylva under the name of John Evelyn, the first book to be printed by the Society. A few weeks later, on November 5, there is an entry in the diary referring to a meeting at Gresham College as follows: ". . . there was discourse suggested by me, about planting his Majesties Forest of Deane with Oake. . . ." There is no mention in Birch of his

having suggested either the discourse or the scheme, but it is possible that the initial suggestion was his and that it was lost in general discussion. On another committee to study the growing of fruit for cider, the five discourses resulting from their study formed the foundation for the book Pomona, under Evelyn's name. His Circle of Mechanical Trades, his History of Calcographie, his Parallel of Architecture, and other remnants of the abandoned History of Trades were all duly presented to the Society. We may read his own opinion of his publications in a letter to Dr. Good of Balliol, who had reproached him for not having presented copies of his books to the college: ". . . though I have had the vanity to publish and to think that some of them might be useful to persons of my little force, I did not think them considerable enough to make any public present of" (Corr. Dec. 1675).

Evelyn's talents were recognized and used in another sphere which was a side issue with the scientists. In Birch's history, on December 7, 1664, we find this entry: "It being suggested that there were several persons of the Society, whose genius was very proper and inclined to improve the English tongue, and particularly for philosophical purposes, it was voted that there be a committee for improving the English language." Evelyn's name is found along with that of Dryden, Sprat and nineteen others on a committee to study the state of the English language. With the plague at its height, meetings were discontinued that year, and Evelyn's recommendations

are found in a letter to Sir Peter Wyche, chairman of the committee. The combined findings of the committee are not available, but Evelyn's letter shows him to have been one of the earliest to recommend simplification of English spelling, "honor" for "honour", "tho" for "though". In his recommendations for a dictionary he is realistic and modern in that he requires a collection of technical words to be made, gathered not from books, but from shops. He recommends too, more exact definitions of weights, measures, coins, honors, national habits, etc. He is concerned with foreign borrowings, looking for restraint as well as freedom in the introduction of new words, and he notes that those who have lived long in universities use words and expressions used nowhere else. He is anxious also that the idioms and dialects of each county be studied and recorded, and that an examination be made of words fallen out of use in order that they may be re-established where the language is lacking. While he makes a plea for the retention of courtly expressions, "for we are infinitely defective as to civil addresses", his concern is for the living, changing language, with the final injunction that the members of the Society write well enough themselves to be considered acceptable as judges of good English. And so we find Evelyn setting his hand to that undertaking which Sprat, defending the Society, so clearly enunciated a few years later. "They have exacted from all their members, a close, naked, natural way of speaking; positive expression, clear senses; a native easiness; bringing all things as near the

mathematical plainness as they can and preferring the language of Artizans, Countrymen and Merchants before that of Wits and Scholars."[21] Evelyn was proud of his work on this committee, for twenty-four years later he sent a copy of his recommendations to Pepys (Corr. Oct.1689).

His reputation as a traveller who hae seen the collections of many virtuosi brought him a place on a committee to enlarge and preserve the Society's repository and to incorporate into it the collection of Mr. Hubbard which had been recently purchased. This was the most important collection of the kind until the British Museum was established in 1753. The Society's repository was transferred there in 1781.

There is little to show that Evelyn experimented himself. He reported in August 1661 on some experiments with sensitive plants, an investigation which Charles II had requested. In 1662 the Journal Book records his experiment in grafting a cock's spur to its head, but history does not relate with what success, and a year later he undertook a small experiment towards solving the problem of spontaneous generation.[22]

In various ways then the Royal Society made use of Evelyn's particular interests and gifts. On the other hand it is of interest to note what of the scientists' endeavours drew his keenest interest.

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21 Thomas Sprat, History of the Royal Society of London, 2nd ed., (London, 1702), p.113.

22 Birch, I, 212.

Through the years of plague, fire, and war, immediate necessity crowded Evelyn's association with the Society into a minor role in his life, but with leisure his interests expanded and his contacts with the philosophers became again more vivid. Dining with Sir Joseph Williamson on January 16, 1683, he says with satisfaction "in truth the discourse was perfect Deipnosophisme and very harmlesse; nor without Salt and instruction." While throughout the diary mention of the work of Boyle, Haak and Hooke is regularly made, Evelyn does not elaborate or comment on what these men did. Their experiments in chemistry and mechanics are simply noted. We have seen that his visual acuity was his sharpest means of appraisal, and when something strange or fabulous was exhibited the notes are longer and more vivid, for instance an electric eel, that "mortiferous Torpedo" interests him.(Mar. 18, 1680). Visitors from abroad are described minutely, their behavior and retinue carefully noted (Aug. 27, 1680: Jan. 11,1682: June 20, 1682), but no more carefully set down than his impressions of the first rhinoceros shown in England (Oct. 22, 1684), or the horses taken at the siege of Vienna and shown in St. James Park on December 17, 1684. The exhibits of the scientists were rarely so spectacular, but his old interest in medical matters remained with him and was readily aroused by the new developments. Of all the work seen by Evelyn at the Society, medical experiments are noted most frequently in the diary. The work of Dr. Tyson on the optic nerves (Mar. 22, 1682), on the nourishment of the embryo (Dec. 18, 1682), and on parasites in the body (Aug. 9,

1682), is described at some length, but his favorite experimenter is Dr. Slaer, a physician, whose medical view-point lay somewhere between that of the early physicians and the clinical school of Sydenham. Slaer performed many experiments with phosphorus which, at that time, presented to science a possible answer to the question "What is life?", in much the same way that electronics does today. But it caught Evelyn's imagination and curiosity as little else did, combining a spectacular demonstration with practical potentialities. Slaer had worked with Boyle in his laboratory and Boyle himself reported on the preparation of phosphorus in September 1680. Evelyn makes no mention of Boyle's experiments, and we can only assume that Dr. Slaer's showmanship was responsible for this omission. On August 4, 1681, Evelyn records that he watched Slaer write on paper with this substance which, when exposed to bright light, revealed the noble sentiment, "Vivat Rex Carolus", and Evelyn remembered the man in Bologna who found out the composition of the "lapis illuminabilis". Then Evelyn washed his hands and face in this substance and appeared "like some spirit or strange apparition." He attributed it to the providence of God that this was not first found out by the Papists who would certainly have made a miracle of it, rubbing the consecrated wafer, or washing the priest's hands and face with it.

I am confident that the Imposture would bring thousands to them and do an infinity of mischief to the establishing of the common error about Transubstantiation. . . . He affirmed it to be . . . composed of

urine and human blood: which gives great light to Dr. Willis . . . notions of the flamula vitalis which animates the blood and is for all we know the animal life itself of all things living.

Dr. Slaer's report is as follows:[23]

An experiment of this kind I made last week in the Presence of several Persons of very great quality where a very learned and ingenious Person, washing both his Hands and Face with it, made not only his own Face to shine but the lustre of his Face discovered three or four other Faces not far distant to it . . . What medical use may be made of this noble concrete, Time may discover. This I am sure, that the learned Willis (were he alive) would rejoice to see such a Product out of our Bodies who was very confident of something igneus, or flammeous, or very analogous to Fire, that did kindle and impregnate our Blood.

Several times the experiment was repeated before Evelyn, calling from him the epithets "noble" and "extraordinary" in a length of description equalled only by that accorded to the rhinoceros or the fabulous tales of M. Jardine, the traveller in the East. Evelyn always regretted that when he was in Rome he did not find out how to make the glowing substance. "I wish I knew how to make the like for a greater sum of money; since [if] it could be made without exceeding cost, it would be an expeditious way to kindle any fire, light a candle and use upon a thousand occasions, abroad or at home" (Aug. 4, 1681). He sees it finally from the utilitarian standpoint, another "benefit to mankind".

As one reads the contemporary references to Evelyn, the words

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23 Philosophical Transactions, III, 347

"worthy" and "good", "learned" and "distinguished" recur. His friends would have rewarded his conscientious, painstaking work with more public acclaim, but for the most part he would not accept it. We have seen that he refused a knighthood and the presidency of the Royal Society. The knighthood perhaps would not have fitted with his concept of the service due from him to the life of his day, and his letter to Pepys on August 12, 1689, again illustrates his estimate of himself in relation to the scientists. Pepys had written him asking him to sit to Kneller for his portrait so that he might add it to the gallery of great men adorning his library. Evelyn replied, "I did not in the least suspect your intention of placing my shallow head amongst those heroes who, knowing my unworthiness of that honor, will . . . either condemn his [Kneller's] coloring, that he made me not blush, or me for impudence that I did not." However the explanation may be more complex in that his tendency to be passive and private ran counter to his religious and philosophical conviction that only God and the Angels are entitled to be onlookers. He did accept a D.C.L. from Oxford, however, so that the academic honor must have seemed to him appropriate, and perhaps appealed to his vanity in a way that the others did not. On this point we can look for help from Pepys, whose shrewd estimations of character can always be respected. Evelyn once read to him some plays and poems "though with too much gusto.". "Very good", Pepys adds, "but not as he conceits them, I think, to be. He showed me his Hortus Hyemalis; leaves laid up in a book of several

plants kept dry, which preserve color, however, and look very finely, better than any Herball. In fine, a most excellent person he is, and must be allowed a little conceitedness; but he may well be so, being a man so much above others."[24]

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24 Pepys' Diary, Nov. 4, 1665.

SAMUEL PEPYS

Worthy, industrious, curious. These were the epithets which seemed apt to John Evelyn as he meditated on the death of Samuel Pepys.[25] Foremost among the characteristics which Pepys would have ascribed to himself would have stood his worthiness as a loyal servant of the king. To back his ideal, and with his way to make, he worked hard, learning naval business from the bottom up so that no man would cheat the king. Any personal profits which he gained, he told himself, were derived only after a hard bargain had been driven for the Crown. But profits there were, adding substance to the appearance of his house, with silver and wines, and accumulating handsomely as he rose in the world (Feb. 10, 1663: July 5, 1665).

Above all it was curiosity that marked him. Any spectacle was noted with pleasure whether it was Captain Holmes' baboon (Aug. 24, 1661) or a court ball (Nov. 15, 1666), and anyone who could tell him some interesting fact found an eager listener (Nov. 14, 16, 1666). There is something childlike in the freshness of his curiosity, which, driven by his industry and given significance by his acute intelligence, made his attitude to life a constantly expanding one. He is childlike too in his pleasures, and this he recognized on such occasions as when he found himself compelled to look at the time on his new watch every few minutes. He experienced the same sort of satisfaction when he,

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25 Evelyn's Diary, Mar. 26, 1703.

at last, got a new slide-rule engraved in just the way he had wanted (Aug. 11, 1664), and we have his own confession as to his orderly methods when he says he "cannot be pleased with any thing unless it be very neat" (Aug. 10, 1663). His attitude to people is always one of approach, but while he was an appreciative listener and an acute observer, it is apparent throughout the diary that Pepys took part in the "very fine discourse" he mentions so often, only with people whom he felt to be his equals. With his superiors he kept quiet and listened (Apr. 28, 1662: Sept. 10, 1665: Jan. 22, 1666: Aug. 19, 1666). Socially, Pepys stood on a lower rung of the ladder than Evelyn, and his relationships with the great of his times were modified by that position. His humbler slot in life brought him the gift of an untrammelled outlook, and set him on his way unimpeded in his dealings by any degree of snobbery.

His are the qualities of a good companion in any society, but the specific interests and characteristics which drew Pepys into the company of the great names of his day are clearly indicated in the diary. In the furtherance of his work as Clerk of the Acts, he began to learn mathematics when he was 29.

By and by comes Mr. Cooper, mate of the Royal Charles, of whom I intend to learn mathematiques and do begin with him today, he being a very able man, and no great matter, I suppose, will content him. After an hour's being with him at arithmetique (my first attempt being to learn the multiplication-table); then we parted till to-morrow (July 4, 1662).

Up and after ordering some things towards my wife's going to

the country, to the office, where I spent the morning upon my measuring rules very pleasantly till noon, and then comes Creed and he and I talked about mathematiques, and he tells me of a way found out by Jonas Moore which he calls duodecimal arithmetique, which is properly applied to measuring, where all is ordered by inches, which are 12 in a foot, which I have a mind to learn (June 9, 1663).

Throughout the spring and summer of 1663 there are many references to"sliding-rules" which gave him great pleasure (Mar.25, Apr.14, 15, May 5, June 11, Aug.10, 1663). Mathematical instruments continued to interest him at least for the duration of the Diary. In February 1666 he can be found discussing the relative merits of certain of these with Robert Hooke.

Thence with my Lord Bruncker to Gresham College, the first time after the sickness that I was there, and the second time met. And here a good lecture of Mr. Hooke's about the trade of felt-making, very pretty. And anon alone with me about the art of drawing pictures by Prince Rupert's rule and machine, and another of Dr. Wren's; but he says nothing do like squares, or, which is the best in the world, like a dark roome, which pleased me mightily (Feb.21).

In October 1668 he was shown, and resolved to buy a "parallelogram", an instrument used in map-making. Pepys was no reactionary, and a new "gadget" of any kind got from him at least appraisal. In 1661 he bought his first "perspective" from Reeves, the instrument maker, for five shillings (Feb.11). Two years later he became interested in a microscope, and in the summer of 1664 acquired one for himself (July 26: Aug. 13). That summer his driving curiosity made him buy Dr. Power's book on the microscope.

There comes also Mr. Reeve with a microscope and scotoscope. For the first I did give him £5.10s., a great price, but a most curious bauble it is, and he says, as good, nay, the best he knows in England, and he makes the best in the world. The other he gives me, and is of

value; and a curious curiosity it is to look objects in a darke room with . . ..Thence home and to my office, wrote by the post, and then to read a little in Dr. Powers' book of discovery by the Microscope to enable me a little how to use and what to expect from my glasse (Aug. 13, 1664).

Two years later, persisting in his hobby he notes that he has had Reeves to dinner and learned more about the instrument.

So away home to dinner, where Mr. Spong and Reeves dined with me by invitation. And after dinner to our business of my microscope to be shown some of the observables of that, and then down to my office to look in a darke room with my glasses and tube, and most excellently things appeared indeed beyond imagination. This was our worke all the afternoon trying the several glasses and several objects, among others, one of my plates, where the lines appeared so very plain that it is not possible to thinke how plain it was done (July 29, 1666).

In January of 1665 he had bought a copy of Hooke's Micrographia.

So took coach and to my Lady Sandwich's, and so to my bookseller's, and there took home Hooke's book of microscopy, a most excellent piece, and of which I am very proud. (Jan.20, 1665).

Before I went to bed I sat up till two o'clock in my chamber reading of Mr. Hooke's Microscopicall Observations, the most ingenious book that ever I read in my life (Jan. 21, 1665).

The following year he acquired a telescope and was disappointed with Reeves, its maker, for his lack of knowledge of its theory.

Arriving home one night he found Reeves there,

it being a mighty fine bright night, and so upon my leads, though very sleepy, till one in the morning, looking on the moon and Jupiter, with his twelve-foote glasse and another of six foote, that he hath brought with him to-night, and the sights mighty pleasant, and one of the glasses I will buy, it being very usefull (Aug. 8, 1666).

