

SIR THOMAS BROWNE AND HIS AGE

An examination of the life and writings of  
Sir Thomas Browne with a view to determining  
their relation to the age in which he lived.

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## PREFACE

Sir Thomas Browne, seventeenth-century physician and scholar, is usually thought of as an antiquarian who had little interest in contemporary events, and who lived in England during a time of political, religious, social, and scientific upheavels without being actively conscious of them. It is the purpose of this study to determine how valid such an estimate is, and to what extent Browne's works reflect contemporary thought and events. It is my purpose to show Browne as he really was, a man acutely aware of the trend of the times, particularly of the changes that were taking place in thought and scientific research, and one keenly interested in finding out about the things about him. His interest and the breadth of his knowledge concerning contemporary things are often hidden by the beauty of his prose, his vast erudition, and an excessive quoting of classical authorities. But beneath this is a surprising knowledge of those movements in thought and society that were influencing England and were breaking down the hold of religion, authority, and medieval superstition and were paving the way for modernity.

Yet Browne was not a scientist as we now use the term, nor a philosopher, nor yet a political man. His contributions were to the realm of literature, and he will be remembered as the author of the Hydriotaphia and the Religio Medici. It is partly because of this that it is so difficult for us to reconcile him to his age, for we are prone to demand achievement of men who experiment and speculate, and Browne achieved little in the way of contributing something of lasting value to the fields to which he gave his attention, except as he contributed to literature. Lack of such achievement, however, cannot be construed as ignorance of what was taking place about him, and he should not be criticized too severely

because he lived in an age strangely paradoxical in its medieval and modern interests and because he reflected its paradoxes as well as its advancements. Most of the outstanding men of the century were those slightly younger than he. They had the advantage of having the field for achievement made ready for them by the men of Browne's generation, who took time to test common errors and who loosened the clinging bonds of medievalism by random experiment, by what often appears to us now to be useless speculation, and by the thoughtful consideration of small, but important, details.

I have omitted almost all mention of Browne's literary style as not pertinent to the purpose of the study. His place in the field of literature has long been established. My consideration has to do with his, as a seventeenth-century man who reflected clearly and truly the age in which he lived. I have tried to avoid hasty and unfounded conclusions and generalities. My attempt has often entailed discussion concerning the seventeenth-century background against which Browne must be placed in order that we may know him as he stands in connection with his age. It has been necessary to discuss at length what others were thinking and doing in order to know whether Browne had interests and beliefs in common with them. This has resulted in what, at times, must seem a disorganized and ill-proportioned piece of work, and has a tendency to obscure Browne under a mass of material that does not seem to deal directly with him. But Browne's cognizance of those things that were taking place about him cannot be determined until it is first known what was happening during the century and with what other men were occupied.



I wish to express my appreciation to those who have lent their aid and encouragement in the preparation of this study, especially to Dr. Louise Pound and Dr. L. C. Wimberly of the University of Nebraska, under whose inspiration the study was first begun; to Dr. W. S. Johnson and Dr. J. H. Nelson of the University of Kansas, who have supervised the continuance and completion of the work; to Dr. E. H. Hollands, who aided me in my study of the thought of the century; to Miss Mary Grant, who made the translations for me, and to Dr. F. B. Dains, who lent me magazines and journals and who helped me in my study of the science of the period, all of the University of Kansas.

G.L.

## CHAPTER I

### INTRODUCTION

The common conception of Sir Thomas Browne has been that he was an antiquarian, a recluse who withdrew from the political and religious controversies of his age to live his own peaceful and uneventful life alone with his thoughts and who found his deepest enjoyment and interest in ancient and unusual events, in the books, thoughts, and superstitions that belong to the antiquarian. This conception has permeated almost all the criticism that has been written about him and his works until it has become almost traditional. It is the purpose of this study to show that the conception, while it has some justification, is, for the most part, false, and to indicate by a close examination of Browne's works and his private correspondence the interest that he had both in the events and in the changes of thought that were taking place during his lifetime.

Before going into a consideration of the problem proper, the way in which Browne reflected his age and the extent to which he responded to it, it will be helpful to consider the prevalence of the belief that Browne was a man apart from his world. My choice of critics has been made with little regard to their standing or their importance in the field of English criticism. I have attempted rather to cover most of the criticism on Browne (for he is not a man well known to the majority of readers) in order to show that this general idea concerning him has been accepted by those who stand in the outer reaches of criticism as well as by its central figures. Some of the men quoted have but little importance in the literary field; others rank high, but even these men seem, in spite of their unusual and keen discernment, to have allowed themselves to fall in with the accepted idea of Browne's secluded indifference to all else but the

satisfaction of his own antiquarian interests. It must be remembered that no great amount of critical material on Browne can be found for with the exception of the Religio Medici, the Urn Burial, and parts of the Garden of Cyrus, his works are not commonly read.

One of the first literary criticisms we have of Sir Thomas Browne is found in Samuel Johnson's "Life of Browne,"<sup>1</sup> in which Browne's statement that the Religio Medici was written as a private exercise and not for publication is ridiculed. To Johnson, the statement seemed incredible, but he seems to have forgotten that it was quite the fashion among sixteenth and early seventeenth century authors to write for the pleasure of their friends as well as themselves and to circulate their products in manuscript form.<sup>2</sup> Many of these manuscripts were long, so that Johnson's argument against the probability of Browne's allowing the Religio Medici to pass from hand to hand because of its length is without weight. Although Johnson is favorably inclined toward Browne, he feels that some of Browne's works "are of little value, more than as they

1. Contained in Simon Wilkin's edition of the Works of Sir T. Browne, Henry G. Bohn, London, 1852.
2. Poetry especially was circulated in manuscript form. Much of Donne's poetry was collected and published only after his death. Milton's Comus was published only after Henry Lawes wearied of copying out the music for the many friends who wished it. Most of the sonnet sequences were not written originally for publication. Samuel Butler's "The Elephant in the Moon" is one of the later instances in which a manuscript was circulated in this manner. The poem remained in manuscript for almost a century after it was written, although it may have furnished the argument for a similar poem by La Fontaine which appeared among his Fables in 1679. Butler's poem may be found in the Riverside Press edition of The Poetical Works of Samuel Butler, II, 138. The poem of La Fontaine, "An Animal in the Moon," can be found in The Fables of La Fontaine, translated from the French by Edgar Wright, London, 1888, Book VI, v, xviii, p. 173. Prose manuscripts were perhaps less commonly circulated, for the age was primarily one of poetry. Earlier, however, Sidney had written the Arcadia only for his friends and had begged on his deathbed that it might be destroyed. An essay of Milton, "On Christian Doctrine," was not printed until the first part of the nineteenth century.

gratify the mind or show upon how great a variety of inquiries the same mind has been successfully employed," a criticism to be used in substance later by Legouis. He comments on the "contempt and ridicule" in which Browne held the idea of the motion of the earth - an exaggerated statement, if Johnson were fair enough to admit it - and quotes John Whitefoot, a personal friend of Browne and the one who preached his funeral sermon, upon his bearing and personality. Whitefoot describes Browne as quiet, sagacious, retiring, and excessively modest, a characterization that fits well our idea of the secluded man who had little regard for current happenings.

There is little further criticism or comment on Browne until his "rediscovery" during the Romantic Period, when Lamb, Coleridge, Hazlitt, and Southey read and responded to him, finding their delight in the most mystical and paradoxical parts of his works.<sup>3</sup> Browne, however, did not receive much attention until the appearance of the Wilkin edition, first published in 1836, and later in 1852. It was about the time of this last edition that the criticism concerning Browne began to take definite form. Simon Wilkin, in his 1852 edition, referred to a series of papers published in the Athenaeum, No. 93 (1829), entitled "The Humorists," the first of which was devoted to Sir Thomas Browne. In a footnote to his "Supplementary

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3. A letter from Robert Southey to Governor C. Bedford, Esq., dated Keswick, November 28, 1828, contains the following paragraph: "If I were confined to a score of English books, this, I think, would be one of them [the Hydriotaphia]: Nay, probably it would be one if the selection were cut down to twelve. My library, if reduced to those bounds, would consist of Shakespeare, Chaucer, Spenser, and Milton; Lord Clarendon; Jackson, Jeremy Taylor, and South; Isaac Walton, Sidney's Arcadia, Fuller's Church History, and Sir Thos. Browne; and what a wealthy and well-stored mind would that man have, what an inexhaustible reservoir, what a Bank of England to draw upon for profitable thoughts and delightful associations who should have fed upon them!" The Life and Correspondence of Robert Southey, edited by his son, The Reverend Charles Cuthbert Southey, New York, 1855.

Memoirs" contained in the first volume of that edition, he quotes the following passage taken from this article: "In all likelihood, he [Browne] was an absent and solitary man, extracting the food of serious contemplation from all objects indifferently, and busied in perpetual abstraction. Ceremonious in observing times and seasons, as reverencing the inner mysteries of custom. Attached to old manners, as apprehending hidden wisdom in their properties, and as connecting him with remembrance and speculations on the past; curious, probably, in casting the fashion of uncertain evil, and, therefore, little inclined to innovation." To this statement Wilkin replies that he could not "adopt this opinion of the absent and solitary man," and adds, "..... on the contrary, I am persuaded, that his social deportment must have been distinguished by the kindest courtesy; ..... he was too ardent in the pursuit of knowledge, not to have improved to the utmost every opportunity of increasing his stores, by conversation with those who were capable of enriching them. I am satisfied, in short, that had his earlier journals been preserved, they would have exhibited him to us as a traveller, in just as striking a point of view as that in which his diligence and curiosity, ..... have placed him under other characters."<sup>4</sup> This critical rescue was commendable but ineffectual in its very mildness, and beyond this he did not go. Neither did he make any other attempt to prove his assertion that Browne was not the solitary man of the Humorist papers.

In fact, Wilkin, in his quotation from the Humorist papers, may have given the writer in The North American Review for April, 1862, the cue

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4. Simon Wilkin, Works of Sir T. Browne, "Supplementary Memoirs, I, xxxvii-xxxviii.

for his comment that Browne was a "molluscous" man, for Wilkin's statement that Browne was "an absent and solitary man, extracting the food of serious contemplation from all objects indifferently, and busied in perpetual abstraction" might well have suggested the exaggerated later comment. The article in the North American Review was unsigned, and it is among the first to catalogue Browne definitely and without qualification as the "solitary" man, indifferent to the storm of the civil wars that seemed to pass over his head.

There are men in every age who may be described as being of a molluscous temperament - that is, who, whatever storm may be raging around and over them, remain quiet and unperturbed, attached to their own rock, absorbing their peculiar nutriment out of the waves and currents, letting all else go by. Of these molluscous men there are many varieties . . . . Finally, not to multiply classes, others are your antiquaries and your meditative philosophers, the objects interesting to whom are not those of the contemporary world at all, but such as belong to the past or to the universal. . . . the past that furnishes the data, which the thoughts of all men of all ages have revolved only to bequeath them on and on to successive generations, . . . . It is very rare to see a perfect specimen of the molluscous mind, a man absolutely imperturbable by them. . . . And yet there have been men who, in a state of society almost verging on this extremity [that of the French Revolution], have gone on during the very crisis of a revolution affecting the country in which they lived, have preserved a philosophic equanimity approaching to neutrality, and who, while all around them were divided right and left into two conflicting factions, filling the kingdom with their noise, have either belonged to neither, or if forced to belong to one, have been but nominal members of it. There they lie, deep down under the turbid waters, clinging to their chosen rock, sending out their busy filaments into the local currents, sucking in and giving out according to their nature, and living lives of calm growth and secretion! Of men of this class the history of English literature furnishes no more distinguished example than Sir Thomas Browne of Norwich. <sup>5</sup>

Some forty years later, Edward Dowden in his Puritan and Anglican (1900) devoted a chapter to Sir Thomas Browne in which he sounded much

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5. "Review of Wilkin's edition of Sir T. Browne's Works," North American Review, April, 1862.

the same note, although with less rhetorical exuberance:

With nothing unsocial or inhospitable in his disposition, these contemplative charity, illuminated wonder made him in his best moments a solitary - Thomas Browne, "the only one." In an age of violence and strife, he moved serenely, or abode in the cloudy tabernacle of his own mind. In an age of uniformity, he valued ceremony - of diverse kinds - for its emotional and imaginative suggestions. In an age when dogma hardened into systems, and the sense of mystery departed, as all truth was made definite in schemes and plans dovetailed together from Scripture by the schoolmen of Protestantism, he gazed into what Bishop Berkeley described as the arcane part of divine wisdom, and amid the humblest circumstance of our daily lives he discovered something shadowy and arcane. While others were alarmed by the terrors of religion, he was rapt by its harmonies of beauty and of wonder. <sup>6</sup>

With such an estimate of the man, it is little wonder that Dowden went still further, and while he admitted that Browne showed some interest in the scientific movement of the age, saw no evidence of active participation and placed him as one who clung to the old science even though he looked toward the new. On this point Dowden writes:

The great scientific movement of the period which followed the Restoration was in the hands of a younger generation than that of Browne. His position was between the old view of the world and the new. The fabulous natural history, the popular folklore, the fictions of geographical speculation, the mediaeval legends preserved in pictures, the strange Rabbinical interpretations of Scripture interested his imagination; they had the support of antiquity and of authority; they led him into a curious labyrinth; they made him, as he says, a wanderer in "the America and untravelled parts of truth"; and such wanderings in the virgin continent pleased him. <sup>7</sup>

In fact, Dowden feels that he must justify and explain this author who

..... when Fairfax advanced to Oxford, and the King quitted the city in disguise to place himself in the hands of the Scottish commissioners, ..... published his folio on *Vulgar Errors*; [and who] in the year of the Protector's death, ..... was discoursing on the sepulchral urns lately found in Norfolk, and on the quinoucial plantations of the ancients. <sup>8</sup>

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6. Puritan and Anglican, p. 35.

7. Ibid., p. 36.

8. Ibid., p. 37.

He speaks of Browne as one whose mind was "curious in its research for recondite facts, . . . elusive of facts in its meditative climbings, . . . of rare occurrence, and among English writers of his day, unique." He pictures him in the quincuncial game as "hunting his prey through the heavens and the earth, until at length earth and heaven so thicken with quincuncial forms that the chase becomes a mystical battue."<sup>9</sup> And he finally concludes that "It cannot be said that Browne contributed an idea of capital importance to seventeenth-century thought; he ascertained no new truth; he confirmed no old truth by an original dialectic."<sup>10</sup>

Dowden's attitude toward Browne has been the one generally accepted. Most readers, as was Dowden, have been unable to reconcile an active interest in current affairs and movements of thought with the fact that Browne did not contribute essentially to the forward movement of science, of religion, of government, as did many of the other men of his period, and that he did not rise in hot rebellion when rebellion and defense were ruling factors. They have, therefore, interpreted his quiet acceptance of conditions as ignorance of them, and his mentions of superstitions, urn burials, ancients, and mystic beliefs as an indication of his obliviousness of all else.

Browne has, consequently, for the most part, been shelved with antiquarians and solitaries. Raymond Weaver, in an article in the *American Bookman* for October 1918, says,

. . . while England was fevered with brewing political strife, Sir Thomas Browne, tranquil in his "quiet rest" amid the "drums

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9. Puritan and Anglican, p. 59.

10. Ibid., p. 68.



and trappings of conquest", came forward with his liberating disquisitions of the erroneous beliefs of the "vulgar" in phoenixes and griffins. . . . And while Parliament grew hysterical over the question of Divine Right of Kings, Sir Thomas decided - not without a touch of unconscious historical irony - that swans do not sing before they die. During the Commonwealth period Sir Thomas was lost in dusty antiquities and quaint lore of ghosts, dreams, and the curiosities of history and the pseudo-science of the Ancients. . . . With a magnificent irrelevancy to the passions and politics of the hour, Sir Thomas Browne made the death of Cromwell and the prospect of the "joyful Restoration" a time for meditation of "Urn Burial", 11

While Weaver does not rank in the field of English criticism with Edward Dowden, he has embodied the same criticism in his statement concerning Browne. He again illustrates the general attitude that was adopted by historians of English literature, critical essayists who dealt with Browne or his age, general historians, and those men who read Browne for pleasure or curiosity, as well as the few scientists who have found interest in this seventeenth century physician. From about 1850 until recent times Browne was considered almost without exception as "a collection of miscellaneous fact," a man with "an appetite for acquisition and display of curious learning . . . .," one reputed for "curious and minute learning who had superstitions of his own," who "helped at Bury St. Edmunds to bring down upon two women, Amy Durry and Rose Callender, sentences of death for bewitching children";<sup>12</sup> a "psychological curiosity" who remained to all appearances placidly indifferent to the struggle going on about him.<sup>13</sup> He was wrapped in the beauty and the wonder of religion at a time when others were alarmed by its terrors.<sup>14</sup> He was a "gentle, quaint

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11. Raymond Weaver, "Sir Thomas Browne," Bookman (Am.), October 1918.

12. Introduction to Cassell's National Library edition of the Religio Medici.

13. Encyclopedia Britannica, 11th ed. p. 666.

14. Edward Dowden, op. cit., p. 35.

student" according to Grierson<sup>15</sup> and Groom.<sup>16</sup> A similar criticism appears in the Dictionary of National Biography,<sup>17</sup> and is used by Clayton Hamilton,<sup>18</sup> Edmund Gosse,<sup>19</sup> E. A. George,<sup>20</sup> Paul Elmer More,<sup>21</sup> Keith Graham Feiling,<sup>22</sup> A. J. Ashton.<sup>23</sup>

Professor Legouis, a more recent critic, does not go so far as to say that Browne had but little knowledge of the general situation in England at the time, but he speaks of him as a man who enjoyed the exercise of his own erudition. He states that the urns found near Norfolk "induced him [Browne] to meditate on death and on oblivion which soon covers up man's traces, and he was able to air his vast erudition regarding the various ancient modes of burial,"<sup>24</sup> a statement that smacks of Johnson's earlier one. Legouis further states that Browne "is, in fact, an artist rather than a thinker, and more interesting as a writer than as a man." The French critic is not attracted by the charm of Browne's thinking as were the romanticists, but is somewhat irked by what he calls "the pride of the mystic who believes that his nature is exceptional and that he is privileged to meditate as men rarely do and to receive direct revelations."<sup>25</sup>

15. Herbert J. C. Grierson, Cross Currents of the Seventeenth Century, p. 210.

16. Bernard Groom, A Literary History of England, p. 10.

17. Sir Thomas Browne

18. Clayton Hamilton, "Sir Thomas Browne," Sewanee Review, January, 1903

19. Edmund Gosse, Sir Thomas Browne, p. 103 ff.

20. E. A. George, Seventeenth Century Men of Latitute, p. 166. Mr. George becomes a somewhat metaphorical". . . the Religio Medici is as the olive leaf which the dove brought back to the ark, an indication that at least from the elevation of some high soul the waters of conflict had subsided."

21. Paul Elmer More, Shelburne Essays, Sixth Series, p. 184.

22. Keith Graham Feiling, The History of the Tory Party, p. 48.

23. A. J. Ashton, "Sir Thomas Browne en famille," English Review, December 1926, and January 1927.

24. Emile Legouis and Louis Cazamain, A History of English Literature, New York, 1927, p. 542.

25. Ibid., p. 543.

Another recent critic, William Dunn, feels that "it is equally obvious that over all his thinking is the pale cast of the medieval mind." 26 Dunn does, however, admit him to be one of the truest mirrors of that age, for he "exhibits in one direction its highest attainment, and in another its most striking limitations," although "those who have a primarily practical interest in the progress of exact knowledge will continue to feel that the chief significance of his books lies rather in their scientific limitations than in their artistic attainments." 27 He adds that when Browne studied animals and plants and stars, "he enters their fairy land of monsters and prodigies and legendary tales and pious frauds . . . . Most of his 'vulgar errors' are simply the venerable animal legends of the bestaries of Vincent of Beauvais and Bartholomew, but he reviews them so gravely and often parts with them so reluctantly as to leave the case much where he found it - in the endless circle of scholastic debate." 28 Browne, he felt, had a reverence for the printed page which experiment could hardly shake, and for him natural history was still to a considerable degree a matter of research in a library, the citing and weighing of authorities.

All of this is, in part, true. Because not entirely true, however, it is manifestly unfair to one whom I hope to show not only as a man who reflected the seventeenth century in England, but as one who felt the magnitude and the daring of the new period of thought that he was privileged to see enter, and from which he felt great things were to result.

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26. William P. Dunn, Sir Thomas Browne, A Study in Religious Philosophy, Columbia University, 1926.

27. Ibid., p. 1.

28. Ibid., p. 3.

My thesis that Browne was a man conscious of his age and closely related to it because he had an active interest in it, is not a new one, for it has been suggested previously and has been stated in passing by some. But those who have spoken of Browne as a "mirror" for his age have done so more as a qualification for the criticism which usually follows, that he was detached from the political and religious struggle of the period and, with a few others, such as Robert Burton, was uncaring and perhaps unknowing of the political, religious, and scientific turmoil going on about him.

The brief rescue by Wilkin had been merely a statement that Browne was probably convivially inclined and not solitary in his daily life. Walter Pater, in his Appreciations (1893), had stated that Browne was not as unique as he appeared, nor as singular among his fellows as he was frequently thought, for Browne, even more than a mere professionally instructed writer, belonged to and reflected the age in which he wrote. But it is first with Gosse and Osler that an attempt is made to determine Browne's standing in relation to his age. Edmund Gosse suggested early in his book, Sir Thomas Browne, that Browne was not a solitary antiquarian, but reflected in much of what he wrote the general thought of the period. But Gosse failed to keep to his promise, and after a few pages, returned to the old criticism, that Browne was a man of curious and recondite knowledge, interested only in the odd and the ancient, and that he was incapable of seeing beyond those things in which he found his own particular interest. Gosse, in fact, is responsible for adding to the usual conception of Browne, for he commented, wrongly, upon Browne's lack of knowledge of Descartes and Gesner. Careful reading of the Vulgar Errors would have shown him that Browne not only knew both men, but in the case of Descartes that he had adopted some of the principles laid down in the Principles of

Philosophy,<sup>29</sup>

Although Gosse admitted that Browne was a mirror of his age, he felt him to be a comparatively unimportant one, for he reflected the "vulgar" science and not the new. He quotes Professor Ray Lankester in proof that Browne was neither valuable nor outstanding in such a role, for even in the line of study in which he should have been proficient, scientific zoology, he does no more than reflect popular superstition and error. While "the theories and fables which were current in earlier times in regard to animal life and the various kinds of animals form an important subject of study from the point of view of the development of the human mind," Gosse quotes Lankester as saying, they have really "no bearing upon the history of scientific zoology." On the strength of this assertion, Gosse concludes that Browne is "interesting as a writer, even as a moralist, but not as a pioneer in science. . . . Browne was contented to preserve a condition of mental life into which the spirit of severe inquiry had not yet intruded. It was to set in, a very few years later, with the advent of the Royal Society." <sup>30</sup> Gosse apparently forgot that Browne, while not a member of the Royal Society, was greatly interested in it, followed its transactions carefully, and helped his son Edward in his speeches to be made before it, as well as forwarded to it the specimens that Edward collected on his travels on the continent. "But," Gosse continues, "we must take it [that Browne was stained with thaumaturgy, tempted into false chimerical byways of science, a dabbler in necromancy, witchcraft, and a believer in the philosopher's stone] into consideration when we have to

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29. Cf. Appendix B. See also Appendix C, where, in the book lists given, are included two of Descartes' treatises that were owned by Browne.

30. Edmund Gosse, Sir Thomas Browne, pp. 93-4.

admit all that his book does is to mark a step on the ladder of human knowledge, a safe and humdrum step." 31 And he adds, "There is something very entertaining in the repetition of monstrous tales about animals, and plants, and minerals; but it would be a mistake to think that these tales, or even their refutation, influenced the course of knowledge." 32 According to this, Browne is conversant only with the extraneous material that still clung to the outer parts of seventeenth century knowledge and does not depict the age proper.

It remained for Sir William Osler to make a consistent estimate of Browne based on the knowledge and events of the century, and one that took definite, substantiated form. 33 But Osler dealt with him only as one interested in science, and without special regard to the seventeenth century as a whole. George Saintsbury found in Browne the "special intellectual and literary temperament of the seventeenth century till nearly its close," but

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31. Edmund Gosse, Sir Thomas Browne, pp. 73.

32. Ibid., p. 93. I should like to call attention here to the necessity of refuting superstitions that stand in the way of the discovery of true knowledge and of its adoption. The history of the progress of science is in a large part the history of the breaking down of accepted-as-true beliefs that are later to be counted as superstitions, even as the history of Browne's century is that of the struggle between the new and the old science. The substitution of knowledge for belief is usually slow and painful. The outline of the history of zoology may be a record of epoch-marking events and discoveries, but the real history must also take into account the establishment of belief and the building up of credence by the destruction of the impediments of old knowledge and superstition. For those who object to the "safe and humdrum" step "on the ladder of human knowledge," these minor reflections are probably unimportant, but to one who wishes to understand any period, they are of value. They explain attitudes and the slowness or the rapidity of progress. Especially is this true for such a period as the seventeenth century, when a complete revolution in thought was taking place, a revolution that embraced not only a cosmological system, but the discovery that the butterfly wing is covered with a fine powder and not with exuded moisture from the body of the insect, and that feathers, as Sir Francis Bacon thought, are not the excess secretions of the body.

33. William Osler, An Alabama Student, London, 1906.

he says little beyond that.<sup>34</sup> A. C. Howell, in an article, "Sir Thomas Browne and Seventeenth-Century Scientific Thought," contained in Studies in Philology for January, 1925, gave serious attention to a small part of the problem and attempted to show Browne's close relationship in thought to Francis Bacon and René Descartes. He bases his assumptions principally upon such passages found in the works of the three as have striking similarity to each other in thought and statement.<sup>35</sup> The attempt is interesting, although such paralleling of passages is apt to lead to erroneous conclusions, for the dominant thought of any age may be found among several thinkers who have neither a reading nor a speaking acquaintance with each other. Howell at least accomplishes one thing. Gosse had stated, "It is a vain, but tempting speculation to wonder what kind of an influence Browne would have exercised if - instead of living (as it would seem) side by side with Descartes yet ignorant of his existence - Browne had been born a generation later, and subjected to the full tide of Cartesian ideas."<sup>36</sup> Howell indicates that Gosse's speculation is beside the point, for Browne did have many similarities in thought and statement with Descartes, even though the extent of his actual debt of dependence can only be conjectured.

Only one critic has seriously argued that Browne has a place in the realm of science. Harrison Allen, in an address before the Academy of

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34. Henry Duff Traill, Social England, Vol. 4:1, p. 410.

35. A. C. Howell, "Sir Thomas Browne and Seventeenth-Century Scientific Thought," Studies in Philology, January 1925. In Shakespeare's Silences, Harvard University Press, 1929, Alwin Thaler, has been somewhat less successful in a similar attempt to prove Browne's knowledge of Shakespeare. Cf. chapter II, "Shakespeare and Sir Thomas Browne."

36. Edmund Gosse, op. cit., p. 37.

Natural Science of Philadelphia on December 7, 1894, energetically remarked:

How pregnant his inquires! How trenchant his comments! A phrase suggests the beginnings of new sciences. His phraseology is cumbersome and pedantic . . . . [but] he became a leading authority in the zoology and botany of Great Britain. He introduced the word "commonalty", new in common use, to express a state of many living together, . . . . Browne was a pioneer in the scientific study of graves and their contents. He appreciated the value of fossils. He was also a comparative anatomist, and constantly engaged in such topics as the anatomy of the horse, the pigeon, the beaver, the whale . . . . He studied animal mechanism, especially the gaits of the quadrupeds and the acts of swimming and floating; the problem of right- and left-handedness; the erect figure of man, . . . .<sup>37</sup>

Even the greatest of Browne enthusiasts could not allow Allen's statements to remain unchallenged. While Browne does mention these things, Allen is wrong in the interpretation he places upon them. Badgers were "reasoned" out, not dissected, although Browne did many dissections. The study of right and left-handedness was not based on psychological and physiological principles, but ~~is~~ on unscientific observations dealing with the tendency of the one to take precedence over the other. But I quote the account in all fairness to Browne, for here is one misguided zealot who saw in him all the scientific qualities that others have denied him and which he had only in part.

The truest evaluation comes, perhaps, with Geoffrey Keynes, one of Browne's latest editors. The following statement by Keynes, given quietly and without elaboration, seems, when one has reviewed Browne in relation to his century, to be true. "Browne may be justly compared with his contemporary, Robert Boyle, in his restless curiosity and his use of

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37. Harrison Allen, "Two Scientific Worthies," Popular Science Monthly, November, 1896.



the experimental method, though he fell far short of Boyle in his achievement." 38

It is easy to see why Browne has had built up about him this traditional criticism of aloofness. The seventeenth century was a period of political and religious unrest in which the very foundations of English government and traditions were shaken. For the only time in her history, England attempted to abolish her monarchy - and failed, but not without bloodshed, bickerings, and religious and political tyranny. Browne saw the reign of James I, the beheading of Charles I, the rule of the Protector, the Restoration, and lived within six years of the Bloodless Revolution. He saw Episcopacy and Presbyterianism, divided into dissenting sects and schisms, fight for supremacy, and yet remained a tolerant "latitudinarian" at a time when to be an adherent of one was to be a very real enemy of the others. He saw the reforms and sanctimonious piety of the Puritans and the licentious disregard for conventions and morality of the Restoration. He lived during the early struggles of the new science to establish itself. The Copernican theory was forcing its way into the consciousness of a thinking world in spite of the cudgel that the church on the continent had taken up against it. It was the age of Galileo, Descartes, Harvey, and Newton. The field of medicine, in the latter part of the century, was to see such men as Malpighi, Willis, Mayow, Glisson, Lower, Sydenham, and such patient microscopists as Swammerdam, Leeuwenhoek, and Hooke, and the botanists Willoughby and Ray. Most of these men were younger than Browne but they made many of their contributions to science while Browne was

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38. Geoffrey Keynes, The Works of Sir Thomas Browne, preface to the Miscellany Tracts, xiv.

actively engaged in the practice of medicine. It was in such an era as this that Browne chose to write, for the most part, of things not directly pertinent to revolutions in government, in religion, in thought, and so drew to himself the criticism of being a man outside of his age, one who was continually looking either backward or inward.

Browne's style contributed also to this estimate. Leslie Stephen, when he turned over the pages of the Vulgar Errors, felt as though he "were entering one of those singular museums of curiosity which existed in the pre-scientific ages. Every corner is filled with a strange, incoherent medley, in which really valuable objects are placed side by side with what is simply grotesque and ludicrous. The modern man of science may find some objects of interest; but they are mixed inextricably with strange rubbish that once delighted the astrologer, the alchemist, or the dealer in apocryphal relics."<sup>39</sup> Yet he was convinced that Browne fully believed his own pretension, but somehow indulged himself in a "half-suppressed smile, which indicates that the humorous aspect of a question can never be far removed from his mind." Much of this impression on Stephen's part is undoubtedly due to Browne's manner of writing, as well as to his own disbelief in the things about which Browne wrote. Gilbert Coleridge, in the Fortnightly Review for July, 1914, agreed with Samuel Taylor Coleridge's earlier statement when he said, "so completely does he see everything in the light of his own fancy, reading nature neither by sun, moon, nor candle-light, but by the light of the fairy gloom around his own head, that you might say

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39. Leslie Stephen, Hours in a Library, I, 253-4.

that nature had granted him in perpetuity, a . . . monopoly for all his thoughts." 40

Such criticisms come in fact from the effect Browne's style has upon the reader. As author of some of the most literary and musical prose in the English language, Browne so thoroughly charms his reader by his method of statement that he often produces forgetfulness of what is being said. The famous "purple patches" for which he is remembered have come to epitomize him, for, as I have stated before, few know him for more than the author of the Religio Medici, portions of the Urn Burial, and the famous last paragraph of the Garden of Cyrus. In these pieces of delightful, rhythmic prose, he has shown the side that belonged most truly to his inner nature, the responsive, meditative soul of a man who walked the paths of his scholarship and meditated tolerantly on life and death, the great forces of the universe, which were proof, for him, of something greater than the mere fact of existence. His whimsical paradoxes are couched in the measured feet of cadenced prose that, with its accentuated rhythms and natural, easy balance, assumes a rare beauty that carries the reader far from the thing that is being said, and that gives him the pleasant feeling of what Emerson would probably call an "oversoul" understanding. So persistent is the tendency of the reader to feel the force of Browne's meditations that the well defined lines of the more practical man have become greatly obscured.

As for subjects about which Browne wrote, no single published work or fragment deals primarily with anything that is closely connected

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40. Gilbert Coleridge, "Sir Thomas Browne," Fortnightly Review, July, 1914.

with any of the events or movements which we associate with the seventeenth century. The Religio Medici is, in large part, a flight into untaught, unsystematized mysticism. The Urn Burial seems to confirm the opinion that Browne was an antiquarian who was oblivious of all else but his reflections on the method of burial, in spite of the careful explanation in the dedicatory epistle:

We are hinted by the occasion, not caught the opportunity to write of old things, or intrude upon the Antiquary. We are coldly drawn into discourses of Antiquities, who have scarce time before us to contemplate new things, or make out learned Novelties. But seeing they arose as they lay, almost in silence among us, at least in short account suddenly passed over; we were very unwilling they should die again, and be buried twice among us.<sup>41</sup>

The Garden of Cyrus, to one who has the patience and determination to wander through its medley of quincunces, seems to give little evidence that Browne was interested in more than his own knowledge and the piecing together of quaint bits to form a strangely beautiful, if somewhat bewildering, whole. Christian Morals, the book of his old age, lacks the attractive mysticism and skeptical faith of the Religio Medici, and for the most part may be regarded as but another collection of rules for Christian conduct. Because of the curious combination of fact and legend in the Vulgar Errors, the book is often thought of as

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41. Urn Burial, p. 4. Unless otherwise indicated, all references to the works of Sir Thomas Browne will be made to the six volume edition by Geoffrey Keynes, The Works of Sir Thomas Browne, published by Faber & Gwyer, London, 1928-31. All future footnotes on Browne will be made by initials only, as U.B. - Urn Burial; V.E. - Vulgar Errors; R.M. - Religio Medici; C.M. - Christian Morals; G. of C. - Garden of Cyrus; M.T. - Miscellany Tracts; L. to a F. - Letter to a Friend. To avoid complicated footnotes such as would result with notes on the Vulgar Errors if volume numbers were given, the volume numbers have been omitted and the reference made directly to the name of the work cited. This should cause no confusion, for the titles of the works contained in each volume are stamped on the back, as are the volume numbers.

a collection of ancient superstitions and a reflection of the more vulgar knowledge of his day, and seems to add evidence that Sir Thomas Browne's interests lay only in the things that dealt with the curious or the old, and that he had a total disregard for the events that were taking place about him.

While the predominance of opinion, then, appears to lie with those who hold Browne to be a man alone and definitely apart from his age, there has been a growing tendency to recognize in him some of the salient features that were indelibly a part of the age in which he lived, although the attempts have been incomplete and often little more than suggestive. The chapters that follow represent an attempt to determine what was true of this man who is said to have failed to reflect the turbulence of his times in his Religin Medici which was presented in the year of the outbreak of the Civil War, who published the Vulgar Errors in the critical year of 1646, and the Hydriotaphia, which deals with the shortness of human life and the modes of burial, on the eve of the Restoration. Nothing will be said of the literary value of his prose, and the discussion of his religious beliefs is left to those who have already made quite complete studies of them. It will be my purpose to attempt to place Browne against the background of his age (the period from approximately 1600 to 1688) in an effort to determine what relation he bore to it. It is not my purpose to show him as a foremost figure or a leading scientist, for he was neither of these. It is my purpose, however, to indicate that if he is considered carefully in the light of what other men of his period believed, he will be found to be representative of that large middle section of educated England that contributed little in the way of actual discovery and

knowledge, but that, through its interests and unguided efforts, ushered forward the new thought and the new science and produced a congenial atmosphere for the work of those other men who were the actual pioneers in these fields.

In order to understand the seventeenth century, however, it is first necessary to recognize the forces that impeded its progress and made it curiously paradoxical. This cannot be accomplished until the background of the century is scanned in order to determine how deeply ingrained was the adherence to the dictates of authority and the church and why certain attitudes and beliefs, even though obviously untrue, were held to be true by educated and intelligent men. Before we can condemn for a lack of knowledge, we must understand the possibilities of knowledge. The chapter that follows serves no purpose except as it accomplishes this. In the light of such an understanding, the subsequent chapters will attempt to show that Browne was not just a seeker after oddities, nor an adherent to the cult of authority simply because authority fascinated him, but one who shared these things with the majority of men of his education and rank. He paid the penalty of being a seventeenth century man, for his age was still saturated with medieval beliefs and attitudes, even as it looked toward a new knowledge gained by a new method. With regard to what Browne could know, compared to what he did know, I shall attempt to show him as he reflects the old science, that which had been passed on to the century by the medieval mind, and as he reflects the new science - the gift of his century to modernity, as well as his knowledge of the national and local events that were taking place about him.