Spong and I had also several fine discourses upon the globes this afternoon, particularly why the fixed stars do not rise and set at the same houre all the yeare long, which he could not demonstrate, nor I either, the reason of. So, it being late, after supper they away home. But it vexed me to understand no more from Reeves and his glasses touching the nature and reason of the several refractions of

the several figured glasses, he understanding the acting part, but not one bit the theory, nor can make any body understand it, which is a strange dullness, methinks (Aug. 19, 1666).

In the field of music in which Pepys' facility and sensitivity were considerable, he was interested not only in the new instruments which were manifold at that time, but also in the theory of sound. He pronounced his opinion on the instruments with assurance (Oct. 5, 1664). On more than one occasion he listened attentively to what Hooke had to say about the theory of vibrations but carefully reserved judgment on the matter.

Up, and with Reeves walk as far as the temple, doing some business in my way at my bookseller's and elsewhere, and there parted, and I took coach, having first discoursed with Mr. Hooke a little, whom we met in the streete, about the nature of sounds, and he did make me understand the nature of musicall sounds made by strings, mighty prettily; and told me that having come to a certain number of vibrations proper to make any tone, he is able to tell how many strokes a fly makes with her wings (those flies that hum in their flying) by the note that it answers to in musique during their flying. That, I suppose, is a little too much refined; but his discourse in general of sound was might fine (Aug. 8, 1666).

Thence with Lord Brouncker and several of them to the King's Head Taverne by Chancery Lane, and there did drink and eat and talk, and, above the rest, I did hear of Mr. Hooke and my Lord an account of the reason of concords and discords in musique, which they say is from the equality of vibrations; but I am not satisfied with it, but will at my leisure think of it more, and see how far that do go to explain it (Apr. 2, 1668).

Evelyn's judgement was correct. The curiosity, energy and honesty of mind which he recognized and which made him think of Pepys along with Wren as "two extraordinary ingenious and knowing persons",[26]

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26 Evelyn's Diary, Feb. 12, 1671.

were the vital forces of his friend's life.

If we consider the names of the men who are first associated with Pepys' progress towards the doors of the Royal Society, we find that his first visit to Gresham College was made in the company of Greatorex, the mathematical instrument-maker. There he "saw the manner of the house and found great company of persons of honour there" (Jan. 23, 1661). The following year on a journey to Portsmouth on naval business, Pepys' boon companion Dr. Clerke offered to bring him into the "college of virtuoses" (Apr. 28, 1662). This same doctor touched Pepys' life at many points. Besides being a physician of considerable standing who was not inhibited by any conception of medical reticence from retailing details of medical court gossip, he was also a judge of the drama (Sept. 1, 1760), one of Pepys' greatest pleasures, and something of a busy-body (June 24, 1665). On several occasions Pepys watched him experiment and dissect (May 16, 1664).

It was not only through his native interests however, but also in the course of his daily work that Pepys found himself for several years on the fringes of the group of philosophers before he reached its inner circle. Just a year before his admission to the Society on the occasion of one of his meetings with the Duke of York, Lord High Admiral of the Fleet, he had heard the King good-naturedly poking fun at the Royal Society in general and at William Petty and his double bottomed boat in particular.

Thence to White Hall; where, in the Duke's chamber, the King came and stayed an hour or two laughing at Sir W. Petty, who was there about his boat; and at Gresham Colledge in general; at which poor Petty was, I perceive at some loss; but did argue discreetly, and bear the unreasonable follies of the King's objections and other bystanders with great discretion; and offered to take odds against the King's best boates; but the King would not lay, but cried him down with words only. Gresham College he mightily laughed at, for spending time only in weighing of ayre, and doing nothing else since they sat (Feb. 1, 1664).

Twenty years later Pepys was to find himself again involved with Petty, his boat and a wager.

On another business visit to the palace, Pepys saw the Charter Book of the Royal Society brought in to be signed by the Duke of York.

To the Duke, and there did our usual worke. Here I saw the Royal Society bring their new booke, wherein is nobly writ their charter and Laws, and comes to be signed by the Duke as a Fellow; and all the Fellows' hands are to be entered there, and lie as a monument; and the King hath put his with the word Founder (Jan. 9, 1665).

In the end it was Thomas Povey who proposed Pepys' name for membership; Povey whom Evelyn described as "a nice contriver of all elegances and exceedingly formal",[27] and whom Pepys knew in their association over the affairs of Tangier as "the most ridiculous foole that ever I knew to attend to business. Lord, to see what a puppy that Povey is with all his show is very strange" (Apr. 16,1664).

Dr. Clerke was then on the council and Lord Brouncker, who in the year before had been made a commissioner of the navy, was its first president. Thus known and introduced, the sharp-witted,

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27 Evelyn's Diary, Feb. 23, 1676.

progressive and gregarious Clerk of the Acts was unanimously elected Fellow of the Royal Society on February 15, 1665. Here was no self-conscious dabbler in the sciences, no striver for the betterment of mankind. His first concern at that time was to better himself. Never given to self-deception, he acknowledged the limitations of his knowledge and his position. With an open mind he worked stolidly and persistently to improve both.

On the first occasion of his attending a meeting as a member, a typically heterogeneous program of discourses was offered; a report on the air-sack at the base of the trachea of the merganser; another on a "monstrous calf"; two observations on a comet and some experiments with fire and air by Boyle and Hooke.[28] Out of all this Pepys' discerning judgement selects these two outstanding men for comment.

> Thence with Creed to Gresham College, where I had been by Mr. Povy the last week proposed to be admitted a member; and was this day admitted, by signing a book and being taken by the hand by the President, and my Lord Brunkard, and some words of admittance said to me. But it is a most acceptable thing to hear their discourse, and see their experiments; which were this day upon the nature of fire, and how it goes out in a place where the ayre is not free; and sooner out where the ayre is exhausted, which they showed by an engine on purpose. After this being done, they to the Crowne Tavern, behind the 'Change, and there my Lord and most of the company to a club supper; Sir P. Neale, Sir R. Murrey, Dr. Clerke, Dr. Whistler, Dr. Goddard, and others of most eminent worth. Above all Mr. Boyle today was at the meeting, and above him Mr. Hooke, who is the most and promises the least, of any man in the world that ever I saw. Here excellent discourse till ten at night, and then home, . . . (Feb. 15, 1665).

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28 Birch, II, 15.

Sometimes the topics discussed were beyond him.

> At noon I to dinner at Trinity House, and thence to Gresham College, where Mr. Hooke read a second very curious lecture about the late Comett; among other things proving very probably that this is the very same Comet, that appeared before in the year 1618, and that in such a time probably it will appear again, which is a very new opinion; but all will be in print. Then to the meeting, where Sr. G. Carteret's two sons, his own and Sr. N. Staning, were admitted of the Society; and this day I did pay my admission money, 40s. to the Society. Here was very fine discourses and experiments, but I do lack philosophy enough to understand them, and so do not remember them (Mar. 1, 1665).

Intellectually Pepys never over-reached himself, whatever he may have done sartorially or socially. Thoroughly honest, he was content for the most part to comment, "very pretty", or to reserve judgement on what he did not fully understand. His interest and enthusiasm rose when he could see a result, and on the occasions, later on in his membership, when he could see the application of an experiment to human beings (Apr. 2, 1668). His attitude was always that of a spectator and not a participator. The only time he uses the pronoun "we" in relation to the Society was under the unifying threat of ridicule rising from the visit to the college of that eccentric lady, "Mad Madge", Duchess of Newcastle. "And we do believe the town will be full of ballads of it.. . . The Duchess hath been a good comely woman; but her dress so antick, and her deportment so ordinary, that I do not like her at all, nor did I hear her say any thing that was worth saying, but that she was full of admiration, all admiration" (Mar. 30, 1667). Pepys was not impressed. Evelyn was there on that same occasion but was unable

to see the ridiculous aspect of the Duchess's peculiarities.[29]

Pepys' first task for the Society was to obtain from Major Holmes information regarding the identity of an island at which his ships called on the way to Guinea. He was required too, to get from him information as to the performance of certain "pendulum watches" which were used on that voyage. Pepys himself makes no mention of this undertaking, nor of his report on it which he gave the following week.[30] The diary entry of March 8, 1665, however, tells what was uppermost in his mind at that time. He was preoccupied with his health and the loss of the "London" which blew up off-shore with great loss of life. However, concerned as he was with other matters, it is likely that he got the necessary information without putting himself out in the slightest since he attended a farewell dinner to Major Holmes in the Tower on March 14. A week later he watched with great interest an experiment on a "kitling" to find a way of breathing under water. He remarks only on the revival of the cat and records no interest in the possible application of the result to diving. (March 22,1665). He was at this time asked to "bespeake a man at Deptford for diving"[31] and to send him to Mr. Hooke to be instructed in the use of

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29 Evelyn's Diary, May 30, 1667.

30 Birch, II, 21-23.

31 Birch, II, 24.

"air boxes",[32] but there is no record of his having done so, and in June he had to be reminded of his undertaking.[33] Between June 1665 and January 1668, there is no mention of Pepys in Birch's history, but we know from the diary of his continuing interest. Some of his keenest comments and accounts are concerned with a discourse by Sir George Ent on respiration, the mechanics of which excited his curiosity. "But what among other fine discourse pleased me most, was Sir G. Ent about Respiration; that it is not to this day known, or concluded on among physicians, nor to be done either, how the action is managed by nature, or for what use it is" (Jan. 22, 1666).

The earliest successful experiments with transfusion interested him intensely. This work he heard of from Dr. Croone, and three times notes in his diary the progress of a transfused dog, inquiring once from Robert Hooke about it and hearing at first hand the discussion of it (Nov. 14, 16, 28, 1666). Following up what he saw to be an experiment of great potential benefit, he comments on the Society's having arranged with a man ("who is a little frantic") to have some sheep's blood transfused into him, and notes that opinions differ as to what the result will be.

> The purpose to let in about twelve ounces; which, they compute, is what will be let in in a minute's time by a watch. They differ in the opinion they have of the effects of it; some think it may have a good effect upon him as a frantic man by cooling his blood,

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32 Birch, II, 26.

33 Birch, II, 55.

others that it will not have any effect at all. But the man is a healthy man, and by this means will be able to give account what alteration, if any, he do find in himself, and so may be usefull (Nov. 21, 1667).

However, some days after the transfusion had been given he writes,

I was pleased to see the person who had his blood taken out. He speaks well and did this day give the Society a relation thereof in Latin, saying that he finds himself much better since, and as a new man, but he is a little cracked in his head, though he speaks very reasonably and very well. He had but 20s. for his suffering it, and is to have the same again tried upon him; the first sound man that ever had it tried on him in England, and but one that we hear of in France, which was a porter hired by the virtuosos (Nov. 30, 1667).

Pepys, of sound judgement and true scepticism, concluded that he had an unreliable witness. These were the transfusion experiments which Shadwell seized on and ridiculed so heartily. "The truth on't is, we shall never get any but Madmen for that operation."[34] The same judicious scepticism had brought Pepys to the conclusion that Joseph Glanvill's arguments in favor of the existence of witches were not very convincing (Nov. 24, 1666). Pepys' attitude to "experimental philosophy" had matured and he had quickly learned where the path of progress lay. By this time he could consider the possible application of the work to human subjects, and demonstrates that attitude again in his comment on the "Otacousticon" (Apr. 2,1668). He had come to realize how important a part in his life his association with the scientists had come to play," . . . and if I should be put out of my office, I do take great content in the liberty I shall be at, of frequenting these gentlemen's company" (Nov. 21, 1667). Pepys does

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34 Shadwell, Act IV.

not speak as an equal but Evelyn remembered him as"a very great cherisher of learned men of whom he had the conversation."[35]

By 1666 Pepys began to be recognized as an authority on naval affairs, and his help was sought by Robert Hooke to furnish accurate information on naval terminology for Dr. Wilkins' new book, An Essay towards a Real Character and a Philosophical Language. At this time too, he first received votes for election to the council having had till then no ambition in that direction (Apr. 11, 1666).

During the year 1667, Pepys attended only four meetings. In the summer months, however, he read Boyle's book on Hydrostatics, and ordered a copy of Sprat's history of the Society (Aug. 16, 1667).

> Home in the evening, and then to sing and pipe with my wife, and that being done, she fell all of a sudden to discourse about her clothes and my humours in not suffering her to wear them as she pleases, and grew to high words between us, but I fell to read a book (Boyle's Hydrostatiques) aloud in my chamber, and let her talk . . . (June 4, 1667).

> So I homeward, as long as it was light reading Mr. Boyle's book of Hydrostatiques, which is a most excellent book as ever I read, and I will take much pains to understand him through if I can, the doctrine being very useful (June 10, 1667).

> And so with very much pleasure down to Gravesend, all the way with extraordinary content reading of Boyle's Hydrostatickes, which the more I read and understand, the more I admire, as a most excellent piece of philosophy (July 24, 1667).

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35 Evelyn's Diary, Mar. 26, 1703.

That year was a period of great anxiety for Pepys, for the Navy Office was under severe and constant criticism for the management of the Dutch war, and Pepys took its whole defence on his shoulders, making the speech of his life (for three hours) on March 6, 1668, at the Bar of the House of Commons. Following this triumph he went to the Society meeting on March 12,

> there to show myself; and was there greeted by Dr. Wilkins, Whistler, and others, as the patron of the Navy Office, and one that got great fame by my late speech to Parliament. Here I saw a great trial of the goodness of a burning glass, made of a new figure, not spherical . . . that did burn a glove of my Lord Brouncker's from the heat of a very little fire, which a burning glass of the old form, or much bigger could not do, which was mighty pretty (March 12, 1668).

Hard on the heels of increasing fame and substance came a demand for solid demonstration of his success. He was asked to subscribe to a building fund for the Society. Ruefully he writes, "I was forced to subscribe . . . and did give forty pounds", which seems to indicate that vanity played a large part in the triumph over parsimony (Apr. 2, 1668).

By this time the finances of the Society were in an extremely shaky condition. Steps were taken to collect arrears in dues, but during the summer of 1669 interest and backing for the work was flagging. On June 24th there was no meeting for lack of members.[36] There is no mention of Pepys in the history of the Society until

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36 Birch, II, 386.

November 1672 when he was elected to the Council, by which time the Society's arrears amounted to 1957 pounds.[37]

Three years before this the diary had come to an end, and Pepys had met a major personal crisis in the death of his wife. Without the searching beam of his personal comment our knowledge of him from this time on, becomes necessarily more remote and formal and our understanding of his actions depends on what he revealed of himself in the earlier years. Up to this time, Pepys' association with the Royal Society had afforded him many of the amenities of a club. He went there primarily out of curiosity, and as his knowledge and interest grew, for relaxation and diversion. Extremely vigorous and busy in his daily work, he had little impulse to take active part in the proceedings of the group, but what he saw and heard there was a constant stimulus to his intellect. The new mysteries of anatomy and physiology caught his attention, and his old interests in music, astronomy, scientific and mathematical instruments, were well served. Like most members of scientific societies he derived as much information and satisfaction from social gatherings after the formal meetings as from the meetings themselves, but there is no evidence that he contributed to formal discussion. He was as acquisitive of curious facts as he was of silver plate. It has been said that he made himself useful to the Society on many occasions by supplying information on naval matters. Certainly he collected material for

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37 Birch, III, 63.

a history of the navy for many years, but apart from his contribution towards accuracy in Dr. Wilkins' book, evidence of this service is lacking at the present time.