## CHAPTER II

## THE BACKGROUND OF SEVENTEENTH CENTURY THOUGHT

Before continuing our discussion of Browne, then, the background against which he should be seen must be considered. The seventeenth century still cherished numerous medieval beliefs, some of which had remained unquestioned and unchallenged through the period of the Renaissance. A number of these beliefs the century itself was to discard; others it was to pass on to the succeeding centuries. Such a procedure was in no way unique, for it is the normal course which is followed in the transmission of human knowledge. But one of the distinguishing characteristics of the century lies in the close juxtaposition of superstition and accurate knowledge of easy credulity and intelligent skepticism. During a study of the century, one is tempted to wonder why, if certain things were clearly understood, obvious implications could remain unrecognized and to ask in bewilderment, "Why, if that was known, was not this known as well?"

The explanation is not simple. Part of it lies in the limited power of the human intelligence to see all things in perspective, and its hesitancy in taking a fact from its place of initial recognition to be used as an approach to another inference. Part of it lies in the reluctance of the mind to leave the security of taught beliefs and to strike out for itself. And part of it lies in the slow, painful process of wearing down new channels into which the thought stream may be diverted. Probably at no other time in the history of Western Europe can one find a period of thought so strangely paradoxical as that of the late sixteenth and the seventeenth centuries. The period was no longer medieval, neither was it modern. It looked eagerly to the new

knowledge and longingly back to the old, regarding both with almost equal interest.

It is this trait of regarding all learning seriously that makes Browne so truly a man of his time. He takes pains to disprove what seems to us now to be obviously false and in need of no formal disproof. We are apt to wonder at his serious regard for these errors and to feel, as did Sir Leslie Stephen, that perhaps he was writing with his tongue in his cheek, or, perhaps, to feel with Sir Edmund Gosse that he was wasting a great deal of time and energy in pursuing so carefully and with such a show of erudition something that needed little consideration to determine its falsity. Because we do not understand the period, we assume this display of erudition to be an indication that Browne was not a man of the keenest perception, and that he must surely be an antiquarian at heart, interested in knowledge only as a passive, already determined thing.

Part of the reason for our inability to understand Browne and his contemporaries lies in the comparative ease with which we modify theories and even laws and principles so that they conform with new discoveries and determinations. We proceed on the supposition that a thing is true if science can demonstrate it so, with the result that we easily relinquish a once well-established and generally accepted truth for another that seems, under close and recent scrutiny, to fit more adequately into the general scheme of things. While we venerate the names of such men as Galileo, Newton, Darwin, we recognize in them only an approach to the truth. We do not regard them as having revealed to us the entire truth in unquestionable form. We modify their ideas, we change their principles, we build upon their beliefs, and we hail them principally as the thinkers



who set us on the proper path for our later formulations and considerations.

This was not true of the seventeenth century man. For him, at least in the early part of the century, authority was vested in a name and allowed no suggestion of error. If two men of authority had contradictory ideas upon the same subject, steps were taken to discover the hidden meanings that lay in these ideas in the full belief that, could they be correctly interpreted, these meanings would be found to be the same. There were, of course, as there are today, schools of thought that stood out and against each other, but these schools in turn were usually built around differences in the interpretation of the same authority. Behind these schools was a broad theological unity, a belief in God as the creator of all things, the revealer of true knowledge, the inspirational source for all rules of ethics and conduct, and a belief in the devil as the corrupter and seducer of a natural and fallen world. Theological authority had retained a firm hold, for the understanding of the manifestations and revelations of this God and the ways and workings of this devil were felt to be beyond the power of the usual man. Such interpretations were left for the church fathers who attempted to build up some sort of a philosophical-theological system that would reveal the ways of God to man and give explanation for the relationship that existed between God and man and the universe. This was not the task of the common man. It belonged to the theologian and the philosopher who, until the late sixteenth and the seventeenth centuries, were the same man.

Religion, in fact, still underlay all beliefs and knowledge of the century. It was the nucleus for all thinking and its influence was

of long standing. This was an inheritance from the medieval period. During the Middle Ages men had been sustained principally by their belief in God and by the hand of the church and the church fathers. Famine, pestilence, war, plague, serfdom, abject slavery had been their lot, and they had been given but little opportunity to exercise their own powers of reason or independent thought in an attempt to control the conditions in which they found themselves. For centuries, so many centuries, in fact, that western Europe had practically forgotten the high peaks in the civilizations that lay behind her, religious teachings and speculations had so dominated the people that they felt them to be an integral part of their existence. These teachings did not merely include a worship of a Deity, nor did they necessarily act as a check on conduct. They were a part of all life, as common and ordinary a part as the food and drink necessary to sustain the physical body. They did not raise the moral tone of society, for the immoralities and cruelties of the Middle Ages cannot be overlooked, but they acted as a stabilizing force on one hand, even while they stunted social and mental development on the other. They offered an explanation for the exigencies that the common man had to face in his struggle for existence. The world, he had been told, was bad. It was a hospital for him to die in, a testing place where evil and suffering besieged the individual in an attempt to make him quail under vicissitudes and break faith with his God. If, however, he could withstand the hardships that the life in the Middle Ages offered him, if he could suffer in silence and endure the evil of a vitiating social system, if he could fight in the name of God with true religious zeal in an attempt to wrest back for God a lost people and a lost land, then he would have

his reward in heaven. And that reward offered him all the things that his suppressed being wanted and could not have: happiness, gold, jewels, power, station, leisure, companionship with an overlord. It promised him the punishment of his enemies, and a period of eternal happiness if he could but endure through the short trial of earthly living.

Religion, then, was a prop for endurance and the explanation of his suffering. Its most disastrous effect, beyond making social changes and improvement in general living conditions slow, was that it made him disparage the physical world about him and raise his eyes to the heavenly world that was to be his ultimate home and for which he was preparing himself. So many were the evils of this world, and so hard his struggle in it, that he came to regard it as dangerous to his faith for it threatened to seduce his interests away from the heavenly pilgrimage by calling his attention to those things that lay about him. The inevitable result followed, and because of this attitude, it is almost incredible how very little was known of the common things of the physical world. Knowledge that casual observation should have given to even the slowest of thinking minds was disregarded by men of high intelligence because they had no respect for the physical world as it lay before them. They trusted in the statements of others for their instruction concerning the length of the leg of the badger and the anatomy of man and whether horses had a gall sac. Explanations for natural things were not entirely due to Christian teachings, however. Aristotle and Pliny had contributed a great amount of natural history lore whose authenticity was not questioned. This respect for authority included the Greek and Roman philosophies and teachings, and much of this teaching was to remain until the time of Browne's century.

It is easy to understand why, throughout these centuries, an almost adamant belief in the sanctity of authority had been built up. Immediately following the fall of Rome, scholarship and things pertaining to schools and learning had been at a premium. Yet, as is always the case, a certain amount of teaching and study was available even though not given formally. But the usual man could not read. He received his moral and religious precepts from the hands of the Church Fathers, or from his own priests, and from the monks who withdrew into the monasteries. The church interpreted for him as much of religious philosophy as it thought necessary for him to know, and gave him whatever explanations of existence and immortality he demanded. The confessional relieved him of his sin. His plane of living was, for the most part, low, and he usually was without the desire to think. There were few schools that offered themselves, and these were mostly church schools and monasteries. The universities of the late Middle Ages were centres for the congregating of those men who represented schools of thought that offered opposition to each other and who spent most of their time interpreting the teaching of the Bible and the doctrine of the earlier Church Fathers. There were, of course, universities that taught languages and medicine, but these were also disciples of a philosophy and the subject matter of their courses in anatomy and medicine dated back to such men as Hippocrates and Galen. Here, too, was assumed the infallibility of authority. In fact, the principal recommendation for all things taught in medicine was the introductory clause, "Galen says." The Renaissance was to modify to some extent this type of college and university, but the hold of authority was not easily broken. The chief consideration then became who was to be considered the authority.

But, even with these few congregating places for the ardent thinkers of Europe, the state of learning was at a particularly low ebb. The usual man could neither read nor write, nor did he show any inclination to learn to do so. There were but few books, and they were expensive and jealously guarded. Moreover, reason was felt to be incapable of encompassing the moral law, for a knowledge of the moral good was not to be obtained from a study of the natural order, the only realm open to the reason, but must come through periods of ecstasy experienced during the contemplation of God. Only the minds schooled in such contemplation and favored by God were capable of experiencing such periods, for the human mind was inferior to that of God and was incapable in itself of approaching a knowledge of him. Leisure for thought without the necessity of grubbing out a living was a necessary boon for such thought, for the more one could disregard this world, the nearer he came to understanding the next. Consequently, most speculation and study was directed by a favored few toward the oneness of God in an attempt to approach that God-mind of which all was a part, although corrupted. Ingenious metaphysical systems were the result, and while the common man heard and understood little or nothing of the systems, he fell into the habit of holding those who devised them and offered learned explanations as favored of God and as having authority.

The study of a religious and un-physical world made by minds that could not encompass abstractions without relating them to reality led to a belief in the occult sciences. Men, many of them sincere students, made wide application of things which they did not thoroughly understand, and astrology, alchemy, and witchcraft gained a firm foothold in the western European world. Men read their destinies in the stars. They hunted for

that single pure essence of which every substance of the physical world had a part, although a corrupted part; it was the hunt for the philosopher's stone. Witchcraft had both a philosophical and a religious justification. To deny it was to deny the existence of both good and evil spirits. It was also to deny the boon of free will, for the individual could, by choice, sell himself to the devil in exchange for supernatural powers, sensual pleasure, worldly knowledge, those lures held out by Satan to make man forget his true status as a religious being. This belief in witchcraft was not to come to a head until the seventeenth century, when its crude superstitions and its inhuman methods of trial and punishment added another blot on the pages of human history. Browne's testimony at the Bury-St. Edmunds trial, that he believed in witches even though he did not know whether the women on trial were witches, was a testimony that most men of the early seventeenth century might well have given. In fact, it was a more cautious testimony than might have been expected.

With this increasing interest in the occult sciences during the latter part of the Middle Ages, the people fell more and more into the habit of accepting as true that which those counted as authorities had said were, the physical world became less and less known. The testimony of the senses was held to be deceptive, for it was based upon those things determined by the faculties of the physical body, which were in themselves corrupt and could not be trusted. Things that should have been known from casual observation were oftentimes unknown, or were counted as gross errors.

But some explanation had to be given for natural things. The world, in consequence, came to be considered as symbolical, the allegorical

manifestation of the power and goodness of God. Stories about tigers, eagles, panthers, whales, all with allegorical interpretations carefully worked out, were repeated until the symbolical characteristics were often accepted as true ones. In this way the animal received physical traits and habits that even the most cursory observation or the slightest of reasoning could often have disproved.

In time, these mythological traits came to be part of the knowledge that was available concerning natural things. The literature of the seventeenth century is permeated with allusions to this lore and, while many of these allusions are not familiar to us now, or are regarded merely as quaint or poetical usages much as we consider references to Greek mythology, we are astonished as we go through the science of the period to learn how much of it was accepted as actual fact. It is because of our difficulty in realizing how many of these pseudo-facts still remained in the seventeenth century as seriously accepted knowledge that we often view Sir Thomas Browne's Vulgar Errors with indulgence, feeling that such a collection must indicate a man steeped in the knowledge of past ages and clinging to it instead of becoming interested in the new science that was coming into being. Actually, he was reflecting a large part of the knowledge passed on to the century by the Middle Ages, knowledge which had not yet been discarded. He himself was aware of the origin of many of the errors which he considers, for he says, ". . . how dangerous it is in sensible things to use metaphorical expression unto the people, and what absurd conceits they will swallow in their literals."<sup>1</sup> Other men whose names we remember

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<sup>1</sup> V.E., IV, x, 47. The large Roman numeral indicates the book, the small the chapter, the Arabic numeral the page number. In cases where the chapter is in turn divided into sections, the section will be inserted between the book and the chapter number by the abbreviation sec. followed by the section number. This scheme will be followed for all references to the Vulgar Errors. In references to any of the works of Browne, Arabic numerals will always indicate the pages.

more than we remember Browne's were awakening to the same realization, but most of these were younger men than Browne, or were among those who lead one period of thought into a new period, using what the century has to offer in combination with what skill in thought and determination that their own genius affords them. Browne was not a genius, but he was a typical seventeenth century man of letters and science.

I have attempted in the foregoing discussion to show how religion and authority had attained a powerful hold upon the minds and actions of the people during the centuries preceding the Renaissance. By the time of the seventeenth century, this hold was being somewhat loosened although it had not been thrown off. The amount of actual knowledge available had not been greatly changed from medieval times, but conditions and attitudes had so shaped themselves that a revolution in thought was inevitable.

Toward the close of the Middle Ages, religion, while not preventing moral corruption, was still the most potent factor in the life and thought of the period. But the church as an organization began to lose its hold as an unquestioned dictator to the people. Previously, it had supplied all things necessary: moral teaching, forgiveness of sins, a unifying principle for all people of western Europe. Although it had no stated civil control, it had acted as a party to most political movements. Conquests had been made in its name, and it had offered religious justification to such ventures. To reconcile temporal and spiritual power, kings had become the servants of God, chosen by Him, and invested with infallibility - the doctrine of the Divine Right of Kings. The church had fallen into the hands of corrupt popes who exploited its power and position. Once it had given solace and stability to a weak and helpless



people; now it began, in its turn, to torture and to make helpless. Dissension arose within it, and the split of the Reformation was inevitable. The attempt to return it to its original purpose, that of a strictly religious institution, increased religious persecution and weakened its temporal hold. But this did not destroy man's belief in its religious precepts or his veneration for the teachings of the Bible as given to him by its priests. Instead, he clung even more closely to those things, for they had come to be the things for which he fought.

The Reformation concerned itself chiefly with the church as a religious institution. Another inroad was made on the power of the church by the doctrine of nationalism, as given by Machiavelli. According to him, the state was above the church in civil affairs, and was to look first to her own welfare. This would tend to keep most of her wealth and power under her own civil control to be used for her nationalistic purposes, unhampered by the dictates of a common religious organization. This undermining of the position of the church was also augmented by the rise of the middle classes as they began to throw off the yoke of serfdom and to engage in trade. As a result of their new sense of adequacy, they began to look to the church only as a spiritual adviser. Along with these movements came the discovery of the New World, which ushered in a period of exploration, legalized piracy, and colonization. Nations not only looked to their European boundaries, but set jealous eyes upon the lands across the seas and sent out exploring expeditions in the name of God and country. The tendency that had shown itself in the time of Charlemagne to conquer a people and baptize them in the name of God, at the same time proclaiming them to be subjects of a temporal king, showed itself even more distinctly now. In spite of the fact that

the explorers set out to convert the inhabitants of these new lands to a belief in a Christian God, in spite of the fact that taxes and tithes from these new lands were often paid into the church, the lands were taken in the name of whatever nation first set her flag upon the soil - the national expansion of a national kingdom.

This partial disintegration of the civil and temporal power of the church was to have a twofold effect. It divided religious bodies into sects and schisms, each declaring itself the true religious organization of the only true God, and it deepened the regard for religious principles by making men fight for them. The members of these diverse religious cults were jealous of their self-avowed position, and religious opposition and the desire to persecute those not conforming to their religious doctrines, deepened into hatred. The determination of each was to convert, by force if necessary, all to its views. The brunt of this ecclesiastical madness was borne by the sixteenth and seventeenth centuries, and during this period opposition to any religious view or tenet was dangerous.

On the other hand, even while religious zeal was driving men to bigotry, these same men were beginning to get away, under not too auspicious circumstances, from the idea of a single source for authority and to come in contact with sincere contradictory beliefs that indicated that there must have been some discrepancy along the path of determination. Regardless of what may be said about the circumstances that brought this about, men's minds were gradually awakening to diversity in thought and belief, and, although the result was not immediately beneficial, and although the immediate advantages may not have outweighed the disadvantages, men were gaining in tolerance and the weighing of evidence.

The period of discovery and exploration in the sixteenth century had

contributed little to scientific knowledge, other than that which was geographical. Tales of fabulous wealth, of strange creatures and people, were the result of the journeys of the adventurers. Few thought to study topography, climate, animals, resources, (except as they contributed to immediate wealth) or inhabitants from a scientific point of view. Sailing the high seas and braving storms and shipwreck and death was for material gain, seldom, as is often the case at the present time, for the enlarging and enriching of knowledge.

The invention of the printing press had given an impetus to the circulation of books and ideas, and, consequently, it fostered a greater familiarity with what had been written, making more people aware of the thoughts of other men. It increased the number who could use the same sources and materials, and it facilitated an exchange of ideas and an independence in interpretation. Even this, however, affected but a few, for the price of books was almost prohibitive. Besides, only a small proportion of men could read. But in spite of this, knowledge that had been the possession of a few now became the possession of many, with the result that more things were thought to be proper material for consideration and there was an increase in independent thinking.

The revival of interest in the classics during the Renaissance did not change to any great extent the amount or kind of knowledge then available. The Renaissance had its deleterious as well as its beneficial effect. It added more errors to man's already inaccurate knowledge. It widened the field of authority, and instead of making men independent thinkers, it tended, for the time, to give them more sources for quotation.

But with this revival of interest came the desire of the individual for self-expression. The sixteenth and seventeenth century man had

becomeconscious of himself. He had now a desire to live in the present and to have a part in exploration, trade, discovery, and later, in experimentation. He experienced a growing desire to know, to gain temporal power, to use things for a material gain. He made but little attempt to slough off religion, for the Renaissance and seventeenth century man was still theologically minded, although he had begun to think what God had created must be good and worthy of consideration. He wanted control of states, lands, and trades, and by the middle of the seventeenth century, of the forces and resources of the physical world.

The desire to control by making use of the laws of the physical world was late in developing. As I have already indicated, it belonged principally to the post-Renaissance period. During the Renaissance, man had sought for self-expression through their artistic powers and through their daring and their ruthless exploitation of other peoples and wealth. The literature and art of the period were principally the expression of the individual. Oftentimes they were the expression of the sensuous man who had been held rigidly in check for years, and who now found himself free to indulge his passions in action and song. Oftentimes it was the orgy of one who, like Cellini, combined genius with overweening egotism, and who knew the vices almost better than the virtues of the age.

But even these things belonged to the minority. The vast number of people were untouched by the revival of old knowledge, or by the wave of self-expression. They still could not read, nor were they interested in philosophy and letters. National exploitation and discovery and colonization meant little to them except as greater hardships were worked upon them. They were still medieval in a stolid sort of a way. For them, the Renaissance was hardly a new birth. The printing press

gave them no books. The church was still the ruling factor of their lives, and those things that had been believed by the generations preceding them, they also believed. The cult of authority had too firm a hold on them to let them realize suddenly that proof lies not in a name, and that allegorical statements are not necessarily true. They merely extended the boundaries of their acceptance, and when Greek and Roman names were quoted, they received these names with the same veneration with which they had received those of the church fathers. To the names of Augustine and St. Thomas were added those of Plato, Lucian, Galen, and Cicero. At the beginning of the seventeenth century Pliny and Aristotle and the Bible were still indiscriminately held as authorities.

A large part of this material adopted from the ancients was in error, decidedly so, but it was accepted with little questioning. But at least men were awakening to the power of the mind and were once more deciding that the world was good and worthy of consideration. This helped to make the domination of the ancients brief, but no less effective. Many of the errors that Browne notes in his Vulgar Errors were vulgar only in the sense that they were commonly accepted. The early seventeenth century had yet to determine whether elephants had joints in their legs, whether the phoenix actually existed, and whether bear cubs were born shapeless and were later licked into shape by the mother. It had yet to question the use of mummy dust in medicine. To it, the fire-quenching salamander and the air-sustained chameleon were not mere poetical fancies. The Copernican theory was considered by the majority of thinkers, not only as absurd, but dangerous. The effect the moon had upon tides had been suggested by a few, but determined by none. Most

people still believed in unicorns, and there was among the crowned heads of Europe rivalry for the possession of the largest horn. The rising and descending of the sap in plants was still a mystery to botanists. Nicholas Culpeper, as late as the middle of the century, refused to concede that the sap remained in the roots during the winter, pointing out that sap made plants grow, that roots did not become appreciably larger during the winter, and therefore could scarcely be said to have sap stored in them.<sup>2</sup> This may have been good reasoning, but it was not good science. But science was then principally a method of reasoning from accepted premises to what appeared to be logical conclusions.

The real struggle between empirical knowledge and adopted authority was to occupy the sober minds of the men of Browne's century. Method

2. Nicholas Culpeper (1616-1654), The English Physician Enlarged, London, (1739?), pp. 369-70. Culpeper asks trenchantly, What would the sap do in the roots during the winter, pick straws? It was a paltry objection, but one that puzzled the champions of seasonally rising and descending sap. Its answer belonged to the search of even later men. Browne, on the same subject, is more observant and reasons somewhat better than Culpeper, although the true use of the sap and its movements had not yet been determined. He questions, Whether the sap of Trees runs down to the roots in Winter, whereby they become naked and grow not or whether they do not cease to draw any more, and reserve so much as sufficeth for conservation, is not a point indubitable. For we observe, that most Trees, as though they would be perpetually green, do bud at the Fall of the leaf, although they sprout not much forward untill the Spring, and warmer weather approacheth; and many Trees maintain the leaves all Winter, although they seem to receive very small advantage in their growth. But that the sap doth powerfully rise in the Spring, to repair that moisture whereby they barely subsisted in the Winter, and also to put the Plant in a capacity of fructification; he that hath beheld how many gallons of water may in a small time be drawn from a Birch-tree in the Spring, hath slender reason to doubt." V.E., II, vii, sec. 4, 174.

Francis Bacon, who thought that to shake a tree would stir its sap (Natural History, Cent. V, sec. 423, p. 133) was much more deluded in some of the properties he ascribed to it. "The moss of trees is a kind of hair; for it is the juice of the tree that is excerned, and doth not assimilate. And upon great trees the moss bathered a figure like a leaf." Natural History, Cent. VI, sec. 542, p. 144.

was hap-hazard and bounded always by religion and authority and the dogmatic adherence to what was said to be true. Conclusions contrary to accepted authority were still considered to be dangerous. The fate of Huss and Servetus and Galileo was of too recent occurrence to be easily forgotten. The world, as the unfathomable expression of God, was not to be violated as such, although the men of Browne's time were beginning to see in it the manifestation of the Divine Wisdom. The conceptions of lower animal forms had been distorted by the earlier natural historians, as Aristotle and Pliny, and there had been but few corrections made of even the more glaring errors. The human body might well have been a foreign thing, as far as knowledge of it was concerned, for modern medicine was not to have its beginning until the middle of the century when Harvey formulated the theory of the circulation of the blood, and when other men began to observe and to dissect. What was known of plants had to do with their medicinal value; botany as a science of plant life was to wait until the latter part of the century when Grew and Willoughby and Ray were to separate the study of the plant from that of medicine. In fact, the idea of the world as systematically arranged and ordered, with laws governing its phenomena, was yet in the offing.

The new science had to be handled cautiously. On the surface it might look harmless, innocuous in its findings, but it threatened to become deleterious to the old cults. Prior to Galileo, there had been but little experimentation, for the laws of nature were thought out a priori, or on the basis of uncontrolled experience. With the sixteenth century had come the first real contributions to the new science. Copernicus (1473-1543), a Pole, had given to the world in the year of his death his De revolutionibus orbium caelestium. Andreas Vesalius (1514-1564)

a Belgian, had published what was perhaps the first modern treatise on anatomy, De fabrica corporis humani. But these two works were unfavorably received, and had little effect upon science for the next fifty years. In fact, until the middle of the seventeenth century not all men of keen wit and clear intelligence were yet convinced of the authority of these works.

Even such men as Copernicus and Brahe had done little experimentally. Copernicus had advanced the mathematical and theoretical side of his theory far beyond the experimental, as had Brahe. Kepler had made some critical observations and had checked much of Copernicus's work by observation of the phenomena. Galileo combined his experimental and observational skill with the work already done by Kepler and gave a new appreciation to physical laws. But even he experimented more to demonstrate his deductions than to arrive at laws. It was not until the time of Newton in the latter part of the seventeenth century, after the death of Browne, that a synthesis of the results of almost two centuries of work was made and a rational and consistent mathematical theory of the solar system was arrived at. When we speak of these men, and to the list we might well add the later name of Leibnitz, we should keep in mind that a large part of their work was first based on the records and theories of ancient and medieval thinkers, and that though they appear to have advanced beyond their century, they were merely larger minds working within it. They were motivated by a search for a knowledge of God, for not only did they (with the exception of Brahe, who was a sun worshipper) believe in God in an orthodox manner, but they felt that their discoveries proved his existence and contributed to the knowledge and understanding of his nature. They were not empiricists for the sake



of empiricism.

Besides, too many aids to accurate work were lacking to allow sound scientific deductions. Astronomical instruments were poor. The telescope was not used to advantage until the time of Galileo; observations had been inaccurate, and the data had been kept over too short a period of time to be of great value. Algebra and arithmetic were a product of the same age as the new astronomy, and logarithms were the later offering of Napier.<sup>3</sup> Accurate clocks were unknown, and even in the early part of the seventeenth century Bacon had been forced to make some of his experiments concerning the speed at which sound travels with the pulse beat as the instrument of measuring time. The inaccuracy of water clocks was recognized; the pendulum clock was to be a product of the Royal Society, a society organized in the latter part of Browne's life, and watches were yet curiosities.<sup>4</sup> Equipment, in the sense we now use the term to designate that paraphernalia which modern scientists hold to be indispensable to scientific research, was all but unknown.

Not only was the seventeenth century man hampered by his lack of equipment for controlled experimentation, but the effect the new know-

3. John Napier, 1550-1617. He was a religious controversialist and a landowner, who was involved in many legal difficulties. He devoted much of his leisure time to the study of mathematics. He explained the method of the construction of logarithms before he invented the term, and referred to them only as artificial numbers in contradistinction to natural numbers. His Mirifici Logarithmorum Canonis Descriptio was published in 1614, and was dedicated to Prince Charles, later Charles I.

4. G.C. Clark, The Seventeenth Century, p. 19. Cf. also R.T. Gunther, Early Science in Oxford, I, 8, for an account of Sir Henry Wotton's (1568-1669) experiments with the measurement of small units of time by the descent of drops of water through a filter. Also Aubrey, Brief Lives, Clark ed., I, 412, mentions the invention of pendulum watches by Robert Hooke, a member of the Royal Society. Browne speaks of the inaccuracy of water clocks in hot weather. Before the pendulum clocks, water clocks were a common means for the measurement of time. Cf. V.E., V, xviii, 131-2.

ledge was to have upon accepted fields of thought, especially religious thought, had to be taken into account. Here, perhaps, was the most serious obstacle to advancement. Browne treated the Copernican theory cautiously, and not a little skeptically. But to adopt it meant more than to acknowledge that a new system had been evolved from mathematical principles. It meant striking at the root of centuries of religious and philosophical teaching, for so to aim at the central theory was to bring down countless other beliefs and theories that had been built around it. The preponderance of mathematical evidence might have been in favor of the theory, but religiously, philosophically, authoritatively, all evidence was against it, and mathematics, its only real basis of argument was still in bad repute. Before we censure Browne and his contemporaries for not adopting the theories that now seem second knowledge to us, or for not observing even where observation would have been comparatively easy, we must take into account what the immediate consequences of such adoptions might be and where lay the preponderance of evidence and the weight of argument. Two well known examples, taken, however, in reverse chronological order, will illustrate my point; the theory of the circulation of the blood, and that of the Copernican cosmology.

The advancement of such a theory as the circulation of the blood<sup>5</sup> appears, on the surface, to be fraught with no harm. It threatened, however, an entire section of physiology. Its establishment would, of necessity, do away with the Aristotelian hypothesis of animal and vital spirits. This, in turn, would do away with the explanation of the manner

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5. William Harvey, De Motu Cordis et Sanguinis, Frankfort-on-Main, 1628. The first English edition was published by R. Lowndes, Physician of Rotterdam, 1653.

in which impressions were carried to the brain, and so damage psychology. When the theory was finally proved, as it was later by Malpighi in 1661, by his discovery under the microscope of the tiny capillaries that united the veins and arteries, it was to change the theory of the function of the blood vessels, and so damage anatomy. When it was proved on observational and dissectional grounds, it invalidated a mass of philosophical and theological reasoning that had been offered as explanations for the purpose or function of the heart, its place as the "life giving principle" as the first organ formed in the development of the embryo because of its importance.<sup>6</sup> It would disprove the theory of the heat of the heart and the condensation and vaporization of the blood in the ventricles, as well as the refrigeration of the blood by its contact with the air taken in by the lungs. This single theory, then, would disrupt accepted ideas in medicine, in psychology, in philosophy, in anatomy, in religion, and it would discredit authorities from Aristotle to Descartes. To destroy even one error was to threaten the superstructure that had been built upon it.

This effort to save a structure by refusing to undermine a foundation accounts for much of the bitter contention waged over the adoption of the Copernican theory. This was not merely a question of changing

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6. Konelm Digby, Of Bodies, London, 1669, pp. 295 ff. Digby's explanation is a composite of several explanations, but it covers a number of beliefs concerning the heart and the blood and their functions that were then widely accepted. Although here, as well as with everything he discussed, he has put his own touch upon the explanation, it is still representative of what was then generally held to be true. Descartes' explanation of animal and vital spirits contained in his "Treatise on Man" is typical of the psychological principles then accepted.

the theory concerning a cosmological system, but a question of threatening explanations in astronomy, theology, and philosophy that for hundreds of years had been accepted by most men as being indestructible and unchangeable. The earth and the heavens had hitherto been held to have been especially created for man. He was thought to be the centre of all things, both allegorically and literally. The old Ptolemaic system had satisfied this interpretation, for it placed man and his earth as the actual cosmological centre. It allowed definite locations for heaven and hell. It offered a universe easy to contemplate, for it corresponded with the sensory illusion that the earth stands still and the sun and stars move around it. This system gave a sense of security, for the mind can understand a thing that has limitations and boundaries. To change it, and to make the sun the centre of the solar system, was to make man more truly than ever a worm of the dust. It bewildered him in his contemplations.

It was no small matter to do away with centuries of tradition and of philosophical and religious teaching. It was no light thing to acknowledge that man dwelt on a planet of relative unimportance, one that might even be destroyed without great effect on the rest of the system. The new system, moreover, allowed for limitless areas of space that the mind of man had difficulty in encompassing. It suggested infinity. In proportion as space was extended, man and his earth became comparatively smaller and more insignificant. It also made the solicitude of God for man appear less. By pushing back the boundaries of the universe and making the earth but one of the planets, and that one first neither in size, position, nor importance, was to make man and his earth come under laws common for all planets and heavenly bodies

instead of laws made for him alone. This would destroy the basis for many of the allegorical interpretations of man and nature and God.

To accept the theory would also cast reflection upon antiquity and make the system of knowledge once more uncertain. Strangely enough, however, Copernicus, in the first formulation of the theory, had not departed from the accepted method of looking first to authority for his beginnings. This theory that was later to help despoil antiquity came from antiquity. It was a product of the medieval attitude, for it had been adopted from the ancients and was based on the very old idea that nature works in the simplest way. Copernicus had approached his problem in the same manner as Browne and his contemporaries were to approach many of their speculations a century later - by giving close consideration to what had already been thought. He handled his material much as they, at times, handled theirs by pushing forward, without actual observational proof, the implications found in a premise first suggested by authority until a new conclusion had been reached. Copernicus had come across the statement that certain Pythagorean philosophers explained the phenomena of daily and yearly motions of the heavenly bodies by supposing the earth itself to rotate on its axis and to have an orbital motion. He had also found in Cicero that Hicetas of Syracuse believed that the earth moved, although Hicetas thought that only the earth had motion.<sup>7</sup> He knew that Plutarch

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7. W.T. Sedgwich and H.W. Tyler, A Short History of Science, p. 56. The heliocentric theory had, of course, been conjecturally anticipated by several ancient philosophers. Heraclitus of Pontus, of the 4th century, B.C., taught that the earth rotated or turned on its own axis from west to east every twenty-four hours. Aristarchus, 270? B.C., held to an orbital motion of the earth. In the next century the rotation of the earth on its axis was taught by Seleucus, an Asiatic astronomer. Nicholas of Cusa, 1401-1464, had also ascribed motion to the earth. None of these anticipations had found the necessary acceptance to give them permanence.

mentioned others who had held the same opinion. This, he felt, justified his assuming the motion of the earth if by so doing it would better explain the revolutions of the heavenly bodies than did the Ptolemaic theory. So he assumed motion for the earth and found that, when the motions of other planets were referred to the revolution of the earth, and computed for the revolution of each star, not only did the phenomena necessarily follow therefrom, but that the magnitude of the stars and all their orbs and the heaven itself were so connected that in no part could anything be transposed without confusion to the rest and to the whole universe. But here he was content.

The Copernican theory accomplished no more than did the Ptolemaic, except that its explanation of the system was simpler. Copernicus was himself not much interested in a study of the heavens. He was a philosopher and a mathematician, not an astronomer. He had a theory that could be proved mathematically. What observations he did make were inaccurate, for his instruments were poor, his eyesight was not keen, and his location was unfavorable for clear skies.

It was not, then, a startling theory, but it was a dangerous one. By the time of Galileo,<sup>8</sup> early in the seventeenth century, the church

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8. The theory had not been considered seriously until the latter part of the sixteenth century when Tycho Brahe, Bruno, and Kepler undertook to work out observational proofs. Tycho Brahe rejected all but the placement of the sun at the centre of the solar system, for he was a sun worshipper, and so to place the sun was to strengthen his own religious beliefs. He admitted that the other planets circled the sun, but refused to believe that the earth could do so. His main contribution to science was his careful cataloguing of the stars and his study of comets. Kepler, famous for his three laws of planetary motion, was an astrologer, who spent most of his time following his profession of foretelling human destinies by the stars. He worked on the making of observations and the rechecking of the computations of Copernicus only during the time that he was not busy with his horoscopes, and with a crude instrument as his only aid. Cf. Preserved Smith, A History of Modern Culture, pp. 22 ff. Also Edwin Arthur Burtt, The Metaphysical Foundations of Modern Physical Science, pp. 44 ff.

had realized what this new theory might mean to her and began to take harsh methods to prevent its acceptance. A large part of her religious philosophy, as well as part of the justification for her organization, rested on the idea of man placed at the centre of the universe. To demonstrate her wrong in so fundamental a thing as this would be to further the then recognized tendency of questioning authority and of finding out by independent thinking, observation, and experiment. Galileo was made to suffer the heavy hand of the inquisition. He was made to recant his belief of the motion of the earth, although, if one may accept a tradition that has no proof, he whispered to himself after the recantation, "And yet it does move". He, too, learned to say cautiously, as had the friend of Copernicus who forced the Polish mathematician to publish his work, that his hypotheses were merely speculations, and that the results were true only if certain premises were assumed to be true. So strong was this feeling of the necessity of caution that even Descartes' system of vortices suggests compromise, a bowing to churchly precept and authority, an attempt, at least, to reconcile a heliocentric system with a religious belief. According to his scheme, the earth did not move of its own motion, but was carried along in a liquid vortex of ether which circled about the sun. Here surely was motion without motion. It is not for us, then, to condemn Browne, or other seventeenth century men, for not accepting the theory wholeheartedly; it is for us, rather, to realize that to do so was to throw away what centuries had given and to accept that which still needed years of study and investigation and observation to correct and make conclusive. And this was true of other new theories, although perhaps in less degree.

What, then, were the possibilities for knowledge in Browne's age, the background for his beliefs and interpretations? I am giving no consideration to the political situation in England, assuming that it is too well known to the reader to need recounting, and also that it is of but secondary importance in the explanation of the thought and beliefs that influenced the period. Political history is usually a result, not a cause, and with a few notable exceptions, such as at the time of the French Revolution and the more recent Russian Revolution, it is too limited in scope to do more than to facilitate or to irritate the trends of human thought and of human advancement.

Prior to the seventeenth century, the word "science" in English, in Latin, and in the Romance languages, meant no more than "knowledge" in a general sense. And knowledge meant that either derived by mental peregrinations about any subject, or that handed down by authority. What is now called science was then known as "natural philosophy", and was dabbled in by those who built for themselves alchemical laboratories, and who dared to run the danger of being thought sorcerers or magicians. Where modern science is empirical and objective, early seventeenth century science was still largely metaphysical and speculative. But the most noticeable difference between the two lies in the hold that religious and philosophical tenets had in the seventeenth century. These tenets were the limiting factors to all thought. Men might play with ideas for their own satisfaction, but these ideas did not assume validity except where they fell within the limits of lawful interpretation - the interpretation of the church fathers and other authority. The end of the century found all of this much changed, but the beginning of the century was still laboring under these restrictions.



At the beginning of Browne's century, then, authority and religion were still the basis for all belief. The physical world was still thought to be deceptive and seductively attractive, while the contemplation of God gave truth and understanding. This attitude, however, was to be lost rapidly, for it was already beginning to show signs of disintegration. Medicine, as it was commonly practiced, had as its basis superstition and ignorance. Almost nothing was known of the human body that had not been suggested, taught, in fact, in the second century by Galen. Generation was still mysterious, equivocal in insect and in some animal life, and might even be due to the reproductive quality of the air in some instances. Aristotle, Pliny, and the Bible were the chief sources for zoological and physiological information. Truth was principally that which had been written or said by an authority, and inquiry was often mere interpretation, scholastic debate, fine points of disagreement and sophistry, and the exercise of ingenious minds upon the rational and logical modes of thinking, without regard for the actual qualities of the thing discussed. Little was known about plants beyond their medicinal use. Sex in plants was yet undetermined; plant morphology and propagation were mysteries that had attracted but little attention. Mathematics, until Galileo, was closely associated with the "Black Art." Weight, mass, and time were yet to be used widely to express scientific and philosophic determinations.

Even the science of physics was without systematic measurement and questioning, for the physicist was interested in the philosophical verification of his hypothesis; if the hypotheses were wrong, he usually had behind him enough authority to place the weight of the argument on

his side. If an experiment failed to prove that which it was supposed to prove, it was usually disregarded, and while experiments were made, science was largely unaffected by them. The occult sciences were generally studied and relied upon, and astrology, sorcery, divination, and the magical power of words and writing were taken seriously.

The result was that the century was a queer mixture of ignorance and sense, a paradoxical interest in new things and the domination of authority, mental agility and, at the same time, mental inflexibility, superstition and mental keenness. Not that these paradoxes are uncommon to any age, but that during this particular period these contradictory attitudes were found in such close juxtaposition that they seem to us strikingly incongruous. Bacon, who could pull down the pillars of Aristotelianism and give to science a new method, denied the Copernican system and filled his Natural History with a medley of strange conclusions. Lord Herbert of Cherbury, who wrote a treatise to prove that miracles were irrational, could pray on his knees for a sign from heaven whether to publish it. Boyle, whose name stands foremost among physicists, could look for the philosopher's stone and could be touched for the King's Evil. Even Newton, at the close of the century, had been interested in his youth in the possibility of the philosopher's stone. He also held that God, upon occasion, personally regulated minor difficulties in the solar system, and accepted without question that the only law that was final was that of God, who could adjust his own handiwork without interfering with the permanence or the efficiency of the system that he had put into operation.

Yet in spite of all this, the century accomplished much. It broke down the hold of authority. It recognized that much of the mystery of

life could be solved by observation as well as by revelation, and that natural things are not naturally bad or deceptive, for they were created by God and are therefore good and not of the devil. This attitude widened the already growing split between philosophy and theology, for where philosophy wanted to draw conclusions and to formulate principles of natural law based on the study of the physical or material world, theology refused to follow. Philosophy had once been subordinate to theology in the determination of controversial questions, but now, based on experiment and observation, it often became the final determiner. This does not mean that philosophy discarded theology. Far from it. The major purpose for all study was still a knowledge of God. The world was still held to be of divine creation but, since it was the handiwork of God, it was not entirely corrupt. It was still the habitation of man, and even if no longer of central position, was believed to have been made distinctly for him, and for him alone.

This is but an inadequate sketch of the background of Browne's century. As with all else, no absolute judgment can be made, and all that has been said must remain relative. When, however, we consider Browne's connection with his age and his contemporaries, we must remember to take into account the possibilities of knowledge that were offered him, and the prevalency with which references to his interests and beliefs were to be found among his contemporaries, those men who belonged to that broad class of educated Englishmen who directed the thought of the century.

It is not my purpose to show Browne ahead of his time; it is merely my purpose to show him a product of his age, the epitome, as nearly as one man can be, of those things that made the age paradoxical, strangely

medieval and yet strangely modern. Certainly he did not live outside of it, nor dwell a solitary alone with his thoughts, untouched by the changes that were taking place about him. He reflected, too closely for his own reputation, the contending forces that characterized the first part of the century. He was skeptical, and at the same time, credulous. He did not hold with the Copernican theory; he believed in witchcraft, but had little faith in alchemy and astrology. Most of the physical world was unknown to him, but he was interested in it and spent much of his time finding out all manner of information about it. He experimented haphazardly, for he knew nothing of method except as he evolved his own. His instruments were poor, and his results were often vitiated because he did not control controllable factors. He was oftentimes on the verge of discoveries, but was unable to see the importance of what he had observed. He had proper respect for authority and religion. He quoted authorities, for authorities were still the point of departure for most considerations, but he often proved them wrong, and his veneration for them was tinged heavily with seventeenth century skepticism. The restrictions placed upon him by religion were rejected and accepted in the same strangely inconsistent fashion. He believed in a mystical God of miracles, but he oftentimes separated religious belief from scientific conclusions when he found that they did not coincide. Cosmology, theology, physiology, anatomy, chronology, griffins, sirens, and the metamorphoses of butterflies were all of interest to him, and demanded the same careful consideration. At the same time, he was cautious in advancing any idea that would tend to damage greatly related ideas or fields.

All of this was the mark of the seventeenth century; it showed

the heritage that had come to him through the Renaissance from the Middle Ages. Much of his basic knowledge was wrong, but the new knowledge lay ahead of him. He looked at the new and the old with solemn interest and little discrimination. And in this, too, he was of the century in which he lived.

## CHAPTER III

## BROWNE AND THE POPULAR BELIEFS OF THE SEVENTEENTH CENTURY

The foregoing chapter gave an account of the state of knowledge in England and on the continent prior to the seventeenth century. It indicated that the Renaissance had not done away with many of the beliefs that were prevalent during the Middle Ages, although it had prepared the way for later independent thinking and for the revolutionary change that was beginning to take place in the method of thought and in what was held to be proper for thought. By the seventeenth century, men in general were, for the first time in centuries, beginning to observe the physical world closely and to draw scientific conclusions from controlled experiments. Scientists and philosophers were beginning to demand empirical proof before they accepted as true the accounts of Aristotle and Pliny, and the results of their experiments were to revolutionize science. This process of empirical determination, however, was hampered, as the early part of the second chapter indicated, by the hold that religion and authority had upon the minds of the people, and by their reluctance to accept the far-reaching consequences of certain theories, e.g., the Copernican.

In the present consideration of Browne as he stood in relation to his age, his possibilities for knowledge must be determined, and also how usual or unusual his beliefs were among his contemporaries, the educated men of England. If similar beliefs and interests are found among other men of his standing and education, then it is hardly fair to state that Browne was a man who lived outside of his age and retained a medieval mind in a modern setting. Browne's methods of determining the truth or error of the various popular beliefs to which he gave his

consideration must be taken into account, for a great change in the manner or method of determination was taking place. Galileo had undertaken to test his conclusions by controlled experiments and with the aid of mathematics, and he expressed his conclusions in terms of mass, weight, and acceleration. Bacon was an advocate, although by no means the originator, of an inductive method of scientific approach. Galileo was, of course, a scientist of true proportions, but Bacon, except for his treatises on method, showed no greater scientific knowledge than did Sir Thomas Browne. In fact, the interests and the attitudes of these two men toward what took place in the natural world and what was worthy of study, parallel quite closely. Browne's Vulgar Errors contains, on the whole, no more curious a collection of odd beliefs than does Bacon's Natural History. And, if one compares the accuracy of the contents of the two books, the one author can hardly be said to surpass the other in knowledge. Although Browne may not always have applied his method of inquiry to things of importance, or even to have arrived at true conclusions, his method should be looked at critically, for the "modern" of that time was often a man of method, not necessarily one of accomplishment, or one who made keen discriminations between fact and fiction.

This chapter will deal principally with Browne's attitude toward the popular beliefs that had, for the most part, come down almost unmodified from the Middle Ages. It will attempt to show that his interest in and attitude toward a large number of them were not peculiar to him, but that other men, some of them better known to later generations than Browne, many of them leaders in some particular field of thought, were interested in much the same things. It will also show that, in spite of

many erroneous conclusions, Browne's method was that of a man awake to the trends of thought of his period.

During the early part of English history, England contributed nothing of worth to scientific knowledge, but accepted whatever the continent offered her. There were but two books on science of any importance. The Physiologus, which is supposed to have been written in Greek about the second century A.D. at Alexandria, was translated into English in the Old English Period. In the Middle English Period, Bartholomew, a mendicant friar who had been sent to England about the middle of the thirteenth century, wrote his De proprietatibus rerum in Latin. There were, of course, other learned works which were translations or which were written in Latin, but none of these were popularly known. Science was but a continuation of that established by Aristotle, Pliny, Galen, and Scaliger. It is thought that the first work written in English upon a scientific subject was Chaucer's Treatise on the Astrolabe, which he addressed to his small son and for which he apologized because he had written it in the vernacular. It was not until the middle of the sixteenth century that scientific books written in English as contributions of English thought began to appear with any frequency.

The two books first mentioned, the Old English Physiologus and Bartholomew's De proprietatibus rerum, were sources for a large number of the popular beliefs which were current in England until the middle and latter parts of the seventeenth century. They contain many of the errors that Browne undertook to refute by experiment, by reason, or by authority. Most of these errors seem to us at the present time to be childish, but then they were thought to be consistent with the highest standards of scientific thought. From the Physiologus came such beliefs



as that a crocodile weeps when it has eaten a man;<sup>1</sup> that the lion sleeps with its eyes open, and that it fears a white cock;<sup>2</sup> that the little beast Crylio (Paracelsus called it the salamander) is so cold that it puts out a fire;<sup>3</sup> that the pelican slays its young, then tears its breast and revives them with its own blood.<sup>4</sup> From the De proprietatibus rerum came such statements as that the succession of the colors in the rainbow was red (fire), blue (water), and green (earth);<sup>5</sup> that bees load themselves with stones in order to be more steadfast in a heavy wind; that the crab waits until the oyster gapes, and then puts a stone between the shells so that it may feast at its leisure; that the right legs of a fox are shorter than the left (this was also said of the badger).<sup>6</sup>

Such beliefs persisted, and were used as serious explanations of natural phenomena. They were also reflected widely in the figures of speech in the literature of the sixteenth and seventeenth centuries, an indication that they were commonly known to a large number of people, and these educated people. The period offers, as Preserved Smith has said, an inexplicable paradox, for it was the first great age of modern science and, at the same time, a dark age of superstition.<sup>7</sup>

As the previous chapter pointed out, the last period of real scientific interest in the occidental world had been that of the Greek

1. L. to a F., 174.

2. V.E., III, xxvii, 296.

3. V.E., III, xiv, 231.

4. V.E., V, 1, 89.

5. This is also to be found in Aristotle. It was not until early in the nineteenth century that someone discovered the discrepancy.

6. V.E., III, v, 195.

7. Preserved Smith, The History of Modern Culture, p. 425.

scientists and philosophers, for the Romans had done little in the way of investigating or furthering the study of factual knowledge. Seneca, in the first century A.D., had suggested that knowledge might be extended, but little was done. Galen, of the second century, had been an authority on anatomy and medicine. From then until the influence of Humanism in the fifteenth century, science was at a low ebb. Only a few minds, such as that of Roger Bacon (1214-1294), were to pay much heed to the knowledge that could be gained from the study of actual things. During the fifteenth century, a few independent thinkers began to formulate theories based on what might be observed. By the sixteenth century, a definite tendency to establish an empirical method for the gaining of knowledge began to manifest itself. A great deal of interest in the study of natural phenomena during the period of the Renaissance, however, proved fruitless, for it was directed principally toward the collection of the marvelous rather than toward a careful investigation of the common. Biology was in a large part the study of monstrosities, and physics was the study of the curious. The age-old search for the philosopher's stone, the elixir of life, potable gold, in short, the activity of the alchemist, was to lead in time into chemistry, but that was a development of the seventeenth and eighteenth centuries.

Except for mathematicians, most scientists during the time of Browne were not scientists by profession, but were men who followed other lines of thought or endeavor as a means of livelihood, and who indulged their taste for learning merely as an additional interest. Browne was himself a physician by profession. At no time can it be said that his interest in science was that of the research worker who sees in his investigations potential explanations or aids for his profession.

He was interested in it as a means through which he might gain knowledge of various fields, but he instituted no search for any one thing, for he had no particular thing that he wished to accomplish.

For that matter, speculation among those of the earlier part of the century had no definite goal toward which it was directed. Any topic that would allow speculation or controversy was suitable for discussion. Letters that presented problems for consideration were often exchanged between friends or with men of standing. The replies were based on "probability and reason", and the suggested solution often was accompanied by a counter question or puzzle. Such correspondence was not confined to men in England, but letters were often sent to men on the continent who were willing to engage in an attempt to solve whatever ingenious problem might be called to their attention. Many of these speculations dealt with mathematical problems, such as the possibility of the squaring of the circle, and they were often openly posted so that any ambitious thinker might engage in the quest for a solution.<sup>8</sup> Some of the questions were impossible of even probable solution, such as Browne's query concerning what song the Sirens sang, but the zest with which they were taken into consideration was no less because of it.

Browne seems to have engaged at least once in such an exchange of letters, for the Miscellany Tracts contains a letter written in reply to a question sent him concerning the fishes eaten by our Saviour. He

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8. J.O. Halliwell-Phillips, Letters on the Progress of Science in England from Queen Elizabeth to Charles II, London, 1846, intro. xi. Even as late as the latter part of the seventeenth century we find Hobbes trying his hand at some of the mathematical puzzles, but with little success, for he became involved in controversial and mathematical difficulties that did much to lessen his philosophical standing in England. Cf. Appendix B.

begins:

Sir,  
I have thought, a little, upon the Question proposed by you (viz. What kind of Fishes those were of which our Saviour ate with his Disciples after his Resurrection?) and I return to you such an Answer, as, in so short a time for study, and in the midst of my occasions, occurs to me.

Not only was Browne interested enough in the query that had been sent him to make a reply, but at the conclusion of his own letter, he suggests in turn a like question upon which the questioner might ponder.

Thus having returned no improbable Answer to your Question, I shall crave leave to ask another of your self concerning that Fish mentioned by Procopius, which brought the famous King Theodorick to his end: . . . What Fish do you apprehend this to have been? I would learn of you; give me your thoughts about it.

I am, &c.<sup>9</sup>

Such questions seem, at the present time, little worth investigation. We do not see any importance or value to be gained in interesting ourselves as did Browne, in what clothing John the Baptist wore, and whether the locusts he ate in the wilderness were poisonous or of the family of grasshoppers,<sup>10</sup> what form the serpent took when it spoke to Eve,<sup>11</sup> whether or not Adam and Eve had navels since they were created and not born.<sup>12</sup> We feel such questions to be a waste of time and a prodigal use of intellectual energy. But they served the purpose of giving the seventeenth century speculator something on which to sharpen

9. M.T., 63.

10. V.E., VII, ix, 284.

11. V.E., I, 1, 15.

12. V.E., V, v, 97.

his wits and gave practice to the finest ingenuity of his nature.<sup>13</sup>

It was, then, in accord with this general interest in enigmatic questions that Browne wondered whether the forbidden fruit was actually an apple,<sup>14</sup> whether there was a rainbow before the flood,<sup>15</sup> whether Noah might not have delivered lectures to Methuselah,<sup>16</sup> and whether Crassus laughed but once.<sup>17</sup> He did not approach these problems with the expectation that they would, if properly considered, give him information of great value. In fact, such problems as would allow some sort of a conclusion to be reached often seemed to hold no greater interest for him than those where conclusions were impossible, for he did not always make use of his results. Having determined that Crassus, to all probability, laughed more than once, he makes no use of his hard-gained conclusion, and we find no other mention of Crassus. Such speculations were merely the means and an excuse for a certain type of

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13. This minuteness of consideration of any topic is also seen in the sermons that were preached in the churches during this time. During the first decades of Presbyterianism and Puritanism, sermons devoted to but one text or verse of Scripture were preached over a series of Sabbaths. The minister was not supposed to dip here and there into the Scriptures for his material, nor was he supposed to preach from a new text each Sabbath, but he was to expound for several Sabbaths a single text until all its possibilities had been thoroughly exhausted and it had been drained of whatever sap it might have had. I can think of no better example of this method of Scriptural interpretation than Jeremy Taylor's Life of Christ. Taylor reads a moral and an allegorical meaning into every small detail until the Life becomes an exercise in finding seemingly simple statements and events deep theological meanings that carry with them the force of Scriptural interpretations. That method undoubtedly reflected, or perhaps practically taught, the habit of looking minutely at things in an attempt to track to earth explanations and interpretations that might lie hidden under seeming innocuous words and phrases. It was, of course, reminiscent of the Schoolmen.

14. V.E., VII, i, 261.

15. V.E., VII, iv, 269.

16. V.E., VI, vi, 195 ff.

17. V.E., VII, xvi, sec. 2, 310.

mental activity. They offered the speculator an opportunity to make use of known facts, authorities, and whatever erudition he had at his disposal, and they tested his mental skill. If we regard Browne's interest in sirens and the food of John the Baptist from this point of view, we are less prone to regard him simply as a man interested in the curious. We see in him something more than one who finds his attention attracted to the out-of-the way, simply because it offers him another oddity to add to his collection.

This last statement may not seem to hold in regard to one of his writings, however. Browne's "Musaeum Clausum, or Bibliotheca Abscondita: Containing some remarkable books, antiquities, pictures and rarities of several kinds, scarce or never seen by any man now living" does seem to reflect a tendency to revel in the curious simply because it is curious. It contains an exchange list of rarities that he sent a correspondent in response to a similar list that had previously been sent him. From the statement at the beginning of the letter, we may assume that such lists were not uncommon.

Sir,

With many thanks I return that noble Catalogue of Books, Rarities, Singularities of Art and Nature, which you were pleased to communicate unto me. There are many Collections of this kind in Europe. And, besides the printed account of the Musaeum Aldrovandi, Calceolarianum, Moscardi, Wormianum; the Casa Abbellita at Loretto and Treasor of S. Dennis, the Repository of the Duke of Tuscany, that of the Duke of Saxony, and that noble one of the Emperour at Vienna, and many more are of singular note. Of what in this kind I have by me I shall make no repetition, and you having already had a view thereof, I am bold to present you with the List of a Collection, which I may justly say you have not seen before.<sup>18</sup>

The list is made up of curiosities mentioned in the various books

of learning and the fables that belonged to the ancient and medieval world. Most of them would attract little interest now even among those interested in folk-lore. But though the unusualness of the list attracted Browne's attention, he dismissed it easily. "He who knows where all this Treasure now is, is a great Apollo. I'm sure I am not He."<sup>19</sup> While some of the things he did spend his time upon may seem to be just as curious as some of the rarities contained in the "Musaeum Clausum," they offered him the possibility for the exercise of logic and reason in his speculations concerning them. They had more to recommend them to an active mind than rarity.

Although Browne's speculations result in nothing of great value, they often take the form of scientific discussions. In his account of Philoxenus wishing that he had the neck of a Crane so that he might take more pleasure in his meat, Browne questions whether such an exchange would have given the desired results.<sup>20</sup> The triviality of the subject under discussion tends to obscure the anatomical dissertation that follows. Along with the suggestion that Philoxenus might have wished to be a musician and to sing rather than to take greater pleasure in his food, he attempts to show that had Philoxenus made such a wish, he could not have hoped to obtain the added pleasure he so ardently desired because the exchange would not have increased the area of taste.<sup>21</sup> He also comments upon the length of the necks of the various animals, noticing that the length is always in such proportion to the other parts of the body that

19. Ibid.

20. V.E., VII, xiv, 303.

21. The taste buds were not discovered until the time of Malpighi, after 1680, so a knowledge of them was not at Browne's command at the time that he wrote his discussion.

it may serve its purpose as a contrivance to allow the animal to feed. He suggests other animals that might have given Philoxenus the benefit he desired since they actually had the anatomical requirements necessary for such a result.

The discussion concerning the fable involves a strange medley of folly and sense, but Browne's fundamental points of consideration have sound value. He shows a good knowledge of the anatomy and physiology as known at that time and includes accurate observations that he must have made himself. Whether Philoxenus had made such a wish could not be determined, but the impossibility of its fulfillment might be demonstrated on empirical grounds. Such a procedure was an easy and effective method of combatting medieval superstition and fable. The refutation was logical and scientific, even if the error itself, or fable, might seem trivial. Here, as in numerous of his other discussions, Browne had no methodized approach to the problem he set up for himself. But we must remember that "method" and "technique" had not yet been established, and conclusions about even obvious truths were often reached by a hit or miss process of testing fable with fact. The same approach, supplemented by Browne's regard for such natural laws as he felt were indisputable, will be noticed in most of his discussions of the "vulgar errors."

Many of the vulgar errors discussed by Browne were just beginning to be considered as errors, while others were still current beliefs. Besides indicating Browne's reaction to them, I shall try to point out in passing (and I am using only a small part of the material at hand) that many of these errors were held to be true by well known men of the time. They were, in fact, known to enough people so that authors



of plays, sermons, and letters, as well as the authors of scientific treatises, used them freely both in a figurative and a literal sense. I have made but little attempt to group the errors in any definite manner, for they do not fall easily into divisions. A community of fundamental error will be recognized in many of them, and the mention of one will often suggest numerous analogous beliefs that had grown up with it or around it.

One of the most frequent explanations for what seemed to be a natural attraction and repulsion among natural things was the doctrine of sympathies and antipathies. The doctrine held that like things were attracted by like, and that unlike things had an antipathy for each other. Heat attracted heat; cold, cold; poisons, poisons. But there was an antipathy, even an active and open warfare between heat and cold, the poisonous and the non-poisonous. Certain animals were the enemies of others because of a natural antipathy that existed between them, as in the case of the toad and the spider, the lion and the cock, the elephant and the mouse, the basilisk and man. Some of the animals reacted violently to substances which were antipathetical to them, as the crocodile to saffron. Oftentimes the quality that determined the sympathy or antipathy was merely a superficial physical likeness or dissimilarity. Red coral, because of its redness, was used to cure anemia; white coral had no such value. Plants with speckled flowers were held to be efficacious in the cure of spotted diseases, such as the smallpox and measles. They were even used to remove freckles, for the spots of the plant, being natural, were thought to attract any acquired, superficial spots and draw them to the plant itself, since natural manifestations were stronger than artificial ones. These last examples demonstrate the lengths to which a principle might be pushed in applica-

tion, for they were held to be as true an application of the theory as its application to the phenomena of heat and cold, dryness and moisture.<sup>22</sup>

Browne expressed a general belief in the fundamental truth of the theory, "For many things secret are true: sympathies and antipathies are safely authentick unto us, who ignorant of their causes may yet acknowledge their effects."<sup>23</sup> But although he commits himself to the doctrine, he does not follow it blindly in all cases. He stands early among those who began to question its authenticity when given widespread application, and to test whether sympathies and antipathies existed in such individual cases as could be studied by experiment and observation. We find him accepting empirical truth in those cases where experiments have been made, although where experimentation is lacking, he adheres to the first hypothesis. Whether this failure to destroy the hypothesis when the results of a great number of experiments have been overwhelmingly against it is due to an inability to see implications or to a characteristic caution, cannot be definitely determined. But this trait of leaving intact whatever part of a hypothesis had not been proved false in for him, characteristic.

The results of a belief in this principle of inherent sympathies and antipathies were many and widespread. Perhaps the most famous during the seventeenth century was that of the sympathetic powder introduced

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22. Bacon, in his Natural History, states, ". . . the greatest secret in all nature; which is, that similitude of substance will cause attraction, where the body is wholly freed from the motion of gravity; for if that were taken away, lead would draw lead, and gold would draw gold, and iron would draw iron, without the help of the loadstone." Cent. VIII, sec., 704.

23. V.E., I, x, 74.

by Kenelm Digby, the "famous" Kenelm Digby<sup>24</sup> who is so frequently mentioned by his contemporaries. It had had a forerunner in the "weapon-salve" introduced about 1625 by the notorious charlatan and Rosicrucian, Dr. Fludd.<sup>25</sup> Digby's powder, better known because of the popularity of its promoter, was closely akin. The principle upon which the powder was presumed to work was the same as that of all sympathetic cures; like things were attracted to like.<sup>26</sup> A cloth, stained with the blood from

24. Digby had read the spurious edition of the Religio Medici in one night and immediately published his "Observations" upon it in spite of Browne's courteous plea that he defer his comment until the authorized edition was available.

25. Robert Fludd, 1574-1637. In 1609 he was made a Fellow of the College of Physicians and acted as censor of the College in 1618, 1627, 1633, and 1634. He was a theosophist, having great interest in Rosicrucianism and other mystic philosophies. He had been educated at St. John's College, Oxford, and Christ's Church. His weapon-salve consisted of moss growing on the head of a thief who had been hanged, mummy dust, human blood, suet linseed oil, and Armenian bole, a species of clay. These were thoroughly mixed in a mortar. The weapon that had caused the wound, after being dipped in the blood that resulted from the injury, was carefully anointed with the mixture and laid in a cool place. The wound then was cleansed and bandaged. The salve had met with some skepticism, but it was nevertheless held in popular favor. Cf. Robert Means Lawrence, Primitive Psycho-Therapy and Quackery, p. 143.

26. The sympathetic powder offers, perhaps, extreme enough application of the doctrine of sympathies to allow a quick understanding of the underlying principle upon which it operated. It was made of iron sulphate and green vitriol or copperas, an ingredient of ordinary ink, and was prepared during prescribed ceremonies. The recipe had been brought from the East by a Carmelite friar, who gave it to Digby as a favor. The salve was supposed to be able to cure a wound by being applied to anything stained with the blood from it. Portions of the patient's blood-stained apparel were immersed in a solution containing this powder, and the wound was bound after a thorough cleansing, as in the case of the weapon salve. The efficacy of the cure was not a matter of speculation, but was attested to by men of note. James Howell, of the Familiar Letters, had been injured in a duel and felt immediate relief from pain when a cloth stained with his blood was placed in a basin containing the powder. As a test of the true merit of the powder, Digby later removed the cloth from the solution, but shortly after he had done this, he was accosted by a servant of Howell who begged of him what should be done, for Howell was again in great pain. Digby returned the cloth to the pan, and immediately Howell's pain abated, and the wound began to heal, although Howell had not been in the same house with Digby during the experiment. Kenelm Digby, Of Bodies, and of Man's Soul, London, 1669. First published in 1644. Cf. the section "Of the Powder of Sympathy."

the wound, was anointed with the healing salve. Since the original blood stream attracted the blood particles on the cloth to it, these particles, which were laden with the healing ointment, returned and medicated the wound.<sup>27</sup> Browne mentioned the powder, but took little stock in its efficacy. He was good enough physician, and observant enough, to suggest that if the wound were kept clean and properly bound, it might well heal naturally whether or not the powder were applied. This attitude is much the same as that of Ambrose Paré, a sixteenth century physician, whose terse statement, "I bound the wounds; God healed him," was a statement of his recognition that the healing process was natural and was facilitated by cleanliness along.

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27. Digby explains the principle in detail in his Of Bodies, at the same time giving a reason why the hanging of a clod upon which a cow with an infected and rotting hoof had stepped on the north side of a fence would heal the infection; and why throwing salt on a fire would cure the inflammation of a cow's udder, assuming that the inflammation had been caused by the accidental or malicious dropping of milk into the fire." . . . . every body whatever yields some steam, or vents a kind of vapour, from itself; and consider, how they must needs do so most of all, that are hot and moist, as bloud and milk, and all wounds that sores generally are . . . . and a Fox breaths out so strong a vapour, that the hunters themselves can wind it a great way off, and a good while after he is parted from the place. Now, joyning this to the experiences we have already allowed of, concerning the attraction of heat (putting a hand to the fire so that the fire will draw away the particles of heat from the burn. This is also the principle upon which warts disappear when they have been rubbed with a piece of flesh that is later buried and allowed to decay; we may conclude that, if any of these vapours light upon a solid warm body, which was the nature of a source to them, they will naturally congregate and incorporate there; and, if those vapours be joyn'd with any medicative quality or body, they will apply that medicament better than any Chirurgeon can. Then, if the steam of bloud bloud sic and spirits carry with it, from the weapon or cloth, the balsamik equalities of the savle or powder; and with them settle upon the wound: what can follow but a bettering in it? Likewise, if the steam of the corruption that is upon the clod, carrying the drying quality of the wind, which sweeps over it when it hangs high in the air, to the sore part of the cows foot; why is it not possible that it should dry the corruption there, as well as it dryes it upon the hedge; and, if the steam of burned milk can hurt, by carrying fire to the dug; why should not salt cast upon it be a preservative against it? Or rather, why should not salt hinder the fire from being carried thither? Since the nature of sale always hinders and suppresses the activity of fire . . . . " Cf. Kenelm Digby, op. cit., p. 208.

The powder, however, was not generally regarded as lightly as Browne regarded it. Joseph Glanvil, of the middle seventeenth century, wrote with perfect belief in it.<sup>28</sup> Locke queried whether the sympathetic powder might be of any use in dontium dolor, an indication that he was not averse to considering its possibilities. Howell, the man on whom the salve had been so effective, testified to its potency. Digby, of course, had nothing to say against it. And those who witnessed the wounding of Howell and the subsequent cure, were eloquent in its favor. Browne, in this instance, apart from London society, stands out against public opinion, and although he does not attest to the inefficacy of the powder, he has no physicians enthusiasm for it.

Browne shows much the same lack of interest in the possibility of grafting the flesh of one individual on to that of another. This was a medical experiment whose merits were still under discussion. Throughout the century, reports of such operations attracted much attention and speculation. A general objection, based on the theory of sympathetic attraction, was that the grafted flesh, having a sympathy with that of the original body from which it came, would be governed by the decay and putrefaction of that body rather than by that of its adopted host. Digby had approached the question of the success of the operation with self-conscious skepticism:

I will say nothing of artificial Noses, made of the flesh of other men, to remedy the deformity of those, who by an extreme excess of cold, have lost their own; which new Noses putrifie, as soon as those persons, out of whose substance they were taken, come to die; as if that small parcel of flesh, on-grafted on the face, lived by the spirits it drew from its first root and source. For, though this be constantly avouch'd by considerable Authors, yet I desire you to think that I offer you nothing which is not verified by solid tradition; such, that it were a weakness to doubt of it.<sup>29</sup>

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28. Joseph Glanvil, On the Vanity of Dogmatizing, pp. 208-9.

29. Kenelm Digby, A Late Discourse &c., touching the Cure of Wounds by the Powder of Sympathy, p. 192.

Glanvil showed no hesitancy in stating that the operation was dangerous because the grafted flesh would retain its affection for its original body. He held that if the flesh was transferred from one person to another, whatever hurt would be sustained by the grafted flesh would be felt by the original body.<sup>30</sup> Browne, however, shows but a passing interest in the "in-arching of noses"; in fact, he merely mentions it.<sup>31</sup> Yet the operation must have presented a good field for speculation for those who held strongly with the theory of natural sympathies - and most of the seventeenth century men did - but for some reason, it did not appeal to Browne. In spite of the curious interest that so many feel that he had in things that contained elements of the unusual or allowed strange relationships between the natural and the mysterious in nature, he seldom gives credence to, or exhibits much interest in, such explanations as suggest preternatural or unnatural forces working to bring about such relationship. He is, in most cases, more interested in those things that lend themselves to pure speculation and are incapable of being observed, or in those natural things that allow experimental testing. The grafting of flesh would, of course, have allowed experimentation, but surgery was not yet in good repute. A surgical feat of this kind was rare, and only a few daring physicians had undertaken it. It lay mostly in the realm of the speculation.

This tendency to center his attention upon things that admitted actual proof, might also account for Browne's interest in the sympathies and antipathies that were said to exist between animals. Here was an opportunity for experiment and observation, for actual determination by

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30. Joseph Glanvil, op. cit., p. 206.

31. V.E., III, ix, 213.

empirical means; and Browne felt strongly the urge to determine by testing. The principle of existing affinities and hatreds was held to apply, as I have already indicated, to the animals also. It was thought that certain animals could not endure the sight of others, and that others were affected even by the distant presence of their natural enemies. Lions were supposed to be afraid of cocks, and particularly of white ones. Browne shows a greater degree of interest in this supposition than he had in sympathetic cures, for here was an opportunity for an actual trial to be made. "In our time," he stated, "in the Court of the Prince of Bavaria, one of the Lions leaped down into a Neighbour's yard, where nothing regarding the crowing or noise of the Cocks, he eat them up with many other Hens." 32

Alexander Ross answered this observation with a refutation characteristic of a certain type of thinking common at that time.<sup>33</sup> The hue and cry of those who wished to save popular beliefs from being toppled over by experiment called attention to possible exceptions and the effect

32. V.E., III, xxvii, sec. 7, 296.

33. Ross was born about 1590. He was a native of Aberdeen, and served as a minister there, according to Anthony Wood in Athenae Oxonienses, London, 1721, I, 438-9. He came to England and succeeded Thomas Parker in the mastership of the Free School at Southampton. He was Chaplain in Ordinary to Charles I shortly before the Civil War began. He was a prolific writer in both prose and poetry, in Latin and English. Urged by his friends to confute the errors of the Religio Medici, he published in 1645 the Medicus Medicatus; or the Physician's Religion, cur'd by a lenitive or gentle potion. Later he published the Arcana Microcosmi, . . . . With a Refutation of Doctor Browne's Vulgar Errors, The Lord Bacon's Natural History, and Doctor Harry's Booke Do Generations, . . . . London, 1652. In this last work he takes exception to most of the things Browne said, standing staunchly by the old beliefs, and using whatever method he found necessary to prove their lasting authenticity. He died at Park-house, Hampshire, 1654, at the age of about 64. He was probably among the last champions of the old science, but he attracted some attention and gained some applause.

that varying sets of circumstances might have on the experiment invalidating the results. Browne himself used this method, but he usually discusses only those plausible exceptions that might well take place, or such variations as were common occurrences. Ross is not quoted here as one demanding respect, for his work is obviously that of a man who takes exception through principle rather than through a knowledge of facts. His book, Arcana Microcosmi, although not embodying the general attitude of the day toward science, is well worth perusal, if for no other reason than because it affords an example of the method by which conclusions at that time were frequently reached. The excerpt that is quoted below, may serve as a statement of the prevalent belief in antipathies that existed between animals, and a demonstration of the shifting manner in which wanted conclusions could be attained. It might also suggest the lengths by which Browne had surpassed some of the men of the seventeenth century in scientific attitude.

That the Lion is afraid of the Cock, is doubted by the Doctor, because Camerarius speaks of one lion that leapt down into a yard where were Cocks and Hens, which he ate up. But the same Camerarius (Medit. part. I, c. 12) in the same alledged place, sheweth, that this fear of the Lion is justified both by experience, and many eye-witnesses. And surely this is no more improbable than for a Lion to be afraid at the sight of a fire, or for an Elephant to be afraid at the sight of a Hog; which the Romans knew, when they drove a Herd of Swine among the Enemies Elephants, by which means they got the Victory of Pyrrhus. So much afraid is the Elephant of a Hog, that if he hear him gruntle, he will run. And who would think that a Monkey should be afraid and shake at the sight of a Snail, that Erasmus (in amicitia) tells us, he saw one which at the sight of a snail was so affrighted, that he fell to vomiting so, as the owner could scarce keep him alive . . . . There is among Horses in the same stable, among oxen in the same stall, among children in the same school, an antipathy; it is no wonder then, that so magnanimous a creature as the Lion should be afraid at the sight of a Cock, when the courageous horse startles at the sight of a block, and the Elephant will not touch the straw which the mouse has touched. Now for that Lion which killed the Cock and his Hens, I deny not but it may be true; yet hencefore cannot conclude that the Lion is not afraid of the Cocks. For a speciall antipathy may by accident faile



in some individuals . . . . And it may be that this Lion was mad and so the phantasie distempered; for they are subject to be mad - because of their heat; or else he was a hungred, and hunger we know makes even men transgresse the common lawes of Nature, and eat those things which otherwise they hate.<sup>34</sup>

Browne's opinion, we might say, is hardly invalidated by such reasoning as this, although as has been pointed out, he was not entirely free of the method himself.

Browne tested for himself the antipathy between toads and spiders, for toads were supposedly killed by the poison of spiders. He placed a toad and several spiders together in a glass and noticed that a spider sat upon the head of a toad, although, with six others, it was finally swallowed by the toad.<sup>35</sup> He was willing to abide by the results of his experiment and concluded that the traditional antipathy between the two did not exist. The belief, however, was not uncommonly accepted as true. Burton spoke of it in the Anatomy of Melancholy.<sup>36</sup> Fuller, in his Holy War, mentioned it.<sup>37</sup> Ross came to its rescue, of course, Digby recommended that a bruised toad be placed against a wound, such as one made by a poisonous snake, for since the toad attracted the poison of spiders to itself, it must also be useful in attracting and drawing out other poisons. He held, however, that the flesh of the snake was of greater value than that of a toad, for poisons naturally seek their original home.<sup>38</sup> But in this case, Browne was not misled by the theory; he had proved it false to his own satisfaction.

Browne was not entirely incredulous concerning the theory of sympathies

34. Alexander Ross, Arcana Microcosmi, pp. 144-45

35. V.E., III, xxvii, sec. 6, 296.

36. Robert Burton, The Anatomy of Melancholy, p. 9.

37. Thomas Fuller, History of the Holy War, p. 221.

38. Kenolm Digby, Of Bodies, p. 203.

when it was applied to the sympathetic vibrating of the strings of one viol when those of another were struck. Francis Bacon had observed the same phenomenon, but he stated that only the corresponding string vibrated and that it did not give forth any sound.<sup>39</sup> Browne also noticed the vibrations, and falsely attributed it to a sympathetic movement of the strings, but he did not, as had Bacon, state that the vibrating strings made no sound.<sup>40</sup> Had he been more curious for an explanation of this "sympathetic" vibration, or had he been more skeptical of the doctrine of sympathies, which he had proved to be fallacious in so many instances, his observations might have led him to make some interesting experiments with sound. But the pre-determined theory of sympathetic action had already given explanation to the phenomenon. His experiment or observation merely satisfied him that such an action took place.