During the year 1672 Pepys became Secretary of the Admiralty. Possibly pressure of work intervened, but his name appears at only four meetings of the Council and he was not re-appointed at the annual meeting in November. On the council again in 1674 he appeared at four meetings and was one of those members asked to read an "experimental discourse" within the year.[38] This he agreed to do, and no doubt it would have concerned naval matters, but there is no evidence that it was ever given. He was also one of a committee to decide the best use of a legacy of 400 pounds. A report on this was made in the name of two other members of the committee, making no mention of Pepys. His name appears again on the council in 1681 and that year he was present at six meetings, possibly in response to Evelyn's letter urging him to put in an appearance.[39] Once again it seems that his sense of obligation to the Society was not paramount, but our means of following his life after 1669 is curtailed, and from a less intimate view-point the busy, alert figure fades and in its place stands the not very clear, but more ponderous outline of Samuel Pepys, executive, benefactor, and in 1684, President of the

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38 Birch, III, 175.

39 Arthur Bryant, The Years of Peril. (Cambridge, 1935), p.337.

Royal Society.

By this time he was well established as a man of merit and influence. Master of Trinity House, Master of the Clothworkers Company, Member of Parliament, his name had even been mentioned in connection with the vacant post of Provost of King's College, Cambridge. That same year he became, for the second time, Secretary of the Admiralty and the following year, at the Coronation of James II, to whom Pepys' loyalty had never flagged, he marched directly behind the canopy as one of the Barons of the Cinque Ports.

During the two years of his presidency Pepys took the chair thirteen times, four times in 1684, nine times in 1685. In the record of his actions in that position, and despite considerable accumulation of pomp and circumstance, the hand of the energetic, fun-loving man is still recognisable. Sir William Petty, then president of the newly established Dublin Society, had sent a wager of fifteen proportions that his "sluice-bottomed vessels" were superior to any of the common make. To this Sir Anthony Deane, grown in estate along with Pepys, produced an answer signed by himself and the president, taking up the bet and offering a definite sum. This, Deane tactfully pointed out, was not done out of enmity, but so that the inventor might be provoked to the utmost efforts in his experiments.[40] It must be added that

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40 Birch, IV, 347.

Petty lost his bet, for in spite of ten tons of paving stones as ballast the boat could not carry its complement of sail and nearly capsized.[41]

Pepys licensed three books during his presidency, Ray's History of Plants, Willoughby's History of Fishes and Newton's Philosophiae Naturalis Principia Mathematica. The Principia and the History of Plants were launched without mishap, but the History of Fishes splashed heavily and drifted back to shore. An account of the endless difficulties in connection with this book is not perhaps appropriate here since the major part of the work involved was "completed with the great care of Dr. Lister", the vice-president.[42] Pepys' share in the publication of the History of Fishes was mainly monetary and pleasing to his vanity. To defray some of the expense of publication it was decided that if any member wished to contribute one guinea for the engraving of a plate for the book, his name should be inscribed on that plate.[43] On November 11 Pepys gave fifty pounds to the Society "to be laid out as the council should judge most convenient". It was ordered that the money should be used to pay for fifty plates for the History of Fishes and that the president's name should appear on these plates.[44] C. R. Weld states that Pepys contributed

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41 Birch, IV, 351.

42 Birch, IV, 444.

43 Birch, IV, 393.

44 Birch, IV, 428.

sixty plates and gave fifty pounds besides.[45] The source of his information is not given but there are in fact seventy-five plates in the History of Fishes bearing Pepys' name. This, like a distant echo, recalls the action of the humble clerk who accompanied the expedition to Holland to bring back King Charles. "I wrote this morning many letters, and to all the copies of the vote of the Council of War I put my name that if it should come in print my name be at it" (May 4, 1660). The book was dedicated to him and a copy presented "curiously bound in Turkish leather".[46] It did not sell and a few months later fifty copies of it, as an alternative to fifty pounds, were offered to Edmund Halley as a reward, if he could show to the satisfaction of Sir Christopher Wren, Sir John Hoskyns and Pepys that he had measured a degree of the earth. Later still Halley received another twenty copies in lieu of his arrears in wages as secretary of the Society.[47] Signed plates; six portraits of himself; a carefully bound library with minute and detailed directions as to its management; a diary and an easily available cypher; Pepys was preparing for posterity.

During this second year as president Pepys seems to have

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45 C.R. Weld, History of the Royal Society. (London, 1848), I, 299.

46 Birch, IV, 491.

47 Birch, IV, 545.

made an effort to improve the business organisation of the Society. The election of a new clerk was undertaken and a list of twelve necessary qualifications drawn up along with a list of his duties.[48] How much of this was Pepys' work we cannot know, but the numbered, orderly, and somewhat exacting list of qualifications recalls his letter to Commissioner Pett in defence of the Navy Board's contract for masts,[49] and his letter to Cesare Morelli stating in exact and orderly terms how he wished some music to be transcribed.[50] At the time some of these qualifications were questioned and Edmund Halley was elected. He was later commended for his efficiency, in spite of the fifth listed requirement, that he be single and have no children. In addition to this, old inventories were searched for, lists of missing books and papers drawn up, and a catalogue of objects in the repository was made, all possibly at the instigation of the president whose predilection for neatness we have already seen. The Society also undertook the working out of a philosophical method and Robert Hooke was asked to draw up such a method. This he preferred not to do but asked that the Society name a subject for experiments to be made by him, and leave him to carry them out in his own way.[51]

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48 Birch, IV, 453.

49 Arthur Bryant, The Man in the Making. (Cambridge, 1933), p. 255.

50 R.G.Howarth, Letters and Second Diary of Samuel Pepys. (London and Toronto, 1932), p. 87.

51 Birch, IV, 455 & 464.

At the annual meeting in November, Pepys remained on the council although he attended no meetings that year and the following year his name disappears from the list and his official connection with the Society ends.

It is usually said that after his retirement Pepys continued his association with members of the Royal Society in his own home, and that dinner parties on Saturday evenings were occasions for discussion of literary subjects.[52] There are many entries in Evelyn's diary referring to dinners at Pepys' house where he heard a fine Italian singer on one occasion, and on another met the famous buccaneer-turned-voyager, Dampier.[53] There is, however, one entry on December 13, 1685 which shows us the incumbent president in a new role and one which he may well have continued to play in his retirement. Never an experimenter himself, here we see Pepys sponsoring in his own home the progress of science.

> Dining at Mr. Pepys', Dr. Slayer showed us an experiment of a wonderful nature, pouring first a very cold liquor into a glass and super-fusing on it another, to appearance cold and clear also; it first produced a white cloud, then boiling, divers corruscations and actual flames of fire mingled with the liquor, which being a little shaken together, fixed divers sunns and stars of real fire, perfectly globular, on the sides of the glass, and which there stuck like so many constellations, burning most vehemently, and ressembling stars and heavenly bodies, and that

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52 J.R. Tanner, Mr. Pepys. An Introduction to the Diary together with a Sketch of his Later Life. (London, 1925), p. 264.

53 Evelyn's Diary, Mar. 7; June 24, 1690; May 30, Aug. 6, 1698.

for a long space. It seemed to exhibit a theorie of the eduction of light out of chaos, and the fixing or gathering of the universal light into luminous bodies. This matter of phosphorus was made out of human blood or urine, elucidating the vital flame or heate in animal bodies. A very noble experiment.[54]

Evelyn, it seems, was somewhat carried away, fancying some fundamental law reproduced before him, but his host had never let himself be swept off his feet. While enjoying this blaze of magnificence the sceptic no doubt restricted his comment to "Very pretty".

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54 Evelyn's Diary, Dec. 13, 1685.

COTTON MATHER

Puritan children, we may suppose, were on occasion light-hearted and joyful, forgetting when they could the jealous and punitive God who in His providence ruled their lives. Fear of the Lord was to be the beginning of wisdom in these children, and if that wisdom brought melancholia in its wake it was God's will and a mark of their guilt that they should be so afflicted. As early as possible they were taught to ponder over their sins, and the ordinary joys of childhood were not thought worthy of record. Cotton Mather brought his children before him on their birthdays to ask them, "What is their main errand into the World and what have they done of that Errand?" (July 25, 1713), and when two of them were scorched playing with gun-powder he used the occasion "to inculcate Instructions of Piety on them . . . especially with Relation to their Danger of eternal Burnings" (Aug. 2, 1713). The important thing was the salvation of their souls, and what was set down for posterity was the example of the most pious among them or the afflictions of the wicked.

In his Magnalia Christi under the title "Some Examples of Children in whom the Fear of God was remarkably budding before they died" Anne Greenough is enshrined. Dying at five years old she"had an unspeakable delight in catechizing" and "was very

frequent and constant in secret prayer".[55] Priscilla Thornton, aged eleven, "pressed that some other pious children of her acquaintance might with her keep a day of humiliation together, that they might get power against their sinful natures."[56] When his own dearly loved daughter Jerusha died of measles at the age of two and a half, she, in her last moments, begged her father to pray with her (Nov. 21, 1713). Nathaniel Mather who died at nineteen "systematically studied and worried himself to death".[57] Dwelling on his backsliding he wrote "I was whittling on the Sabbath day; and for fear of being seen I did it behind the door. A great reproach to God! a specimen of that atheism that I brought into the world with me."[58] His elder brother noted that he was subject to "very afflictive touches of melancholy",[59] and another panegyrist saw:

> His rare devotion, such now seen
> A sign of ninety at nineteen.[60]

Such were the Mathers; and Cotton himself, had he died young, would have merited just such a eulogy. At the age of seven he composed forms of prayer for his schoolmates and "rebuked them for their wickedness". For this he was duly beaten by the sinners,

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55 Cotton Mather, Magnalia Christi Americana or The Ecclesiastical History of New England (Hartford, 1855), II, 485.

56 Magnalia, II, 483.

57 Barrett Wendell, Cotton Mather, the Puritan Priest, (Cambridge, 1926), p.8i.

58 Magnalia, II, 167.

59 Magnalia, II, 158.

60 Magnalia, II, 176

and the story, as he related it to his son Samuel, reveals that "when somebody told your grandfather, I remember he seemed very glad, yea, almost proud of my affronts and then I wondered at it, tho' afterwards I better understood his Heavenly principles."[61] Kept from school during the winters he read church history. At eleven he spoke Latin and at twelve he entered Harvard. When he was fourteen he began to keep days of prayer and read fifteen chapters of the Bible daily. He was melancholy, hypochondriacal, and he suffered from a stammer. The stammer was controlled with the help of his teacher, Mr. Corlet, and so the handicap which had stood in the way of his entering the ministry and had perhaps allowed his natural interest to flourish into a decision to study medicine, was removed. Cotton Mather then followed in the footsteps of his stern father into the highest calling in New England.

Increase Mather who "swam quietly in a Stream of Impiety and Carnal Security" until he became ill of the stone, took fright and reformed, was subject to "heavenly afflations", and according to Barrett Wendell, "was of a temper whose affections were most conciliated by enthusiastic acquiescence."[62] A man of influence in his day, and at the height of theocratic power in New England, his example was always before his son. Cotton Mather, highly sensitive

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61 Wendell, pp. 28-34.

62 Wendell, p. 28.

and prodigiously bookish, reached his most influential position between his twenty-fifth year and the crucial outbreak of witchcraft in Salem, which in 1692 demanded his judgement and authority. Subject also to "afflations", he describes on the first page of the diary of 1685 the vision of an angel who appeared before him bringing a message "to a certain youth from the Lord Jesus and to bring back a reply." The angel, happily, endorsed his dearest ambitions and "spoke of the influence his reason should have, and of the books this youth should publish, not only in America but in Europe."

While all the Puritans were prone to seek the hand of the Lord in any event, Cotton Mather, lacking the simplicity and common sense of Samuel Sewall, far outstripped his contemporaries with his fantastic interpretations of daily life. Samuel Sewall was conscious of the distinguishing favor of God when the bullet which his son Joseph had swallowed waw duly returned, while his neighbor's child drowned in a well.[63] but his comment on the minister's accidental ducking in Spy Pond was matter of fact, although he may have seen in that event a sign of God's protection of a good man. "Now about Dr. C. Mather Fishing in Spy Pond, falls into the water, the boat being ticklish, but receives no hurt."[64]

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63 Samuel Sewall's Diary, (New York: 1927), Mar. 9, 1693.

64 Sewall's Diary, Aug. 15, 1716.

To Mather, unable to accept his deliverance simply as a mark of God's approval, it was a portent. "I returned well in the evening, solicitous to make all Reflections of Piety on my Disaster . . . But yet not able to penetrate into the whole meaning of the occurrence. Am I quickly to go under the Earth as I have been under the water!" (Aug. 14, 1716). A toothache made him wonder if he had sinned by overeating or evil speeches. His wife's miscarriage brought him to wondering if he had ever troubled the churches of the Lord with any misconception, while her death was interpreted as a sign of God's mercy, since she would have been unable to carry out her duties properly had she been spared. Like other missionary spirits he sees Indian massacres as a judgement on backsliding Puritan parents. "They are very lying wretches, and they are very lazy wretches, and they are out of measure indulgent to their children; there is no family government among them. We have shamefully Indianized in all those abominable things. Now the judgements of God have imployed Indian hatchets to wound us, no doubt, for these our Indian vices."[65] Life, always in suspense between God and the devil, was to Cotton Mather a balance of rewards and punishments. When misfortune occurred its cause was to be sought in some error or sin. Never far from self-satisfaction even in his moments of deepest self-abasement, he prayed that the Lord would "return

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65 Magnalia, II, 400.

to his children what their father had spent in Charity " (Oct.2, 1713). He gave his watch to his father, and when he was himself given a better one soon after, saw that incident as a reward for filial piety. This kind of spiritual trading was a constant habit, and his ways recall Perry Miller's definition of the Puritan as a "visionary who never forgot that two plus two equalled four . . . a soldier of Jehovah who never came out on the wrong side of a bargain."[66]

More conscious than most that New England was the special concern of both God and the devil, and deeply aware of his own prime responsibility to wrest New England from the devil's influence, he saw evidence of Satan's work in the fact that church steeples were more often struck by lightning than other buildings, and, in an orgy of egocentricity, saw the devil's habit of requiring his converts to sign his book as an oblique attack on his own manifold publications. In questions of religion that tide of emotion so readily roused in Cotton Mather swept reason and moderation away. The Salem episode which presented an occasion to instil fear and belief in the people, overwhelmed him, and his actions at that time left his more moderate contemporaries with an ineradicable impression of him as a man of boundless credulity and superstition, a man beyond the reach of reason.

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66 Perry Miller and T.H. Johnson, The Puritans. (New York, 1938), p. 61.