I shall pass over somewhat hastily the various beliefs in natural history that Browne held in common with the other men of the century. We usually find that Browne is less credulous of those legends that had grown up around animal and plant life than were many of his contemporaries. Seldom does he exceed them in their belief in the curious and the untrue. In fact, he bases a large part of his discussion concerning these beliefs upon his independent observations, or upon the "reason."

The seventeenth century man knew little about wild animal life, except what had been given him by Aristotle and Pliny and, in some instances, Scaliger. Errors that had been perpetrated by these men persisted until some centuries later some scientist or lay-scientist charged upon the discrepancy between fact and that which was thought to be true, and so

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39. Francis Bacon, Natural History, Cent. III, sec. 279.

40. V.E., VII, xviii, 329.

called attention to errors that had so long been held as accepted knowledge, that none had wasted any thought questioning them. Some of the errors were due to inaccurate observations; others were due to inaccurate reasoning and mistaken premises. Most of them had little or no physiological and anatomical verification. From the accounts of animals and their habits as found in the natural histories prior to this period, one might well suspect that the world before the seventeenth century was a fantastic animal playground, inhabited by strange creatures of unusual powers and arbitrary traits. No one thought that the natural world was governed by quite well-defined and general laws. Each animal was believed to have its own distinguishing characteristics. Such common traits, habits, or physical characteristics as are found among animals belonging to the same genus or related groups had not led the natural historian to make conclusions in comparative anatomy or physiology.

Browne is less likely to err when discussing animals than most of those writing on the same subject at that time. One general principle to which he adheres closely saves him from too fantastic conclusions. He feels that all bodily parts and functions have a physiological purpose, and he seldom allows his credulity to override his belief in the economy of nature. While he discusses chameleons and bear cubs, he does it from a scientific point of view, and those statements concerning them that he could not test, he did not always accept as true, even when they had been given by accepted authority.

Browne's comments on the color-changing, air-fed chameleon may well be used to illustrate the point here. The chameleon was more the animal

of the poet than of the natural scientist,<sup>41</sup> but the natural scientist did not neglect it. The two properties most commonly ascribed to it were those of changing its color and of feeding on nothing but air. Browne does not stress the first property, that of changing color, for it is not a vulgar error. But he derides the idea of the chameleon living on nothing but air. He points out that the animal is furnished with the wherewithal to take in food, swallow it, and digest it, and he feels that these organs for this purpose must be some use, for nature abhors superfluity and has produced nothing that does not have a purpose or use.<sup>42</sup> Here is an argument, based on a long honored natural law, that Bacon does not seem to have thought of. While Bacon expresses only a qualified belief in the theory that the chameleon derived its nourishment from the air along in his discussion of it in his Natural History, he did concede to the idea that the chameleon lived principally on air, thus allowing a nutritive value to the air itself. A queer medley of credulity and sense is seen in his statement that one". . . might observe their bellies well after they had exhausted the air and closed their jaws; which they open commonly against the rays of the sun. They have a foolish tradition in magic, that if a chameleon be burned upon the top of a house, it will raise a tempest; supposing, according their vain dreams of sympathies [the same vain dreams that he had previously defended], because he nourisheth with air, his body should have great virtue to make impressions upon the air."<sup>43</sup> Browne, at

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41. Cf. William Drummond of Hawthornden, A Cypress Grove, At the Hawthornden Press, 1919, p. 32; Robert Burton, The Anatomy of Melancholy, Empire State Book Company, 1924, p. 34; Samuel Rowland, The Letting of Humors Blood in the Head-Vaine, Epigram 17; Joseph Hall, Satires, Book I, Satire I. The reference in this last is to both the changing color and to the "air-fed" serpent.

42. V.E., III, xxi, 257 ff.

43. Francis Bacon, Natural History, Cent. IV, sec. 360.

least, had a scientific approach to the subject and with his physician's knowledge of anatomy and of the slender nutritive value of the air, formulated his negative conclusions.<sup>44</sup>

The question of the nutritive value of the air was not an "old belief", but was a question of contemporary interest. We find, among seventeenth century writers, frequent mention of both plants and animals that derived their sustenance from the air alone. Kenelm Digby had seen young vipers that had been kept from all food but that furnished them by the air live for eight or ten months and wax great in length, particularly during the season "of the Equinoxes, when the air is fuller of those aethereal and balsamical atoms, which they drew for their nouriture."<sup>45</sup> Birds of paradise were thought to live on air and the dew from heaven, and when they were brought back to England to be exhibited to interested Englishmen, the wily exploiters of the bird often cut off the legs and wings in order that the bird might be truly helpless in making any attempt to obtain food other than by inhaling or swallowing air.<sup>46</sup> Browne spoke of the feathers of these birds as being brought back from Molucca and passed off as the feathers of the phoenix, but he says nothing of their manner of obtaining nourishment.<sup>47</sup> It was commonly thought that air could nourish not only animals, but also plants. Bacon had noticed the increase in weight of some onions that grew without planting, and

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44. Ross, as ingenious as ever in answering Browne, held that the digestive tract was necessary, for the air was impure and must be digested. If flies were ever found in the stomach of the chameleon (as Browne had asserted), it was because some whimsical chameleon had been indulging his pleasure or had found them necessary for physick. Ross, op. cit., p. 136.

45. Kenelm Digby, Of the Powder of Sympathy, p. 159.

46. Percy Ansell Robin, Animal Lore in English Literature, pp. 155-8.

47. V.E., III, xii, 220.

concluded that the increase must have been due to the food value of the air, since there was nothing in the onion itself that would allow it to add to its own weight. The significance of this observation, according to Bacon, was that "air can nourish; which is another great matter of consequence."<sup>48</sup> Browne also refers to the growth of onions without planting, but he holds that they then lose instead of gain weight.<sup>49</sup>

From such instances as those cited, instances in which air was supposed to furnish the nutriment for both plants and animals, Browne might have assumed that it was not improbable that the chameleon gained its food from such a source and left unchallenged a belief commonly accepted and one that was not unique in its connection with the chameleon. Or he might have qualified his conclusions by a cautious statement that it would seem that the chameleon was equipped for the digestion of food in the manner usual to most animals. But here he looked only at his experiment. His conclusions concerned only the question that he had set about to consider - in this case, whether the chameleon lived on air. He based his argument on the material that was at his disposal - the theory that nature produced nothing except for a purpose, and the anatomy of the chameleon. Whether the air had food value or not did not enter into his consideration, for that question was not a part of his experiment. His problem was simply whether the chameleon lived on air, and that was the problem he considered, and on the only acceptable grounds of consideration - the chameleon itself.

With the idea of the nutritive properties of the air grew up also the idea that it had generative qualities, for the fleet Spanish mares

48. Francis Bacon, Natural History, Cent. I, sec. 29.

49. G. of C., p. 106.

were sometimes held to be impregnated by the west wind,<sup>50</sup> In this instance, Browne shows little skepticism or perspicuity, probably because he had no opportunity to test the belief, and because the idea furnished him with an apt illustration at the time that he used it. Part of his credulity in this instance may also have been due to his seeming inability to transfer conclusions gained from one experiment to instances where similar conditions were involved. This method of transfer was to be used more intelligently and more frequently in the latter part of the century by younger scientists. The habit of not using the conclusions resulting from one experiment or from a reasonable determination as an approach to another problem left Browne with many erroneous beliefs that he did not discard because he had not tested them. Consequently, where he had not experimented, he was prone to be interested in old theories, and oftentimes held to them. But much might be said even for this fault. It prevented flexible conclusions from being formulated easily into doctrines that would apply to numerous fields, as had been the result when the doctrine of sympathies and antipathies had been allowed to permeate almost all science.

In Browne's discussion of bear cubs, which were thought to be born shapeless and after birth licked into proper form by the mother, he again relies for his argument upon natural law as it was then known. The length of the period of gestation in bears had not been determined, although it was thought by some to be from a few days to a month. The argument of birth before the formation and distinction of parts met with Browne's disapproval, for he refused to believe in anything that would "overthrow the general Method of Nature in the works of generation."<sup>51</sup>

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50. G. of C., 107; V.E., III, iii, 190; V.E., III, xxi, 265. Cf. also Fletcher, Rule a Wife and Have a Wife, IV, iii, 95-9.

51. V.E., III, vi, 198.

Here again is an instance of his adherence to a principle that he adopted because it seemed universally true and his application of it to the problem under consideration. This is not a contradiction of the statement made in the above paragraph, that Browne trusted only to experiment to give him such knowledge as he adopted that was contrary to the generally accepted belief, for here was a law applicable to all forms of life; whereas, in the case of the chameleon or of air-impregnated horses, the belief applied only to the single instance or to a small number of instances. While the law of generation varied with the different species of animals, it was definitely established and invariable for each class or division of living things.

Browne's discussion of bear cubs is based on the principles of anatomy and of generation as then known, and he emphasizes once more the unlikelihood of nature transgressing her own laws merely for the sake of the phenomenon. He is here coming close to the idea of an orderly, methodical natural world that did not act capriciously. The thing to which this method of reasoning is applied may seem trivial and preposterous, as did his discussion of Philoxenus' wish for the neck of a crane, but before bears could be held to be born with proper shape and proportions, the information and reasoning concerning them had to be rescued by science and brought in under its rules.

We may feel that Browne was indulging his love of the curious by taking seriously the idea of unformed bear cubs, but the same idea is not uncommon to both literary and scientific writers of the century.

Burton, in his Anatomy of Melancholy, writes:

I have no such skill to make new men at my pleasure, or means to hire them; no whistle to call like the master of a ship, . . . . I must for that cause do my business myself, and was therefore enforced, as a bear doth her



whelps, to bring forth this confused lump; I had not time to lick into form, as she doth her young ones, but even so to publish it, as it was first written.<sup>52</sup>

Even in the latter part of the century we find references still being made to the belief. Joseph Glanvil, in his Vanity of Dogmatizing, writes,

We came into the world like the unformed Cub; 'tis education is our Plastic: we are baptized into our opinions by our Juvenile nurture, and our growing years confirm those unexamined Principles.<sup>53</sup>

I do not doubt that Glanvil, at least, is using the expression figuratively, yet the allusion must still have been known commonly enough to be recognized even among scientists.<sup>54</sup>

Browne, in his discussion of the bone said to be found in the heart of the stag, bases his conclusions once more upon the grounds of comparative physiology. Pliny had said that the bone to be found in the heart of an old deer was of great value because the stag had reached a venerable age by the time the accretion was formed. Great medicinal value was therefore attached to it, for, like mummy dust,<sup>55</sup> it was believed,

52. Robert Burton, op. cit., p. 11.

53. Joseph Glanvil, op. cit., p. 128.

54. For a purely figurative use, cf. John Ford's The Broken Heart.

" . . . . . there's a lust  
Committed by the eye, that sweats and travails,  
Plots, makes, contrives, till the deformed bear-whelp,  
Adultery, be licked into the act." Act II, scene i.

55. The use of powdered mummy flesh for medicinal purposes was common. Since the flesh of mummies had remained in a state of preservation for so long a time, it was concluded that the elements must be in perfect proportion and, if the flesh were taken internally, it would help to restore the balance of the elements of the living body, and so prolong life. As late as the first quarter of the eighteenth century, mummy dust was still advertised in apothecary shops. Browne makes but one reference to it, and that gives us no real indication of his opinion of its medicinal value. "The AEgyptian Mummies, which Cambyses or time hath spared, avarice now consumeth. Mummie is become Merchandise, Mizraim cures wounds, and Pharoah is sold for balsams." U.B., p. 48. The sale of mummies gave excessive profits. When real mummies became scarce, artificial ones were made by the enterprizing merchants in ancient flesh and were sold for real mummy. Those purchasing mummy dust were warned to rub it between the fingers before buying it, for it appeared to cling to the fingers, it was probably from a recently made 'mummy' and had no medicinal value. Even a recipe for making artificial mummies has been found.

because of its own great age, to increase the likelihood of longevity in man. Roger Bacon had mentioned it, and had condemned the practice of apothecaries of substituting other bones for those of the stag. A few centuries later, Francis Bacon made reference to it, and the explanatory Catalogue of the Pointer Collection contained in St. John's College has the following note:

26. Stag. A Bone out of a Stag's Heart. My Lord Bacon in his Nat. Hist. p. 157, says, that most of the Hard Substances fly to ye Extremities of the Body, as Skull, Horns, Teeth, Nails, & Beaks [Beaks were also used to preserve youth and to increase the span of life. The old eagles either lost their beaks or whetted them anew and so regained their lost youthfulness]. only the Bones are more Inward & clad with Flesh. As for the Entrails, they are all without Bones, save that a Bone is sometimes found in ye Heart of a Stag, & it may be in some other Creature. Give me leave to add, that they seem to be a Help for ye stronger & more steady motion of the Muscles of the Heart. 56

Browne accepted without question the belief that the stone was to be found in the heart of the stag. He had had no opportunity to observe differently, but he objected to the statement that it was to be found only in stags of great age. He argued that the stag, to all probability,

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56. Gunther, Early Science in Oxford, III, 456. As an indication of how little was known about the physiology of the deer, we might mention Buffon's later explanation concerning the growth of the horns of a stag. Buffon, who was a scientist about a hundred years later than Browne (1707-1788), still thought that the growth of the horns was due to the accumulation of organic molecules derived from its food. The lichen on which the reindeer fed was richer than the leaves and other vegetation on which the deer fed, and hence the reindeer had a greater abundance of secretion of horn. The organic matter was not properly assimilated and the horns came to resemble the branches of trees in texture and form. They were vegetable structures grafted on the bodies of the animals. He suggested the periodic shedding of the horns to be due to their vegetable origin, for their dropping is analogous with the fall of ripe fruit. Ancient naturalists had believed that ivy would grow around the horn of a living stag, and Buffon thought that if this could be established as a fact, it would constitute an interesting proof of the identity between stag's horn and wood. I cite this as an indication that the knowledge of the deer was still in arrears even a hundred ½ years later than Browne. Cf. L.C. Miall, The Early Naturalists, their Lives and Work, pp. 383-4.

did not live to a great age, drawing his conclusions from the length of time required for gestation and maturation in deer in comparison with that required by other animals whose life span had been determined. His reasoning has much in common with that of modern scientists, who still use this means of predicting the length of life of animals. While his statement concerning the bone is prompted by error, his method of arriving at a part of the conclusion is modern, even though that conclusion is wrong. He states:

As for the bone, or rather induration of the Roots of the arterial vein and great artery, which is thought to be found only in the heart of an old Deer, and therefore becomes more precious in its Rarity; it is often found in Deer much under thirty, and we have known some affirm they have found it in one of half that age.<sup>57</sup>

Gosse is much inclined to smile at Browne for his learned reasoning on the shortness of a badger's legs on one side compared with those on the other. "It is characteristic of Browne that he takes no such rude short-cut [as that of recognizing that should the badger have two legs shorter on one side than on the other, he would turn heels over head if he reversed his direction on a slope] to knowledge as this. He has to deprecate Albertus Magnus and to shield himself behind Aldrovandi, before he can make up his mind that the theory is repugnant 'to the three determinators of truth, authority, sense, and reason.' He argues with great prolixity that, although frogs and spiders have legs of unequal length, the inequality is between pairs and 'opposite joints of neighbour-legs'; that Aristotle has held an odd leg to be repugnant to the course of nature, . . . ."<sup>58</sup> Gosse continues his comment, ridiculing Browne

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57. V.E., III, ix, 209.

58. Edmund Gosse, *op. cit.*, p. 81. William P. Dunn repeats the comment in Sir Thomas Browne, a Study in Religious Philosophy, p. 4.

for not even attempting to catch or to buy a badger and measure its legs, but I am inclined to disagree with Gosse's attitude. From our point of view, the problem would have been solved in some such way. From the point of view of the seventeenth century scientist, even had the badger been measured and no two legs found wanting in length, the task of discussing the principles upon which the ancients had made their error would still have confronted the investigator. A lengthy explanation would still have been made, for until the Royal Society decided that reports made before it should be written in the simplest manner possible,<sup>59</sup> material of this nature gave opportunity for rhetorical eloquence. Moreover, when one considers the list of experiments that Browne did perform along with his duties as a physician and as head of a family,<sup>60</sup> and the number of books he seems to have perused,<sup>61</sup> it is not inconceivable that the length of the legs of a badger might have offered him one instance, at least, where the mind might reason out its conclusions.<sup>62</sup>

In all that Browne wrote we see the reflection of the old scholastic method of considering carefully both sides of a question. This often led him into needless prolixity, a trait to which Gosse objects. Unfortunately,

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59. Thomas Sprat, History of the Royal Society, 3rd ed., London, 1732, p. 113.

60. Cf. Chapter IV.

61. Cf. Appendix B.

62. Macaulay's account of Titus Oates is interesting in this connection. "On the day Titus Oates [one of the main perpetrators of the Popish Plot] was brought to the bar, Westminster Hall was crowded with spectators, among whom were many Roman Catholics, eager to see the misery and humiliation of their prosecutor. A few years earlier, his short neck, his legs uneven, the vulgar said, as those of a badger, his forehead low as that of a baboon, his purple cheeks, and his monstrous length of chin, had been familiar to all who frequented the courts of law." Thomas B. Macaulay, History of England, Fifth edition, I, 477.

Browne's discussions are verbose and so filled with names and quotations and references that the reader is often lost under the excess baggage of his discussion. But his manner must not be allowed to obscure his method or his meaning, nor yet hide the seeking mind that worked behind it. The lay scientist was a literary man as well, and until the latter half of the century, used the same style for his scientific treatises as for his theological and philosophical discussions. It was a style, finally discarded because of demands of the new science for clear statement, but not until the time of Dryden was this clearness of statement, unembellished and straightforward, considered "good" writing.

Browne's attitude toward fabled animals is at times one of caution and credulity, and at other times one openly skeptical. The space that he devotes to some of the fables is out of proportion to that given to others. For example, he discusses the salamander very briefly, and the phoenix at considerable length. The literary use of the salamander as an animal that withstood heat was a common trope,<sup>63</sup> so common that Browne could not have been unaware of the belief. Yet he does no more than to mention it in the Vulgar Errors in calling attention to the metaphorical term "salamander's wool" for asbestos, a term also used by Francis Bacon. Browne was careful to distinguish between the cloth woven from the fire resisting metal and the idea that the material for this cloth was obtained from the skin of the salamander.<sup>64</sup> He calls attention to an earlier experiment made by Brassavolus in which Brassa-

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63. Thomas Fuller, The History of the Holy War, p. 268; Holy State and Profane State, p. 2; John Fletcher, Rule a Wife and Have a Wife, V, ii, 4-14; Phineas Fletcher, Purple Island, Canto 2, section 10; Francis Bacon, Natural History, Cent. IX, sec. 860, etc.

64. U.E., III, xiv, 232.

volus had succeeded in burning the skin of a dead salamander,<sup>65</sup> but he makes no other mention of the animal.

The phoenix, on the other hand, should have offered Browne little difficulty, for its existence was not generally believed in at that time, although there was no definite proof that the bird did not exist. Reference to it was still common in both prose and poetry, but I question whether such reference was not made simply because the phoenix served well as a rhetorical conceit. Browne considers the bird at great length, and exercises his erudition upon a belief that should have been easily discredited without elaborate proof.<sup>66</sup>

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65. Antonio Musa Brassavola (Brassavolus), 1500-1570. An Italian physician who was patronized by Francis I, Charles V, the popes Paul III and Clement VII, and other persons of distinction. He was a naturalist of considerable repute.

66. Yet Ross can refute Browne's arguments with the same headlong force with which he refutes everything Browne says. He is a good opponent. He believes consistently that no good can be found in the one he is opposing. His arguments for the existence of the phoenix are ingenious and typical. He admits that few have seen the bird, but the Egyptians attested to its existence, and although many fables have come out of Egypt, this does not make the story of the phoenix false also. To Browne's suggestion that it is against philosophy and logic to have the perpetuation of a race or species rest in but one individual, Ross answers: "That the species can be preserved in one individual, Pererius sheweth, That this is only true in things incorruptible as in the Sun and Moon; but I say, That this is true also in things subject to corruption; for in these, though the individuals be corruptible, yet the species are eternal; and it skills sic not how few the particulars be so long as the species can be preserved; for in Winter the species of Roses is not perished, though there be no individual Roses actually existent. For even they have their being and essence, though their existence be not potentially in the ashes, as the forms of the elements are in the mixed bodies, or as the form of a cock is in the egg, which by the heat of the hen or Sun, is actually educed." Ross feels that the nobler the animal, the fewer the individuals. "There are fewer eagles than doves; elephants than rabbits. Nature is so provident in the conservation of the species, that where there be few of the kind, they live long; and have their abode in some remote rocks, mountains, . . . ." The phoenix appeared to man but seldom, for it wished to preserve itself, "for had Heliogabalus, that Roman Glutton, met with him, hee had devoured him, though there were no more in the world." Ross, op. cit. p. 201 ff.

It is at such times as this that, when dealing with natural things, Browne comes closest to being typically medieval in many of his considerations. He feels the belief in the existence of the phoenix to be "repugnant to philosophy, scripture, and authority,"<sup>67</sup> the three great determiners of medieval science. But even when he places a great part of the weight of his argument upon these three criteria of medievalism, he bases his final judgment upon the established laws of natural science as they were then known. One might almost assume that he included the phoenix in the Vulgar Errors merely to afford another instance whereby he could discuss the principles of natural law. He points out that the equivocal generation of the phoenix is contrary to the law of spontaneous generation, a law that was actively believed in by all but a very few scientists until the time of Pasteur of the nineteenth century. According to this law, a degeneration in the type of life took place with each new corruption. Worms and insects were generated from corrupt flesh, but they could not come from their own organism. If this were true, all possibility of the phoenix' turning first into a worm and then into a phoenix was precluded, for its so-called imperishable and unchanging attributes would be corrupted with each successive generation of its own existence.<sup>68</sup>

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67. V.E., III, xii, 222.

68. V.E., III, xii, 224-5. Ross again. "It is as possible for a Phoenix to arise out of the ashes of the dead parent, as for a silk-worm to proceed out of the Egge of the dead Worm." A cock is excluded from an egg as a perfect creature. A bird comes out of an oyster quite as perfect. The mule, a more perfect animal than the bird, is generated of seed of another kind than itself, so why may not a phoenix arise from the putrified ashes of itself: Clackgeese (barnacle geese, supposed to be generated from trees) are generated of the trees in Northseas, beyond Scotland - at least so the inhabitants believe. They are seen to fly every year North to Shetland and Orkney and in the spring fly north again. Also, bodies of trees that are driven upon the islands by storms have full proportions and the shape of birds. Why then, could not a Phoenix be generated without two of its kind? Moreover, Ross adds, the Phoenix has no sex, so it entered the ark alone, for "how could he that is but one, go in two by two?" Op. Cit., pp. 201 ff.

While Browne carefully disproved the existence of the bird by authority, sense, and philosophy, he added to them reason and natural law, all contributing factors that went to make up early seventeenth century science. He was even here, not a man whose interests or method lay outside of his century.

The belief that crocodiles shed tears was a more common error than that of the phoenix, and when Browne contends that they can weep but not cough,<sup>69</sup> we must allow him his own mistake. He did not hold, as did many, that the crocodiles were peculiar to the Nile. The belief that they wept after eating a man had been strengthened by the adventurers and explorers who brought back marvelous tales concerning the people, their wealth, and the lands that they inhabited. Such an explorer as Hawkins, who had been foiled in slave dealing and had ranged the coast of Florida, vividly described the "wobbing" crocodiles as well as flourishing unicorns he had found there. In 1624, Father Lobo, a Portuguese missionary to Abyssinia, wrote that the country abounded in lions, elephants, rhinoceroses, horses, mules, oxen, and cows, but that "neither he, nor any with whom he conversed about the crocodile, ever saw him weep, and therefore all that hath been said about his tears must be ranked among the fables invented for the amusement of children."<sup>70</sup> Fuller, in his Worthies of England, in a discussion of the medicinal powers of saffron, speaks of the crocodile's antipathy for it. "In a word, the sovereign power of genuine saffron is plainly proved by the antipathy of the crocodiles thereunto: for the crocodile's tears are never true, save when he is forced where saffron groweth (whence he hath his name of

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69. L. to a F., p. 174.

70. Quoted by Arthur Murphy in his edition of the Works of Samuel Johnson, i, 18-23.



, or the saffron-fearer), knowing himself to be all poison, and it all antidote."<sup>71</sup>

For some reason or other, the prevalent belief in weeping crocodiles did not seem to attract Browne, for he gives it but brief mention. Perhaps this is again because there was little that could be offered as actual evidence for or against the tale. Crocodiles were not common to England, and the physiology and anatomy of the crocodile were generally unknown. No natural law could be applied, or any attempt made to test its propensity to shed tears, whether hypocritical or real. Authority and hearsay, neither of which was entirely spurned by Browne, were the only sources to which he could turn for his information concerning it. While Browne was not averse to using them, he seldom, as was seen in his treatment of the phoenix, used them exclusively in his consideration of natural phenomena. He usually substantiated such arguments by some natural law that would bear out his premises, or by some actual observation or conclusion that had been based on experiment. In this case, such a procedure was impossible, and we may assume that perhaps this is one of the reasons why Browne did not discuss the error at greater length.

Liberal reference to the basilisk is found in much of the Elizabethan and seventeenth century literature. The references are chiefly in the form of figures of speech, but they indicate that the properties ascribed to the basilisk were well known. Undoubtedly men believed in its actual existence. There is also frequent mention of the cockatrice, a bird of English origin. The two were supposed to belong to the same species; the basilisk was continental in origin, and the cockatrice was its English variant.

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71. I, 493.

Browne was not so bold as to deny the existence of the basilisk, although he did question whether the animal in England which was commonly called the basilisk was one. He pointed out that the basilisk of the ancients was a snake, and the one commonly referred to in England was usually the cockatrice, a curious product that came from a cock's egg hatched under a toad or serpent and appearing as a strange hybrid of a serpent and a cock, its tail like that of the serpent and the rest of the body like that of the cock. Many variants of this form had been thought to exist, and the form of the animal became more and more fabled, and the story concerning it became more widespread. Its principal attribute was its ability to kill its enemy by shooting poison from its eye, although the enemy had actually to meet the glance of the basilisk before the poison could be effective. The explanation for such a curious occurrence was based upon Aristotle's principles of physiology, for Aristotle had not yet been superseded in this field. It was held that all objects gave off a fine film of particles that retained the shape of the object from which they were exuded. This film met the eye of the beholder, entered it, was carried to the pineal gland where it stirred the vital spirits, and the shape of the object was then conveyed to the brain. Browne follows this explanation in part, but, in his consideration of the basilisk, he developed the belief a step further than it was usually carried, and his conclusion was valid of the preceding principles were held to be valid. Browne did not question the shooting of venom from the eye of the basilisk when it saw a person in its path, but he did question the statement that whichever saw the other first, that one died. Sight, then, would not be by "Reception", but by "Extramission," which was against Aristotle. While the reverse belief was held by many

of the ancients, Aristotle's explanation was a postulate of "Euclide in his Opticks, but now sufficiently convicted from observations of the Dark Chamber." Since this did not seem to fit as an explanation of this warfare of glances, Browne contended that the power of the basilisk was probably but an "Hieroglyphical fansie."<sup>72</sup>

Browne's argument that it would be impossible for a basilisk to be hatched from an egg is more sound. He pointed out the impossibility, physiologically, of the fertility of a cock's egg, and the absurdity of requiring the warmth of a toad or a serpent to hatch it when any heat seemed to have the quality of keeping eggs warm enough to bring about incubation. Once more, we find him following the modern method of looking at the thing itself and drawing his conclusions from what was actually known and what were the possibilities allowed by such knowledge.

We cannot say that Browne's interest in the basilisk was peculiar to him or even indicative in any way of a man whose principal interest lay in curious lore. The prevalence of the mention of the basilisk need not be detailed. Phineas Fletcher used it in "Christ's Victory on Earth";<sup>73</sup> John Webster used it several times in the Duchess of Malfi;<sup>74</sup> Herbert used it as the fundamental image in "Sins Round";<sup>75</sup> Fuller used it seriously in

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72. V.E., III, vii, 200-3. Biblical translations then current might have contributed something to Browne's failure to deny the existence of the basilisk. Ralph Cudworth, in his dedication letter "To the Honourable House of Commons", for his sermon, "The Life of Christ," quotes Isaiah 11:8 as ". . . when the sucking child shall play in the hole of the asp, and the weaned child shall have his hand in the cockatrice's den. . . ." Cf. Cudworth's "Life of Christ, the Pith and Kernel of all Religion, A Sermon preached before the Honourable House of Common, at Westminster, March 31, 1647." Cambridge, 1647. And Isaiah 14:29 in the Vulgate read, "out of the serpent's root shall go forth the cockatrice."

73. Line 25 ff.

74. Act III, scene iii; two mentions of it in Act V, scene ii.

75. George Herbert, The Temple, "Sins Round."

his sermon "On the great Danger of sleighting the Least Sinne,"<sup>76</sup> and so we might go on indefinitely.

Perhaps the most versatile of animals as conceived by the popular mind was the viper. It was supposed to be able to detect murderers and to preserve youth. Its body was used as a tonic and was an antidote for poisons. According to Mrs. Loyal, "The use of vipers in medicine has been a constantly recurring mania in the history of medicine, and was never more exploited than in the seventeenth century."<sup>77</sup> The celebrated "Viper lozenges of Venice" were known throughout all Europe as a preventive for the plague, as well as an antidote for poison.<sup>78</sup> The so-called "malignant" diseases, which included all forms of poisoning and all toxic conditions were frequently treated with viper flesh. Attempts had been made to discover the one master antidote for the one master poison of which the several types of toxic conditions were a part.<sup>79</sup> Viper flesh, for some reason, was often thought of as this antidote. By reasoning from the individual error to a general one, snake-flesh was thought to be effective in cases of snake bite. By its own poison, it drew out of the wound the poison that had been injected, for a sympathy existed between poisons. This finally led to the belief that the flesh of the serpent would be a

76. Thomas Fuller, Sermons, I, 553.

77. Mrs. C. F. Loyal, The Magic of Herbs, p. 278.

78. C.J.S. Thompson, The Mystery and Art of the Apothecary, pp. 230-1.

79. Notice the similarity in the idea that there was but one master antidote and one master poison with the alchemical idea that there was but one pure essence, could it but be found.

reliable remedy against all malignant diseases.<sup>80</sup> Its omission from the British Pharmacopoeia did not come until the middle of the eighteenth century, when the College of Physicians rejected it as a remedy by a single vote.<sup>81</sup>

Browne, however, does not seem to be interested in the medicinal use of vipers, but is more interested in the habit that the female was said to have of biting off the head of the male immediately after mating. She was said to be punished for this homicide by being killed, in turn, by her young, for, instead of being born in a natural and proper fashion, they ate their way out of her side.<sup>82</sup> This, Browne points out, would be against natural law, as it would leave the young snakes to their own protection. Moreover, he felt that it would hardly be natural for the mother to be killed in giving birth, since it would not be the way

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80. The curing of toxic poisons would, I suppose, lead to its use as the restorer of youth and, in many cases, of feminine charm. Fuller reports an incident in which a gentlewoman complimented an old man upon his youthful appearance, asserting that he had probably eaten a snake. Her remark was met with the answer that "it is because I have never meddled with any snakes which maketh me look so young." Cf. Thomas Fuller, Holy State, p. 28. The most notorious instance of the medicinal use of vipers was probably that in connection with the beautiful Venetia Digby, wife of Sir Kenelm, who was far-famed for her great beauty. Digby is said to have fed her snakes to preserve her beauty, as well as to counteract poisons in her body. But she died at the age of thirty-three in spite of his precautions, and when her head was opened, "little brain was found." One cannot suggest that the vipers dried up the brain, but certainly Digby reaped the suspicious glances and comments of many, who suggested darkly that she had perhaps been curiously treated, although none denied that Digby seemed to love her well and had cared for her faithfully.

81. Dan McKenzie, The Infancy of Medicine, pp. 117-120.

82. Because of this, the viper was supposed to be able to detect murderers, for it had an antipathy toward them and poisoned them by its bite of hatred. The story of Paul, shipwrecked on the island of Melita and bitten by a viper without apparent effect, was explained on this ground. The barbarians, seeing that a viper had fastened itself on his hand, immediately declared him to be a murderer, but when the viper was shaken from the hand with no ill effect following the injury, they declared him a god instead. Acts, 28:1-7.

of Providence to ordain a manner of reproduction that would destroy the producer. The edict, "Be fruitful and multiply," would be violated if so heavy a penalty were placed on generation. Ross responded that the benediction was not pronounced on beasts and creeping things, only on birds and fishes. He questioned closely whether vipers and other poisonous creatures were created before the fall, and concluded that if they were not, they could not come under this decree. Since the viper brought forth more than twenty young at a time, Ross felt that the loss of one in the generation of twenty would certainly not make impossible the fulfillment of the law. Besides, all must die, so the curse was not increased because death came during generation. And, if the death of the dam left the young unprotected, he felt that the God of David would care for them.<sup>83</sup> Neither of the two men can be commended for his perspicuity or his method of approaching the question. Browne, however, remained close to his belief that a natural law, as that governing the different phases of generation, was not violated for the sake of the single phenomenon. Ross was attempting to force a natural phenomena under a theological explanation.

Browne was interested enough in the question of the manner of birth of the vipers to make three attempts to breed vipers in captivity. But although he fed the dam milk, bran, and cheese, she always died before giving birth to the young, and the question had to be settled, as far as Browne was concerned, upon the basis of reason, sense, analogy, religious and natural law<sup>84</sup> - those working tools of the early seventeenth century.

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83. Ross, op. cit., pp. 149-150.

84. V.E., III, xvi, 237 ff.

But the fact that he attempted to experiment first before drawing his conclusions is the mark of the seventeenth century man who was shortly to become the modern scientist, even though still engaged in dealing with medieval superstitions.

Browne, in his discussion of the unicorn's horn, is much less credulous than many of those who were his peers in training and position. The existence of the horn was seldom disputed during the century. The horn had been used from the fifteenth century on against disease, and especially was it effective in detecting and counteracting poisons. It was held that God had ordained many poisons and diseases, but out of his kindness, he had also ordained as many antidotes as poisons. Of all the antidotes held to be the "true" antidote, the unicorn's horn was perhaps the one most sought, probably because of its scarcity.<sup>85</sup>

The use of the horn for the purpose of curing or preventing disease was comparatively modern, for it is mentioned no earlier than by Aelian, an Italian writer of about 200 A.D.<sup>86</sup> The horn was, in reality, the tusk of a cetaceous animal of the northern ocean known as the narwhale, or the sea-unicorn, as Browne accurately points out. Browne did not feel

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85. The horn sold for enormous sums, one specimen in the sixteenth century being valued at \$75,000. The cost restricted its use principally to the nobility. The epithets "precious" and "rich" that were frequently applied to it are easily understood when one realizes that the apothecary sold it at a price more than ten times as great of a similar weight in gold. The horns acquired such value that kings vied with each other for the possession of the largest and the heaviest. One belonging to the King of France was worth £ 20,000, but Charles I of England was said to have owned the largest on record. The one owned by the city of Dresden necessitated elaborate ceremonial rite with any part of it was to be used for medical purposes, for the cutting off of the piece required would be done only if two persons of royalty were present. The horn was administered in the form of a jelly, or was made into drinking cups from which wine or water was drunk. It acted as a cure for the plague, as an antidote for every kind of poison, and as a remedy for fevers and epilepsy. It was not rejected formally as a medicine until the eighteenth century.

86. Robert Means, Lawrence, Primitive Psycho-Therapy and Quackery, pp. 161-3.

that the use or sale of these horns of the Morse or sea-horse for fluxes was objectionable, but "Antidotally used, and exposed for Unicorn's Horn, it is an insufferable delusion." He is correct in concluding that if "Elk's Hoofs and Horns are magnified for Epilepsies, since not only the bone in the heart, but the Horn of a Deer is Alexipharmacal, and ingredient into the confection of Hyacinth, and the Electuary of Maximilian; we cannot without prejudice except against the efficacy of this. But when we affirm it is not only Antidotal to proper venoms, and substances destructive by qualities we cannot express; but that it persisteth also Sublimate, Arsenick, and poysons which kill by second qualities, that is, by corrosion of parts; I doubt we exceed the properties of its nature, and the promises of experiment will not secure the adventure."<sup>87</sup>

The experiment was, as far as I know, not tried by Brown himself, but no less august a body than the Royal Society undertook to prove the efficacy of the horn against poisons. The members of the Society placed a spider in the centre of a ring of powdered unicorn horn and watched breathlessly for the result. Spiders were held to be venomous. Had the unicorn horn been effective, it would have intimidated the spider into staying within the circle, if it had not killed him outright, for the horn was supposed to be a very sensitive to the presence of the least poison.<sup>88</sup> The spider, with little regard for science or for established beliefs, scuttled over the ring of unicorn horn without hindrance or hesitation. Aubrey, in his Brief Lives, gives an account of a similar

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87. V.E., III, xciii, 274.