Mather records that the bewitched Goodwin children "would fly like geese, and be carried with an incredible swiftness through the air, having but just their toes now and then upon the ground . . . and their arms moved like the wings of a bird." When observing the behavior of one child of that family whom he took into his own home he notes that "A Quaker's book being brought her, she could quietly read whole pages of it; only the name of God and Christ she still skipped over . . . But a book against Quakerism [they] would not allow her to meddle with."[67] Robert Calef, who was not suggestible or prone to hysteria, saw the whole witchcraft episode with detachment and deliberation. Mather's judgement where his religion was involved was never deliberate, and from his heightened emotional position saw the honest efforts of Calef to let matters of fact bring the populace back to normal, as the work of the devil and Calef himself as "one vile Fool" (Apr. 5, 1701).

Throughout his life Cotton Mather was the constant witness of marvels and "remarkable evidences" of the hand of Providence. But Protestant Providence in the seventeenth and eighteenth centuries had certain attributes which gave strong sanction to the advancement of science, Under Puritan fervor a difference in emphasis is to be found, but Cotton Mather's definition of the ways of that Providence would have been equally acceptable to Robert Boyle, John Evelyn or William Byrd.

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67 Magnalia, II, 460.

Although in relation to the foreknowledge and decree of God, the first cause, all things come to pass immutably and infallibly, yet by the same Providence he ordereth them to fall out according to the nature of second causes, either necessarily, freely or contingently.

God in his ordinary providence maketh use of means, yet is free to work without, above and against them at his pleasure.[68]

Puritans however, spoke habitually of seeing God's power in the order of the universe and admonished their parishioners "to seek out, and find the wisdom of God in the world, and not be idle; for the world, and the creatures therein are like a book wherein God's wisdom is written, and there must we seek it out."[69] The study of nature was in itself an act of faith and one key to the Puritan attitude lies in the injunction not to be idle. Preachers even told their parishioners that a certain amount of knowledge was necessary in order to be saved. Puritan receptivity to science was encouraged by the attestations to its theological orthodoxy by some of its most outstanding proponents, Boyle, Sprat and Glanvill. The accepted attitude of withheld judgment and assurance of the tentative nature of the conclusions of science held off any threat of heresy, and so their acceptance of the Royal Society as an ally was based primarily on non-scientific considerations. Puritan preachers availed themselves of scientific knowledge for

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68 Magnalia, II, 186.

69 Perry Miller, The New England Mind (New York, 1939), p.162.

moral and religious purposes and, so long as a moral lesson could be drawn, were content to accept the idea that the sun was the centre of the universe. Insistence on "special providences" warded off too mechanistic theories and kept backsliders wary. The notion of providence as unpredictable and arbitrary, issuing inevitable retribution, loomed larger in New England where a strong Calvinistic clergy dominated the populace, and where the facts and memories of extreme hardship were always present.

To the Puritan the main business of life was salvation of the soul, but the prospects of salvation were to be fostered by application to learning and the exercise of reason. Thus under Puritan zeal learning flourished and the study of science proceeded under the auspices of a blend of Reformation and mediaeval thinking.

It may be that one of the perquisites of isolation is a more rapid emancipation from entrenched notions and institutions; for Harvard, established long before the new philosophy had taken hold in England, soon set aside the teachings of Aristotle and Ptolemy for those of Peter Ramus and Copernicus. Vincent Wing's Astronomia Instaurata was adopted about 1657 and soon essays on it began to appear in the Almanac which, in turn, found its way into every home. In it Zacchariah Brigden called Copernicus' system "the only true and genuine system of the world."[1] What met with strong opposition in other parts of the world was accepted and

propagated by most of the New England clergy. Until the eighteenth century John Winthrop and Thomas Brattle were the country's only lay scientists. Increase Mather founded the Philosophical Society, first offspring of the Royal Society, in 1683. In 1686 Charles Morton and Samuel Lee arrived in Boston. Both had been students at Wadham in the days of Wallis, Boyle and Petty. Lee's treatises on science, proving the glory of God, were bought as devotional manuals and Morton's Compendium Physiciae, compiled from the Philosophical Transactions, was the best science textbook of the time. Cotton Mather himself urged that students should be more closely examined in mathematics, astronomy and natural philosophy, and commended his brother Nathaniel for his knowledge of Boyle's "Corpuscularian (and only right) Philosophy."[70]

Observations on comets which may be regarded as the acid test of modernity in the seventeenth century, show clearly the dual viewpoint of the New England Puritans. John Evelyn had found it difficult to rid himself of the ominous view of comets, but Increase Mather, not knowing that Halley had identified the comet of 1683 with those of 1607 and 1531, admitted natural causes of their appearance but said they could not be predicted. Thus the comet could still be regarded as a portent and the two notions were reconciled by the acknowledgement of God's superior mathematical powers. But some must have been uneasy and we know that Samuel

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70 Magnalia, II, 158.

Sewall saw problems where the Mathers allowed none. "Dr. C. Mather preached excellently from Ps. 37. Trust in the Lord, etc. only spake of the Sun in the centre of our System. I think it inconvenient to assert such problems."[71]

Cotton Mather's interest in science began at an early age and remained steady throughout his life. Offering his own exemplary industry at Harvard as an example to his son Samuel he related, "For my Declamations I ordinarily took some Article of Natural Philosophy for my Subject, by which contrivances I did kill two birds with one Stone. Hundreds of books I read over and kept a Diary of my studies."[72]

The microscope revealed to him the wonderful works of God, and his careful observations of natural phenomena appear in much of his writing and in his correspondence.

> There is not a Fly, but what may confute an Atheist. . . . By the Assistance of Microscopes, Have I seen animals of which many Hundreds would not aequal a Grain of Sand. How Exquisite, How Stupendous must the structure of them be! The Whales that are sometimes found more than an Hundred Foot in Length, methinks these moving Islands, are not such Wonders as these Minute Fishes are.[73]

In his homily, Winter Meditations, of 1693 the proper Puritan attitude to natural phenomena is defined.

> The great God requires our Contemplation to observe All His Works, and the Leisure of the Winter should very much go to the Contemplation. We should now Know the Work of God, and Study as far as

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71 Sewall's Diary, Dec. 23, 1714.

72 Wendell, p.36.

73 Cotton Mather, The Wonderful Works of God (Boston, 1690), p.25

we can every one of his Works.[74]

Winter in New England was admittedly hard but he admonishes his readers to see that "the weeds of Corruption in your Hearts, and of the Disorders in your Lives, have been duly Nipt by the Frost of such a Winter."[75]

In this way he argues theistically from the demonstrations of science, the two points of view vacillating in his mind.

Cotton Mather planned, but never completed, a handbook of the liberal sciences. Like the Reverend Michael Wigglesworth, his care was for the body as well as the soul. He published a pamphlet on the management of measles, and is said to have been the first to treat yellow fever in Boston. There exists in the care of the Massachusetts Historical Society a manuscript by him entitled The Angel of Bethseda which is a manual of medical practice. His medical interests, efforts to do good, and indeed the storms of his life found fullest expression during the smallpox epidemic of 1721 and in the controversy for and against inoculation at that time. That year too his Christian Philosopher was published in which he set out to reconcile science and religion.

It may be that with the sanction of his heavenly messenger in 1685 Cotton Mather took all knowledge to be his province, but his

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74 Cotton Mather, Winter Meditations (Boston, 1702), p.17.

75 Winter Meditations, p. 46.

concept of cultural co-operation and of his own role in it was global. He corresponded with scientists and scholars in Europe and the Indies and was able to read seven languages. Small wonder that in that "infant country . . . entirely destitute of philosophers"[76] he ranked as its most learned man and it was to him that Dr. John Woodward, F.R.S., geologist and physician, wrote asking for fossils and information about them. Dr. Woodward's letter does not now exist, but Mather's reply to it is in the Royal Society's Letter Book dated November 17th 1712. In the face of the allegation that he sent his communications to London without being asked to do so, this letter proves that at least some of his letters on scientific matters were in answer to requests for information. "Your excellent Essay toward the Natural History of the Earth has obliged and even commanded the true Friends of Religion, and Philosophy, to serve you with as many communications as they can, that may be subservient to your noble intention."[77] Sixteen months before this, in August 1711, he had written in his diary, "The Improvement of knowledge in the Works of Nature, is a thing whereby God and his Christ is glorified. I may make a valuable collection of many Curiosities, which this country has afforded, and present it unto the Royal Society." His ambition was

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76 Selections from Cotton Mather, ed., K.B. Murdock, (New York,1926), Intro. p.20.

77 G.L.Kittredge, "Cotton Mather's Election to the Royal Society." "Further Notes on Cotton Mather and the Royal Society," Publications of the Colonial Society of Massachusetts, XIV, 81-115, 281-293, (1911-1913). p.83.

clear then. Another note, made soon afterwards, may be the answer to a prayer. "My Glorious Lord has in his gracious Providence ordered it, that very eminent Persons beyond-sea take notice of me, and such as I myself have never written unto, send me their Letters and their Presents" (Sept. 2, 1711). Whether the correspondence with members of the Royal Society was begun by Mather or by the London scientists is not clear. The accusation that he suggested himself as a member cannot be disproved, but there is ample evidence to show that the contributions of such a learned man were, after the initial communication, encouraged and sought after.

The fact of his election to the Royal Society he regarded as "a marvellous Favor of Heaven to me; A surprising Favor; one that will much encourage me, in my Essayes to do Good, and add unto the superior Circumstances, wherein my gracious Lord places me above the Contempt of envious Men" (Oct. 12, 1713). The contempt, which he chose to attribute to envy, was frequently shown and the causes of it are not hard to find. In dealing with the witchcraft cases he had appeared to many as a man bereft of reason, and other minor but irritating characteristics blocked understanding of his better qualities. Unduly impressed with the need to make "Remarks of Piety", he improved every possible occasion to that end. Pious injunctions were uttered as a duty to wife, children, the watchmen, and even to his partner in funeral processions. If he heard bad language in the street he paused to pray, and in the diary on

June 24, 1713, he notes the appearance of rioters who, "on purpose to insult Piety . . . will come under my window in the Middle of the Night and sing profane and filthy Songs." The Mathers were not noted for tact, and as Increase Mather aged, the son's diary contains frequent anxious notes as to how the old man will conduct himself. Cotton Mather realized his own weakness in this respect. Hurt over the building of a new brick church with "pues", and the departure of many of his own flock to it, he determined to curb his tongue. "My God make me prudent and Patient", and "G.D. I take notice of my Error, I too easily fall into; the foolish, uncivil, and ungrateful Carriage, in the People of the Town and my own Vicinity, I am too ready to express my Resentment of it; and my Opinion of them as being an ill-spirited People.. There would be more wisdom and virtue in it if I less followed the Dictates of Splean in this Matter" (Apr. 26, 1713).

He was sensitive, touchy, and naive as to the ways of his fellow men. His pedantry and his self-conscious piousness fired an antagonism which, in the minds of many people, overshadowed his good deeds of genuine kindness and compassion. The antagonism lived after him, colored and twisted the facts of his life, and left a legacy of prejudice against him which had to be set aside, even two hundred years after his death, to show that he was not a liar and an impostor. G. L. Kittredge has discussed the controversy over the authenticity of Mather's F.R.S. and linked that feud to the

furor which arose over the initiation of inoculation for smallpox.[78] The fact that his name did not appear on the printed list of members of the Society gave great comfort to Mather's enemies. This was due to the regulation which withheld names of elected members from the list until they had gone through the necessary ceremonies of admission which included signing their names in London. This regulation was not changed until 1727 when it was modified to absolve elected members who lived forty miles or more from London from the obligation to present themselves there. It is not the present purpose to recapitulate the evidence which Dr. Kittredge has accumulated, but it is of interest to mention that by some omission Cotton Mather's name had not actually been ballotted for when he received letters announcing his election. This was only rectified after his enemies had made his life miserable by their scepticism, and letters had gone back and forth questioning and establishing the validity of his membership. William Brattle was elected in 1714 and certainly did not visit England before his death in 1717, but his right to the honor was never questioned. Paul Dudley was elected in 1721 and his name also did not appear on the list until after 1727. It seems that Cotton Mather's personal relationships were his misfortune. His right to call himself Fellow of the Royal Society was not challenged until 1720 when John Checkly, High Churchman and non-juror, opened the question. Checkly felt he had been unjustly dealt with by the

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78 Kittredge, pp. 81 and 281.

Court of General Sessions and fixed on Mather in the dominant party as the object of his revenge. He had been involved with proceedings against Mather in the settlement of an estate, and took it upon himself to write to London hoping to prove his enemy an impostor. It was his persistent enmity which brought the secretary of the Society to discover that Mather's election had not been formally carried out and to rectify that omission on April 11, 1723, ten years after he had been informed of his admission to the Society.

Cotton Mather's printed communications to the Royal Society cover a wide range of subjects and show only here and there the hand of the parson.

> The first Letter directed to Dr. Woodward, is dated at Boston in New England, Nov. 17, 1712. In this the writer gives an Account of a large Work in Manuscript, in two Volumes in Folio, but does not name the Author. This is large Commentary upon some Passages in the Bible, interspersed with large Philosophical Remarks, taken out of Natural Historians, and the Observations of himself and others, more particularly as to Matters observ'd in America, whence he entitles the Work, Biblia Americana. This Work Dr. Mather recommends to the Patronage of some Maecenas, to promote the Publication of. As a specimen of it, he transcribes a Passage out of it, being a Note on that Passage in Genesis, chap. VI. ver.4. relating to Giants; and confirms the Opinion of there having been,in the Antediluvian World, Men of very large and prodigious Statures, by the Bones and Teeth of some large Animals, found lately in Albany in New England, which, for some Reasons, he judges to be Human; particularly a Tooth, brought from the Place where it was found to New York, 1705, being a very large Grinder, weighing four Pounds and three Quarters, with a Bone, suppos'd to be a Thigh-bone, 17 Foot Long. [79]

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79 Philosophical Transactions and Collections, Abridged and Disposed under General Heads by Henry Jones, (London, 1731), V, ii,159.

The parson in another letter claims to have identified the wood of which the ark was built, and at the end of his thirteenth letter winds up with a calculation of the possible number of descendants of Adam and Eve. Otherwise his topics are Indian remedies, beliefs and relics, weather phenomena and migration of birds.

> As to the Itinerants, he takes notice of vast flights of Pidgeons coming and departing at certain Seasons: And as to this, he has a particular Fancy of their repairing to some undiscovered Satellite, accompanying the Earth at a near distance.[80]

The habits of rattlesnakes and the power of their venom are spoken of in some detail, and another letter gives instances of Sympathies, Antipathies and Maculae Maternae. Another communication, giving an account of a murder in England made known through a dream to a relative in Boston, drew from Edmund Halley the comment that "The relation seems to be well attested."[81] All these topics are within the range of the subjects dealt with by the London philosophers. Of course there were other communications which were not printed, and the good Dr.Woodward soothed the touchy contributor with the explanation that the "Editors . . . are very neglectful and partial."[82] At the height of the controversy over the authenticity of his membership, Cotton Mather wrote to Dr. James Jurin, the secretary of the Society, stating the difficulty

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80 Philosophical Transactions, V, ii, 161.

81 Kittredge, p. 82.

82 Kittredge, p. 101.

and citing Woodward and Waller as the source of his understanding that he had been elected. He mentioned that Halley and Petiver had both used the title, F.R.S., in addressing him.

> But, if, after all, it be the pleasure of those Honorable Persons, who compose or govern the Royal Society, that I should lay aside my pretensions to be at all Related unto that Illustrious Body by the least Signification of it by your pen, it shall be dutifully complied withal . . . it is not the Title but the Service that is the Heighth and indeed the whole of my Ambition. [83]

He promised further communications in two weeks, and enclosed with his irreproachable letter his most famous scientific contribution, his paper on inoculation for smallpox. This information was probably initially sent to Woodward soon after Mather's Address to the Physicians of Boston was published, and Zabdiel Boylston had made his first inoculation on one of his own family. Mather had borrowed the volume of the Philosophical Transactions containing the first reports on inoculation from William Douglass, Boston's only M.D. at that time, who disagreed with his interpretation of the material and bitterly opposed him. Douglass wrote to Alexander Stuart, M.D. and F.R.S., in London asking him what English physicians thought of "this rash practice" and calling Cotton Mather "a certain credulous preacher of this place." A pamphlet war broke out and Douglass decried him as "a Man of Whim and Credulity" who thought the outbreak "a fit Opportunity to make

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83 Kittredge, p. 108.

Experiments on his Neighbors (which in his Vanity he might judge acceptable to the Royal Society)."[84] The storm gathered from other points. The first inoculations had been reported from Africa and Asia, and the objection was quickly made that it was unlawful to learn from the heathen. Boylston's point that the physicians of antiquity and the Indians of America were also heathen, and that from them the Colonists had accepted knowledge, carried no weight. In his diary in July 1721, Mather reports,

> I have instructed our physicians in the new method used by the Africans and Asiaticks to prevent and abate the dangers of smallpox . . . The Destroyer has taken a strange Possession of the People on this occasion. They rave, they rail, they blaspheme, they talk not only like Idiots but also like Franticks, and not only the Physicians who began the experiment but I am the object of their Fury.

In August, Mather's son Sammy wished to be inoculated and the father, fully aware of the dangers of the experiment, worried "and if he should after all die by receiving it in the common way how can I answer it?" Increase Mather advised him to do it and keep the matter quiet. (Aug. 1-30, 1721). And so Sammy was inoculated and was more seriously ill than was usual in inoculated persons. By November the number of cases of smallpox was down to fifty, but feeling was still high and a meeting of the freeholders on November 4th voted to prevent inoculated people from coming to town. Feeling against Mather was so violent that a cannon ball

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84 Kittredge, p. 103.

was thrown into his house. As it came through the window the fuse was knocked out and only the appended note was left to scourge him. "Cotton Mather, you Dog, Dam you: I'll innoculate you with this, with a Pox to you" (Nov. 14, 1721). Credulous, superstitious, and vain, that was how his enemies saw him, and there was enough truth in their estimate of him to blind them to other qualities. In the face of it all he stuck to his project and in November published, along with his father, a broadside, "Sentiments on the Smallpox Innoculated". By December he had drawn up the method of procedure in inoculation and sent it with his usual diligence to physicians all over the country. (Dec.1, 1721). In the Philosophical Transactions there are printed thirteen communications on smallpox following the report from New England given by Henry Newman. This is thought to be Cotton Mather's account of the method used in the epidemic of 1721. Among these communcations is a comparison by Dr. James Jurin between the dangers of natural smallpox and those incurred by inoculation. He refers to a letter of Cotton Mather's and notes that the severity of the Boston epidemic made the physicians more adventurous than those performing inoculations in England.[85]

A letter on "An horrid Snow" addressed to Dr. Woodward illustrates in miniature Mather's method of dealing with information

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85 Philosophical Transactions, VII, 601-611.

on natural phenomena, and the style in which he wrote on such matters. The material for this letter was supplied by John Winthrop, scientist, and later F.R.S.[86] The letter begins with a characteristic display of learned virtuosity.

> . . . The Winter was not so bad as that wherein Tacitus tells us that Corbulo made his expedition against the Parthians. Nor like that which proved so fatal to the Beasts and Birds, in the Days of the Emperor Justinian [nor] that wherein the very Fishes were killed under the Freezing Sea, when Phocas did as much to the men whom Tyrants treat like the Fishes of the Sea. . . . A Snow 'tis true, not equal to that which once fell and lay Twenty Cubits high about the Beginning of October, on the parts about the Euxine Sea. Nor to that which the French Annals tell us, kept falling for Nine weeks together. Nor to several mentioned by Boethius, wherein vast Numbers of people, and of Cattel, perished; Nor to those that Strabo finds upon Caucasus and Rhodiginus in Armenia. But yett suchan one, and attended with such Circumstances, as may deserve to be Remembered.

Then follows a simple account of the phenomena of that winter; sheep, hens and turkeys were found alive under the snow after twenty-eight days; cattle, walking on the crust of such a deep snow, could reach and munch the branches of trees. Where facts strain credulity it has to be remembered that John Winthrop supplied those facts. The letter ends with charm and warmth.

> And now Iam Satis Terris Nivis. And here is enough of my Winter-tale. If it serve no other purpose, yet it will give me an opportunity to tell you, That Nine months ago, I did a thousand times wish myself with you in Gresham Colledge, which is never so horribly snowed upon. But instead of so great a satisfaction, all I can attain to, is the pleasure of talking with you in this Epistolary way, and subscribing myself, Syr, Yours with an affection that knows no Winter.

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86 Selections from Mather, p. 373 and Intro., p. 57.

Somehow great distance warded off the winter that so often blighted his affections at close quarters.

The Christian Philosopher of 1721 shows more fully Mather's attitudes to the facts of nature and science and the point of view represented in it shows how he had grown away from the stark beliefs of his early years. Far from the dark Puritan concept of nature as an awesome sign of God's power, Cotton Mather, in later life, was deeply concerned with the beauty of nature as a sign of God's goodness. Here he attempts to reconcile science and religion, and in so doing urges the progress of man's knowledge so that he may thereby comprehend as fully as possible the goodness of God. "The Essays before us will demonstrate that Philosophy is no Enemy but a mighty and wondrous incentive to Religion."[87] "Behold . . . a Philosophical Religion . . . IF men so much admire Philosophers because they discover a small part of the wisdom that made all things; they must be stark blind who do not admire that Wisdom itself!"[88] This virtuoso's passionate thinking expresses itself in rhythmical prose, interspersed with what we might call cadenzas of references. In particular he acknowledges the "illustrious Mr. Boyle, the Industrious Mr. Ray and the Inquisitive

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87 Selections from Mather, p. 286.

88 Selections from Mather, p. 292.

Mr. Derham" and the "illustrious" Dr. Grew. Of their writings he had first hand knowledge, but of the many others he refers to his acquaintance was only second hand. In the essay Of the Vegetables he mentions fifty writers, but it has been established that he was familiar with only ten of these.[89] Sometimes he acknowledges his source but sometimes he does not.

The essays follow a moralistic pattern. Writing Of the Earth and answering the "vain Colts of Asses" who have cavilled at the unevenness of the earth's surface, he lists the benefits derived from mountains, among them the reminder that "Hippocrates did usually repair to the Mountains for the Plants by which he wrought his chief cures." Trying always to point to the uses rather than the terrors of fire and water, he can justify earthquakes only as a sign of God's wrath, although without volcanoes, he points out, they would do still more damage.

> Whether a collection of Minerals in the Bowels of the Earth is the cause of those direful Convulsions, may be considered: As we know a Composition of Gold which Aqua Regia has dissolved; Sal Armoniack, and Salt of Tartar, set on a Fire, will with a horrible crack break through all that is in the way. But Mankind ought herein to tremble before the Justice of God. Particular Cities and Countries, what fearful Desolations have been by earthquakes brought upon them. 90

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89 Selections from Mather, Intro., p.49.

90 Selections from Mather, p. 298.

> I know that Varenius thinks it probable that the northern part of America was joined unto Ireland . . . O Inhabitants of the Earth, how much ought you to fear the things that will bring you into ill terms with the Glorious God! Fear lest the Pit and the Snare be upon you! [91]

Then his own moral lesson is found: knowledge of earthquakes will "instruct me to avoid the Folly of setting my Heart inordinately on any Earthly Possessions or Enjoyments . . . I take Earthquakes to be very moving Preachers unto worldly minded Men." With a scornful reference to Mahomet, "the thick-skulled Prophet", and his superstitious interpretations of nature, he ends, "May your Devotion exceed the Mahommetan as much as our Philosophy!" [92]

The trader in him appears again in the essay on Minerals in which he comments on the "surprising Providence of God in keeping up the Value of Gold and Silver notwithstanding the vast Quantities dug out of the Earth at all Ages." [93] But the moralist remembers the voyager Dampier who said, "I know no place where Gold is found but what is very unhealthy", and he exclaims, "Possessors of Gold! Beware lest the Observation be verified in the Unhealthy Influences of thy Gold upon thy Mind." [94]

Of the Vegetables he says, "We will single out some

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91 Selections from Mather, p. 299.

92 Selections from Mather, pp. 298-302.

93 Selections from Mather, p. 322.

94 Selections from Mather, p. 323.

remarkables and Glorify our God." His authority on the processes of vegetation is Dr. Woodward to whom he attributes the information that water is not the matter which composes vegetables but the agent which conveys matter to them.

> The parts of Water being exactly spherical, and subtile beyond all expression, the Surfaces perfectly Polite, and the Intervals being therefore the largest and so the most fitting to receive a foreign Matter into them, it is the most proper Instrument imaginable for the service now assigned to it.

After enumerating the functions of the different parts of plants he turns to wonder at the beauty he sees.

> How charming the Proportion and Pulchritude of the Leaves, the Flowers, the Fruits, he who confesses not, must be . . . one sunk into a forlorn pitch of Degeneracy, and stupid as a Beast.. . .
>
> How unaccountably is the figure of Plants preserved? And how unaccountably their growth determined? Our excellent Ray flies to an intelligent plastick Nature, which must understand and regulate the whole economy.
>
> Gentlemen of Leisure, consult my illustrious Doctor [Grew] peruse his Anatomy of Plants, ponder his numberless Discoveries, but all the while consider that rare Person as inviting you to join with him in adoring the God of his Father, and the God who has done these excellent things which ought to be known in all the Earth. 95

In all these essays on natural phenomena can be found the expression of Cotton Mather's dual attitude in which rational explanations and postulates co-exist with a rapt acknowledgement of an all powerful Providence. The emphasis in this late work is different. While the theological outlook, deeply rooted and

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95 Selections from Mather, pp. 326-330.

ineradicable, is still the theme to which he returns, it is like and old anachronistic refrain recurring among his more serene passages.

While in the Christian Philosopher Cotton Mather reaches beyond his generation to the attitudes of a later day, some of his medical observations seem strangely apt in our time. He notes carefully, without judgement or explanation, the psychotic state of people who have eaten the Virginian James-Town-Weed. This is one of the earliest references to that plant the name of which was later contracted to Jimpson Weed or Jimsonweed. In the habit of smoking he sees a potential harm.

> Methinks Tobacco is but a poor Nepenthe, tho' the Takers thereof take it for such an one. It is to be feared the caustick Salt in the Smoke of this Plant, convey'd by the Salival Juice into the Blood, and also the vellication which the continual use of it in Snuff gives to the Nerves may lay foundations for Diseases in Millions of unadvised People, which may be commonly and erroneously ascribed to some other Original. 96

The range of Cotton Mather's subjects is paralleled by the variety of his style. Defending his own literary style he asserts that, "After all Every Man will have his own style which will distinguish him as much as his Gate", [97] and Cotton Mather's gait varied through the ranting of his Hortatory and Necessary Address, the ponderous style of most of the Magnalia, to the directness of

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96 Selections from Mather, p.342

97 Selections from Mather, Intro., p.37.

the scientific writing and the simplicity of the Political Fables. Here and there the poet in him appears to remind the reader that this much misunderstood member of the Mather family could, in another age and another society, have trod a very different path. Writing of the arrival of the first Puritan settlers in New England in 1620 he writes, "The sun was withdrawn into Sagittarius whence he shot the penetrating arrows of cold; feathered with nothing but snow, and pointed with hail."[98]

In the end, in spite of unflagging diligence and labour, it must have seemed to Cotton Mather that life had been a failure. Peace in his religion he never had, for the struggle within him between his sense of his own scope, his passionate feelings and the stern behaviour and humility proper to a Puritan minister was unending. His own unrealistic notion of Christian charity and lack of worldly wisdom dissipated his possessions, and the favors from heaven, hoped for in return, were not forthcoming. Of his fifteen children, to whom all his love and tenderness went out, only two survived him.

G.D. The glorious Lord who orders my condition for me, has ordered me a Condition of considerable Poverty. What very little Estate I had, has been sold, and the Money is gone to pay my Debts. I do not own a foot of land in all the world . . ..There occur

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98 Magnalia, I, 51.

strange ways to pull me back and keep me low, if at any time I have begun to lay by any thing for the Relief of my Necessities (June 9, 1721).

Samuel Sewall's diary reveals that even at his funeral the memory of Cotton Mather was given short shrift by some of his contemporaries,[99] but Benjamin Colman, aware of the sensitive scholar he had known, wrote in memory of the fine qualities of that mind,

It was Conversation and Acquaintance with him . . . that discovered the vast compass of his knowledge and the Projections of his Piety; . . . Here he excelled; here he shone; being exceeding communicative, and bringing out of his Treasury things new and old, without measure. Here it was seen how his wit, and Fancy, his Invention, his Quickness of thought and ready Apprehension were all consecrated to good as well as his Heart, Will and Affections; and out of his Abundance . . . were as the choice silver for richness and brightness, pleasure and profit. 100

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99 Sewall's Diary. Feb. 19, 1728.

100 Selections from Mather, Intro., p. 24.

WILLIAM BYRD.

Every diary serves a particular purpose in the life of its writer. With Evelyn, Pepys and Mather the personal value of their diaries is at least partly to be discerned; Evelyn gravely writing, re-writing and preserving his experiences for posterity or old age; Cotton Mather confiding to his diary intimacies and eccentricities which otherwise could not appropriately have been expressed. Pepys, as if compelled by a will-o'-the-wisp, found in his diary a way of coming to terms with that alter ego, his creative self, with whom, so often, he seems to be communicating. What was to Pepys a channel for contemplation and expression served for William Byrd a diametrically opposite purpose. Pepys' humblest ventures are alive to the reader, but Byrd's colourful and eventful life is reduced in his diary to a repetitious account of certain features of each day, almost devoid of description and emotion. Between the lines lies, for the imagination of the reader to fill in, the stuff of his life, problems, frustrations, joys and sorrows; the colour of his life which he shut out of the diary. In his character sketch "Inamorato l'Oiseaux" he says of himself, "He loves retirement that while he is acquainted with the world he may not be a stranger to himself . . . A constant hurry of visits and conversation gives a man a habit of inadvertency, which betrays him into faults without measure and without end.