88. This was probably the reason for the affection royalty held for it, especially during and following the Renaissance.



experiment in his life of William Davenant (1604-1668), who acted as page to the first Duchess of Richmond. The Duchess was also of a speculative turn of mind, for "she sent him Davenant to a famous apothecary for some Unicorneshorne, which he was resolved to try with a spider which he incircled in it, but without the expected successe; the spider would goe over, and thorough and thorough, unconcerned."<sup>89</sup> It might be well to note that although Browne had not climbed beyond the full limits of the superstition, he was beyond many of his contemporaries, and had taken his stand before the Royal Society had tested the efficacy of the horn.

Numerous other errors might be listed, and the few that follow are given only to suggest that interest in them was not unique with Browne. Browne's speculation on how it happened that Eve was deluded by the serpent<sup>90</sup> might well be compared with Milton's account in Paradise Lost.<sup>91</sup> That Eve had one rib more than Adam had been a speculation, a firm conviction with some, until the sixteenth century when Vesalius dissected bodies of both sexes and found the number of ribs to be identical. Browne comments upon Columbus who "in an Anatomy of his at Pisa" had prepared a skeleton of a woman who chanced to have thirteen ribs on one side. Columbus had maintained that this was abnormal but he was cried down and oaths were taken that this was the rib with which women excelled.

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89. John Aubrey, Brief Lives, I, 205. In answer to such a result of the experiment, Ross might well have wondered if the perversity of creatures to act without regard for generally adopted beliefs might not have indicated that the spider, as was the lion who ate the cock, might not have been mad. Instead, he merely recounts instances where the horn had been effective and added the method by which true horn could be detected from artificial. In fact, he suggests two methods: "to wit, if it cause the liquor in which it is put, to bubble; and secondly, if it sweat when the poison is near." Ross, op. cit., pp.149 ff.

90. V.E., I, ix, 17 ff.

91. Paradise Lost, Book IV.

Browne, whimsically enough, felt that had this been the extra rib, then we might have found out from which side Eve had been framed, but he asserts no real belief in the statement.<sup>92</sup> Bishop Hall, who lived near Browne and was a close friend of his, although considerably older than he, was more serious in its acceptance. He states, "Many things are useful and convenient, which are not necessary; for if God had seen man might not want it, how easy had it been for him which made the woman of that bone, to turn the flesh into another bone? But he saw man could not complain of the want of that bone, which he had so multiplied, so animated. O God, we can never be losers by thy changes, we have nothing but what is thine, take from us thine own when thou wilt; we are sure thou canst not but give us better!"<sup>93</sup> Bishop Hall's faith was superb, but he was the victim of belief without investigation, and investigation in a matter of this type would have been easier than the measuring of the legs of a badger.

Browne's speculation on pigmies<sup>94</sup> fighting on the backs of cranes, recalls Milton's mention of them in Paradise Lost.<sup>95</sup> Rowlands, somewhat earlier, had mentioned them in connection with the "Idle person who frequented St. Paul's" in Satire I of "The Letting of Hunors Blood in the Head-Vaine."

His wondrous travels challenge such renowne,  
That Sir John Mandiuell is quite put downe.  
Men without heads, & Pigmires hand-breath hie,  
Those with one legge that on their backs do lie,  
And do the weathers iniurie disdainne,  
Makeing their legges a penthouse for the raine;  
And tut and tush; not any thing at all.

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92. V.E., VII, ii, 265.

93. Joseph Hall, Contemporaries, Book I, chapter 2.

94. V.E., IV, xi, 51.

95. Paradise Lost, Book I, lines 570-576.

Nothing much was known of pigmies, for most of the tales told of them were fabulous. Browne's interest was in the authenticity of the tales told about them, a rather skeptical interest.

That the mandrake kills when pulled up by the roots was another error not held by Browne, although the belief could not have lain far back of him, if we may judge by the excessive figurative use of the mandrake as a literary conceit during the Elizabethan period. Webster's White Devil and the Duchess of Malfi may serve as examples,<sup>96</sup> as well as Shakespeare's Romeo and Juliet.

Shrieks like mandrakes torn out of the earth,  
That living mortals, hearing them, run mad.  
IV, iii, 47-8.

Browne did not discuss the plant because of its reputed narcotic value,<sup>97</sup>

96. Ferdinando: I have this night dig'd up a mandrake.  
Cardinal: Say you?  
Ferdinando: And I am growne mad with 't.  
The Duchess of Malfi, Act II, scene v.

Vittoria: I prethee yet remember,  
Millions are now in graves, which at last day  
Like mandrakes shall rise shrieking.  
The White Devil, Act V, scene vi.

Flamineo: Heare me, -  
And thus when we have even powred our selves,  
Into great fights, for their ambition  
Or idle spleene, how shall we find reward?  
But as we seldome find the mistle-towe  
Sacred to physicke, or the builder oke,  
Without a mandrake by it; so in our quest of gaine.  
Alas, the poorest of their forc'd dislikes  
At a limbe proffers, but at heart it strikes!  
This is lamented doctrine.  
The White Devil, Act III, scene i.

97. The mandrake has a decided narcotic action, but it was dropped from the list of official remedies about the time of Boerhaave and has never been reinstated. This may be due in part to the mass of superstition that had grown up around it and had made zealous skeptics deny all virtue to a plant that had given rise to so many foolish stories.

or because it was supposed to shriek when pulled up by the roots, sending the puller mad or perhaps killing him, but because he was interested in its manner of generation. It was thought that the mandrake sprang from the fat or urine that dropped from the bodies of the dead, and it was supposed to be particularly prolific under the gallows. This, he felt, was again too erratic a departure from the law of generation, a law he never admitted allowed caprice.

The belief that murdered bodies bleed in the presence of the murderer was not uncommon during the earlier part of the century. Bacon had attested to it;<sup>98</sup> Burton had agreed to it;<sup>99</sup> Digby had explained it on the basis of physiology and revenge;<sup>100</sup> and in the Diary of Walter Yonge, we find an account of a trial held in 1613 in which the people within a radius of three miles of the victim were caused to come and touch the corpse. The murderer, refusing the test, ran away, and was so detected.<sup>101</sup> Browne, however, seems to give no acceptance to the theory; at least, he refuses to admit that it might serve as an explanation of the bleeding of Abel after his murder by Cain

Who can thinck that when tis sayd that the blood of Abel cryed unto heaven, Abel fell a-bleeding at the sight of Cain according to the observation of men slayne to bleed at the presence of the murtherer.<sup>102</sup>

Even such an inquiry as Browne instituted against the Jews is not without explanation, for during the time of Elizabeth, stringent laws had been enacted against them throughout England, and the English attitude toward them was such that Browne might well say, "Neither doth herein my

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98. Francis Bacon, Natural History, Cent. X, sec. 958.

99. Robert Burton, The Anatomy of Melancholy, pp. 160-169

100. Konelm Digby, "Observations on the Religio Medici," included in the edition of the Religio Medici, p. 159.

101. Diary of Walter Yonge, Camden Society Publications, ed. by George Robers, vol. 41.

102. M.T., p. 246.

zeal so far make me forget the general Charity I owe unto Humanity, as rather to hate then pity Turks, Infidels, and (what is worse) Jews; . . . .<sup>103</sup> In spite of Gosse's statement that what Browne says about the Jews is extraordinarily rude, and his Hebrew readers, if he had any, must have complained that it was more painful to be defended by such an advocate than to be left to the casual obloquy of the vulgar,<sup>104</sup> one must remember that England's treatment of the Jews had also been rude and antagonistic, and that they had suffered severe national discrimination. Browne's attitude, then, is not surprising, nor is the question of the odor of their bodies<sup>105</sup> without explanation when one remembers the many speculations that always surround an out-cast race.

We are likely to view any belief that is strange to us, when we run across it in books of many years past, as indicative of the undue credulity of those who lived at the time the books were written. We are attracted to ideas that were once of small importance because they commend themselves to us as odd and unmodern, and thus we are often persuaded that the people who gave them credence were more backward than was really the case. The undercurrent of knowledge of a period tends to satisfy our interest in the curious beliefs of a past people and appeases our taste for the strange and the credulous, even though it often obscures the more important knowledge that is less strange and exotic. It is for this reason the seventeenth century and any one who lived within the century are so hard to judge. Preserved Smith was right when he

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103. R.M., p. 5.

104. Edmund Gosse, Sir Thomas Browne, p. 91.

105. V.E., VI, xi, 248.

said, "It may seem one of the most inexplicable paradoxes of history that the first great age of modern science would have been, at the same time, the darkest century of superstition."<sup>106</sup> - right in all, perhaps, but in the use of the superlative. The period is strangely contradictory, incongruous, and highly confusing. No single epithet can fit the state of knowledge during the century, nor can any broad designation place proper emphasis upon what was happening to the manner of thinking and the material for thought during the first five or six decades. Without question, the century paid a heavy toll for its interest in the curious and its belief in the untrue. Browne had his full share of both, and found keen enjoyment in speculations on the rare and the unusual, and enjoyed a dialective method of proving or disproving the beliefs that were a part of the knowledge handed down to him from the preceding centuries. But that he was a solitary man, antiquarian in his interests and pursuits to the exclusion of all else, that his knowledge lay on the further side of the knowledge of his age, can hardly be accepted.

The present chapter has been an attempt to indicate briefly that many of the seemingly curious errors that Browne discussed were but a part of the common knowledge of the century; to show that in his manner of looking at prevalent beliefs and his method of considering them, he was abreast, and at times ahead, of his age. His skeptical attitude called for experimentation, proof in an empirical manner, determination by sense and reason with the weighing of authorities, and the adherence to certain invariable natural laws. He made use of all the

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106. Preserved Smith, A History of Modern Culture, p. 425.

sciences at his command in determining his conclusions, a point which will be seen even more readily in the chapter following. Although he accomplishes little in actual scientific discovery, he was walking close to those who were to make the discoveries which he often approached, but never made. His interest lay in the determination and discovery of the truth of both old and new beliefs, and the manner in which he undertook the task is not entirely uncommendable. His chief fault lay in the material to which he gave his attention, but even such material needed evaluation. Its oddity alone did not attract him. He sought, instead, to determine its truth.

## CHAPTER IV

## SIR THOMAS BROWNE AND THE SCIENCE OF THE SEVENTEENTH CENTURY

John Addington Symonds, in his edition of the Religio Medici (1886), stated, "If nothing but his [Browne's] Vulgar Errors had been handed down to us, we might have numbered him among the possessors of vast and recondite learning, who wasted ingenuity and patience upon subjects of little interest and of no permanent value."<sup>1</sup> But Symonds was not entirely correct in this statement. Browne did not expend his patience and ingenuity only upon subjects of little interest and of no permanent value in the field of knowledge. Many of his considerations had to do with the theories that were then being investigated by the new method of experiment and observation and in many cases were being verified by mathematical computations, and expressed in such new terms as mass, weight, density, and acceleration. He was not ignorant of hypotheses that had as their working basis the assumption that there were determinable natural laws, nor did he scorn the idea of a systematic and well-ordered universe that could be known empirically. His Vulgar Errors is not confined to a discussion of the erroneous beliefs held by the many who still clung to the so-called knowledge bequeathed them by the Middle Ages. The new science had attracted Browne's attention, and as he showed an interest in pointing out the absurdity of those popular beliefs that he felt to be untrue and to be disproved by reason and experiment, so he also showed an interest in what was being done in the empirical determination of the natural forces that were at work about him.

It is not my purpose to measure Browne's scientific stature, but

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1. John Addington Symonds, in his edition of the Religio Medici, London, 1886, p. vii.



rather to place him where he properly belongs, with his century instead of behind it. Those who hold him to be benighted and uninterested in the affairs of the day, a solitary man who allowed no disturbance to spoil the equanimity of his mind, who took no part in the current religious, political, or scientific pursuits, can hardly have studied the century and Browne in close conjunction. It is my purpose to indicate that Browne did know the period in which he lived, even though he influenced it little one way or another, that he knew it because of an active interest in it, that the new science and manner of thinking found him neither behind his age nor leading it, but close upon the heels of those who made up the front ranks.

Browne was unfortunate in that he was born too early to do more than to take a place with those many who investigated at random, but who had an insufficient background of proved factual knowledge to allow them to realize the true significance of what they were doing, or enough of genius to achieve telling results without such a background. He reached maturity too early to have encountered much of the new science in the schools that he attended, although he had come in contact with some of it during his period of study on the continent. His first years of medical practice were without the boon of the discoveries that were to influence the practice of medicine in the latter part of the century, for with the exception of Harvey's discovery of the circulation of the blood, new medical knowledge was still thirty or more years in the offing. He lived long enough to realize that great possibilities lay in the new method of research, but the attainment of positive results from the use of that method had to be left to his younger contemporaries, those men, who although still of Browne's time, were just enough later for them to have better opportunity

to accomplish that which we are prone to lament that Browne did not. Moreover, Browne lived in Norwich instead of in London, and consequently was far away from the English center of scientific activity. Because of this, he was forced to regard from afar a large part of what was being done in the way of experiment and discovery.

The status of scientific thought at the beginning of the century I have already discussed.<sup>2</sup> To a large extent, science was still based on ancient authority, tradition, reason, and uncontrolled experiment. Browne often seems to lean heavily on the ancients for much of the material that he included in his discussion of the various common errors that he considered. But he was only doing what almost every man of his time, similarly interested, did. He took his first ideas from the material that lay behind him. Copernicus, in the century preceding, had "found his epoch-making discovery, not in observing the stars, for he owed little to such investigation . . . . but in the writings of Cicero, who suggested that Hicetas had held that the earth turned round on its axis daily. From Aristarchus he got the notion that the earth not only rotates, but also moved bodily about the sun."<sup>3</sup> Copernicus had been handicapped by his poor instruments and telescopes, for they were by no means the best on the continent, but his skepticism and scientific curiosity had led him to enlarge upon this ancient theory in the light of his own reasoning and by the use of mathematical computations. With his keen mind, he carefully fitted the parts of his hypothesis together, and he produced his new theory, although it was far from infallible, and without grave fault. Galileo had owed his

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2. Cf. Chapter II.

3. John Herman Randall, The Making of the Modern Mind, p. 216.

conversion from medicine to mathematics to the work of Euclid. His native bent for the independent investigation of nature, as well as his fundamental combination of mathematics and experiment, had been developed from a perusal of the great Hellenic physicist, Archimedes.<sup>4</sup>

Browne's interest in what the ancients had held to be true was not, then, unique, but similar to that of other men who were more fortunate in their use of the material which they obtained from the classical authors that they read. Men such as Copernicus and Galileo used the ancients as a point of departure for the exercise of their own genius. They went so far afield from them, however, that they may well be called "original thinkers". Browne, although his point of departure was often much the same as theirs, concerned himself only with the attempt to test the common beliefs and theories that had been so handed down. He seldom went beyond simple investigations, and gained from his work nothing more than the conclusion of the truth or fallacy of the single point under consideration. It is because he did no more than this while others forged ahead to independent conclusions that he has been accused of holding hands with the old science, unwilling to throw himself whole-heartedly into the new.<sup>5</sup>

There are still other things that must be taken into account when we attempt to determine Browne's relation to his age. During the course of the century, many new discoveries, inventions, and hypotheses were to be made in the field of science, such as the discovery of new stars and planets by the aid of the telescope, the discovery of the circulation of the blood, the inventions of the barometer, thermometer, air-pump, and microscope, the formulation of the cellular theory of the structure of plants, and the discovery of the sensory systems of the body and of the

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4. John Herman Randall, op. cit., p. 216.

5. Edmund Gosse, Sir Thomas Browne, in passim.

Malpighian duct. But few of these contributions were made by men who were scientists or research workers by profession. The period was, in a sense, a golden age for investigation. It was possible at that time for one man to be interested in all fields of knowledge, for so little was known about any one field that its possibilities for retrospective study were quickly covered. The scientist, in the earlier part of the period, was a dabbler in many lines of investigation. He usually had no one thing in mind toward which to direct his research. He merely wished to know of all things generally, to experiment, to discover, oftentimes for the sake of experimentation itself. For him, most of the natural world was still unexplored. In fact, he frequently regarded all fields of knowledge as the realm for his investigation and went, as did Browne, from one phase of study to another with no effort to concentrate his investigations or to attempt an orderly arrangement of the scattered data he so indiscriminately collected. Almost everything that came to his attention served him as something new, an advancement above what he had known before, and a thing of interest to others who were engaged in exploring the physical world with him. Unconsidered trifles became important truths, either because they had not been known before, or because they had not hitherto been proved empirically. Bedrooms and kitchens were transformed into laboratories.<sup>6</sup> Even Robert Boyle cannot be said to have had a laboratory in the sense that we now use the term. His apparatus was set up in whatever room was convenient, and much of his experimentation with gases was done with his tubes running along the stairs. The results obtained from these crude make-shifts of laboratories were eagerly

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6. Martha Ornstein, The Role of Scientific Societies in the Seventeenth Century, p. 5.

exchanged among those who were similarly interested. As has already been pointed out in Chapter III, many of the accounts of experiments and speculations were exchanged between the experimenters by means of letters. An easier means for this exchange of ideas and the results of experiments was afforded when the Royal Society was formally organized in 1662. Its meetings and printed "Transactions" facilitated intercourse among those interested in the new science.

Browne had no one field of research. He was first a physician, and then a lay-scientist who made little or no claim to the name. In such a combination of interests (and the physician of the day was not a scientist as we now use the term), he was typically of the seventeenth century. The men of science during the earlier part of the century came from diverse fields. Christopher Wren was an architect, but we might well also accord him a place in the annals of science, which he pursued as a hobby, did we not choose to remember him as the architect of St. Paul's instead. In the biological and zoological sciences he was, at that time, unparalleled. Boyle was a man of leisure, a member of the aristocracy who engaged in experimentation to pass his time and to indulge his fancy. Lower, Willis, and Mayow were practicing physicians. Chief Justice Hale and Lord Keeper Guildford stole hours from the business of their courts to write on hydrostatics. It was, according to Macaulay,<sup>7</sup> under the immediate direction of Guildford that the first barometers ever offered for sale in London were constructed. Charles II had his own laboratory at Whitehall, and took part in chemical experiments and in dissections. Browne mentions the visit of the king to Norwich and speaks of his dissection of a dolphin while there.<sup>8</sup> Rupert, nephew of Charles I, dabbled in natural philosophy.

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7. Thomas B. Macaulay, History of England, I, 216. (Firth edition)

8. In a letter to Edward, June 14, 1676, Letters, p. 69.

Evelyn, the diarist, was so much interested in physics that he proposed to found a retreat for persons engaged in research. Pepys, Secretary to the Admiralty, was at one time President of the Royal Society, although none could accuse him of being a scientist. Science no longer manifested itself in the search for the philosopher's stone, or in a meticulous discussion of the natural phenomena as they had been described by the ancients, or in the philosophical justification of old truths because they fitted a manner of reasoning and agreed with the teaching of church authority. It appealed to almost every man of learning, for it opened to him a new world whose only restrictions were those placed upon him by his own personal beliefs and by his mental possibilities. When Browne responded to it in his own way, he was doing what scores of others were doing, many of whom are now remembered for accomplishments other than their proficiency as scientists.

The fact that Browne knew the ancients intimately and quoted widely from them, and that he seemed to dip in many fields of investigation without concentrating his attention upon any one, cannot, then, be used against him. He did, perhaps, refer to the statements of authorities with what often seems undue frequency. He does this, however, more often as a literary device than because of a deep regard for the authorities that he quotes. At that time, a common literary style was used for all writing, without regard for the purpose or the type of material under consideration. There was as yet no scientific vocabulary, and matter-of-fact discussions were often burdened with elaborate conceits and poetic or allegorical phrasing. Browne was no more guilty of this manner

of writing than others who wrote at the same time,<sup>8</sup> but this heavily ornate and elaborated style which is used for all his writings, in-

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8. Notice the Brownesque style in the following excerpts from some of the books written during the century. "But there the Will, or Passion hath the casting voyce; the case of Truth is desperate. And yet this is the miserable disorder, into which we are laps'd; The lower Powers are gotten uppermost; and we see like men on our heads, as Plato observ'd of old, that on the right hand, which indeed is on the left. The Woman in us, still prosecutes a deceit, like that begun in the Garden; and our Understandings are wedded to an Eve; as fatal as the Mother of our Miseries. And while all things are judg'd according to their suitableness, or disagreement to the Gusto of the fond Feminine; we shall be as far from the Tree of Knowledge; as from that, which is guarded by the Cherubin. The deceiver soon found this soft place of Adam's; and Innocency it self did not secure him from this way of seduction." Joseph Glanvil, The Vanity of Dogmatizing, p. 118.

"For, as we see in a Bowl or Pail full of water, or rather in a Pipe, though which the water runs along; if there be a little hole at the bottome or side of it, the water will wiggle and change its course to creep out at that Pipe. . . ." Kenelm Digby, Of Bodies, in a discussion leading up to the explanation of the loadstone, p. 220.

[On condensation.] "For heat, entring into a body, incorporates it self with the moist and viscuos parts it findes there; as purging medicines do with the humour they work on; which when the stomach can no longer entertain (by reason of their unruly motions in wrestling together), they are both ejected grappling with one another; and the place of their contention is thus, by the supervenience of a guest of a contrary nature (that will not stay long there), purged from the superabundance of the former ones that amoy'd it. Even so the fire, that is greedily drunk up by the watry and viscuos parts of a compounded body, and whose activity and restless nature will not endure to be long imprisoned there quickly, pierces quite through the body it enters into; and, after a while, streams out at an opposite side, as fast as it enters on the side next to it, and carries away with it those glewy parts it is incorporated with; and, by their absence, leaves the body they part from dryer than at first it was." Kenelm Digby, Of Bodies, p. 185.

[On the motion of the planets] "If we will take the literal evidence of our Eyes; the AEthereal Coal moves no more than this Inferior clod doth:...." Joseph Glanvil, Scepsis Scientifica, p. 68.

". . . . whereby, conveniently placed, they (steel and iron near a loadstone) do septentrionate at one extream, and Australize at another." V.E., II, ii, 101.

"The Aristotelian Philosophy is inept for New discoveries, and therefore of no accommodation to the use of life, . . . . And that there is an America of secrets, an unknown Peru of nature, whose discovery would richly advance them, is more than conjecture." Joseph Glanvil, The Vanity of Dogmatizing, p. 178.

cluding the Vulgar Errors, had done much to make a large part of what he wrote uninteresting to the general reader.<sup>9</sup>

At the same time, there are those who find such a style charming and musical, and who see in the balanced phrasing of Browne's prose, the work of a superb stylist. To them, Gosse gives a word of warning. "We should not," he says, "be led away by our affection for Browne, and by his charming way of saying things, to exaggerate the scientific value of the 'Vulgar Errors.'"<sup>10</sup> Gosse is right. There is little of real scientific value in the book. In fact, there is but little of true literary value.<sup>11</sup> One usually reads it for the purposes of scholarship, or because of a curious interest in the working of Browne's mind. But our caution in guarding against the charm of the style must not, on the other hand

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9. Most of Browne's letters are free from this 'literary' style of writing, and offer a striking contrast to the books he wrote for publication. I do not mean to suggest that he was a self-conscious author, but merely that this ornate style was a part of the 'literary manner'. Cf. footnote 8. In his letters to Edward, Browne is straight-forward in statement and approached a simply stated discussion of the topic which he is considering. He is still the same Browne who wrote the Vulgar Errors, the slow, cautious thinker who felt along the surface of his problem without probing far into its depths, although skeptical and incredulous of things that could not be proved by actual testing, or by considering them according to the "sense and reason." But no one who has read the outstanding passages contained in the Urn Burial, the Garden of Cyrus, and the Religio Medici could charge him with artificiality because of this difference in style between what he wrote for publication and what he wrote in his intimate letters. Browne was a natural stylist who had an innate sense of rhythm and balance, and a natural love of dignity that showed itself best when he wrote formally.

10. Edmund Gosse, Sir Thomas Browne, p. 93. The idea is repeated several times throughout the book.

11. The Vulgar Errors was written before the founding of the Royal Society and the consequent benefit which prose derived from its demand that all reports be written concisely and in a straight-forward, clear manner. Thomas Sprat records that the Royal Society requested that its members use a "close, naked, natural way of Speaking; positive Expressions, clear Sense; a native Easiness; . . . preferring the language of Artizans, Countrymen, and Merchants, before that, [sic] of Wits, or Scholars." The History of the Royal Society, London, 1702, p. 113.



make us oblivious as to the value of the material that is contained in the book. We must not, as did Gosse, refuse to look at the content itself for fear that we may be deluded by the manner of writing. We must not assume that it has no real value because of the mass of discussion concerning curiosities, the quoting of now discarded authorities, the ponderous reasoning on trivial subjects, the many vain conclusions that are reached, as well as the many questions that are left without conclusions, under which the real value is hidden.

The Vulgar Errors reflects what was happening during the seventeenth century in the realm of English thought and science. We cannot say that Browne reached the high peaks of the century. In fact, he did not always recognize them. But he was not unaware that they were present, for, as has already been stated, his preoccupation with what he termed 'vulgar errors' did not make him shut himself away from what was happening about him. The very manner in which he set about to show the falseness of these beliefs indicates his interest in a method that reached conclusions by experiment and observation, and that resorted to the 'reason' only when this method was not possible. So strong was the fascination of the new thought that Browne did not stay with his avowed purpose of discussing 'errors'. His seven books contain discussions of the Copernican theory, of electricity in as far as anything was then known about it, of tides, of clocks that were then being perfected, of potential barometers, of sun spots, of magnets and magnetism. These were not subjects pertaining to vulgar errors. They were questions that challenged the best minds of the period, and in some cases, that have challenged the best minds of all times.

Browne was hindered in his efforts in experimentation by two things.

First, he seemed to have no knowledge of mathematics, and the burden of proof for the larger and most important speculations of the century was to be largely mathematical. Thought had begun to change from the qualitative to the quantitative with Vesalius. A new method of research, mathematical and observational, had taken definite shape with the work of Galileo at the beginning of the seventeenth century. This method, during the course of the century, was to give a real meaning to the term 'research', for by the time of Newton at the end of the century, the word had come to mean the arranging into an ordered whole of such facts as were at the command of the scientist, the hunt for a shaping explanation not only for the individual parts, but for those parts in their relation to each other. Natural laws were beginning to be formulated into statements that were based on the data gathered from the actual observation of natural things, instead of being traced from interpretative meanings of purposes and of fitting explanations for these purposes.<sup>12</sup> A large part of this was possible because of an increased use of mathematics. Mathematics, at the end of the sixteenth century, had not been in good odor, and only in 1619 did the will of Sir Henry Savile, Warden of Merton College, institute in Oxford his professorships of astronomy and geometry.<sup>13</sup> Wood records that, upon the institution of these chairs, "not a few of the then foolish gentry" kept their sons from the university in order that they might not be "smutted with the black art", for most people still regarded mathematics as belonging to the realm of magic.<sup>14</sup> Bacon had mourned the mathematical tendency that was being shown in the study of astronomy, for, he said,

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12. Edwin Arthur Burtt, The Metaphysical Foundations of Modern Physical Science, pp. 61 ff., Cf. Chap. III, "Galileo".

13. A.E. Taylor, Thomas Hobbes, p. 7.

14. Anthony Wood, Athenae Oxonienses, p. 27.

astronomy "loses its dignity by being reckoned among the mathematical arts, for it ought in justice to make the most noble part of physics."<sup>15</sup>

But physics as well as astronomy was to send its roots deep into mathematics and, while Bacon might institute a method of research, he did not use this method to best advantage, nor did he ever appreciate its possibilities or the vast reaches of its power because of this disregard for mathematics.<sup>16</sup> But mathematics was to bring with it measurement of various kinds - of time, of mass, of density,-which, in turn, was not only to further the knowledge of the natural world, but to change the method of approach to and the explanation of the metaphysical world.<sup>17</sup> Browne, however, was handicapped, for he had at his disposal no such vocabulary of terms as would express precisely his meaning, and no means of measurement that was commonly accepted. We find no mention of mathematics in the Vulgar Errors, except that which was included in his knowledge of chronology and numerology.

His second fault is one that I have mentioned before, a defect that struck at the root of his possibilities and made impotent his best achieve-

15. Francis Bacon, Advancement of Learning, ed. by Joseph Devery, New York, 1902, p. 150.

16. Bacon, much more than was Browne, was bewildered and helpless in the field of science. Although he sought out facts by his proposed method, he did not see more than the obvious, and even in this his conclusions were often wrong. He retained a great deal that was plainly incompatible with sense and reason. Neither did he attempt to formulate what he held to be true into a larger system, but left most of his facts isolated and unrelated. His Natural History is a storehouse of strange explanations for the natural phenomena. In it he deals with sound, fire, air, the natural processes of plant growth, maturation, and propagation. Many of his conclusions were drawn from his own observations and experiments, but his interpretations are so often inaccurate as to make one hesitate to allow him a place among scientists except as a methodologist. As a philosopher, he is probably over-rated by most, for his method did not prove of great benefit to himself, and only in the hands of others did it become of great value.

17. Cf. Burt, op. cit.

ments. In spite of Browne's interest in experimentation and in disproving the errors of the "rabble", which were often in this case the errors of antiquity and the Middle Ages, he seemed to lack the imaginative and correlating intelligence that lead to new conclusions. Whether because of timidity, or simply because he did not always see the significance of his observations, he often relinquished a line of reasoning or an observational conclusion just before he reached its real implication.

This trait of not realizing where his experiment or line of reasoning would lead him often kept him from making many discoveries that he had approached, some of which were to be made decades after by men who devoted all of their time and effort to the field of research. Alfred Noyes, in a review of Geoffrey Keynes' edition of Sir Thomas Browne, points out "that Sir Thomas Browne in his extraordinarily acute discussion of the distribution of animal life over widely separated continents, came within an ace of anticipating the main argument of Darwin's 'Origin of Species'."<sup>18</sup> Gunther indicated that The Garden of Cyrus contains "observation on the forms of plants and laws of vegetation, with ideas on growth which to some extent anticipated later work on phyllotaxis."<sup>19</sup> To these anticipations might well be added that he rejected the traditionally assigned cause for the blackness of negroes as the fulfillment of the curse of God on Cham and his posterity, and accepted instead a theory that would have the secret of the black color to lie in the sperm itself. By his usual manner of devious analogies, he pointed out that plants with white roots grew colorful flowers, and that the white spawn of frogs and lobsters

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18. Alfred Noyes, "Review of Geoffrey Keynes' edition of The Works of Sir Thomas Browne," Bookman (London, 1928.) Cf. V.E., VI, vi, 190 ff. for the passage referred to.

19. R.T. Gunther, Early Science in Oxford, III, 161.

gradually darkened to the color of the tadpole or the shell. The secret of these changes he felt to lie in the sperm, if one could but trace it. And from such observations, he concluded that it "may also be in the generation and sperm of Negroes; that being first and in its naturals white, but upon separation of parts, accidents before invisible become apparent; there arising a shadow or dark efflorescence in the out-side; whereby not only their legitimate and timely births, but their abortions are also dusky, before they have felt the scorch and fervor of the Sun."<sup>20</sup>

In these examples - and others might well be added to them - it is apparent that here was a slow, careful mind searching this way and that, oftentimes slowing down its own progress by long digressions on popular beliefs and on views that had already been advanced by others who had thought upon the subject and to whom Browne's attention had been called. But it was a mind that carefully gathered up the threads of its own meditations and often reached conclusions that were not far from correct. But something prevented that mind from seeing the implications that lay within their immediate determination. In the case of Malpighi and Willis, some presaging instinct kept them working on certain investigations and seemed to warn them when they were close enough to a new discovery to warrant further and persistent search. They had the ability to push their observations to explanations that began to take on the pattern of the whole, to become aware of the indication of relationships and the dependence one thing had upon another. But it would seem that Browne could not differentiate between material that would contribute to scientific knowledge and material that was merely of general interest. He was

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20. V.E., VI, x, 231 ff.

too truly a seventeenth-century lay-scientist. He could not always distinguish the kernel from the chaff, although he usually knew the general class to which the entire plant belonged.

If we may legitimately credit Browne with a knowledge of his century, with a consciousness of the new thought that lay within it, we must see in him a reflection of those things that were crowding their way into the scientific world during the middle part of the century. There is no doubt that Browne refused to accept the Copernican theory and held, instead, that the sun moved about the earth. Nevertheless, he regarded the new postulate with a kindly and inquiring interest. He says in the first book of the Vulgar Errors:

And therefore if any affirm, the earth doth move, and will not believe with us, it standeth still; because he hath probable reason for it, and I no infallible sense, nor reason against it, I will not quarrel with his assertion. But if, like Zeno, he shall walk about and yet deny there is any motion in Nature, surely that man was constituted for Anticera, and were a fit companion for those who having a conceit they are dead, cannot be convicted into the society of the living.<sup>21</sup>

In his "A Digression of the Wisdom of God in the site and motion of the Sun," he concludes his discussion of the benefits gained by the sun's position according to the Ptolemaic theory with the following comment:

Now whether we adhere unto the hypothesis of Copernicus, affirming the earth to move, and the Sun to stand still; or whether we hold, as some of late have concluded, from the spots in the Sun, which appear and disappear again; that besides the revolution it maketh with its Orbs, it hath also a diurnal motion, and rowls upon its own Poles, whether I say we affirm these or no, the illations before mentioned are not thereby infringed.<sup>22</sup>

Before the time of Browne, Tycho Brahe (1546-1607) had rejected the

21. V.E., I, v, 39.

22. V.E., VI, 184 ff.

Copernican theory except as it placed the sun at the centre of the universe. His objections were not based purely on astronomical reasoning, but were largely influenced by his own religious tenets. He felt that although the theory was not contrary to mathematics, it was to physics, for he held that the heavy and sluggish earth was unfit to move and that the system was opposed to authority, at least according to his interpretation of the scriptures. He made careful telescopic observations, but they did not override his objections, for it was incredible to him that the earth's supposed orbital motion should cause no change which he could detect in the positions and brightness of the stars.<sup>23</sup> The Scotch historian Buchanan, had argued that if the earth turned on its axis, a violent wind would sweep everything from its surface. Cardan had not supported the theory. Francis Sizzi had declared that there must be seven planets, i.e., the moon, the sun, Mercury, Venus, Mars, Jupiter, and Saturn, because there were seven openings in the head, there were seven metals in nature, seven days in the week, and so on through the long enumeration of the use of the number seven both in natural and in explanatory

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23. W.T. Sedgwich and H.W. Tyler, A Short History of Science, pp. 205-7.

history.<sup>24</sup> In 1608, Alexandre Tassoni, the Italian poet, denounced Copernicus and his hypothesis. In France, Montaigne observed that Copernicus, having overthrown his predecessors, would in time be overthrown himself. Pascal's mind was too skeptical to decide definitely between Ptolemy, Tycho, and Copernicus. Francis Bacon had said of the theory:

. . . . the absurdity of which notions concerning the moon, the other planets, etc., have thrown men upon the extravagant idea of the diurnal motion of the earth, an opinion which we can demonstrate to be most false.<sup>25</sup>

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24. Kepler, whose name is always associated with the establishment of proof for the Copernican system, is a rather good example of "fact and fiction", credulity and incredulity, as it was evidenced during this period. The motives of the various men interested in the theory were often curious. Kepler's motives have usually been overlooked because of what he accomplished. I am quoting from Langdon-Davies: "As the air to the bird or the sea to the fish, so were numbers to Kepler; his mind breathed them and transformed them into light and heat. Faced with a mass of calculations he tried every conceivable theory which might fit them; he was convinced that numbers all had a 'meaning.' [This for much the same reason that Francesco Sizzi had insisted on the number seven.] . . . . Now the modern man reading this smiles and says that there is no particular virtue in the number seven and that it is merely mystical superstition to suppose that because there are seven openings to the head that [sic] there must be seven planets. Kepler did not take this line at all; nobody believed more than he in the magic virtues of numbers, and if 'seven' had to be scrapped it could only be because it was in this instance the wrong magic number.

"According to the Copernican idea the seven old 'planets' were replaced by six bodies going around the sun, . . . . Kepler asked himself: why six? After a great deal of calculation he discovered that their distances from the sun were such that round each orbit you could build one of the five regular solids. A regular solid is a solid having all its faces, edges, angles, etc., absolutely alike, . . . . there are only five of them; Euclid has a simple proof in his geometry, that there can be only five such volumes. Here then was the reason why God made six and only six planets, because there would have been no regular solid to go round a seventh. . . ." The conclusion was, of course, wrong, for three other planets were later to be discovered and to spoil Kepler's perfect number of six, but, as Langdon-Davies says, "Yet what a flood of light the whole incident throws upon the human motive; this insatiable desire to give form and pattern and therefore significance to the universe." Taken from John Langdon-Davies, Man and His Universe, pp. 125-28.

25. Francis Bacon, Advancement of Learning, p. 150.



And it is likewise evident, that although the opinion of Copernicus about the earth's rotation cannot be confuted by astronomical principles, because it agrees with phenomena, yet it may easily be exploded by natural philosophy.<sup>26</sup>

He attacked the hypothesis by an appeal to the evidence of sight and argued that the earth must be the centre of the universe because of its weight. William Harvey, the discoverer of the circulation of the blood, had heard Galileo lecture at Padua, but rejected the hypothesis flatly in 1628, and in 1649 referred to it merely as conjectural and unsatisfactory. James Howell saw fit to refer to it humorously in a letter to his brother written from Amsterdam 1 April 1617. "I am newly landed at Amserdam ..... Having been so rock'd and shaken at Sea, when came a-shore, I began to incline to Copernicus his Opinion, which hath got such a sway lately in the World, viz. That the Earth, as well as the rest of her Fellow-Elements, is in perpetual Motion, for she seemed so to me a good while after I had landed."<sup>27</sup> Digby was dubious concerning his acceptance of the theory, neither affirming nor denying it, and using indiscriminately both the Ptolemaic and Copernican theories in his discussion, but giving no personal preference to either.<sup>28</sup> Drummond, in his Cypress Grove, condemned the theory and spoke bitterly of the idea of sun spots, of the possibility of the moon being inhabited, of the air being but water rarefied, of the earth as a magnet, of stars no longer fixed, and added, "Thus sciences, by the diverse motions of this globe of the brain of man, are become opinions, may, errors, and leave the imagination in a thousand labyrinths."<sup>29</sup> Burton

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26. Francis Bacon, op. cit., p. 176.