For this reason he commonly reserved the morning to himself, and bestow'd the rest upon his business and his friends."[101] For the same reason perhaps which made him shut out the world each morning, he set down in his diary the bare facts of the events of each and every day, whether in Virginia, London or on board ship. On hundreds of occasions he wrote such an entry as the following:

> I rose at six o'clock and read two chapters in Hebrew and some Greek in Josephus. I said my prayers and ate milk for breakfast. I sent back Mr. Mumford's fine horse because it is dangerous to ride him. Colonel Bolling died this morning after a long illness. I read a sermon of Dr. Tillotson's. I ate roast pigeon for dinner. In the afternoon Mr. C-S and Mr. Doyley came to see me and stayed till the evening. I walked a little way with them. Old Ben had his fever again this afternoon and it remitted in the evening. I said my prayers and had good health, good thoughts and good humour, thanks be to God Almighty (July 17, 1709).

If his morning routine of reading was interrupted he makes note of the fact (Sept. 15, 1709). What he ate is regularly recorded along with the state of his prayers, thoughts, health and humour. This diary was not a medium for the exercise of his skill or enjoyment in writing, nor was it a vehicle for reflection or introspection, nor was it a receptacle in which to store experience to which he might wish to refer at a later date. The most interesting people he knew, if they are mentioned at all, are only noted in passing and not in any terms by which he could recall in later years a memorable occasion. Three times in the London diary he mentions

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101 William Bird, Another Secret Diary, with Letters and Literary Exercises, ed. Maude H. Woodfin, Decoded by Marion Tinling. (Richmond, Virginia, 1942), p. 281.

Congreve, "Then I went to Mrs. FitzHerberts where I found Mr. Congreve. I stayed one hour" (Jan. 12, 1718). He records nothing except the fact of the meeting. In some way Byrd's diary may, for him, have represented keeping life under control. Probably he had no very clear idea of what it meant to him, but it can be seen as a method of reducing his life to order, a reaction away from the turmoil of living. In his later writings, The Histories of the Dividing Line, A Journey to the Land of Eden, and a Progress to the Mines, composed from diaries and expanded with some idea of publication, can be found the qualities which are so sparsely found in the diary. Lively and descriptive, these writings are full and complete in comparison with the scaffolding of the diary.

The reader who persists with the Byrd diary in spite of repetition and monotony does not go unrewarded. Here and there a comment allows some feeling to come through and the diary springs to life. "A little before dinner came Ben Harrison in his best clothes, because he happened to come yesterday in his worst" (Jan. 2, 1712). The simple comment at once brings us closer to the man who notices the inconsequential behaviour of a friend. Glimpses of the social life of Williamsburg are as much relief to the reader as they no doubt were to the planters themselves. "My wife and I quarrelled about pulling her brows. She threatened she would not go to Williamsburg if she might not

pull them. I refused however, and got the better of her, and maintained my authority" (Feb. 5, 1711). Mrs. Byrd however, had some compensation for her defeat.

> The Governor opened the ball with a French dance with my wife. Then I danced with Mrs. Russell and several others, among the rest Colonel Smith's son, who made a sad freak. Then we danced country dances for an hour and the company was carried into another room where there was a very fine collation of sweetmeats. The Governor was very gallant to the ladies and very courteous to the gentlemen. About 2 o'clock the company returned in the coaches and because the drive was dirty the Governor carried the ladies into their coaches.. . . The President had the worst clothes of anybody there (Feb. 6, 1711).

Such length of detail is unique in the diary, but with patience and endurance the reader gradually becomes aware of a sophisticated, cultivated personality, full of humour and kindly tolerance. The inequality of man was self-evident to him, and with the responsibilities of the position he held, he accepted the role of a great gentleman to the manner born, with a genial, charitable understanding of the ways of his fellowmen and without a vestige of snobbery.

With his great library of over three thousand books, occupying a whole wing of Westover and tended by a librarian whom he addressed as "Most Hypochondriack, Syr",[102] William Byrd kept up the standards of culture and style of living to which he was accustomed by upbringing and by his education in England. The only comparable private library in the colonies was Cotton Mather's and Byrd's library was restricted by no creed, special

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102 Carl I. Cannon, "William Byrd II of Westover," The Colophon, III, No. 2, Spring (1938), 292.

interest or hobby. A gentleman was tacitly expected to be an amateur, and while he came by his knowledge of science and medicine both by natural interest and by necessity, it was also by then the mark of a gentleman to be knowledgeable in those matters. But on a Virginia plantation a gentleman had to fill many and varying roles. The physical demands of plantation life are evident all through Byrd's diary. (Mar. 30, 1710: Jan. 29: Dec. 4, 1711) The approach to new knowledge in a newly colonized land was, more often than not, primarily the approach of necessity and expediency. New facts towards the advancement of learning were sought in the imperative need to develop Virginia's unknown resources and in the search for another money crop besides tobacco. The position regarding cash and tobacco is shown in the first fragment of Byrd's diary. "Then we went to the vestry where we ordered the church yard to be paled in for 8,000 pounds of tobacco by Mr. Parker" (Feb. 3, 1710). For the most part his own physician and often his own overseer and planter, William Byrd led a life which was active, demanding and full of public and personal responsibilities. His highly cultivated tastes were acquired in London where he spent all but 6 of his first 31 years. In the diary lies the record of how he persevered to retain that culture. In it is evidence of his reading six languages besides English and of his teaching his neighbors French and Greek (Feb. 15, 1710: Mar. 23, 1711).

Learning in Virginia, lacking the zeal which Puritanism gave it in New England, was more difficult to acquire and to cherish.

The first William Byrd's way of life had laid out the path which his more famous son followed and developed. He had been interested in plants and seeds and had sent to England at the request of Lord Howard of Effingham, ex-governor of Virginia, walnuts, hickory nuts and persimmon seeds. He sent to London for treatises on minerals and stones, "Mr. Boyle's or any other English author;", and for samples of ore, especially lead, tin and silver, for ignorance, he felt, had led him to neglect what might have been of value.[103] In England in 1687 he had been in contact with Leonard Plunkenet, botanist, and Dr. Martin Lister, zoologist. With them he discussed the work of John Banister who had been in Virginia, many years before. William Byrd I had been known as Banister's patron. Plunkenet promised to send him a copy of the first part of Ray's History of Plants. He visited the botanist, Jacob Bobart in Oxford and brought back to Virginia trees and shrubs packed by him. Soon after that he was sending back to London samples of crystal rock brought from beyond the Christian settlements by his Indian traders.[104]

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103 Maude H. Woodfin, "William Bird and the Royal Society," Virginia Magazine of History and Biography, XL (1932), 23-34, 111-125, p.25.

104 Woodfin, p. 27.

It may be that such a man shared Noah Biggs' opinion of the universities as a"Quagmire of pittiful learned idleness" for his son, whose whole education was obtained abroad, was not sent to Oxford or Cambridge after he had finished at Felsted Grammar School, but was sent to Holland to learn something about business and trade, and then into the firm of Perry and Lane in London. His education was paid for in furs and tobacco consigned from Virginia to Micajah Perry. After some business experience he entered the Middle Temple and was called to the bar in 1692. Of this period he wrote later in life to Benjamin Lynde who had been a contemporary at the Middle Temple. "You and I both remember what an advantage it was to two bashful people to be taken notice of by the worthys of a strange country."[105] The "worthys" he met through Sir Robert Southwell who acted as Byrd's guide and mentor in his young days in London and whose character Byrd described, giving him the fashionable, Italianate name of Cavaliero Sapiente. "Whatever he undertook was forecast with so much prudence and sagacity, that he left no room for repentance . . . He was able to converse in a corrupt Court above 30 years, without any prejudice to his Integrity . . . And though he was all that while Courteour, . . . yet he improved his Virtue and his understanding more abundantly than his Estate."[106] Through

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105 Woodfin, p. 104.

106 Another Secret Diary, p. 207.

Southwell, president of the Royal Society from 1690-1696, he met Sir William Petty, Sir Hans Sloane, and other men of prominence in medicine and science. William Byrd II's interest in these matters and his easy entry into scientific circles were due to the personal influence of his father. Through Southwell's influence William Byrd was elected to the Royal Society in 1696 at the age of 22.

Virginia was then an almost unknown land, and information from travellers from there was eagerly received. William Byrd was the first native Virginian to appear before the society and on his return to London from Virginia, where he had gone for some months after his election, he gave a report of a negro boy with depigmented patches on his skin, and presented a live rattlesnake and an opossum to the society on July 20, 1697.[107] Rattlesnakes they had had before,[108] but the opossum was the first seen in England and was immortalized in Dr. Tyson's monograph on the Virginian opossum in 1698. While Byrd had been away possible explanations for the dark skin of negroes had been under discussion. The boy with the dappled skin was then brought to London and seen by other members, after which Byrd was asked to write up the case. On November 17th he read his account and it

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107 Woodfin, pp. 28-29.

108 Evelyn's Diary, Sept. 19, 1657.

was then published.[109] This is his only printed communication to the Royal Society. His description is clear and factual and he notes that "no fright had taken the mother." Two years later he presented the skin of a rattlesnake which he had had when it was alive. The mysterious power of rattlesnake venom was under discussion at the time and Cotton Mather, in his turn, contributed information on the same subject. In true virtuoso style Byrd reported in the Autumn of 1697 on a tree in Virginia resembling a maple tree but yielding a white sugar, and on another occasion gave "an Account of a Feather found in the Gall bladder of Mr. Wallop . . . it adhered to the Gall Stones in the Vesicula fellea and he was very Confident it was in the Gall before opening and did not come there accidentally after."[110] At another meeting he presented "an artificial Cup resembling Agate" and made from some material he had acquired from Monsieur Hurbin. The Virginian virtuoso had unique and expert knowledge to offer. On March 1, 1699 when Sir Hans Sloane showed an arrowhead from Maryland, Byrd could inform the Society that such arrowheads were made from white flint. On another occasion he contributed the information that the Indians "made their best Glew of the Nerves of Deer;"[111] and that in Virginia quantities of spirits were made

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109 Philosophical Transactions, III, i, 2.

110 Woodfin, p. 32.

111 Woodfin, p. 33.

from peaches mashed and fermented. In November 1697 Byrd was elected to the council of the society and served again on it in 1698, 1700 and 1702.[112] He was chosen, along with two others, to audit the accounts of 1697-98. In 1701 he presented the skeleton of an oak leaf to the Society.[113] These varied contributions by a native of so distant a country were all acceptable to the members of the Royal Society. Each strange fact or creature offered was another step towards cataloguing the facts of nature and another step in the advancement of learning.

John Evelyn was seventy-eight when he and the young William Byrd served together on the council in 1698. Evelyn makes no reference to Byrd in his diary but on August 6, 1704, he notes that his cousin Parke had brought news of the defeat of the French and Bavarian armies. This is Daniel Parke whose daughter Lucy married William Byrd in the same year, and whose debts kept Byrd short of money for most of his life.

No diary of Byrd's has as yet been found covering these early years in London. There remains only a fragment of a letter to Edward Southwell written after Byrd had attended a council meeting on November 24, 1703. "Gresham Colledge rubbs

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112 Woodfin, pp. 112-113.

113 Woodfin, p. 33.

on at the old (. . .) in everything except the advantage it suffers by your not being there. The (. . .) to sleep in the chair since he went, Blunder do's his part to make it a (better) Dormitory than any Church in Town."[114] In the London Diary of 1717-1721 can be found a number of references to visits to Crane Court where the society then met. He proposed Sir Wilfrid Lawson for membership in November 1718 and notes that he has seen another strange gift to the society, a "great Snake 24 feet long and 20 inchees round from the East Indies" (July 28, 1719).

At the meeting of November 10th, 1697 Byrd asked the members "that they would think of a Fitt person to be sent over to Virginia in order to make observations and Descriptions of all ye natural products of these parts and to write the History thereof, and that for the Encouragement of such a fitt person the charge of his passage and 25 pounds per ann. would b e allowed him by the Governor of Maryland."[115] This was the first of several requests for help in making a systematic study of Virginia's resources.

After 1701 when he became agent for Virginia, Byrd's attendance at meetings was less frequent. In 1705 he returned hurriedly to Virginia following his father's death, and on April

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114 Another Secret Diary, p. 191.

115 Woodfin, p. 111.

20, 1706 he wrote to Sir Hans Sloane apologizing for hurrying away without getting the instructions of the Royal Society. "However I think myself oblig'd to offer my Services by this first opportunity, and shoud be very ambitious to do anything for you, that might make me worthy of the honour I have of being of that illustrious Body, that are ever at work for the good of ungrateful mankind."[116] In that letter he again stressed the need for experts in Virginia.

> The country where fortune hath cast my Lot, is a large field for natural inquirys, and 'tis much to be lamented, that we have not some people of skil and curiousity amongst us. I know nobody here capable of makeing very great discoverys, so that Nature has thrown away a vast deal of her bounty upon us to no purpose. . . Here be some men indeed call'd Doctors; but indeed they are generally discarded Surgeons of Ships, that know nothing above very common remedies. They are not acquainted enough with Plants or other parts of Natural History, to do any Service to the World, which makes me wish that we had some missionary Philosopher, that might instruct us in the many usefull things which we now possess to no purpose.[117]

With this letter he sent a box of a root used by the Indians to treat rattlesnake bite, attested to its value, and asked the London doctors to try it on other ailments. Enclosing other herb specimen he adds, "Be pleased to let me know what uses may be made of all these things, that so I may be able to do good with them here, as I hope you will there . . . nobody has better

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116 Woodfin, p. 115.

117 W.B.Blanton, Medicine in Virginia in the Seventeenth Century (Richmond, Virginia, 1930), p. 98.

inclinations to promote natural knowledge than myself . . .." This letter explains the attitude of the well-educated Virginian layman to medical matters. Many of them kept the best English medical text books on their shelves and felt they were safer to practice what they learned from them themselves, than to rely on ignorant colonial doctors. William Byrd I had an aversion to doctors as he knew them, and there is no record that he sent for one as he lay dying.[118] William Byrd II had a hundred and forty-one works on medicine in his library and could therefore speak with authority. The most worn of them all was a volume called The Poor Planter's Physician.[119]

Since he was, of necessity, his own physician in charge of far-reaching plantations with many slaves and servants, the Byrd diary is full of instances of his being asked for and supplying medical advice. He treated slaves, servants, his neighbors, and his family and no ailment was beyond the range of the prescriptions he dispensed. In October 1709 the doctor (whose name is not given) was very ill and Byrd treated him with Dr. Goddard's Drops and later cinchona bark, the source of quinine. Messengers came to him for supplies of ipecac to treat an epidemic of dysentery among the negroes (Jan. 20, 1710); for "physic" to treat a cancer

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118 Blanton, p. 92

119 Cannon, p. 297.

of the lip (Mar. 1, 1710), and for advice on how to treat a boy kicked by a horse. Red lead plasters are sent to a neighbor for some unnamed ailment (Mar. 26, 1710), and a woman who has lost the power of her hands and feet has cold baths and purges prescribed (Mar. 8, 1712). Cupping, bleeding, purging, sweating and vomiting were ordered by him singly and in varying combinations so frequently that, although the many demands for his help are indicative of how dependent his "people" and his friends were upon his judgement and care, one cannot but be impressed by the amount of stamina that must have been necessary to withstand the treatment. He himself said that there was less illness in Virginia than in most places but that mismanagement accounted for many disabilities. One of his own health measures consisted of swimming in the James River, or wherever he happened to be, at all times of the year.[120] His decisive and authoritative way of dealing with the threat of epidemic is shown in the following account.

> I found every Body well at the Falls, blessed be God, tho' the Bloody Flux raged pretty much in the Neighbourhood . . . Finding the Flux had been so fatal, I desired Mr. Booker to make use of the following Remedy, in case it shou'd come amongst my People. To let them Bleed immediately about 8 ounces; the next day to give them a Dose of Indian Physic, and to repeat the vomit again the Day following, unless the Symptoms abated. In the meantime they should eat nothing but Chicken Broth, and Poacht Eggs, and drink

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120 W. B. Blanton, Medicine in Virginia in the Eighteenth Century (Richmond, Virginia, 1931), p. 182.

nothing but a Quarter of a Pint of Milk boil'd with a Quart of Water, and Medicated with a little Mullein Root, or that of the prickly Pear, to restore the Mucus of the Bowels, and heal the Excoriation. At the same time I ordered him to communicate the Method to all the poor Neighbours, and especially to my Overseers, with Strict Orders to use it at the first appearance of that Distemper, because in that, and all other Sharp Diseases, Delays are very dangerous.[121]

In the later part of the diary in which the entries are shorter, there are many fewer records of these ministrations and only an occasional emergency is noted. "Billy Wilkins fell from the roof of the library by the slipping of the ladder. I caused him to be bled and take a-t-s salt, which made all safe" (July 12,1720).

The treatment freely given to his neighbours he used equally freely to treat himself. Ill with malaria in July 1711, he took snake-root and sage tea for his ague and notes the fact that Dr. Cooke "did not approve of the sweats that I took", giving him, as he gradually recovered, laudanum, cinchona bark and burnt hartshorn. All his life Byrd was somewhat preoccupied with his own health and the regular notes in the diary of what he ate each day are a measure of how important he felt his diet to be. In the early eighteenth century diet was a topic of considerable interest among the London physicians and the particular hobby-horse of Dr. George Cheyne who treated his own immense overweight with a diet of milk and vegetables. Cheyne's Essay of Health and Long Life was in the library of Westover.[122]

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121 Blanton, Medicine in Virginia in the Eighteenth Century, p.182.

122 Blanton, Medicine in Virginia in the Eighteenth Century, p. 110.

Like his father before him William Byrd knew that much was being lost in Virginia through ignorance of the local plants and through lack of men to mine the country's minerals. On September 10th, 1708 he sent to Sir Hans Sloane "a paper of a dangerous Seed of a Plant which we call here Jamestown Weed," seeds of the Jerusalem Oak and of Stickwood roots, the leaves of which the colonists had found to be useful for stopping bleeding. He too asked for samples of ore to compare with what he had found. Sloane replied that it would be better to send samples of ore to England and offered him a word of caution about his own self-medication. He cited his own principle, "never to take Physic when I am well and not to make any use of any medicine but such as are very well tryed."[123] He encouraged his correspondent to search for Ipecacuanna which he said would fetch 30/- a pound in England. This was just the kind of transaction Byrd was looking for and he sent 30 pounds of the shrub to London. However, the customs charge was prohibitive at 40/- a pound. He sent a second consignment, asking Sloane to do what he could to get it into the country customs free, and offering his merchant 2½ per cent commission with apologies for using him in that capacity.

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123 Woodfin, p. 117.

In William Byrd's Histories of the Dividing Line between Virginia and North Carolina can be found the fullest account of his interests, his enterprise and his personality. Commissioner for Virginia on that expedition he shared with the surveyors all the hardships which might be encountered in mapping a boundary line through unbroken country. Throughout his two accounts are many careful observations of plants and animals as well as of the ways of Indians and pioneers. Since he himself filled the role of doctor on that journey he gives many instances of his ministrations.

> Puzzlecase had a sore throat, which incommoded him very much indeed, for he cou'd not swallow so much as a Rum-Punch without Pain. But I advised him to part with 12 Ounces of Blood, which Open'd the Passage to his Stomach. I recommended the Bark to Bootes for an Ague, and gave one of the Carolina Men a dose of Ipecoaccanna, for the same Distemper as I did to Powell one of our own Men.[124]

The search for medicinal plants, fired by his interest and the need to develop the country's resources was also supported by his belief in a kindly and wise Providence:

> Thus in what part of the woods soever anything mischievous or troublesome is found, kind Providence is sure to provide a Remedy. And 'tis probably one great reason why God was pleased to create these, and many other Vexatious Animals, that Men sho'd exercise their Wits and Industry to guard themselves against them.[125]

Where there were rattlesnakes there must also be a remedy against

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124 William Byrd, Histories of the Dividing Line between Virginia and North Carolina (Raleigh, North Carolina, 1929), p. 163.

125 Histories of Dividing Line, p. 276.

them and so he continued his search.

We found in the low ground Several Plants of the Fern Root, which is said to be much the strongest antidote yet discover'd against the Poison of the Rattle-Snake. The Leaves of it resemble those of Fern, from whence it obtained its Name. Several Stalks shoot from the same Root, about 6 Inches long, that ly mostly on the ground. It grows in a very Rich Soil, under the Protection of Some Tall Tree, that Shades it from the Meridian Beams of the Sun. The Root has a faint spicy tast, and is preferr'd by the Southern Indians to all other counter-poisons in this country.

But there is another sort preferr'd by the Northern Indians, that they call Rattle-Snake-Root, to which wonderful Virtues are ascribed in the Cure of Pleurisys, Fevers, Rhumatisms, and Dropsys; besides it being a powerful Antidote against the venom of the Rattle-Snake.[126]

Of all natural remedies Byrd's favourite was Ginseng root. It was for him a panacea for all ills and to the end he believed in its beneficial effects.

Though Practice will soon make a man of tolerable Vigor an able Footman, yet, as a Help to bear Fatigue, I us'd to chew a Root of Ginseng as I walk't along. This kept up my Spirits, and made me trip away as nimbly in my half Jack-Boots as younger men cou'd in their Shoes. This Plant is in high esteem in China, where it sells for its weight in Silver. Indeed it does not grow there, but in the Mountains of Tartary, to which Place the emperor of China Sends 10,000 Men every year on purpose to gather it. But it grows so scattering there, that even so many hands can bring home no great quantity. Indeed it is a Vegetable of so many virtues, that Providence has planted it very thin in every Country that has the happiness to produce it. Nor indeed is Mankind worthy of so great a Blessing, since Health and long Life are commonly abus'd to ill Purposes. This noble Plant grows likewise at the Cape of Good Hope, where it is call'd Kanna, and is in wonderful Esteem among the Hottentots. It grows also on the northern continent of America, near the Mountains, but as sparingly as Truth and Public Spirit. It

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126 Histories of Dividing Line, pp. 158-160.

answers exactly both to the Figure and vertues of that which grows in Tartary, so that there can be no doubt of its being the Same.

Its vertues are, that it gives an uncommon warmth and vigour to the Blood, and frisks the Spirits, beyond any other Cordial. It clears the Heart even of a Man that has a bad wife, and makes him look down with great Composure on the crosses of the World. It provides insensible Perspiration, dissolves all Phlegmatick and Viscous Humours, that are apt to obstruct the Narrow channels of the Nerves. It helps the Memory, and would quicken even Helvetian dullness. 'Tis friendly to the Lungs, much more than Scolding itself. It comforts the Stomach and Strengthens the Bowels, preventing all Colicks and Fluxes. In one Word, it will make a Man live a great while, and very well while he does live. And what is more, it will even make Old Age amicable, by rendering it lively, cheerful, and good-humor'd. However 'tis of little use in the Feats of Love as a great Prince once found, who hearing of its invigorating Quality, sent as far as China for some of it, though his ladys could not boast of any Advantage thereby.[127]

Letters written ten years later testify to Byrd's continuing effort to identify and utilize Virginia's medicinal plants. A letter dated May, 1737 reiterates his plea for help but there is no evidence that the London scientists took up his request.

The truth of it is, our woods abound with so many very usefull Plants, that woud you do as much good after you are dead, as you do while you are alive, you must improve the scheme of Dr. Radcliff, and bequeath in your will an Exhibition for one or more Plantary Physicians, whose travels should be confined to this Part of the World only, where Nature seems to be more in her youth, and to come later and fresher out of her Creator's hand.

In the same letter he reports on his own efforts towards development, in cultivating hemp and vineyards, and planning to experiment with silk and potash. "I am too full of Projects to be very rich, but if I can benefit my country and make it useful to Great Britain, it

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127 Histories of Dividing Line, pp. 272-274.

will be a greater satisfaction by much."[128]

Miss Woodfin in her study of Byrd's correspondence with Sir Hans Sloane points out that although Sloane was president of the Royal Society from 1727-1741 no record shows that Byrd's correspondence was brought before the meetings.[129]

The following year, 1738, Byrd sent samples of ginseng root and snakeroot to England for testing. He had heard from Mark Catesby, a botanist travelling in Virginia, that Sloane did not think the Virginia ginseng root the same as the plant reported on from Tartary. Byrd thought that the seneca snakeroot might be useful as an antidote to rabies and he wanted the English physicians to try it also in cases of smallpox. He was anxious that the results found or claimed in Virginia should be corroborated by them.[130]

The reports from England on his favourite remedies were not encouraging but he refused to lose faith in them, replying to Sloane in April 1741, "I am Sorry our Plant of life, our Ginseng should lose all its virtue by passing the sea as well as our Rattlesnake root." He suggested that the wrong things might have been expected of them. "What I recommend it [ginseng] for is to clear the animal spirits and to feed the flame of life . In the same letter he reproaches the secretaries of the Royal Society for

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128 Woodfin, p. 119.

129 Woodfin, p. 118.

130 Woodfin, p. 118.

having left his name off the list of members. "I suppose my long absence has made your Secretarys rank me in the number of the Dead, but pray let them know that I am alive, and by the help of Ginseng hope to survive some years longer."[131]

Only once did William Byrd find urgent need to publish his work. His writings were circulated in manuscript among friends and on many occasions he read from them aloud (Mar. 25, 1709; May 14, 1741). Louis B. Wright thinks that he was too much of a perfectionist to allow his work to be printed and quotes Byrd's own letter to Peter Collinson to prove this ". . . I have one infirmity, never to venture anything unfinished out of my hands. The bashful bears hide their cubs till they have licked them into shape, nor am I too proud to follow the example of those modest animals."[132] In that part of the diary written on board ship returning to Virginia between December 9, 1719 and February 4th, 1720 there are frequent notes that he has written some English. This he continued at Westover, particularly during August and early September 1720. It had occurred to him that the failure of the plague to reappear in England during the previous fifty-five years coincided with the increased importation and use of tobacco and that therefore the two must be connected. Here his

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131 Woodfin, p. 120

132 William Byrd, The London Diary and other Writings (New York, 1958), Intro., p. 40.

desire to contribute to the relief of suffering converged with the ever present necessity for the land-poor, one-crop planter, to increase his tobacco market. This combination of determining factors brought him immediately into print. In London in 1721 he published his Discourse Concerning the Plague with some Preservatives against it, by a Lover of Mankind. This pamphlet is not a literary exercise or a display of erudition but a sincere effort towards the advancement of learning and the benefit of mankind. He begins with an acknowledgement of the hand of Providence working through second causes in visitations of the plague. This is the same concept of Providence which the Puritans held.

> Now tho' God be able to do every thing in heaven and on earth, by an immediate act of Omnipotence, yet he is generally pleased to work by the ministry of second causes, without stepping out of the ordinary track of Providence. Nevertheless, since natural causes are all subject to his sovereign decrees, how easy is it for his almighty power, to call forth those natural causes, to execute his vengeance upon a depraved and rebellious generation? How easy it is for God to shake the mountains by an earthquake, and out of the clifts thereof make way for contagious damps that may taint the air with Pestilence? [133]

He compares the plague to the thunderbolt of Jove, and of classical writers singles out only Homer for quotation. Unlike Cotton Mather, Byrd felt no need to display his erudition. He recommends repentance as the first preventive and then the seeking of natural

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133 Another Secret Diary, p. 418.

remedies.

However, when I recommend an unfeigned repentance and humiliation before God, as the first and greatest preservative against this pernicious distemper, yet I would not be understood thereby to depreciate the application of such natural remedies, as the divine goodness has vouchsafed to reveal to mankind. On the contrary, as God is pleas'd to send this great calamity upon us by natural ways, so it seems agreeable to his wise providence, that we should endeavour both to prevent and cure it by natural applications. But I am humbly of opinion, that in order to induce his infinite goodness, to direct us to these natural remedies, and after that to bless them with success, the most prevailing course we can take is, heartily to repent of our sins, and reform our corrupt and vicious lives. After this happy step taken, we shall render the business of the Physician more easy, his prescriptions more efficacious, and our constitutions more vigorous to resist and expel the distemper. [134]

Byrd finds an explanation for the prevalence of plague in middle eastern and Asian countries in the belief in predestination which prevents these people from using preventives except in the case of small-pox which they endeavor to ward off to avoid disfigurement.

But most Christian states (the Presbyterians not excepted, who pretend also to believe in fatality) fansy it may be prevented by care, and therefore employ the requisite precautions.

In England it us'd formerly to make a visit about once in twenty or thirty years, but since the universal use of Tobacco, it has now been kept off above fifty-four years. Without the assistance of this powerful Alexipharmick, it were humanly speaking, impossible to have warded it off so long, considering the constant and extensive Traffick the English have carry'd on to every part of the Levant, and the very little care that has

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134 Another Secret Diary, p. 420.

been taken to hinder the Infection.[135]

He is not sure that plague is unknown in America, but if that is so, then he says its absence must be due to the use of tobacco since "there is no complection, no degree of men, but arm themselves with this invincible antidote against the enemy of mankind."[136] He reviews the literature on the plague and refers to a modern physician who, believing the infection carried by the saliva, recommends chewing a strong and agreeable thing and spitting it out. The best of such things is tobacco. Byrd's knowledge of his fellow men brings him to cite those authors who maintain that nothing makes a man more susceptible to infection than the fear of it. Fear "hinders the spirits from exerting themselves, and renders them too languid to repel the infection."[137] Dr. Willis, Byrd felt, had too much faith in amulets and he notes that Dr. Sydenham is guarded and says little about preventives. He lists public precautions, to be taken, the first of these a fast to "humble ourselves and deprecate the vengeance of an offended God." Then isolation of infected areas, quarantine of ships and cleaning of streets are to be undertaken. Only sound provisions are to be sold and the poor are to be subsidised to enable them to buy them. Fires of pitch, tar and tobacco are to be burned to

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135 Another Secret Diary, p. 424.