27. James Howell, Familiar Letters, I, 25.

28. Of Bodies, pp. 65 ff. Cf. the discussion on "Light".

29. William Drummond, Cypress Grove, At the Hawthorn Press, 1919, p. 35.

was inclined to regard the theory with satirical humor, for, after he had discussed the new systems put forward for consideration, including the Copernican, he added;

In the meantime, the world is tossed in a blanket amongst them, they hoist the earth up and down like a ball, make it stand and go at their pleasure: one saith the sun stands, another he moves; a third comes in, taking them all at rebound, and lest there should any paradox be wanting, he finde certain spots and clouds in the sun, by the help of glasses, which multiply (saith Keplerus) a thing seen a thousand times bigger in plano, and makes it come thirty-two times nearer the eye of the beholder. . . . not in jest, but in good earnest these gigantical Cyclops those who measure the site and distance of the sun and moon in a glass will transcend spheres, heaven, stars, into that empyraan heaven; soar higher yet, and see what God himself doth.<sup>30</sup>

Moreover, the church had declared strongly against the theory. Its long and bitter opposition had not abated with Galileo's forced recantation of the motion of the earth in 1616, and religious disapproval was still so strong that in his larger work published in 1632, he dared not treat it as proved, only as possible. Descartes' opinion I have referred to previously.<sup>31</sup> He had been taught caution through the example of Galileo, and until 1644 kept a discreet silence. When he did break that silence, it was to advance a new theory that attempted to reconcile religion and science, although his system was philosophically rather than mathematically determined. All of these men, with the exceptions, perhaps, of Drummond, Burton, and Howell, would have considerable influence in whatever attitude they chose to take concerning the new theory. Browne, then, was not alone or unique in his position. In fact, he was ahead of some of those mentioned for he was inclined to lean towards the new theory and to watch its development, even though he was reluctant to accept it.

It might also be pointed out that Browne, while he was an opponent

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30. Robert Burton, Anatomy of Melancholy, pp. 328-9.

31. Cf. Chapter II.

of the Copernican system, as far as personal belief was concerned, was not only interested in, but hardly skeptical of, those discoveries and modes of reasoning that led to the proof of the system with which he did not hold. Tides, sun spots, the rate of increase in the acceleration of falling bodies all interested him. In fact, the very mildness with which he looked at the Copernican theory might suggest that while he had an orthodox belief in the Ptolemaic, his curious interest was in the Copernican. He does not seem to have objected when others tampered with the Ptolemaic system, for it apparently meant little to him in itself except that it was commonly adopted. He never argued for it on religious grounds, as did many. One might suspect that to a man of his religious tolerance, who had emotional response to the beauties of the more undogmatic religious emotions and sentiments, a system of cosmology was not needed to enhance his spiritual well-being. At least, he seems to have had no repugnance to a consideration of the new hypothesis as an explanation of natural phenomena that would bear critical examination.

In spite of Browne's unenthusiastic adherence to the old idea of the earth as the centre of the universe and stationary, he was not unversed in the experiments and the ideas of those who, like Galileo, were engaged in rapidly "making" the new science. The rise and fall of tides had long been regarded as a general puzzle, and attention was again concentrated on the problem during the time of Galileo. In the seventh book of the Vulgar Errors, Browne states:

And therefore old abstrusities have caused new inventions; and some from the Hypotheses of Copernicus, or the Diurnal and annual motion of the earth, endeavour to salve the flows and motions of these Seas, illustrating the same by water in a boal, that rising or falling to either side, according to the motion of the vessel, the conceit is ingenuous, salves some doubts, and is discovered at large by Galileo.<sup>32</sup>

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32. V.E., VII, xiii, 301.

Galileo, in his book, Two Chief Systems of the World, the Ptolemaic, and the Copernican (1630),<sup>33</sup> had given the discussion of the final day over to one of tides, a phenomenon which he explained to be due to the motion of the earth alone, not to the attraction of the sun and moon as was even then held by Stevin and Gilbert. Bacon had refuted Galileo, also basing his conclusions upon his observation of the motion of water in a bowl turned rapidly. But he felt Galileo's explanation had been based on data that could not be granted (the supposed motion of the earth), and because of this and the fact that it did not explain satisfactorily the tide taking place every six hours, he rejected the theory in its entirety.<sup>34</sup> Although Browne did not believe in the motion of the earth any more than did Bacon, he did not let this interfere with his interest. He wondered "whether the flux and reflux of the Sea be caused by any Magnetism from the Moon."<sup>35</sup> But here again we find Browne with an idea that suggested that there were plausible arguments in its favor, but arguments which he made no attempt to work out. We have assumed that Browne was without such knowledge of mathematics as would allow him to do more than to make general observations and experiments. He suggested no mathematical computations to augment his suggestions, nor did he refer to the computations of others in his discussion. Yet he accepted tidal regularity as a necessary part of the phenomenon, and because

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33. Permission had been granted for the publishing of the book on two conditions: ". . . first, the possibility of the Copernican system was to be treated as a hypothesis, not a reality; . . . and, second, the book must conclude with this argument about the nature of the tides: 'God is all-powerful; all things are therefore possible to Him; therefore the tides cannot be adduced as a necessary proof of the double motion of the earth without limiting God's omnipotence.'" Quoted by John Langdon-Davies, Man and His Universe, p. 136.

34. Francis Bacon, Novum Organum, ed., by Joseph Devey, New York, 1902, Bk. II, 240.

35. V.E., II, iii, 132.

observational evidence was against such an occurrence, he expressed skepticism concerning the seven tides that were supposed to take place irregularly at Euripus.<sup>36</sup> His own suggested solution to the problem of tides is not praiseworthy. He ended his incomplete analysis with the suggestion that the tides might be attributable to the fermentation of the seabed as well as to the attraction of the moon, but he arrived at no real conclusion. The problem of tides was not to be definitely solved until the time of Newton.<sup>37</sup>

Although Browne may not have accepted all the discoveries and conclusions of Galileo, he was interested enough to follow his work and to be impressed by it. The first edition of the Vulgar Errors contained this statement:

Now whether the earth stand still, or moveth circularly, we may concede this magnetical stability; for although it move, in that conversion the poles and centre may still hemain the same, as is conceived in the magnetical bodies of heaven, especially Jupiter, and the sun; which, according to Galileus, Kepler, and Fabricus, are observed to have dinetical motions and certain revolutions about their proper centres; . . . .<sup>38</sup>

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36. V.E., VII, xiii, 297 ff. The tidal irregularity at Euripus was supposed by some to have caused Aristotle, who despaired of determining the reason for it, to drown himself in the harbor. Reports made by actual observers of the harbor, however, maintained that there were but four. Cf. reference indicated in the Vulgar Errors.

37. In a letter by Christopher Sawtell to William Lilly, the astrologer, written from Waymouth, August 6, 1666, Sawtell almost fawningly presents Lilly with an account of the phenomenon of the sea ebbing and flowing seven times in four hours time, which he admits was unusual and strange, but true according to any number of witnesses. The tone of the letter indicates that Sawtell was bidding for Lilly's favorable recognition by tendering him a "curious incident". J.C. Halliwell-Phillips, Letters on the Progress of Science in England from Queen Elizabeth to Charles II, London, 1846, pp. 101-2.

38. Cf. Wilkin's edition, Vol. I, Bk. II, Chap. ii, 114. Cf. Footnote

He also makes the observation:

In that there are just seven planets or errant stars in the lower orbs of heaven; but it is now demonstrable unto sense, that there are many more, as Galileo hath declared; that is, two more in the orb of Saturn, and no less than four or more in the sphere of Jupiter. . . .<sup>39</sup>

It was also from Galileo's work that he received an interest in the telescope. From the manner in which he mentions the "glass", we may be certain that he appreciated its possibilities. The attitudes of some of his contemporaries toward the telescope were often deprecatory. Ben Jonson, biased by his veneration for antiquity, had punned on the "perspective glasses" by calling them, instead, "perplexive glasses";<sup>40</sup> Martin Horky had stolen a look into the long barrel of the telescope and declared that all the fixed stars looked double;<sup>41</sup> Samuel Butler, in the latter part of the century, wrote a satire on the Royal Society, whose members thought that the form of a mouse seen through the glass was that of an elephant walking on the face of the moon.<sup>42</sup> But Browne accepted the instrument quietly and completely. We see nothing in his attitude of the breathless interest of the true scientist, or of the scornful disparagement of the skeptic; only the appreciation of one interested in its possibilities. He refers to the "glass" both figuratively and literally, but he always uses the term to indicate the enlargement of an object or the seeing at a distance.

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39. Cf. Wilkin's edition, Vol. I, Bk. IV, Chap. xii, 423.

40. Ben Jonson, in his satiric masque, "News from the New World discussed in the Moon." 1620.

41. Preserved Smith, A History of Modern Culture, p. 45.

42. Samuel Butler, "The Elephant in the Moon." The members of the Royal Society were supposed to have gathered to view the moon through a telescope. They discovered that, as they looked through the glass, a huge animal moved across the face of the moon. They immediately concluded that the moon was inhabited and set about to make preparations to make their discovery known to the world. The animal was nothing more than a mouse that by some means had got inside the barrel.

. . . . Since there are some stars so bright that they can hardly be looked on, some so dim that they can scarce be seen, and vast numbers not to be seen at all, even by artificial eyes . . . .

When God commanded Abraham to looke up to heaven & number the starres thereof, that hee extraordinarily enlarged his sight to behold the host of heaven & the innumerable heape of starres wch Telescopes now shewe unto us, some men might bee persuaded to believe.<sup>43</sup>

[In speaking of the assumption that heaven and hell were neighboring regions since Dives spoke unto Lazarus . . . .] do too grosly conceive of those glorified creatures, whose eyes shall easily out-see the Sun, and behold without a perspective the extreamest distances: . . . .<sup>44</sup>

While we look for incorruption in the heavens, we finde they are but like the Earth; Durable in their main bodies, alterable in their parts; whereof besides Comets and new Stars, perspectives begin to tell tales.<sup>45</sup>

Men not of retracted Looks, but who carry their Hearts in their Faces, and need not to be look'd upon with perspectives; . . . .<sup>46</sup>

The "new perspectives" had shown the sun spots to Galileo in 1611<sup>47</sup> and had suggested to him still further deductions concerning the motions of the planets. Browne referred to this discovery in his discussion of the vanity of the human hope for earthly immortality.

43. N.T., 246.

44. R.M., 61.

45. U.B., 48.

46. C.M., Part II, sec. 12, 130. The literary use of the telescope was not uncommon. The Cardinal in the Duchess of Malfi says:

We have need goe borrow that fantastique glasse  
Invented by Galileo the Florentine,  
To view another world i' th' moone,  
And looke to finde a constant woman there.

Act II, scene iv.

Fletcher, in "Christ's Victorie on Earth", Canto 60, uses the term "optic glass" in the same sense. Milton's mention of the telescope need not be pointed out.

47. Galileo's famous telescope was first exhibited at Venice in 1609.

While we look for incorruption in the heavens, we finde they are but like the Earth; Durable in their main bodies, alterable in their parts: whereof beside Comets and new Stars, perspectives begin to tell tales. And the spots that wander about the sun, with Phaeton's favour, would make clear conviction.<sup>48</sup>

As an opponent to the Copernican system, he might well have felt no particular merit in this discovery.<sup>49</sup>

The end of the sixteenth and the beginning of the seventeenth centuries saw, in the work of William Gilbert,<sup>50</sup> a few important discoveries

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48. U.B., 48.

49. It was the discovery of the spots on the sun that finally led the Church to take drastic steps in their opposition to the Copernican theory. Galileo at first mistook the sun spots, first observed in 1611, for planets traversing the sun, but he soon discovered them to be dark spots on the surface of a revolving sphere. In 1612 he wrote to Marcus Velsorius Linceus a series of letters describing these spots and his observations. In the next year these letters were published, accompanied with engravings of the spots. Opposition among Aristotelians and churchmen waxed strong, and in 1616, Galileo was forbidden to express his opinions either in books or lectures, and Copernicus' book, De revolutionibus orbium celestium, then already published for almost three quarters of a century, was placed on the Index. The sun spots served as another proof of a constantly changing universe, for the slow motion of the spots across the disk of the sun and their subsequent reappearance showed the rotation of that body, and from them and their variation came another proof that the universe was not rigid and permanent in position. Bacon had taken note of the discovery, and while he spoke of the telescope as "discovered by the wonderful exertions of Galileo," he said of the spots on the sun that had been seen by its aid "and other similar phenomena; all of which are most noble discoveries, as far as credit can be safely given to demonstrations of this nature, which are on this account very suspicious, namely, that experiment stops at these few, and nothing further had yet been discovered by the same method, among objects equally worthy of consideration." As an opponent of the Copernican theory, the discovery of the sun spots held for him but little interest. Cf. Novum Organum, Bk. II, 214.

50. William Gilbert, 1540-1603, court physician to both Elizabeth and James II. He was a believer in the Copernican astronomy. His principal treatise On the Magnet and Magnetic Bodies and the Great Magnet the Earth is held to contain descriptions of most of the fundamental phenomena of science, and remains a classic even today. He had collected and verified the observations of the ancients on magnets, and those that had come to light since the introduction of the compass, and had added others. He had theorized on his observations. He felt the earth might be considered a magnet, explaining from its magnetic character the phenomenon of the needle. The impetus for such a theory had been given by the discovery of the polarity of the magnet, a discovery not known to the ancients. Lucretius had observed that the loadstone occasionally repelled as well as attracted, but he did not seem to have been aware of the constant conjunction of repulsion and attraction in which polarity consists. Gilbert steadfastly asserted that the experimental method had vast advantages over the a priori method in physical inquiry, an assertion that Browne also seems to have taken seriously.



in magnetism, as well as the introduction of the word "electric". The compass had been an early Renaissance discovery, but nothing had been done with it except to use it as a nautical instrument. In the latter part of the sixteenth century, Gilbert became so interested in the subject of the loadstone and the possible effect magnetism might have upon the motions <sup>51</sup> and properties of the earth that he accounted even for the inclination of the earth upon its axis by the property of magnetic attraction. He went so far as to attribute a metaphysical soul to this property. While he was correct in only a few of his deductions, he turned the attention of other men to the consideration of the phenomenon. His suggestive propositions attracted wide attention, and scientists in England, France, and Germany played with the idea of magnetism and electricity (a word first used by Browne), although nothing much was accomplished in these fields until almost two centuries later.<sup>52</sup> This interest in the magnet of loadstone continued for some time after the death of Gilbert. Browne shows it very clearly in the first book of the Vulgar Errors. If one may judge from this book, Browne must have spent considerable time in actual experiment, thought, and reading upon the subject of magnetism. He does not, however, seem to fall into the same error as did Gilbert, for he did not postulate

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51. Gilbert had been one of the few who whole-heartedly subscribed to the Copernican theory at the time. John Dee, alchemist, charlatan, and physician, versed in the arts of image making and spell-breaking, and who claimed with Edward Kelley to have found the philosopher's stone, was another of the sixteenth century adherents to the new system. Dee had been called into consultation when Queen Elizabeth found a waxen image of herself that indicated that a foul magical plot was being made against her. It is strange that this man, father of Arthur Dee, who was a personal friend of Browne, should have been so wholeheartedly in favor of the new system, when he was so thoroughly immersed in the occult and alchemical sciences. In this single point, however, he was head and shoulders above most of the more literal minded Elizabethans.

52. Preserved Smith, A History of Modern Culture, p. 64.

for it a mystical soul. It is worthy of note that Browne seldom allowed his religious mysticism, or his metaphysical speculations, to color to any extent his scientific determinations.

One can hardly say with Johnson that Browne "seems not very easy to admit new positions,"<sup>53</sup> nor with Legouis that he was "especially impressed by the narrow limits of science,"<sup>54</sup> In his discussion of the loadstone, Browne contributed observations of his own, observations that had been gained from such simple experiments as the dipping of a perfectly balanced needle in a cork upon the surface of a basin of water<sup>55</sup> to the testing of the bricks in his fireplace for magnetical attraction.<sup>56</sup> He even went so far as to improve upon the usual technique for the experiments, a thing not unusual in his investigations when he was repeating experiments that had first been made by others. A large part of his observations was made in random experiments, from which he obtained very general and not very startling conclusions. No predetermined set of principles guided him, but at that time few principles had been established except for hypotheses that in themselves had not yet admitted conclusive proof. Science in this field was only a quest, random and undirected, for suspected principles that had as yet few limitations placed upon them.

Browne followed much the same method of random testing in his experiments with electricity. In trying to determine that things might be regarded as conductors of electricity, he tested the general list of substances that were supposed to have the property of electrical attraction

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53. Samuel Johnson, "Life of Browne," contained in Wilkin's ed., I, xvii.

54. Emil Legouis and Louis Cazamian, A History of English Literature, p. 540.

55. V.E., II, ii, 105 ff.

56. Ibid., I, ii, 103.

and added, correctly, a few substances of his own.

Now, although in this rank but two were commonly mentioned by the Ancients, Gilbertus discovereth many more; . . . . And unto these we add Gum Anime, Benjamin, Talcum, China-dishes, Sandaraca, Turpentine, Styrax Liquida, and Caramma dried into a hard consistence. And the same attraction we find, not onely in simple bodies, but such as are much compounded; as in the Oxycroceum plaister, and obscurely that ad Herniam, and Gratia Dei; all which smooth and rightly prepared, will discover a sufficient power to stir the Needle, settled freely upon a well-pointed pin; and so as the Electrick may be applied unto it without all disadvantage.<sup>57</sup>

His list of tested substances, most of which he discarded as non-conductors, was even longer:

No Metal attracts, nor Animal concretion we know, although polite and smooth; as we have made trial in Elk's-Hoofs, Hawk's-Talons, the Sword of a Sword-fish, Tortois-shells, Sea-horse, and Elephant's Teeth, in Bones in Hart's-horn, and what is usually conceived Unicorn's-horn. No Wood though never so hard and polished, although out of some thereof Electrick bodies proceed; as Ebony, Box, Lignum vitae, Cedar, &c. And although Jet and Amber be reckoned among Ditungens, yet neither do we find Asphaltus, that is, Bitumens of Judea, nor Sea-cole, nor Camphire, nor Mummia to attract, although we have tried in large and polished pieces. Now this attraction have we tried in straws and paleous bodies, in Needles of Iron, equilibrated, Powders of Wood and Iron, in Gold and Silver foliate. And not only in solid but fluent and liquid bodies, as oyls made both by expression and distillation; in Water, in Spirits of Wine, Vitriol and Aqua fortis.<sup>58</sup>

Such a list suggests a welter of inquiries. Some of the substances had proved to be conductors, and some had proved definitely that they

57. V.E., II, iv, 133.

58. V.E., II, iv, §34.

had no such value.<sup>59</sup> But in the beginning of any science, as has already been indicated, laws and principles are discovered only after enough random tests have been made so that some sort of a formula may be arrived at that will serve as a means of the determination of the limited areas to which they will apply. And by so limiting the field of operation, positive conclusions can be arrived at, and, by reversing the process, larger fields in turn be built up.

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59. It is interesting to notice that Bacon, Browne's predecessor, had much the same hit and miss method of experimentation as had Browne. In his account of an attempt to accelerate the rate of the maturation of fruits, he records, "There were taken apples, and laid in straw; in hay; in flour; in chalk; in lime; covered over with onions; covered over with crabs; closed up in wax; shut in a box, &c. There was also an apple hanged up in smoke; of all which the experiments sorted in this manner." Natural History, Cent. IV, Sec. 317, p. 120.

It is also interesting to notice the manner in which the scientific mind worked at the end of the century. Newton advised a young friend who was about to travel that he observe laws, manners, men, ships, products, diet, the use of mercury in obtaining gold, grinding of glasses in Holland, tricks of the Dutch in keeping their ships from being worm eaten in the voyages to the Indies, and whether pendulum clocks do any service in finding out the longitude. This list, quoted by Langdon-Davies in Man and his Universe, pp. 152-3, shows the still eager mind reaching out for scraps of general information, a scientific mind very foreign to the schooled, specialized mind of our own times.

And as late as 1776, John Hunter, Irish physician and anatomist, wrote to Jenner, "The hedgehogs came with one dead, which was a female, which I made a preparation of . . . I was told the other day that you was [sic] married and to a young lady with considerable fortune. I hope it is true, for I do not know anybody more deserving of one. What is become of your paper on lead in cider? . . . How do the fossils go on? . . . We had a sale of bad pictures lately. Pictures seem to be rising again. I am told there is the skin of a toad in Berkeley Castle that is of prodigious size. Let me know the truth of it, its dimensions, what bones are still in it, and if it can be stolen by some invisible being. I hurried two toads, last August was a twelvemonth; I opened the grave last October, and they were well and lively . . . Have you any queer fish? Amy sends, with little John, their compliments." (Quoted by Logan Clendening, Behind the Doctor, p. 225.) This is a letter whose contents might well belong to the seventeenth century.

A few years after the work of Gilbert appeared the Jesuit Famianus Strade had almost suggested the electric telegraph. In a work published by him in 1617, Prolusiones Academicæ, he suggested that two friends at a distance might communicate by utilizing the sympathy of two magnetic needles, which would simultaneously point to the same letter of the alphabet. The suggestion was brought to the attention of Galileo in the vain hope that he might make it practical.<sup>60</sup> As far as is known, Galileo did nothing with the suggestion. The plan must have been known to Browne, for we find that he constructed and arranged two sets of alphabets with which he tested out this hypothesis within his own room, and found it to be ineffective. He then reasoned that if the attraction was not great enough to accomplish the desired communication under carefully controlled conditions and in the confines of a single room, then it could scarcely be successful when the distance between the alphabets was even greater.<sup>61</sup>

Browne included in his discussion of this theory his views on the theory of the telegraph by sympathized flesh. It was held by some that flesh from one body grafted upon another would, if an alphabet had been determined upon and the grafted flesh pricked with a needle according to the letters desired, communicate these pricks to the body of which the flesh had been a part, and so allow communication. This, Browne says, "is a way of intelligence very strange; and would requite the lost Art of Pythagoras, who could read a reverse in the Moon." He mentioned the attempts of Baptista Porta, of Trithemius, and Selenus, to test such a telegraph, and stated that he believed that none could make the idea of

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60. Preserved Smith, op. cit., p. 64.

61. V.E., II, iii, 129.

Strade work. So both because of experiment and authority he placed his disapproval upon the hypothesis, and concluded that only by the use of a common table partitioned by a common wall, and the use of a single needle and a loadstone, would such a telegraph be effective. This, of course, would limit the "distance". But he was not betrayed by the romance of the suggestion into thinking that such a telegraph would be possible.

Joseph Glanvil, a younger man than Browne, and one who devoted a great part of his time to science, was in many ways inferior to Browne in ability to evaluate, for he failed often to make meticulous experimentation and to give sober consideration to the experiment itself, two things that often led Browne away from error. Glanvil had read Browne's Vulgar Errors, and had been attracted by the suggestion of communication at a distance. He spoke eagerly of some "hints in natural operations that give us probability that 'tis feasible, and may be compast without unwarrantable assistance from Daemoniack correspondence." His optimism seemed warranted by the later discovery of what was supposed to be a principle that would allow distance communication, although this method had little more to recommend it than the one which Browne rejected. Two needles, equally touched by the same magnet, were to be set in two dials exactly proportioned to each other. A time was to be set for the communication, or, as Glanvil called it, the "Sympathetick conference." The moving of one of the needles, because of the sympathy that existed between them caused by their impregnation by the same magnet, would move the other in exactly the same manner. Browne had objected to this theory on the grounds that the needles would not move in the same manner, but in a manner opposite to each other. To this, Glanvil replied that

"this cannot prejudice the main design of this way of secret conveyance: Since 'tis but reading counter to the magnetick informer; and noting the letter which is most distant in the Abecedarian circle from that which the needle turns to, and the case is not alter'd. Now though this desirable effect possibly may not yet answer the expectation of inquisitive experiment; yet 'tis no despicable item, that by some other such way of magnetick efficiency, it may hereafter with success be attempted, when Magical History shall be enlarged by riper inspection; and 'tis not unlikely, but that present discoveries might be improved to the performance."<sup>62</sup> So much for the hope of magnetic telegraphs.

So far, we have seen Browne conscious of many of the problems which others of his day were considering. The speculations on tides and the sympathetic telegraphs were contemporary interests and did not, any more than the study of the stars and their relation to one another and to the solar system as a whole, belong to the antiquarian. Nor were such speculations and those which will be considered later, confined to any particular group of scientists, and certainly not to the circle of friends that must have surrounded Browne. Knowledge of them was not forced upon him through association with those interested in them, but must have come to him through such sources as would be accessible to him only if he were interested enough to make an effort to find out what was being done in places other than Norwich and if he had read widely (Cf. Appendix B) in the works of those men who were engaged in research and speculation. The idea of a sympathetic telegraph is, to us, novel and strange. If we were to meet it for the first time in the Vulgar Errors, we might easily feel that it gave confirmation to the usually accepted

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62. Joseph Glanvil, The Vanity of Dogmatizing, pp. 202-4.

idea that Browne loved the curious. But if we look at it as it really was, an experiment dealing with a contemporary interest, we can make a fairer interpretation of the so-called "curious mind" of Browne, even though the experiment remain an oddity.

Experiments in the measuring of time and in the changes in air pressure were more successful than those dealing with the telegraph. The barometer and the pendulum clock were both products of the century. While Browne shows no definite knowledge of the actual invention of the barometer,<sup>63</sup> he made an attempt to test the "alteration of the air" by following the suggestions made by Cardan for such testing, but with an effort for greater accuracy than Cardan had achieved. It may be questioned whether Browne would ever have followed his experiment through to any greater conclusion than simply that the weight of the air changed with the changing weather conditions. He probably would never have thought of pushing such a simple conclusion to the more important one, that these changes in pressure might be used as a means of predicting weather conditions, or that the weight of the air changed in proportion to the altitude. It is, of course, doubtful whether, in the early part of the century, very many men, with the exception of a few men like Galileo, would have recognized the possibility of building up from such newly discovered facts any large system that took the appearance of related causes and results. It was only after many isolated facts were known, and men began to devote their lives to the study of that which they were determining by their own work in the light of what had already

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63. The word itself was first used in English in the Philosophical Transactions of the Royal Society for 1665-6, in which occurs the statement "A Barometer or Baroscope first made publick by that Noble Searcher of Nature, Mr. Boyle." N.E.D.



been determined, that they began to formulate systems and theories that covered wide reaches in the field of knowledge.

In the "Common Place Books" contained in the Miscellany Tracts, we find Browne conducting an experiment that demonstrated the principle that air was subject to changes in weight.

Cardanus to trie the alteration of the Ayer exposeth a sponge wch groweth dank when the ayer is inclined to moysture. Another way I have made more exact triall, by putting a dry peece of sponge into one balance of a gold scale so equally poysed with wayghts in the other balance that it will hang without inclining either way. For then upon alteration of the ayer to moysture the scale with the sponge will fall & when the ayer growes hot & dry will rise agayne. The like may be done by favago marina, found commonly on the sea shore.<sup>64</sup>

The accurate measurement of time had presented a difficult problem. Water clocks were commonly used, but temperature changes seriously affected their accuracy. Watches were cumbersome and unreliable. Pendulum clocks were not known in England until 1662. They were a produce of the Royal Society, for, quoting Sprat in his History of the Royal Society,

The Royal Society invented:

A new kind of Pendulum Clock, wherein the Pendulum moves circularly, going with the most simple, and natural motion, moving every equally, and making no kind of noise.

A Pendulum Clock shewing the aequation of Time.

Three new ways of Pendulums for Clocks, and several ways of applying the motion of the Watchwork to them.

Several new kinds of Pendulum Watches for the Pocket, wherein the motion is regulated by Spring, or Weights, or Loadstones, or Flies moving very exactly regular.<sup>65</sup>

64. M.T., 259.

65. Thomas Sprat, The History of the Royal Society, London, 1722, 3rd. ed., p. 246. In the Scarborough MS (Latin) giving the "Account of the Death of King Charles II," edited and translated by Raymond Crawford, Oxford, 1909, p. 46, is contained the following: "Friday morning, in his last illness, he asked that the curtains of his bed be drawn back so he might see the dawn. Then he asked that an eight-day clock in his room be wound, for to-day was the day, else it would run down."

In regard to clocks, Browne says:

Of after years there succeeded new inventions, and horologies composed of Trochilick or the artifice of wheels; whereof some are kept in motion by weight, others perform without it. Now as one age instructs another, and time that brings all things to ruin, perfects also every thing; so are these indeed of more general and ready use then any that went before them. By the Water-glasses the account was not regular: for from attenuation and condensation, whereby that Element is altered, the hours were shorter in hot weather than in cold, and in Summer then in Winter.<sup>66</sup>

These "artificles of wheels, whereof some are kept in motion by weight, other perform without it" must be the new pendulum clocks, or at least a reference to the attempt that was then being made to perfect them. Browne disclosed his knowledge of the new clocks in an unimportant discussion of a picture of St. Jerome seated in his study with a clock hanging upon the wall when clocks had not yet been invented in his lifetime, "being of no very ancient order." But this in no way lessens the importance of the fact that he knew of their recent invention.

As Browne accepted the telescope and the new clocks, so he accepted the microscope. The microscope had been invented by Jansen in 1590, but had been made practical by Galileo in 1608. Galileo had used the principle of the large telescope in making the small magnifying glass. Within twenty years after its invention, the working opticians of Holland, Paris, and London sold compound microscopes which, though cumbersome as well as optically defective, revealed many of the natural wonders to the curious. Simple lenses were soon preferred, and with them most of the best work of the seventeenth and eighteenth centuries was done.<sup>67</sup> The real power of the microscope as an instrument of biological research was not revealed until the appearance of Hooke's Micrographica in 1665. From that time

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66. V.E., V, xviii, 131.

67. L.C. Maill, History of Biology, pp. 36 ff.

on biological processes were rapidly discovered, and the processes of growth and reproduction and the structure of the cells and tissues became known. By the use of the microscope, Swammerdam (1637-1680) worked almost simultaneously upon the tissues and cellular structure of plants and animals. Leeuwenhoek (1632-1723) determined the presence of the red corpuscles in the blood. All of this followed 1660, the year in which Browne was fifty-five years old. His knowledge of the value of the microscope as an instrument of research, therefore, must have been derived in his later years.

But while the microscope had not yet been brought to the aid of anatomical research when Browne's Vulgar Errors was first published, he was not ignorant of it, nor of its possibilities, in spite of Gosse's statement: "In the same way, he discourses of the eyes of snails, and here he speaks of information said to have been gained by others with the 'help of exquisite glasses,' which he has, it is evident, not obtained. Inability to take advantage of the microscope is plainly responsible for the main part of Browne's imperfections."<sup>68</sup> In a discussion of the woodtick contained in one of his Miscellany Tracts, Browne says, "Of this particularly something might bee sayd if the time & place would permitt, especially when opportunity shall afford a vewe of that Insect in a microscope."<sup>69</sup> The question of the brown dots on the backs of fern leaves, their purpose and their composition, had long puzzled botanists. The microscope at least revealed these brown dots to be spores, although the life cycle of the fern was not known until later. As Browne stated, "the exquisite Microscopes and Magnifying

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68. Edmund Gosse, Op. cit., p. 93.

69. "Notes and Experiments," M.T., p. 328.

have at last cleared this doubt, whereby also long ago the Noble Federicus Caesius beheld the dusts of Polypody as bigg as Pepper corns; and as Johannes Faber testifieth, made draughts on Paper of such kind of seeds, as bigg as his Glasses represented them: . . . . "70 In the discussion referred to by Gosse, concerning whether snails have eyes, it may be doubtful if Browne referred to the "help of the exquisite Glasses" as having been given to someone else or to himself, but at least his statement was made with that aid clearly in mind; so his conclusion must have been based upon recent observations.<sup>71</sup> He mentions the microscope again in a letter written to Edward on July 6, 1678. Edward was to give a lecture before the Royal Society. For this lecture Browne enclosed a lizard's skin which he felt Edward might profitably exhibit to the group. He suggested that the skin might have additional interest "if the same by a microscope were drawne upon a paper and showne it would afford content and delight."<sup>72</sup> This suggestion came approximately twenty years after the first writing of the Vulgar Errors, and when the microscope was much more common than it had been when the Errors were collected. The statement suggests the satisfaction of a curious as well as a scientific interest, but it also indicates Browne's

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70. V.E., II, vii, 174.

71. Browne's declaration that "these black and atramentous spots or globales to be their eyes," (V.E., III, xx, 256) is incorrect. Henry Power, a personal friend and devotee of Browne, in one of his "Observations", calls attention to this fact. "And therefore however, though the learned Doctor Brown (my ever honoured friend) hath ranked this conceit of the eyes of a snail (and especially their quadruplicity) amongst the vulgar errors of the multitude; yet through a good microscope, he may easily see his own errour . . . ." Cf. T. Cowles, "Dr. Henry Power," Isis, January 1934. Power also corrects Browne upon the cause of the "dust" on the wings of the butterfly, again by means of the evidence offered by the microscope.

72. Letters, p. 97.

appreciation of the microscope as an instrument of scientific revelation.<sup>73</sup> Perhaps his best claim to a knowledge of the scientific use of the microscope is one that Gosse seems to have overlooked. He viewed the development of flies from maggots, "beholding in Magnifying Glasses the daily progression thereof."<sup>74</sup>

Browne's experiments were so numerous that it is almost unbelievable that one man, who engaged in experimentation principally as a hobby, could have made them all. This seems particularly true when we consider that all of his experiments were carefully performed, carefully observed, and seriously considered. Some of them extended over periods from several weeks to three years. The variety of interests suggested by the experiments could have come from no dreamer, but only from a man who was interested in what others were doing. They speak eloquently of a man who read a great deal in books and who watched carefully the experimentation of others, but who was skeptical enough to doubt even serious-sounding statements to be facts without first attempting to verify them by actually testing them himself. The century did not, as I have said, encourage specialization, or lead men to spend their lives in the pursuit of some particular phase of scientific study. It was, instead, a period when the individual scientist looked into all fields, stopping wherever anything of interest caught his fancy, pausing long enough to satisfy his

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73. How different this quiet acceptance of another valuable aid to empirical knowledge (and that before the microscope had shown itself as valuable as it later proved to be) in comparison with Howell's flippant metaphor in a letter to R.B. (R. Brownrigg) at Ipswich, written from Fleet prison 15 August, 1646. ". . . you look upon me thro' the wrong end of the perspective, or rather thro' a multiplying glass, which makes the object appear far bigger than it is in real dimensions; such glasses as Anatomists use in the dissection of Bodies, which can make a Flea look like a Cow, or a Fly as big as a Vulture." Cf. James Howell, Familiar Letters, II, 425.

74. V.E., II, vii, 172.

immediate curiosity, or until something of new and more enticing interest appealed to him and made him pass on to new considerations. Only the seventeenth-century man has been so privileged. Previous to him knowledge was restricted to proper fields; following him, the fields of knowledge became limited in the number that any one person felt that he could profitably study. Browne's wide experimentation is an outgrowth of the unrestricted scientific interests common to men of his period.

Among Browne's many interests was the newly resurrected atomic theory which Boyle advanced,<sup>75</sup> a theory not unlike the one later advanced by Dalton. Browne experimented with gunpowder as did Robert Hooke, a man whom he fails to mention, although after the latter's discoveries of 1665 he revised the text of the Vulgar Errors to make it agree with Hooke's observation.<sup>76</sup> He anticipated Sir Humphrey Davy's experiment in which ice was melted by the friction of two pieces rubbed together, although Browne's experiment was invalidated by his failure to control such factors as might have contributed materially to the outcome.<sup>77</sup> He experimented with spiders to determine how long and how much they could spin.<sup>78</sup> He placed a spider in a glass with a toad to test the reputed antipathy each held for the other. He tested similarly the antipathy of a "moll", a toad, and a viper. In this last experiment, he drew the proper conclusion that the mole died, not because it had eaten the toad and most of the viper, but because it "commonly will not live above a day or 2 out of the earth,"<sup>79</sup> an independent conclusion that was made in spite of the seventeenth-century acceptance of the

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75. V.E., II, 11, 100 ff.

76. V.E., II, v, 147 ff.

77. V.E., II, i, 87 ff.

78. M.T., 330.

79. M.T., 337.

doctrine of antipathies. He fed opium to dogs, fish, cockerels, crows, cocks, turkeys, pickerel in various quantities to note the effect it might have upon them.<sup>80</sup> He weighed the feathers and the bodies of birds separately to determine their proportionate weight to each other, although he made no attempt to tabulate his work.<sup>81</sup> He followed much the same scheme in an attempt to determine the proportionate weights of the brains and bodies of the various animals.<sup>82</sup> He experimented with different substances in an effort to find some means for deadening the sound of the explosion of gunpowder, using for his numerous trials quicksilver, petre, opium, oil, vinegar, and distilled water of orange-pills; this last he found more effective than common water.<sup>83</sup> He dissected mice<sup>84</sup> and frogs. Some one had declared that, since a frog had lungs, it could drown as every other animal so equipped, and Browne attempted to drown one by tying it so that it remained for several days under water.<sup>85</sup> To prove that digestion took place at the lower end of the stomach, he kept a pickerel in a cistern for six days. At the end of that time, a roach that had been fed to it had not been entirely digested, and it was the part in the upper end of the stomach that remained unaltered.<sup>86</sup> He kept a shrew-water alive for five weeks by cramming it with fish, but it refused to eat naturally, and the servants failed to feed it, so it died after living seventeen days without food.<sup>87</sup> He kept an eagle alive for two years, although it was fed no water or flesh.<sup>88</sup> He studied the manner

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80. M.T., 343.

81. M.T., 237.

82. V.E., IV, 11, 14.

83. V.E., II, v, 151.

84. M.T., 341.

85. M.E., III, xii, 230.

86. M.T., 338.

87. Letters, 372. To Christopher Merrett,  
December, 29, 1668.

88. M.T., 377.

of sprouting in various seeds, as beans, acorns, and lupins.<sup>89</sup> He tested whether corn would grow if the extremes were cut off,<sup>90</sup> and if wheat planted in April would mature that same year.<sup>91</sup> All of these experiments seemed to hold as much interest for him as did his dissection on the bodies of various animals in an effort to determine which of them had the gall sac present and which were without it. From these dissections, he noticed that the gall sac was present in the horse in spite of authority to the contrary, although it was in a different position from that in man.<sup>92</sup>

To disprove that Flos Africanus was a poison, he conducted two experiments in which he fed it to dogs with impunity.<sup>93</sup> He hung a kingfisher by the bill to test the common saying that the bird, if so suspended, would act as a weather vane.<sup>94</sup> He discovered that an ivy cup did not separate wine from water as it was said to do, for the wine soaked through the cup and the water remained where it was.<sup>95</sup> He tested the theory that pumice stone lost weight by grinding because by breaking it into particles, the air within it was released, and the weight consequently reduced. For this experiment he weighed a bladder filled with air and compared its weight with that of the bladder empty. He concluded that while some weight might be lost, it could not be much, for the air in the bladder had weighed only a grain.<sup>96</sup> He found that a pot filled with ashes would not contain as much water as one that was empty, in spite of the traditional belief that there was no difference in the volume of water both would contain.<sup>97</sup> This experiment had also been tried by

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89. G. of C., 89.

90. V.E., III, xxvii, sec. 13, 302.

91. M.T., 333.

92. V.E., III, ii, 185; III, ix, 211

93. V.E., II, vii, 177.

94. V.E., III, x, 213.

95. V.E., II, vii, 177.

96. V.E., IV, vii, 36.

97. V.E., II, v, sec. 4, 146.



Bacon, and with the same results.<sup>98</sup> The mystery of oxides had come to his attention. Although he did not approach a true explanation of the increase in weight when iron was placed in aqua fortis, he did record that in spite of the heavy vapor that was given off, an increase in weight occurred.<sup>99</sup> He doubted that arrows or bullets could be discharged with such force that they would melt in flight, and refused to admit that moving iron might become so hot as to set fire to paper and linen when "the swiftest motion of the hand could not keep one red hot."<sup>100</sup> He held ice to be a change in the form of water, not an essence<sup>101</sup> in itself, as was held by those who still thought hot and cold to be separate or independent qualities, and that steam, ice and water were not three forms of the same thing, but three separate substances to be considered independently. He exhibited a curiosity concerning perpetual motion, the impossibility of which had been but recently declared in a letter by John Romilly, a Swiss watchmaker.<sup>102</sup> He counted the circular sections in a spider's web and its "five Semi-diameters" that he might use the information in the Garden of Cyrus.<sup>103</sup> He wondered if the structure of the larynx of the various animals might not be an explanation of the difference in the noises that they made,<sup>104</sup> much as he had reasoned out that Philoxenus could not have gained his wish for greater pleasure at meat had he but had the neck of a crane. The list given above is by no means complete, but it is

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98. Francis Bacon, Natural History, Cent. I, sec. 34, 88.

99. V.E., IV, vii, 36-7.

100. V.E., II, v, 151.

101. V.E., II, i, 89.

102. V.E., V, xviii, 132. Also Preserved Smith, A History of Modern Culture, p. 4.

103. G. of C., p. 95.

104. Letters, 208. To Edward, February 1, 1680.

indicative. One should add to it, perhaps, that he dissected a whale cast up on the shore of Norfolk, a dissection that is admitted to be good and quite complete,<sup>105</sup> and which is, perhaps, more frequently mentioned by those who have commented upon his scientific activities than any other of his experiments.

In his own field, Browne is strangely non-committal. His observations dealing with medicine usually seem to have been made merely as chance observations, and nowhere does he exhibit an all-consuming interest in medicine. Part of this may be easily explained, but even this explanation will not quite satisfy our curiosity as to why a physician, and a good physician according to all contemporary report, was not more attracted to investigation in the field of his chosen profession. Modern medicine may be said to have been born during the latter part of the seventeenth century, for it was not until after the time of Harvey that the human body and its various organs and their functions began to be understood. I say after Harvey, for although Harvey's discovery of the circulation of the blood marked the beginning of a new epoch in the history of medicine, it was of use only after it had been definitely proved by the men who followed him. Only by the aid of the microscope and with the privilege of dissecting human bodies did medicine begin to become a science in itself. Even then, it developed slowly for some years, for the human body presented more difficulties in the gaining an accurate knowledge concerning it than did the inanimate physical world, or even the world of lower animals.

Before the time of Harvey, and such men as Mayow, Willis, Swammerdam,

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105. V.E., III, xxvi, 287 ff.

and Malpighi, who followed him, the study of medicine was principally a study of a specialized form of botany. A wide knowledge of "simples" and an ability to see in the various plants their "sympathetic" likeness to some quality of the disease or abnormality for which they were to serve as a remedy<sup>106</sup> was often all that was felt to be the knowledge necessary to the physician. Herbert, in his Country Parson, points out that the country parson, or his wife, should have a thorough knowledge of herbs, for in the smaller districts, the parson and the doctor were often one. In "ticklish" cases, the parson might call in help. No great amount of preparation was needed in order to have all the knowledge necessary for the medical exigencies of the parish.

Yet it is easy for any scholar to attain to such a measure of physic as may be of much use to him both for himself and others. This is done by seeing one anatomy, reading one book of physic, having one herbal by him. And let Fernelius be the physic author, for he writes briefly, neatly, and judiciously; especially let his method of physic be diligently perused, as being the practical part and of most use. Now, both the reading of him and the knowing of herbs may be done at such times as they may be a help and a recreation to more divine studies.<sup>107</sup>

The same country parson was to recognize the manifold wisdom of God and to observe carefully what herbs might be used instead of drugs, for the garden often took the place of the apothecary's shop, "for home-bred medicines are both more easy for the parson's purse, and ~~more~~ familiar for all men's bodies. . . . for salves, his wife seeks not the city, but prefers her garden and fields, before all outlandish gums."<sup>108</sup>

The "Doctrine of Signatures," a doctrine which Paracelsus had adhered to closely, applied in medicine to the pharmaceutical value of both

106. Cf. Chapter III, the section on the doctrine of sympathies and antipathies.

107. George Herbert, The Works of George Herbert, "A Priest to the Temple", Landdowne Poets edition, p. 307.

108. Ibid., pp. 308.

plants and animals. Every natural substance which possessed any medicinal virtue had indicated by an obvious and well-marked character the disease for which it was to be employed, or the purpose to which it could be used.<sup>109</sup> Nettles cured nettle-rash; dandelion, the jaundice; peonies, as well as red coral, anemia.<sup>110</sup> Della-Porta (1540-1615) had considered everything about the plant of value, the leaf, the stem, its roots, fruit, seeds, colour, and scent, its birthplace and the time of its birth, its manner of reproduction and growth.<sup>111</sup> He even took into account the length of life of the plant, for plants of long life could be used to lengthen the span of the human life.<sup>112</sup>

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109. Dan McKenzie, The History of Medicine, p. 163.

110. Various examples of this doctrine of analogies demonstrate perfectly the method of its application. Ranunculus and the Persicaria, which have a spotted appearance, cure pimples. Glutinous flowers, like the mistle-toe, are useful in healing sores. Roots that throw up many adventitious roots have a prolific effect, and those plants that produce their fruit in the centre of the leaves are helpful in childbirth. Color analogies were multifarious; flame-colored flowers were soothing to inflammation; blue and purple flowers improved the color of the skin; green and purple ones, which were ruled by Saturn, aided the spleen, and multicolored ones, which belong to Mercury, stimulated the memory and the brain generally.

111. Mrs. C. F. Leyel, The Magic of Herbs, p. 78.

112. Nicholas Culpeper, astrologer and physician (1616-1654), in his The English Physician enlarged, pp. 122-3, gives the astrological connection between herbs and medicine, for plants growing under the different planets were to be used for the different diseases governed by that planet. There was an existing sympathy between the plants and diseases governed by the same planet, and a close relation between those in the same 'house'. Some plants and diseases were not sympathetic, but showed an antipathy for each other. A close analogy may be seen between this and the doctrine of signatures in the determination of the medical use to which the various parts of the plant could be put. The following concerns the dwarf-elder: "Both Elder and Dwarf-Tree are under the Dominion of Venus. The first shoots of the Common Elder boiled like Asparagus, and the young Leaves and Stalks boiled in fat Broth, do mightily carry forth and Flegm and Choler. The middle or inward Bark boiled in Water, and given in Drink, worketh much more violently; and the Berries, either green or dry, expel the same Humours, and are often given with good success to help the Dropsie; the Bark of the Root boiled in Wine, or the Juice thereof drunk, worketh the same Effects, but more powerfully than either the Leaves or Fruit. The Juice of the Root taken, doth mightily provoke Vomiting and purgeth the watry Humours of the Dropsie. The Decoction of the Root taken, dureth the

The century was also a period of animal remedies, and a reflection of the Doctrine of Signatures may be seen in these remedies also, for almost every animal and every part of that animal enjoyed some reputation for the cure of certain diseases. Therapeutic lists contained such things as fats, gall, blood, marrow from bones, teeth, livers, and lungs of various animals, birds, and reptiles; bees, crabs, and toads incinerated after drying; amber, shells, coral, claws, and horns; hair from deer and cats; ram's wool, partridge feathers, ants, lizards, leeches, earth-worms; pearl, musk, and honey; eyes of the wolf, pickerel and crab; eggs of the hen and ostrich, cuttle fish bone, dried serpents, and the hoofs of animals,<sup>113</sup> as well as mummy dust, gold, gems of various kinds, bezoar stone, goa stone, the eagle stone for abortions, and the toad stone for poisons.

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112 - cont'd.

bite of the Adder, and biting of mad Dogs; it mollifieth the hardness of the Mother, if Women sit thereon, and openeth their Veins, and bring downeth their Courses: The Berries boiled in Wine, performeth the same Effect; and the Hair of the Head washed therewith is made Black. The juice of the green Leaves applied to the hot Inflammations of the Eyes asswageth them. The Juice of the Leaves snuffed up into the Nostrils, purgeth the Tunicles of the Brain. The Juice of the Berries boiled with a little Honey, and dropped into the Ears, helpeth the pains of them. The Decoction of the Berries in Wine being drunk provoketh Urine, the distilled Water of the Flowers, is of much use to clean the Skin from Sunburning, Freckles, Morpew, or the like; and taketh away the Head-ach, coming of a cold cause the Head being bathed therewith. The Leaves or Flowers distilled in the Month of May, and the Legs often washed with the said distilled Water, it taketh away Ulcers and Sores of them.

"The Eyes washed therewith, it taketh away the Redness and Blood-shot. And the Hands washed Morning and Evening therewith, helpeth the Palsy, and skaking of them.

"Either Leaves or Bark of Elder stripped upward ad you gather it, causeth vomiting; but stripped downwards, it purgeth downwards. Also Dr. Butler in a Manuscript of his commends Dwarf Elder to the Sky for Dropsies, vix. To drink, it being boiled in White-wine, to drink the Decoction I mean, not the Elder."

113. Robert Means Lawrence, Primitive Psycho-Therapy and Quackery, p. 158.

Browne was not above prescribing some, if not all, of these. He mentions the use of *gantharides*.<sup>114</sup> He refers to the medicinal use of egg shells and crab's eyes,<sup>115</sup> and wonders if the shell of the ostrich egg might not also, reasoning from the efficacy of the shells of hen's eggs, have medicinal value. He speaks, in a letter to John Hobart, Esq., written on 31 August, 1666, of the use of 'issues' as counter irritants,<sup>116</sup> a remedy so common that it took its place with the very common one of bleeding or phlebotomy.<sup>117</sup> He frequently mentions the use of coral, amber, and ambergris,<sup>118</sup> and questions whether or not the custom of feeding coral to men for the preservation of teeth and to children "to make an easier passage for them" is not a "custom . . . superstitiously founded, . . ." He is skeptical about the medicinal value of gold, for "the capital reason that led men unto this opinion, was their observation of the inseparable nature of Gold; it being excluded in the same quantity as it was received, without alteration of parts, or diminution of its gravity,"<sup>119</sup> a reason not sufficient to convince him of its efficacy in medicine. Bezoar he expresses a regard for, although it is "more serviceable for issues, than dangerous and virulent diseases,"<sup>120</sup> In one place he denies the efficacy of certain gems, such as the amethyst

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114. M.T., 422. Also see a letter to Edward, 7 Aug., 1676, Letters, p. 80.

115. M.T., 326. Also see a letter to Edward, Jan. 19, 1681-2, Letters, p. 236.

116. In a letter to John Hobart, Esq., 31 August, 1666, Letters, p. 406.

117. Cf. Howell, Familiar Letters, for the reference to the practice which because of fear that Howell would contract consumption, Dr. Harvey 'stopped'. A letter to his father, February, 1621, p. 32. Also one to his father from Paris, 10 December, 1622, p. 136.

118. M.T., p. 200, V.E., I, vii, 54; V, xxiii, sec. 5, 154.

119. V.E., II, v, 143.

120. V.E., III, xxiii, 275. He also mentions it in a letter to Edward, December 3, 1680, Letters, p. 199.

in preventing inebriation, the emerald in breaking if worn during copulation, the diamond placed under a pillow in betraying the incontinency of a wife, the fumes of an agate in preventing a tempest, crysoprase in reducing one's love for gold, an idea in which he is yet "to believe, and in that infidelity are likely to end our days."<sup>121</sup> To the medicinal value of gems, seriously prescribed for actual ailments, he agrees only in part, for they may "procure desperate langours, or cause most dangerous fluxes."<sup>122</sup> The eagle stone he mentions,<sup>123</sup> but does not declare a staunch faith in it, although he comments that what he says of the stone is not supposed to discourage its use, for he is only questioning its origin.<sup>124</sup>

While Browne does not declare faith in the "touch" for the King's evil,<sup>125</sup> neither does he deny its potency, although he had ample opportunity to do so. In his letters to Edward he mentions two or three patients who, having received no help in Norwich, had undertaken the trip to London to seek help from the king.<sup>126</sup> In A Letter to a Friend, he remarks that the "King's Purse knows that the King's Evil grows more common."<sup>127</sup>

121. V.E., II, v, 158.

122. V.E., II, v, 142.

123. V.E., II, iii, 115.

124. V.E., II, v, sec. 9, 157.

125. By the time of the eighteenth century, the practice of touching for the scrofula had practically died out, but Charles II is supposed to have been prodigal with his divine prerogative and to have touched more for the disease than any other king previous or following. James II usually refused to do so, seemingly recognizing the farce of the action. Queen Anne later touched some few, one of them being Samuel Johnson, who received no benefit from the experience.

126. In letters to Edward, Letters, May 19, 1679, p. 126; October 29, 1679, p. 154; September 21, 1680, p. 190; June 6, 1681, p. 222.

127. L. to a F., 172.

Little of this belongs to modern medicine.<sup>128</sup> From Aristotle (222 B.C.)

128. Edward Browne, son of Sir Thomas, physician to Charles II and well-known member of the Royal Society, even with his foreign study and his association with progressive men, is not free from those medical practices that attracted his father. Dowden has attempted to vindicate him of the taint of interest in unusual and preposterous beliefs, but he is scarcely successful. Dowden says,

The information which Edward received concerning his father's reputation for his Vulgar Errors after they appeared on the continent was in general connected with science or with scholarship but he knowing as he did Sir Thomas's mingled credulity and scepticism, he sometimes ventured to report, in a spirit of doubt, certain supernatural marvels. (Edward Dowden, Puritan and Anglican, p. 40.)

This, if true, would imply that Edward, first generation removed from Browne, realized the fallacies of these "supernatural marvels", and looked on Sir Thomas as a man to be indulged in his fancies. Nothing could be more damning to any belief than the condescending tolerance of youth, for this tolerance is a certain indication that there is no longer basis for contention, that the truth of the matter has been proved to such an extent that it need have no fear of the pitiful insistence of the unfortunate few who have not been able to grasp its significance, but whose protests cannot harm it. Edward Browne, however, was not amusedly tolerant of his father's interests. We find him instead giving expression to like medical beliefs. In his Diary, certainly not written to suit the caprice of his father's interests, we find the following entry:

February 5

I went to see a serpente that a woman living in St. Gregories Churchyard in Norwich vomited up, but shee had burnt it before I came. (Contained in the Wilkin edition of Browne's Works, III, 402). Credulity was not over. He also mentions a cure for jaundice which he thought to be very good. If we remember that the cure was endorsed by the son, and not the father, we see again that the age had not yet climbed out of unscientific cures.

January 30 . . . . A magical cure for the jaundice; - Burne wood under a leaden vessel fill'd with water, take the ashes of that wood, and boyle it with a patient's urine, then lay nine long heaps of the boyled ashes upon a board in a ranke, and upon every heap lay nine spears of crocus, it hath greater effects than is credible to any one that shall barely read this receipt without experiencing. (Wilkin edition, III, 402.)

A second cure, observed while he was in the country, is recorded with no indication of disbelief.

March the 3rd . . . . I observed that to one in the jaundice hee gave the green ends of goose dunge steep'd in beere, and then strayned and sweetned, a country remedy. (Ibid, 406.)

The two quoted cures would suggest that Edward was not entirely without his father's incredulity. We also have, in the preserved correspondence of Sir Thomas Browne with his son, every indication of Browne's interest in the dissections that were being made by the members of the Royal Society. Browne not only gives suggestions to Edward for the speeches Edward makes before that body, but encourages him in his research and with timely suggestions lends a very creditable aid to the young physician who seems to lack a great part of his father's enthusiasm and keenness.



to Harvey (1578-1657) there had been little progress in the science of medicine. Galen, a Roman physician of the second century, A.D., was thought to be the final authority in all medical and anatomical knowledge. What little he had accomplished, and he had not accomplished much, had been corrupted throughout the centuries following. In the sixteenth century, a queer, revolutionary physician, Paracelsus, had revolted from Galen's teaching and evolved a system of metaphysical medicine that was curious and fascinating, although not particularly scientific or effective. Galen had derived his knowledge of anatomy from the pig, the ape, the dog, and the ox. He assumed that the structures found in these animals were identical with those in the human body, and no one thought to question this assumption until the time of Vesalius, another skeptical physician of the sixteenth century, but one more practically minded than Paracelsus.

Much of the inaccuracy and paucity of medical knowledge was due to the disapproval with which the church looked upon the dissection of human bodies. Most people believed in the physical resurrection of the body.<sup>129</sup> and the mutilation of the flesh after death did not contribute comfort to those who held that the body was resurrected with the soul. No one questioned that God could do all things, even resurrect a body after it had decayed into dust and had been eaten by animals in the form of plants, to be utilized again in the making of still other bodies. But to have the body torn into shreds by human hands in an unnatural dispersal of the parts was an entirely different matter. Even so late as

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129. Browne had unquestioned faith in the resurrection of the physical body. Almost every seventeenth century divine held with the doctrine, e.g., Donne, Taylor, Fuller, Hall, etc.

the latter half of the seventeenth century, the cadavers used for dissection were those of malefactors who had been hanged,<sup>130</sup> and Browne remarks pointedly that the injury suffered to the throat was a hindrance to ease and accuracy in dissection.<sup>131</sup> Aubrey recounts in his Lives that in the year 164-, Sir William Petty came to Oxford and "entred himselfe of Brasenose College. Here he taught anatomy to the young scholars. Anatomy was then but little understood by the university, and I remember he kept a body that he brought by water from Reding a good while to road on, some way preserv'd or pickled."<sup>132</sup> In 1636, a professor of anatomy who had been compelled to use animals for dissection, secured a warrant allowing him the corpses of a couple of malefactors, or failing that, of the friendless poor.<sup>133</sup>

It is not surprising that the human body was so little known, for those who taught classes in its structure and functions had scanty knowledge of it. Usually the master used one body for the entire class, and a menial servant cut the parts while the master, who sat behind a bench, lectured. This may account in part for Browne's seeming lack of interest in the human body if one may judge from the scarcity of his remarks concerning it, even though he was quite accurate in his knowledge of the comparative anatomy of other animal life. In A Letter to a Friend,<sup>134</sup>

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130. Monticelso: . . . .

. . . . . Your ritch whores  
 Are only treasuries by extortion filld,  
 And emptied by curs'd riot. They are worse,  
 Worse then dead bodies, which are beg'd at gallowed,  
 And wrought upon by surgeons, to teach man  
 Wherein hee is imperfect. . . .

Act III, sc. ii, Webster, White Devil.

131. M.T., 297.

132. John Aubrey, Brief Lives, II, 141.

133. H.D. Traill and J.S. Mann, Social England, IV, 1, 260.

134. L. to a F., 165 ff.

he makes mention of having performed some kind of an autopsy on the body of the man of whom he writes, and speaks of the condition in which he found the various organs, but nowhere else do we find similar mention. He seems to have had no profound respect for Galen, whom he seldom quotes as an authority to be followed, and certainly not as one invariably correct. He was much more interested in Harvey, the discoverer of the circulation of the blood.

William Dunn makes the statement that Browne refers to Harvey wearily in his Urn Burial.<sup>135</sup> I can hardly agree with the statement, for Browne seems always to have had the greatest respect for Harvey, and mentions him only with sincere appreciation of his accomplishments. Dr. Harvey's discovery of the circulation of the blood, according to Browne, was more creditable than that of the discovery of America. In a letter to Henry Power, written in 1646, he gives an estimate of the essential books to be mastered by one intending to become a physician. He writes, "Lay your foundation in Anatomy . . . . And be sure you make your self master of Dr. Harvey's piece De Circul. Sangu."<sup>136</sup> And in the Vulgar Errors he has, "All which with many respective Niceties, in order unto parts, sides, and veines, are now become of less consideration, by the new and noble doctrine of the circulation of the blood."<sup>137</sup>

Browne mentions Harvey's careful observation of the fertilization and incubation of eggs:

But these at last, and how in the Cicatricula or little pale circle formation first beginneth, how the Grando or tredle are but the poles and establishing particles of the tender membrans, firmly conserving the floating parts in

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135. William Dunn, Sir Thomas Browne, A Study in Religious Philosophy, pp. 5-6.

136. Letters, 277.

137. V.E., IV, iv, 18.

their proper places, with many other observables, that ocular Philosopher, and singular discloser of truth, Dr. Harvey, hath discovered, in that excellent discourse of Generation; So strongly erected upon the two great pillars of truth, experience and solid reason.<sup>138</sup>

In the "Epistle Dedicatory" to the Garden of Cyrus, he writes of having observed that "pur-blind men have discoursed well of sight, and some without issue, excellently of generation. . . ." The reference here is probably to Dr. Harvey, who was without family and who wrote De Generations. At least Browne recognized the single outstanding contemporary figure in the field of medicine and gave him his just due of appreciation. Surely Dunn must be wrong in his interpretation of the tone in which Browne refers to this greatest physician of the time.

An outgrowth of his interest in Harvey was his own interest in blood systems. In one of his investigations, Browne anticipated a discovery that was to be made years later - that worms were not exsanguinous.

That Worms were exanguinous Animals, and such as have no blood at all, is the determination of Philosophy, the general opinion of Scholars, and I know not well to dissent from thence my self. If so, surely we want a proper term whereby to express that humour in them which so strictly resembleth blood; and we refer it unto the discernment of others what to determine of that red and sanguineous humor, found more plentifully about the Torquis or carneous Circle of great Worms in the Spring, affording in Linnen or Paper an indiscernable tincture from blood. Or wherein that differeth from a vein, which in an apparent blew runneth along the body, and if dexterously pricked with a lancet, emitteth a red drop, which pricked on either side it will not readily afford.<sup>139</sup>

Here, again, had Browne been properly impressed by the implications of his experiment, had he not allowed his skeptical nature to interfere with his discovery, had he assumed to be true what so appeared, he might have contributed what Sir Everard Home contributed in the early part

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138. V.E., III, xxviii, 304.

139. V.E., III, xxvii, 297.

of the nineteenth century.

Browne's interest in the reputed iron diet of the ostrich was another outgrowth from contemporary speculations. Pliny had described the ostrich as omnivorous and able to digest anything. Aelian had said that it swallowed iron, which it kept in its gizzard and later digested. The authorities of the sixteenth century had stated freely that it digested iron. Broelli had called attention to the crushing and grinding force provided for by the muscular coats of the stomach, making, so he thought, the digestion of iron easy. He had experimented at the bidding of Duke Ferdinand II at Pisa by introducing into the stomachs of turkeys glass globules of empty vesicles and leaden cubes, pyramids of wood, and other things of like nature. The next day he found that they had been crushed and eroded, and that the glass had been pulverized, but not digested.<sup>140</sup> Browne anxiously asked of Edward that he notice the ostriches which had been sent the king from Algiers and which were then kept in London.

And whether these fragments of Iron and hard substances swallowed by the Ostrich, have not also that use in their Stomacks, which they have in other birds; that is, in some way to supply the use of teeth, by commolition, grinding, and compression of their proper aliment, upon the action of the strongly conformed muscles of the stomach, as the honor'd Dr. Harvey discourseth, may also be considered.<sup>141</sup>

It was his hope that, if the ostriches died, the king might give them to someone to dissect. And it is well to remember that, curious as this speculation might seem to us now, it was not too absurd to have

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140. Sir Michael Foster, Lectures on the History of Physiology during the Sixteenth, Seventeenth, and Eighteenth Centuries, p. 164.

In an essay on the Character in the seventeenth century, Nicol Smith quotes lauderdal as saying that he "hoped that God would not lay it to his charge, if he could not digest iron, as the ostrich did, nor take into his belief things that might burst him." Characters of the Seventeenth Century, p. xlvi.

141. V.E., III, xxii, 270.

received the consideration of Harvey.

Other references to the speculations suggested by the new science might be mentioned, although perhaps to add more evidence would lead to repetition of what has already been said. Browne writes little concerning the pre-formation theory of reproduction in animals, although he corresponded with Dr. Henry Power upon the subject of its possibility as an explanation for the propagation of plants.<sup>142</sup> It was a theory, widely held during the century, that the embryo was a miniature person, complete from the beginning, and that its development was the growth of the parts and not their formation. The theory had its first real opposition in Harvey's De Generatione. Harvey advanced the theory of epigenesis, a theory that held that the development of the embryo takes place by the successive formation of the parts, not by the enlarging of a whole which was complete in the sperm.<sup>143</sup> But Browne confined his discussion of the idea to its fitness if applied to the plant kingdom.

He makes reference to the idea, however, in a discussion of the use of urine as a means for diagnosis and prognosis of disease, held by some to be an infallible method of determination of the condition of the body. "Physitians (many at least that make profession thereof). . . . have made them believe, there is a book of fate, or the power of Aaron's breast plate, in Urins. And therefore hereunto they have recourse, as unto the Oracle of Life, the great determinator of Virginitie, Conception, Fertility, and the Inscrutable infirmities of the whole Body. For as though there were a seminality in Urine, or that, like the Seed, it

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142. Letters, p. 292-3. To Henry Power, 8 June, 1659.

143. The sperm was considered the sole generative factor, the woman furnishing only the blood necessary for heat and nutriment. It was thought that by close scrutiny, one could detect this "little man" in his minute form in the sperm, and pictures of him were common and were supposed to be authentic reproductions of what had actually been observed.

carried with it the Idea of every part, they foolishly conceive, we visibly behold therein the Anatomy of every particle, and can thereby indigitate their Diseases: . . . ."<sup>144</sup>

Again in his discussion of the number of ribs that were thought to be found in men and women, he touches upon the idea that the seed went about in the blood stream and took from each of the parts of the body with which it came in contact the idea of that part, so in time gaining the Idea of the whole. It was commonly held that men had one less rib than women,<sup>145</sup> explainable on the grounds that the seed of Adam would have the idea of one less rib than was contained in Eve.<sup>146</sup> Browne, in referring to this belief, makes it less superficial than did Kenelm Digby<sup>147</sup> by making the Idea a universal and not a physiological concretion

144. V.E., I, iii, 29-30.

145. Cf. Chapter III.

146. Why, since the sperm was the only generative factor in reproduction and the woman furnished nothing but the blood necessary for food and the incubation of the embryo, all of Adam's progeny, regardless of sex, would not have had one less rib on one side than on the other, no one seemed to bother himself.

147. Digby took the theory literally and felt, as did several others, that the sperm went around the body in the blood stream, taking something from every part, and so had within itself at the time of conception, all the parts, in proper proportion and order, necessary to make the child. Gestation, then, was the growth of these parts. He had no hesitancy in carrying the theory out to its furthest conclusions. He felt that were one to wish to breed a race of tailless mice, all that would be necessary would be to cut the tails from both parent mice. Since the sperm could not gather anything from a part that was not present, and since the mother could contribute nothing to the formation of tails for her young, such a tailless race could easily be propagated. All that would have been necessary to disprove the theory would have been to have tried it experimentally. But Digby was within his rights according to seventeenth century science. A thing that reason pushed to a conclusion, so long as there were no flaws in thinking and no fault in logic, was correct and needed no proof. Authority said that the sperm took portions from the different parts of the body in its journey in the blood stream. Reason said that, this being true, if a part were missing, particularly if that part were missing in both parents, that part would also be missing in the offspring. No more proof was necessary. It took decades of research and of time and effort and painstaking labor not to disprove this theory particularly, for it was but one of many, but to substitute for every such explanation one that checked with experiment and observation.

gathered from the various parts of the body. "For if in every part from whence the seed doth flow, there be contained the Idea of the whole; there was a seminality and contracted Adam in the rib, which by the information of a soul, was individuated into Eve."<sup>148</sup>

Little need be said about Browne's attitude toward the theory of equivocal or spontaneous generation. He believed in it firmly, as did men generally until the time of Harvey, and as did the majority of men after Harvey until Pasteur's proof in the nineteenth century that no life could be generated by the corruptinn of matter. The rules of spontaneous generation, however, Browne held to be definite and inflexible, as has been indicated in the chapter preceding. He adhered to this law strictly, and allowed no possibility of capricious generation, for corrupting matter was thought to produce certain types of insects peculiar to the particular type of matter and, as seen in Browne's argument against the existence of the phoenix, each new generation was degenerate from the one preceding. The theory of spontaneous generation of insect life was defended on the groundsthat there is no mention of insects being taken two by two into the ark. This, combined with the observations that were constantly being made that maggots and insect life appeared in putrifying materials without apparent cause, gave both observational proof and authority to the theory. The doctrine ex omne ovnis in the seventeenth century belonged to Dr. Harvey; it was not definitely established until some three hundred years later. As we have already seen, Browne knew Harvey's work, De Generations, but he was not convinced of the fallacy of equivocal generation, probably because it carried with it only theoretical proof.



The critics of Browne frequently mention Browne's failure to attempt what he told Henry Power could be done, the resurrection of a plant from its ashes.<sup>149</sup> Browne himself makes no mention of this in any of his works or letters, but from a letter to him written by Henry Power, we may assume that he had at least mentioned the possibility to Power and that Power had taken the suggestion seriously. Probably too much has been made of this, for it is relatively unimportant. It was, however, a not uncommon speculation. The theory had been expounded by Paracelsus, and its proof belonged to alchemy. Digby felt that the attempt would fall short in part, at least all "colour and much of the odour and taste of it is flown away with the volatile salt."<sup>150</sup> that would result from burning. James Howell used the idea figuratively in his wish for freedom from the Fleet street prison where he was confined.<sup>161</sup> Drummond believed that it could be done, and Glanvil felt that at least much might be said for the attempt since the freezing of plant particles in water would bring about the form of the vegetable from which they came.<sup>152</sup> But Browne could not have believed wholeheartedly in the old alchemical experiment, for even though Power begged him in a letter to demonstrate the phenomenon, there is no evidence that he tried it, either by "reason" or by actual experiment. It has been one of those unfortunate details, unimportant in themselves, about which a great deal has been written.

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149. Letters, pp. 282-3.

150. Kenelm Digby, "Observations on the Religio Medici," contained in the Cassell edition of the Religio Medici, p. 162.

151. James Howell, Familiar Letters, 3 Jan., 1643, II, xxxiii, 426.

152. Joseph Glanvil, The Vanity of Dogmatizing, pp. 47-8.

In the present chapter I have attempted to show that Browne was not only a conscious, but an interested and active participant in the scientific movements and thought of his time. While we cannot deny his fondness for the unusual and for a style of writing that would better fit unscientific material, neither can we deny that his was a scientific mind, a curious and seeking mind, that kept pace with the educated minds of his day. An insatiable curiosity, aided by a willingness to test by experiment, directed him along the path of the lay-scientist who was conscious of the advancements as well as of the peculiarities of his age. And, while he imbibed many of the faults and errors, he had strong within him the urge to know and to work with the new thought of the century.

## CHAPTER V

SIR THOMAS BROWNE AND THE RELIGIOUS, POLITICAL, AND SOCIAL CONDITIONS  
OF THE SEVENTEENTH CENTURY

The seventeenth century was an age of religious, political, and social unrest. The reaches of the world had, in the previous century, been extended to many times their former boundaries, and offered untold possibilities for new wealth, discoveries, national power and prestige, and religious dominance. There were restless stirrings toward industrial independence, and a growing movement toward new ideas in land-holding and land-working. Merchants were no longer servile men of barter, but were beginning to control a large share of the world's wealth, and with such a control, a large part of national and international affairs. The thrones of political and ecclesiastical kings were being contested, and efforts were made on the one hand to overthrow them without pity or remorse, and on the other to keep them intact from the hands of the rising dissenters who wished reform in every conceivable thing - dress, entertainment, religion, court life, international relationships, industry. The enthusiastic zeal with which the various attempts were made was an indication that the foundations of general beliefs and attitudes were being shaken. The tenets of religion were no longer dominated by a single religious body, although each new dissenting sect dictated to its adherents who rallied to its cry of religious freedom in a manner hardly less tyrannical than that of the religious sect they wished to supplant.

Man's ignorance was contending with his expanding knowledge. He was being urged forward into new fields of investigation by a spirit of unrest that he felt and upon which he acted, but which he did not entirely understand. A new empirical science had come in, and the church on the

continent was putting up a desperate fight to maintain her authority in the realm of knowledge in spite of it. The age had begun to realize that it was tending toward something new, and, with a new sense of freedom, it began to tear away the medieval bonds that held it, often with little regard for the frequency with which it substituted others for those it cast aside.

A general spirit of unrest, combined with a new self-conscious nationalism, as well as the demand for political and religious freedom, permeated England, but with perhaps less of the general madness than was exhibited on the continent. Thanks to the English Channel, England fell heir, in a large part, only to her own disturbance. She schemed and intrigued with France, fought against Spain, watched with jealous eyes European successions, but was not herself invaded or embroiled in any international contest that paralleled those on the continent. Her colonial wars were as yet unimportant. Within her own boundaries lay the seething centre of her unrest. James I had seen the gathering clouds of the civil war which was to grow out of the quarrel between King and Parliament. Charles I reaped the force of the storm, and in 1649 lost his head to a Puritan minority. For eleven years, England tried a Commonwealth under a Protector, but the result was continual bickering, dissatisfaction, and intrigue, and in 1660, she called back the son of her murdered king and restored her monarchy. For twenty-five years, Charles II held the name of king and found himself continually at variance with and checked by Parliament. The nation had no inclination to repeat the experiment of this Commonwealth, however, and whatever dissatisfaction was felt was expressed in the attempts of Parliament to control and limit the king's prerogatives. For three years, after the

death of Charles II, the British throne was occupied by James II, and then in 1688, six years after Browne's death, it was given to the Dutch monarch, William, and his English queen, Mary.