136 Another Secret Diary, p. 425.

137 Another Secret Diary, p. 431.

clean the air. He again emphasizes the importance of temperance and courage since "a terrify'd and dejected mind will dispose us to suck in the very distemper we are afraid of." The best purge he says is an infusion of tobacco in strong wine. Instead of amulets he believes we "shall find a simple virtue against the Plague in fresh, strong, and quick-scented Tobacco. . . . for Tobacco being itself a poison, the effluvia flowing from it,by a similitude of parts, gather to them the little bodies of the pestilential taint, and entirely correct them."[138]

He cites the astonishing figure computed by the "Capnometricians of Crane Court", that "about the ninety-thir'd part of the Smoak that covers this great City, must certainly be the smoak of Tobacco."[139] With this strong and sincere plea Byrd must have believed that he had made a major discovery.

In this discussion of the plague and tobacco Byrd also describes the Turkish method of inoculation for smallpox, and remarking on its success, records his surprise that "our Physicians who are in most cases enterprising enough, have not ventur'd upon it here." His opinion of doctors appears again.

> But they are particularly cautious of their patients lives, when they are to introduce any outlandish methods, that may abridge so considerable a branch of their practice. Insomuch that if any publick-spirited person should presume to preach it up for the preservation of his fellow citizens, the mob of the faculty would be apt to insult him, and cry out, Great is the Apollo of the

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138 Another Secret Diary, p. 439

139 Another Secret Diary, p. 441

Britons.[140]

We do not know if William Byrd came to hear of the Boston smallpox epidemic of 1721 and of the struggle there to use this same preventive measure.

In Byrd's account of the plague and his American remedy for it, the dual cultural background in which he lived is very striking. His life spanned that transition period in which personal ties kept the Virginian colonists closely bound to England. The blend of cultures is again apparent in his Histories of the Dividing Line, the Journey to the Land of Eden and A Journey to the Mines. His material is wholly American and his mature style of writing is very different from that of the fashionable literary exercises of his earlier years. Unmistakably American these later works are nonetheless stamped by an urbane sophistication which is apparent in Byrd's attitudes to the people he deals with; in his control of and detachment in personal relationships and in his figures of speech. Throughout the expedition to map the boundary line between Virginia and North Carolina many personal difficulties arose between the men employed on that undertaking. In his handling of these quarrels and problems, Byrd kept himself personally somewhat aloof. Conscious of and accepting his own unquestionable

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140 Another Secret Diary, p. 429

superiority, he maintained a position of authority while at the same time he shared all hardships. Although Byrd was more than willing to dispense with the services of a doctor on that expedition he was responsible for the presence of the Huguenot chaplain Peter Fontaine on the journey. In the "secret" version of that undertaking he appears as Chaplain Humdrum, the object of much of Byrd's affectionate teasing and wit. Here, in his attitude to the minister, in his humour and in the figures of speech that occur to him in writing about him, Byrd's sophistication pervades his Virginian account. Describing the company after a meal of bear-meat he writes, "Particularly our Chaplain lov'd it so passionately, that he wou'd growl like a Wild Cat over a Squirrel."[141] Further on the journey "Here we promoted our Chaplain from the Deanery of Pip to the Bishoprick of Beardom. For as these Countrys where Christians inhabit are call'd Christendome, so those where Bears take up their Residence may not improperly go by the Name of Beardom. And I wish other Bishops loved their flock as entirely as our Doctor loves his."[142] Even in the vicinity of the Dismal Swamp Byrd's mind readily flashes back to impressions of London. After some strayed horses had been found he comments, "They were

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141 Histories of Dividing Line, p. 197.

142 Histories of Dividing Line, p. 251

found Standing indeed, but as Motionless as the Equestrian statue at Charing Cross."[143]

In his introduction to the Histories of the Dividing Line Byrd writes of the men who came to reinforce the settlement of 1607, "From Kiquotan they extended themselves as far as James-Town, where like true Englishmen, they built a Church that cost no more than Fifty pounds, and a Tavern that cost Five hundred." The descendants of these true Englishmen by the time of Byrd's death in 1744 were by force of time and circumstances, becoming true Virginians. The transition period was the period of William Byrd's life, and the beginnings of the struggle which the next generation met fully, can be seen in the pattern of his life, in his numerous enterprises to develop the country, and in his efforts to maintain the independence of the Council of Virginia against attempted encroachments on it by the royal governors.

The open-minded energy with which he met these problems can be illustrated over and over again.
Hearing of the uses of silk grass from the Indians he writes, "As this species of Silk Grass is much Stronger than Hemp, I make no doubt but Sail Cloth and Cordage might be made of it with considerable Improvement."[144]

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143 Histories of the Dividing Line, p. 262.

144 Histories of the Dividing Line, p. 286

After visiting Colonel Alexander Spotswood, pioneer in developing iron ores and furnaces in Virginia, he writes,

> I came to be instructed by so great a master in the mystery of making iron, wherein he had led the way, and was the Tubal Cain of Virginia. He corrected me a little there, by assuring me he was not only the first in this country, but the first in North America, who had erected a regular furnace that they ran altogether upon bloomeries in New England and Pennsylvania, till his example had made them attempt greater works. But in this last colony they have so few ships to carry their iron to Great Britain, that they must be content to make it only for their own use, and must be obliged to manufacture it when they have done. That he hoped he had done the country very great service by setting so good an example. That the four furnaces now at work in Virginia circulated a great sum of money for provisions and all other necessaries in the adjacent counties. That they took off a great number of hands from planting tobacco, and employed them in works that produced a large sum of money in England to the persons concerned, whereby the country is that much the richer. That they are besides a considerable advantage to Great Britain, because it lessens the quantity of bar iron imported from Spain, Holland, Sweden, Denmark, and Muscovy, which used to be no less than twenty thousand tons yearly, though at the same time no sow iron is imported thither from any country but only from the plantations. For most of this bar iron they do not only pay silver, but our friends in the Baltic are so nice, they even expect to be paid all in Crown pieces. On the contrary, all the iron they receive from the plantations, they pay for it in their own manufactures, and send for it in their own shipping . . . But at the same time he gave me to understand that his furnace had done no great feats lately, because he had been taken up to building an air furnace at Massaponux, which he had now brought to perfection and should be thereby able to furnish the whole country with all sorts of cast iron, as cheap and as good as ever came from England.[145]

British colonial policy prohibiting or discouraging local manufacturing tended to keep the colony's economic well-being subservient to the needs of England. Inevitably the aims voiced by

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145 London Diary, p. 629.

Byrd to "benefit my country and make it useful to Great Britain" became incompatible with such acts of parliament as the Iron Act of 1750. Growing democratic forces were soon to compel the New and the Old World to a settling of accounts. The challenge to authority had been thrown down long ago.

ENVOY.

John Evelyn, Samuel Pepys, Cotton Mather and William Byrd, four true amateurs of science, were all valued members of the Royal Society of London. Two of them were gentlemen of no particular occupation; one was Secretary of the Admiralty, the other a Puritan minister. Together with bishop, poet and tradesman their common allegiance to the aims of experimental and descriptive philosophy brought them into the company of the great scientists of the day. All four men were scientifically inexpert yet each one's outlook had in it something of the point of view of the scientist. Their eyes were on the future, notwithstanding a few backward glances. With that forward vision went their optimism; no matter what the problem might be, something could be done about it. With Joseph Glanvill they all concurred that,

> This was a mighty Design. . . . But to the carrying of it on it was necessary there should be many Heads and many Hands, and those formed into an assembly that might intercommunicate their Tryals and Observations. . . . The Design is laid as low as the Profoundest Depths of Nature, and reacheth as high as the uppermost Story of the Universe, . . . it extends to all the Varieties of the great World and aims at the benefit of universal Mankind. [146]

The design and its implementation raised bitter controversy

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146 Joseph Glanvill, Essays on Several Important Subjects (London, 1676), p. 36.

and each of these four diarists, with his reputation and influence, played a part in the establishment and furtherance of the idea. Cotton Mather in far off New England was an ardent and voluble admirer of the aims of the Royal Society. William Byrd was drawn to the new approach to learning by his own vitality and his need to deal with the many problems he faced in the development of Virginia. Both of them were able to offer acceptable information and add new facts towards the compilation of a natural history of the earth. Evelyn, involved with the idea from the beginning and zealous in his efforts towards its fulfillment, was so esteemed that he could have held the Society's highest office. Pepys at first innocent as to the potentialities of the experiments he saw, was also the least pretentious of the four as to his own part in the promotion of science. His was the role of enthusiastic spectator and promoter; yet he became, at the height of his career, President of the Royal Society. With his unflagging energy, his interest and his respect for exactitude, he, with the others, held to the conviction, "There will be a plus ultra to the end of the world."[147]

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147 Miller, The New England Mind, p. 223.

BIBLIOGRAPHY

Primary Works

Byrd, William, Another Secret Diary, 1739-1741, with Letters and Literary Exercises, edited by Maude H. Woodfin. Decoded by Marion Tinling. Richmond, Virginia, 1942.

Byrd, William, The London Diary, 1717-1721, and other Writings, edited by Louis B. Wright and Marion Tinling. New York, 1958.

Byrd, William, The Secret Diary, 1709-1712, edited by Louis B. Wright and Marion Tinling. Richmond, Virginia, 1941.

Evelyn, John, The Diary, edited by E. S. de Beer. Oxford, 1955.

Evelyn, John, Diary and Correspondence, edited by William Bray, F.A.S. London, 1862.

Mather, Cotton, The Diary, 1681-1708, 1709-1724, Massachusetts Historical Society Collections, Seventh Series, VII. Boston, 1911.

Pepys, Samuel, The Diary, edited by H. B. Wheatley, F.A.S. London, 1952.

Secondary Works

Bacon, Francis, Works, edited by James Spedding, M.A., Robert Leslie Ellis, M.A., and Douglas Denon Heath. London, 1870.

Birch, Thomas, History of the Royal Society. London, 1756.

Blanton, Wyndham B., Medicine in Virginia in the Eighteenth Century. Richmond, Virginia, 1931.

Blanton, Wyndham B., Medicine in Virginia in the Seventeenth Century. Richmond, Virginia, 1930.

Boyle, Robert, Works. London, 1772.

Bryant, Arthur, The Man in the Making. Cambridge, 1933.

Bryant, Arthur, The Years of Peril. Cambridge, 1935.

Burr, George Lincoln, Narratives of Witchcraft Cases. New York, 1914.

Byrd, William, Histories of the Dividing Line betwixt Virginia and North Carolina. Raleigh, North Carolina, 1929.

Frost, Robert. Complete Poems. New York, 1949.

Glanvill, Joseph, Essays on Several Important Subjects in Philosophy and Religion. London, 1676.

Grierson, Herbert John Clifford, Cross Currents in English Literature of the Seventeenth Century. London, 1948.

Hartlib, Samuel, "A Description of the Famous Kingdom of Maccaria", The Harleian Miscellany. London, 1808-1813.

Howarth, Robert Guy, Letters and Second Diary of Samuel Pepys. London and Toronto, 1932.

Jones, Richard Foster, Ancients and Moderns. St. Louis, 1936.

Jones, Richard Foster, "The Background of the attack on Science in the Age of Pope", Pope and his Contemporaries, edited by J.L.Clifford and L. A. Landa. Oxford, 1949.

Kittredge, George Lyman, Witchcraft in Old and New England. Cambridge, Massachusetts, 1929.

Mather, Cotton, Essays to do Good. New York, 1815.

Mather, Cotton, Magnalia Christi Americana or the Ecclesiastical History of New England. Hartford, 1855.

Mather, Cotton, Selections from his Work, edited by K. B. Murdock. New York, 1926.

Mather, Cotton, Winter Meditations. Boston, 1702.

Mather, Cotton, The Wonderful Works of God Commemorated. Boston, 1690.

Mather, Cotton, Wonders of the Invisible World. London, 1862.

Miller, Perry, The New England Mind. New York, 1939.

Miller, Perry and Thomas Herbert Johnson, The Puritans. New York, 1938.

Morison, Samuel Eliot, Builders of the Bay Colony. London, 1930.

Morison, Samuel Eliot, The Puritan Pronaos. New York and London, 1936.

Parrington, Vernon Louis, "The Twilight of the Oligarchy", Puritanism in America. Main Currents in American Thought. New York, 1930.

Philosophical Transactions and Collections of the Royal Society of London, Abridged and Disposed under General Heads by Henry Jones, 2 volumes. London, 1731.

Philosophical Transactions and Collections of the Royal Society of London, Abridged and Disposed under General Heads by John Lowthorp, M.A., F.S.S., 3 volumes, London, 1731.

Ponsonby, Arthur, British Diarists. London, 1930.

Ponsonby, Arthur, English Diaries. London, 1923.

Ponsonby, Arthur, John Evelyn, Fellow of the Royal Society. London, 1933.

Ponsonby, Arthur, More English Diaries. London, 1927.

Powicke, Frederick James, The Cambridge Platonists. Cambridge, Massachusetts. 1926.

Sewall, Samuel, The Diary, edited by Mark van Doren. New York,1927.

Shadwell, Thomas, Works. edited by Montague Somers. London, 1927.

Smith, Charles John, Historical and Literary Curiosities. London, 1842.

Smith, Herbert Maynard, Early Life and Education of John Evelyn. Oxford, 1920.

Sprat, Thomas, History of the Royal Society of London. London, 1702.

Stimson, Dorothy, Scientists and Amateurs; a History of the Royal Society. New York, 1948.

Tanner, Joseph Robson, Mr. Pepys. An Introduction to the Diary together with a Sketch of his Later Life. London, 1925.

Tyler, Moses C., History of American Literature during the Colonial Period. New York, 1897.

Weld, Charles Richard, History of the Royal Society. London, 1848.

Weiner, Philip P. and Aaron Noland, editors, Roots of Scientific Thought. New York, 1957.

Wendell, Barrett, Cotton Mather, the Puritan Priest. Cambridge, Massachusetts, 1926.

Willey, Basil, The Seventeenth Century Background. New York, 1952.

Wright, Louis B. The First Gentleman of Virginia. San Marino, California, 1940.

Articles in Periodicals

Brash, F.E., "The Royal Society of London and its influence on Scientific thought in the American Colonies", Scientific Monthly, 33 (1931) 336-355, 448-469.

Cannon, Carl I., "William Byrd of of Westover", The Colophon, A Quarterly for Bookmen, III, No. 2, Spring (1938), 291-302.

Denny, M., "The Royal Society and American Scholars during the Colonial Period", Scientific Monthly, 65 (1947), 405-427.

Freeman, Edmund, "A Proposal for an English Academy in 1660" Modern Language Review, XIX (1924), 291-300.

Hornberger, D., "Date Source and Significance of Cotton Mather's Interest in Science", American Literature, IV (1935), 413-420.

Kittredge, G. L. "Cotton Mather's Election to the Royal Society", "Further Notes on Cotton Mather and the Royal Society", Publications of the Colonial Society of Massachusetts, XIV (1911-1913), 81-115, 280-293.

Monroe, B.S. An English Academy", Modern Philology, VIII (1910), 107-122.

Woodfin, Maude H. "William Byrd and the Royal Society", Virginia Magazine of History and Biography, XL (1932), 23-34, 111-123.