Besides the political difficulties, there were continual serious religious differences. Elizabeth had avoided too great trouble by skillful maneuvering and inactivity, but she had only postponed the religious and political eruption that was to take place and had allowed the situation to grow in bitterness. By the time of Sir Thomas Browne, England had definitely broken away from the church of Rome, but Rome had not been forgotten. Those who had declared themselves independent of papal authority, struggled among themselves. Episcopalian and Puritan fought not only for religious, but for political, supremacy. The civil wars saw religious zeal translating itself into the ways and means of political oppression, and such depredations on property and person as are usually committed in the name of country were often done in the name of religious doctrine. The numerous Acts of Exclusion, Uniformity, and Supremacy were religious tyranny through political means, and met with the opposition and armed force of the sects against whom they were levelled. Such intrigues as the Popish Plot and the later Gunpowder Plot were laid at the door of religious sects and were not charged against any such political organization or group as, regardless of all else, fights for an idea of national freedom or national political reform. In fact, it is difficult to attribute the numerous manifestations of the civil wars either to religion or to national politics, for the two were so closely bound together that to speak of Anglican and Puritan and Presbyterian was also to speak of political parties.

This, in brief, was the political and religious situation in England at the time of Sir Thomas Browne, the situation of which he is accused of being unconscious, and in which he is supposed to have evinced no interest. He is said to have buried himself in his own studies so thoroughly that without any conscious purpose of remaining aloof, he lived apart from it and took no notice of its "thunderings and trampling". A consideration of his works, however, throws doubt upon such an assumption and shows instead, that Thomas Browne was not only interested in what was going on about him, but that he held definite views upon the questions and movements of the day.

The criticism of his lack of interest in the social, religious, and political conditions in England rests upon the fact that very few references to the current civil or political events are to be found in his books. But most of his books were not of such a type as would easily embody any pointed references to such matters. He was not, as the term is usually applied, a literary man. He did not publish his writings as an expression of his "literary Art". His Religio Medici had been penned as a religious exercise for himself, a "memorial unto me".<sup>1</sup> Its purpose was not that of publication. It was written as a

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1. Cf. "To the Reader", Religio Medici, p. 4. "He that shall peruse that work, and shall take notice of sundry particularities and personal expressions therein, will easily discern the intention was not publick; and, being a private Exercise directed to my self, what is delivered therein, was rather a memorial unto me, than an Example or Rule unto any other; . . . . It was set down many years past, and was the sense of my conceptions at that time, not an immutable Law unto my advancing judgment at all times; and therefore there might be many things therein plausible unto my passed apprehension, which are not agreeable to my present self. There are many things delivered Rhetorically, many expressions therein meerly Tropical, and as they best illustrate my intention; and therefore also there are many things to be taken in a soft and flexible sense, and not to be called unto the rigid test of Reason."

meditative venture for personal satisfaction. The Vulgar Errors was a book on common errors in general knowledge, and was not supposed to be concerned primarily with the new science or new discoveries, but with those popular beliefs that Browne had heard and collected. The Garden of Cyrus was another meditative exercise, dealing with the ways in which the number five and the form of the quincunx appeared in nature and the artifices of men. It would be surprising should such a book concern itself with the then pressing questions of political and religious freedom. Beyond chance allusions to such topics, any deliberate discussion would have been dragged in without regard for the purpose of the book or the fitness of the discussion. Urn Burial was written in spite of a feeling that present things should rather occupy its author's mind.<sup>2</sup> The discovery of the burial urns of those who had once lived in England and who had so buried their dead centuries ago, made him write a short dissertation upon death and the modes of burial. The treatise was a result of a reflection that these dead should not be left to die twice in memory, for undoubtedly they had not wanted their bones desecrated or scattered, or, perhaps, forgotten, since they had taken such pains to preserve them. The Letter to a Friend was also an outgrowth of a specific occurrence, the death of a patient, the progress of whose disease Browne must have watched carefully and with a certain painful helplessness. Christian Morals gave little opportunity for reference to the affairs of church and state, for it dealt with the individual's conduct

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2. Cf. "The Epistle Dedicatory," written to Thomas Le Gros, Urn Burial, p. 4. "We were hinted by the occasion, not caught the opportunity to write of old things, or intrude upon the Antiquary. We are coldly drawn unto discourses of Antiquities, who have scarce time before us to contemplate new things, or make out learned Novelties. But seeing they arose as they lay, almost in silence among us, at least in short account suddenly passed over; we were very unwilling they should die again, and be buried twice among us."

not with dogmatic creeds or church doctrines. One might as well request that Christian in Pilgrim's Progress be made to turn aside in his search for the Heavenly City to discuss the state of national affairs in England as to expect that in such a book Browne would deal with institutional religion. The Miscellany Tracts were, for the most part, not intended for publication, or if they were, they were but the notes and jottings for a larger work that would probably have served as a supplement to the Vulgar Errors. These tracts contain frequent repetitions of things already incorporated into the other books, observations and ideas which Browne had written to his son Edward, experiments that he wished to perform or that had been performed, and curious bits of information and misinformation that had attracted his attention. In this book also, there would be little opportunity for reflection on the national situation of the time. Moreover, Browne was a physician, not a politician, and he lived, not in London, but in Norwich, a city at that time third in size in England and one well equipped to supply most of the wishes of its inhabitants for it was then the first English manufacturing town.<sup>3</sup> Trips to London were but infrequently made, for the roads were bad and the means of travel crude and uncomfortable. It is doubtful if Browne ever visited London after he established his home at Norwich. Norwich was somewhat removed from the scenes of active political quarrelings and battles, and those who lived there must have been principally interested spectators who took sides, of course, but who could scarcely have felt the same fiery zeal or have experienced the patriotic enthusiasm of

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3. Thomas B. Macaulay, History of England, I, 324-5. Norwich had some limitations, however. Dorothy Browne, wife of Sir Thomas, frequently had her son Edward and his wife purchase cloth and gifts for her in London. Perhaps even then the London trademark took precedence over that of Norwich. These requests were never for commodities.



those who were more closely connected with the capital and who witnessed the conflict between army and king and parliament at closer quarters.

If we keep in mind the personal quality of Browne's work, the fact that he did not intend to write literature as such, his non-controversial nature and his inactive part in politics, any mention of, or allusion made to, the political and religious conditions of England must, of necessity, take on greater importance than it might otherwise assume, for it is apart from the main theme. The infrequency with which such references are made should not be construed as a mark of indifference without first giving careful consideration to the opportunity that his books might give for such mention. There is, of course, always the argument that had Browne been interested in the affairs of the day, he would not have written on topics so thoroughly detached from current happenings. Such a contention, however, is not unanswerable. Not every interested individual need, if he write at all, write concerning public affairs.

Browne has, as has already been indicated, no "popular book" written for the people at large or for more than a circle of friends, except in so far as such a book as the Vulgar Errors might attract attention. This does not mean that his interest lay only in those fields attractive to himself and a few of his associates, but merely that he wrote as an avocation and a personal pleasure, and not because he regarded writing as a profession or because he wished to establish himself as a teacher, an entertainer, or a propagandist. There is no doubt that certain fields of legend, superstition, medieval custom, and mysticism appealed to him, but there is a legitimate doubt whether these things blunted his sensitiveness to the things that were happening about him, or whether his interest in them offset all other consideration. And there is a grave

doubt whether he, as Dowden says, "stands somewhat apart from the movements of his own day."<sup>4</sup> If "apart" means that he was not an active participant, then the statement is true. But if it refers, instead, to Browne as the "only one", the "solitary", as Dowden has earlier called him,<sup>5</sup> the "molluscous" man who blew in and out the waters of his own erudition as he lived in his gardens at Norwich, the one oblivious to all thunderings and tramlings of the civil wars, who walked hand in hand with his antiquarian thoughts and his own gentle, peaceful, quiet, unnoticing nature, then the statement may well be questioned.

While, therefore, we should not expect very much positive evidence of Browne's interest in contemporary events and currents of thought in his published works, because of their very nature and the circumstances under which they were published, there is a body of his writings that does reveal his genuine interest in such things. This is a collection of private letters, first published in the Wilkin edition of 1836, and later revised and supplemented with additional letters in the Keynes edition of 1928-31. In these letters we see Browne as a person, an individual whose private life was much the same as that of the usual man who is interested in his family and country. Much of the material given here will be taken from these letters, with whatever supplementary passages from his other writings as may seem appropriate.

As might be expected from the very fact that he wrote a religious exercise which he called the Religio Medici, Browne was a religious man, and he was alive to the religious controversies and dissensions that were then wracking the religious sects in England. He was not only a

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4. Edward Dowden, Puritan and Anglican, p. 50.

5. Ibid., p. 35.

professed son of the Church of England,<sup>6</sup> but he was also an ardent Protestant in spite of his professed tolerance of other creeds. There is no indication that he ever embraced ceremony except for the feeling of awe and reverence it inspired in him - a pleasure to his emotions, but not necessary to his religious faith. In his letters to his son Thomas, who left home at the age of fourteen for an extended visit to papal France, he makes repeated admonitions that Thomas hold fast to the Protestant religion, and manifested little of his reputed tolerance when the influence of Catholicism threatened to touch a member of his own family. He writes:

. . . . be courteous and Civil to all, put on a decent boldness and avoid pudor Rusticus, not much known in France, hold firm to the Protestant Religion and be diligent in going to Church when you have any Little Knowledge of the Language.<sup>7</sup>

. . . . if you goe to Saintes you may better Learn the language and I think there is a protestant Church; . . . .<sup>8</sup>

. . . . by this time you may attempt to hear the Protestant Preachers; . . . .<sup>9</sup>

I hope by this time thou art got some what beyond plaisit il, and ouy Monsieur, and durst ask a question and give an Answer in French, and therefore now I hope you goe to the Protestant Church, to which you must not be backward, for tho there Church order and discipline be different from ours, yet they agree with us in doctrine and the main of Religion; . . . .<sup>10</sup>

. . . . you may begin yr Journey when you find the oportunety of such and an honest Messenger, and if you can, to have some Protestant in yr Company, altho you may boldly acknowledge yr self a Protestant in any Part of France; yu must not carry much lugadge about, for that is Chargeable and apt to be stollen.<sup>11</sup>

There is no ranting or railing against the Catholic church, only the

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6. R.M., 6.

7. Letters, p. 4. To Tom, Dec. 22 [1660].

8. Letters, p. 5. To Tom, Jan. 31 [1660-1].

9. Ibid., p. 8. March the 10 style vetere, [1660-1].

10. Ibid., p. 8. Aprill the 22, [1661].

11. Ibid., p. 13, July the 26 [1661].

anxious desire of a parent that his child "cleave unto that which is good". Browne could, for himself, "use the civility of my knee, my hat, and hand, with all those outward and sensible motions which may express or promote my invisible devotion,"<sup>12</sup> but he still regarded those outward forms, holy water and the crucifix, as "dangerous to the common people," and "rectified the Errors of their Prayers by rightly ordering my own."<sup>13</sup> Neither did he borrow the rules of his religion from Rome or Geneva,<sup>14</sup> but followed where necessary the dictates of his own reason. But for his son, he recommended Protestantism.

Browne had little faith in the power of relics or in the efficacy of the remains of the dead, a dogma of the Catholic church that held great significance for papal adherents, and one that was receiving severe criticism at the time. It was not a disbelief in miracles that made him declare against such a faith, for "I hold that God can do all things; how he should work contradictions, I do not understand, yet dare not therefore deny."<sup>15</sup> In fact, he felt that God perverted at times his own rules "to acquaint the World with his Prerogative, lest the arrogance of our reason should question his power, and conclude that he could not."<sup>16</sup> But the belief that God endowed the bodies of martyrs who had died for the church, or those of the saints who had lived without sin or error, with a miraculous power that gave their mortal relics and remains, as well as all objects that had come in contact with them, an efficacy to protect against adversity, to insure prosperity and happiness, to comfort and aid, he could not well accept. In the Urn Burial he remarks, "men

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12. R.M., 7.

13. Ibid., 7.

14. Ibid., 9.

15. Ibid., 36.

16. Ibid., 22.

have lost their reason in nothing so much as their Religion, wherein stones and clouts make Martyrs,"<sup>17</sup> And in the Religio Medici he takes a definite stand against such relies:

And this hath ever made me suspect the efficacy of reliques, to examine the bones, question the habits and appurtenances of Saints, and even of Christ himself. I cannot conceive why the Cross that Helena found, and whereon Christ himself dyed, should have power to restore others unto life . . . . How one reason I tender so little Devotion unto Reliques, is, I think, the slender and doubtful respect I have always hold unto Antiquities. For that indeed which I admire, is far before Antiquity, that is, Eternity; and that is, God himself; who, though he be styled the Ancient of Days, cannot receive the adjunct of Antiquity; who was before the World, and shall be after it, yet is not older than it.<sup>18</sup>

Browne regards many of the illogical practices of the Catholic church as "pious frauds," referring to the Priests of elder time who won credulities by "incredible conceits," such as soothsaying and idolatries, but "winning their credulities unto the literal and downright adoration of cats, lizzards and beetles. And thus also in some Christian Churches, where is presumed an irreprovable truth, if all be true that is suspected,

17. U.B., 36.

18. R.M., 37. The revolt against the "cult of relics" was widespread, and one that the Protestants of all sects took seriously. Bacon had said, "We see the inconvenience of the former miracles in ecclesiastical history, which has too easily received and registered relations of miracles wrought by martyrs, hermits, monks, and their relics, shrines, chapels, and images." Francis Bacon, The Advancement of Learning, p. 60.

And Fuller, in his Sermon "Comment of Christ's Temptation to Presumption, Matthew iv, 5," delivered in 1625, we find, "See here the folly of the Papists, who conceive holy water, holy reliques, holy rags, will drive Satan away; when holy land, holy city, holy temple, heavenly pinnacle, did not fright him from tempting our Saviour." Sermons, II, 50. And in his Holy War, Fuller recounts some of the numerous relics that were supposed to be able to perform miracles and healing, and concludes, "As for the common exception against the cross that so many several pieces thereof are shown, which put together would break the back of Simon of Cyrene to bear them, it is answered, Distrahitur, non diminuitur, and, like the loaves in the gospel, it is miraculously multiplied in the dividing. If all these fail, Baronius hath a razor shareth all scruple clear away; for, saith he, Quicquid sit, fides purgat facinus; so that he worshipeth the false relics of a true saint, God taketh his good intention in good worth, though he adore the hand of Esau for the hand of Jacob. But enough of these fooleries." Holy War, p. 136.

or half what is related; there have not wanted many strange deceptions, and some thereof are still confessed by the name of Pious Frauds."<sup>19</sup>

So, when Browne says of himself, "neither defending one, nor with that common ardour and contention Opposing another; yet in despite hereof, I dare, without usurpation, assume the honourable style of a Christian," we may well add, and of a Protestant.

The actual conflicts and clashes that took place between the various religious dissenters could not have passed unnoticed, for Browne makes frequent allusions to persecutions and religious controversies. He does not take sides with any one sect, nor in any way attempt to determine the merits of the contenders, although he does refer to that "terrible term Predestination,"<sup>20</sup> and seems to draw away from its implications. He realizes, however, the confusion that has resulted from creeds and controversies, and while he does not refer to definite episodes or events, his implications and references are unmistakable. A good cause, he says, need not be patroned by passion, but can "sustain it self upon a temperate dispute";<sup>21</sup> yet the reformers are not to be reconciled, for they leave no "honest possibility of a reconciliation; which though peaceable Spirits do desire, and may conceive that revolution of time and the mercies of God may effect, yet that judgment that shall consider the present antipathies between the two extrems, their contrarieties in

19. V.E., I, iii, 29.

20. "But in Eternity there is no distinction of Tenses; and therefore, that terrible term Predestination, which hath troubled so many weak heads to conceive and the wisest to explain, is in respect to God no prescious determination of our Estates to come, but a definitive blast of his Will already fulfilled, and at the instant that he first decreed it; for to his Eternity, which is indivisible and all together, the last Trump is already sounded, the reprobates in the flame, and the blessed in Abraham's bosom." R.M., 16.

21. Ibid., 9.

condition, affection, and opinion, may with the same hopes expect an union in the Poles of Heaven."<sup>22</sup>

Browne believed in the oneness of religion, the commonality of faith.

Yet have I not so shaken hands with those desperate Resolutions, who had rather venture at large their decayed bottom, than bring her in to be trimm'd in the Dock; who had rather romiscuously retain all, than abridge any, and obstinately be what they are, than what they have been, . . . . We have reformed from them, not against them; for, omitting those Improperations and Terms of Scurrility betwixt us, which only difference our Affections, and not our Cause, w there is between us one common Name and Appellation, one Faith and necessary body of Principles common to us both; and therefore I am not scrupulous to converse and live with them, to enter their Churches in defect of ours, and either pray with them, or for them.<sup>23</sup>

He could not, however, reconcile the notion of the singleness of religion faith and power with the disputes that divided one sect against another.

His comment was timely:

'Tis true we all hold there is a number of elect, and many to be saved; yet, take our Opinions together, and from the confusion thereof there will be no such things as salvation, nor shall any one be saved; For first, the church of Rome condemneth us, we likewise them; the Sub-reformists and Sectaries sentence the Doctrine of our Church as damnable; the Atomist, or Familist, reprobates all these; and all these, them again. Thus, whilst the Mercies of God do promise us Heaven, our conceits and opinions exclude us from that place. There must be, therefore, more than one St. Peter; particular Churches and Sects usurp the gates of Heaven, and turn the key against each other; and thus we go to Heaven against each other's wills, conceits and opinions, and, with as much uncharity as ignorance, do err, I fear, in points not only of our own, but one another's salvation.<sup>24</sup>

Browne may have been a tolerant man, and one regretful of religious dissensions, but he was not one who, unknowing of existing conditions, did not realize or recognize the true state of religious differences. He may have disparaged the methods of settling religious disputes, but he was not unconscious of the disputes to be settled; he may have bent his

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22. R.M., 8.

23. Ibid., 6.

24. Ibid., 69.

knee as a token of respect for another's religion, but he did not give up his own, and he saw in the dissensions that have so arisen throughout the ranks of Christendom, "the sinister ends of Princes, the ambition and avarice of Prelates, and the fatal corruption of time, so decayed, impaired, and fallen from its native Beauty, that it required the careful and charitable hands of these times to restore it to its primitive Integrity."<sup>25</sup>

His was not, then, strict religious tolerance, although his attitude is remarkable enough to justify E.A. George in ranking him as one of his "Men of Latitude" of the seventeenth century,<sup>26</sup> tolerant latitudinarians who viewed religion more or less apart from the church and respected the right of the individual to adopt that form of worship which best suited his purpose and nature. To repeat, he did not agree with the method of persecution of his own time, nor care for the use of violence, but he was not unaware of the controversy between Catholic and Protestant, and Protestant and Protestant. He realized that a reconciliation was hardly possible under the then existing conditions, and although he himself did not feel the antipathy of those of "misguided Zeal", or those "blind with opposition and prejudice", who fell "into an excess of scorn and laughter", at a "solemn Procession", and felt that "we have reformed from them, not against them",<sup>27</sup> he knew the difficulties of the situation.

Nor was Browne unaware of the action of the state against the papists and dissenters. In a letter to his son Edward, who was then at London, dated April 28, 1679 he mentions the bill recently passed against popery

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25. R.M., 6.

26. E.A. George, Seventeenth Century Men of Latitude. A Section is devoted to Sir Thomas Browne.

27. R.M., 7.



and gives voice to his doubts concerning the outcome of such an act.

The bill agaynst popery is intended to be very severe, butt the howse of Lords will moderate it, and whether the King will allowe of it, it is yet undertaine, or what execution there will bee of it may bee as doubtfull.<sup>28</sup>

And in December of that same year, he makes mention of the Exclusion Act:

Wee understand the King hath issued out a proclamation for all papists or so reputed to depart from London ten miles, which makes men conjecture that the parliament will sitt at the prefixed time.<sup>29</sup>

Both of these letters were written about forty years after the composition of the Religio Medici. In them, Browne, as is true for most of his references to political events in his letters, shows little inclination to speculate upon the merit of the event or to evaluate its results. In the Religio Medici he had been looking back of the situation for general conclusions; in his letters he merely points out the event with an indication now and then of his reaction to it.

Had we been fortunate enough to have had preserved for us his letters during the trying years of the Revolution and the Protectorate, we might have been able to supplement these passages with still others that would show his knowledge of the trouble between church and state. But judging from the references made in the letters we do have, we may assume that his interest in such affairs was also manifest at an earlier date.

The idea that Browne was oblivious to political happenings is so common as to be almost traditional. This attitude, the attitude of most of his critics, has been discussed in the first chapter. Two or three more instances of similar criticisms may be added to those already given. Clayton Hamilton makes the following observation in an article contained in the Sewanee Review for 1903:

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28. Letters, 118.

29. Letters, 162. Dec. 9, 1679.

Throughout the civil wars he remained at heart a Royalist, and ever regretted what he called "the horrid murder of King Charles I." But his unruffled spirit "quietly rested under the drums and trappings" of the revolution and the thundorous upheavals of his times find no echo in his works.<sup>30</sup>

William Osler, in an address delivered before the Physical Society, Gray's Hospital, October 12, 1905, modified this opinion somewhat, for he saw in Browne a consciousness of things which were happening about him, but he does no more than give Browne credit for this knowledge. The comment, however, is interesting.

The waves and storms of the Civil War scarcely reached the quiet Norwich home. Browne was a staunch Royalist, and his name occurs among the citizens who in 1643 refused to contribute to a fund for the recapture of the town of Newcastle. It is astonishing how few references occur in his writing to the national troubles which must have tried his heart sorely. In the preface to the Religio, he gives vent to his feelings, lamenting not only the universal tyranny of the press, but the defamation of the name of his Majesty, the degradation of Parliament, and the writings of both "depravedly, anticipatively, and counterfeitly, imprinted." In one of the letters he speaks of the execution of Charles I as a "horrid murder", and in another he calls Cromwell a usurper. In civil wars physicians of all men suffer least. . . . and time and again it has happened that an even-balanced soul, such as our author, has passed quietly through terrible trials, . . . . one might have expected to find in them [his works] references to the Civil War, or at least, echoes of the great change wrought by the Commonwealth, but like Fox, . . . . he preserved a discreet silence. His own rule of life, no doubt, is expressed in his advice to his son: "Times look troublesome, but you have an honest and peaceable profession which may employ you, and discretion to guide your words and action."<sup>31</sup>

Raymond M. Weaver, in the (American) Bookman for October, 1918, makes much the same criticism.

Despite the fact that his life was cast in a stormy time, despite the fact that the Puritan parliament was firmly established in Norwich, while Sir Thomas was a convicted Royalist, still was his life securely and serenely harmonious . . . . The spectacle of life thundered past Sir Thomas Browne bewilderingly complex and unmanageable.<sup>32</sup>

30. Clayton Hamilton, "Sir Thomas Browne", Sewanee Review, January, 1903.

31. William Osler, An Alabama Student, p. 255.

32. Raymond M. Weaver, "Sir Thomas Browne", Bookman, October, 1918.

Browne's reference to the tyranny of the press in the preface to the Religio Medici contains more than a lament. There is the sharp reproof of one who has felt the sting of tyranny and suddenly betrays irritation, not only at the personal injury in the surreptitious printing of his manuscript, but at all the wrongs that it had perpetrated on Parliament and His Majesty. The sharpness of the reproof, born of help-  
less exasperation, is no less real because it is confined to a single paragraph. That it is not repeated in like spirit in the body of the Religio Medici can be explained by the fact that the Religio Medici was a private exercise written seven years before its publication, and before Browne had felt the personal sting of the action of the press.<sup>33</sup>

Browne, we must admit, carefully cultivated for his own pleasure and that of his friends, his special gift for meditative musing, and made no attempt to engage publicly in political controversy, for which he had no particular talent or training. But interest in contemporary

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33. The passage under consideration reads: "Certainly that man were greedy of life, who should desire to live when all the world were at an end; and he must needs be very impatient, who would repine at death in the society of all things that suffer under it. Had not almost every man suffered by the Press, or were not the tyranny thereof become universal, I had not wanted reason for complaint; but in times wherein I have lived to behold the highest perversion of that excellent invention, the name of his Majesty defamed, the Honour of Parliament depraved, the Writings of both depravedly, anticipatively, counterfeitly imprinted; complaints may seem ridiculous in private persons; and men of my condition may be as incapable of affronts, as hopeless of their reparations. And truly, had not the duty I owe unto the importunity of friends, and the allegiance I must ever acknowledge unto truth, prevailed with me, the inactivity of my disposition might have made these sufferings continual, and time, that brings other things to light, should have satisfied me in the remedy of its oblivion. But because things evidently false are not onely printed, but many things of truth most falsely set forth, in this latter I could not but think myself engaged: for, though we have no power to redress the former, yet in the other, reparation being within our selves, I have at present represented unto the world a full and intended Copy of that Piece, which was most imperfectly and surreptitiously published before." R.M., 3.

questions was by no means lacking, as is plainly shown by his private letters. In them we see an entirely different side of his personality from that which is shown in his other writings. Especially in the letters to his son Edward do we see a gossipy Browne who enjoys his family, cares for his sons, evinces a keen interest in the customs and political situations of other countries, and is well aware of what is happening as well as what has happened. He may be the inactive Browne who was knighted by Charles II, but who does not stand for Parliament, or who does not cast his lot with the persecutors of the papists, or yet demand uniformity of the Puritans and Presbyterians. But he was not indifferent to the political situation, nor does he show a lack of interest in the elections and the acts of Parliament and King. It is unfortunate that we do not have his earlier correspondence, for the earliest letters are those of 1660 written to his son Tom who was then in France. That leaves us no letters preceding the Restoration, but, as has been pointed out before, perhaps it is not unfair to assume that he felt the same interest in current political affairs before the Restoration that he felt in the events that took place subsequent to it.

Journalism, during the seventeenth century, had been erratic and untrustworthy. News traveled by post, by word of mouth, by report. Before 1641, a regular newspaper was hardly known, as licenses were restricted and the press closely censored. A lack of postal facilities made distribution slow and uncertain. In 1643, the power of the licenser was shattered, for the government lost control and for several years following, a series of weekly supplements, known as news "books", were printed in the size and manner of pamphlets. Rumor and surmise were the chief sources for each week's news, and items often started "It is

informed", or "the last newes from the West is very variously reported". Oftentimes such introductions as "A true relation", or "A true and exact relation" were used. Since there was no central agency for the dispersion of the news, frequent repetitions and contradictions resulted. At first these news "books" were published every Monday in order to catch the mails out of London, but later they were published on Thursday or Friday, when a second post was arranged for. The Royalist journals came out on Saturday, but the Puritans objected to Sunday mails and commonly retained Tuesday as the day of publication. In 1647, the Puritans undertook to suppress the Royalist paper, but in 1649, The Moderate Intelligencer, a Royalist paper, followed the proceedings leading to the beheading of Charles quite closely. Milton, in 1651, acted as a sort of licensing editor of Mercurius Politicus. The Restoration effected a complete suppression of all newspapers but the one licensed by the king, which led to the establishment of the Gazette. This ended Puritan journalism, but it had taught a great deal in the manner of gathering news and of getting it before the public.<sup>34</sup>

In Browne's letters to his son Edward, we find frequent mention of the "news letters" which periodically came out from London and brought the news concerning the state of national and international affairs. I find Browne quoting them with a degree of interest, but also with a degree of caution, for even by 1679-80 newspapers were, at best, still inaccurate and governed by rumor and hearsay. However, by this time, rival "letters" came by post to the various coffee houses where they were left to be distributed.

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34. Elbert N.S. Thompson, Literary Bypaths of the Renaissance. Cf. the chapter on "Seventeenth Century War Journalism" for a complete discussion.

Though the common letters wch come from London come not to Norwich till Tuesday morning, yet the newes letters of coffee howses come to us on Monday by noone, as being brought on purpose from Beckles where the Yarmouth post leaveth them. Wee heare by them that the King approveth not the speaker, & have the King's & Chancellor's speeches.<sup>35</sup>

[Browne's mention concerning the difficulties in Scotland] . . . the coffie & common newes letters tell us something of the rebellion in Scotland, butt I thinck very imperfectly.<sup>36</sup>

I heard this daye that there was a warrant from the counsell deirected to the Baylives of Yarmouth, to stoppe & apprehend a man for some treasonous dasignes, butt what I knowe not; probably tis better knowne in London. In the newes letters last weeke there was a report of a printer that was in prison for printing some seditious booke.<sup>37</sup>

[After Browne had received Edward's description of the comet, the first description to reach Norwich] The newes letters mention'd it, butt to litle or no purpose or any information.<sup>38</sup>

From these news letters, Browne seems to have been able to watch the political trends closely.

The first of Browne's references to political conditions is in a letter written to Tom while he was on a journey in France, for, as Browne wrote, "these small things I write that you might not be totally ignorant how affairs goe at home."<sup>39</sup> Tom was, at that time, a lad of about fourteen, young for one to take his "wanderjahre", but not too young, it would seem, to entertain an interest in the progress and manner of affairs in England. In a letter of January 31, 1660-1, we find mention of an Anabaptist rising in London, which was soon suppressed and for which thirteen were executed. In the same letter Browne speaks of the Day of

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35. Letters, 113. To Edward, March x, [1678-9].  
 36. Letters, 136. To Edward, June 28, [1679].  
 37. Letters, 151. To Edward, Octob. 2, [1679].  
 38. Ibid., 201. To Edward, Dec. 17, [1680].  
 39. Ibid., 12. To Tom, June the 24th, [1661].

of Humiliation that was proclaimed by Charles II to mourn the "Abominable murder" of Charles I. Almost in the same breath, he states that upon the king's letter, five of the aldermen, who had "got in in the usurpers time in other men's places," had been put out of office.<sup>40</sup> Later comes the announcement of the coronation day and the sitting of the new parliament, for which there has been "a very good Choice almost in all places."<sup>41</sup> In the various letters that follow, he reports the election of my Lord Richardson and Sr Ralph Hare in the County;<sup>42</sup> the preparations for Coronation Day, in which were included a feast for the poor and a service held at Christ Church, with a play given by the "schollers" in the Market Place and another by the young citizens at Timber hill given on a stage, and the effigies of Cromwell "hanged and burned everywhere, whose head is now upon Westminster hall, together with Ireton and Bradshaw."<sup>43</sup> By June 1661, the ships have gone to convey Donna Catherine, Infanta of Portugal, to England to become Charles' queen, and 6000 soldiers have been stationed at Dunkirk to keep it and Jamaica from the Spanish. A parliament with a convocation of the Clergy was sitting at London, and the Bishops were voted to sit again in the house of Peers or Lords.<sup>44</sup> In later letters he tells that Bishop Reynolds appeared once more in Episcopal vestments, after having been forced to refrain from donning them during the Protectorate;<sup>45</sup> that the King of Portugal has resigned up "Tangere, a Town on the Africk side of Barbarie";<sup>46</sup>

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40. Letters, 5. To Tom, Jan: 31, [1660-1].

41. Ibid., 9. To Tom, Aprill the 22, [1661].

42. Ibid., 10.

43. Ibid., 10.

44. Ibid., pp. 11-12. To Tom, June the 24th, [1661].

45. Ibid., 16. To Tom, November the 1, [1661].

46. Ibid., 17.

that a recall has been issued for the coins issued by Parliament so that they might be restamped with the image of the king;<sup>47</sup> that an act of Parliament has set aside legally a Day of Humiliation in commemoration of Charles' beheading;<sup>48</sup> that the Spanish have unexpectedly overthrown the Portuguese, this last but a hasty note, for he had but little time to write.<sup>49</sup>

In a letter to Edward, in the year 1678, he becomes anxious about national affairs with the concern of the older man who can no longer take things as calmly and as philosophically as he has once done. Not that he is any more aware of conditions, but he is more perturbed.

Men are much in doubt yet concerning the warre and the proceedings of the Duch seemes butt odde. God direct our English Counsell for the best.<sup>50</sup>

Things seeme to go forward & backward, & the parliament is like to sett sometime yet. God direct and assist us in all difficulties.<sup>51</sup>

This day wee understood that the parliament was dissolved, wch was very surprising and affords men various thoughts upon it.<sup>52</sup>

Local politics demand some of his attention and in letters to Edward from February 14, 1678-9 to May 7, 1679, he comments upon the contested election of Norwich, the contestants, the deferred trial, the peacefulness of the new election, the number of horses and carriages that thronged the city, although all was more quiet than had been expected.<sup>53</sup> The next year sees the accentuation of the note of discouragement and of appre-

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47. Ibid., 17.

48. Ibid., 18. To Tom, Jan: 4, [1661 -2].

49. Ibid., 19. To Edward and Tom, July, [1663].

50. Ibid., 94. To Edward, May viii, [1678].

51. Ibid., 96. To Edward, June 13, [1678].

52. Ibid., 104. To Edward, Jan. 26, [1678-9].

53. Ibid., pp. 106-122.



hension, and into the letters creeps the weary note of a man who is becoming old and who is tired of dissensions and bickerings.

I am sorry to find that the King of England is fayne to reduce his howsehold expences to twelve thousand pound p. annum, especially hee havāing a farre greater revennus then any of his predecesors. God keepe all honest men from pinching want; men can be honest no longer then they can give every one his due: in fundo parsimonia seldome recovers or restores a man . . . . Two earthen bottles floating upon the sea with this motto, si collidimur, frangimur, is applyeable unto any 2 concernes whose interest is united & is to conserve on [e] another, which makes mee sorry for this dissention between the King & the people, that is, the major part of them, as the elections declare. God send a happy conclusion & bee reconciled unto us & give us grace to forsake our sinnes, the Boutefeus & Incendiaries of all.<sup>54</sup>

Browne's attention was not centered only upon those things that dealt with the internal problems of the British nation. He paid attention to what was happening on the continent as well.

I doubt Sr Leolyn Jenkins [one of the English ministers at the Congress of Nimwegen] is like to have a tedious time at Nimwegen; what the successe of the Prince of Orange will bee at Maestrecht is uncertaine. The Osnabrugge forces beseidg Vic, the suburb of Maestrecht, & the Prince is on this side. Philipsburg by Spire is also a dangerous attempt & the French have greater forces than the beseedged. Stade is in danger, & I believe Hamburg had rather have it in the Suedes hand still, then ether in the Danes or their neibour the Duke of Lunenburg.<sup>55</sup>

In a later letter, he reviews again the situation in Europe, speaking of the French aid of the Swedes, who have an army about Koningsberg, while the French forces have Aquisgrave [Aix-la-Chapelle] and the country about and are said to have the intention of sending forces by sea to the relief of the Swedes.<sup>56</sup> In June of that same year, 1679, he comments upon the French King having got Savoy and Piedmont for money, "an odde passage," for he had a good army that he might have used, "yet tis thought hee hath

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54. Ibid., 212. To Edward, Febr. 28, [1680-1].

55. Ibid., 76. To Edward, July x, [1670].

56. Ibid., 103. To Edward, Jan. xiii, [1678-9].

prevayled much by his money in all the warre and current of his affayres."<sup>57</sup>

In an earlier letter in the spring of 1676-7, St. Omar had been taken by the French and a siege laid at Valenciennes. In his mention of these two events, hemakes the comment that had the weather been as cold there as it was in England, the French must have had a hard time.<sup>58</sup> And in 1680, there comes the simple comment, "Wee heare that there is like to bee a peace with the Moores, which I think will bee the best way."<sup>59</sup>

He gives an account of the Scottish rebellion of 1679, and predicts with not unsound judgment,

This rising in Scotland falls out unhappily at this time, many will wish that the parliament were sitting, butt some Jealous people will think that this may rather hinder their sitting.<sup>60</sup>

And on June 28, of that same year,

I heard that some shippes passed by Yarmouth with souldiers in them for Scotland 6 or 7 days past, and the coffie & common newes letters tell us something of the rebellion in Scotland, butt I think very imperfectly. A litle more time will better informe us of that buisnesse; and they are like to bee more effectually dealt with and brought to reason by the English forces when there shall bee a sufficient number of them in Scotland, for the rebels hope and others doubt whether those of their nation will fight heartily agaynst them, for tis sayd there are more discontented in Scotland then those yet in armes, so that this may bee a coal not so soone quenched; though it was begun by the lowest Scots, yet the Scots are very tenacious of the protestant religion, & have entertained feares & jealousies of designes to introduce the Roman from their observation of the affayres in England, & are not like to bee quieted long without a parliament, & if that should bee broake of to their discontent, they would bee contriving agayne & the English parliaments would bee butt cold in suppressing them. When the Duke of Monmouth giveth a farther account wee may see father into the buisnesse.<sup>61</sup>

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57. Ibid., 133. To Edward, June xi, [1679].  
 58. Ibid., 85. Mar. 7, [1676-7].  
 59. Ibid., 178. To Edward, Aug. 18, [1680].  
 60. Ibid., 134. To Edward, June xi, [1679].  
 61. Ibid., 161. To Edward, Nov. 28, [1679].

Browne is not only interested in what is taking place, but he is dissatisfied with the policies of his country and impatient with the manner in which things are done, just as is every citizen in times of national stress.

I am glad to heare wee have so many shippes launched, & hope there may bee more before the spring. God send Faythfull, valiant & sober commanders, well experienced and carefull; above all, if places bee sould or given by favor only, such virtues will concurre butt contingently. The French are a sober, diligent & active nation, and the Duch, though a drinking nation, yet managed their warre [more] carefully and advantageously then the English, who thought it sufficient to fight upon any termes, & carry to [o]many gentlemen & great persons to bee killed upon the deck, & so encreaseth the number of the slayne & blott their victories.<sup>62</sup>

In a later letter, he sends Edward a copy of Lord Shaftsbury's speech with the pertinent comment that since it had been printed, it was "cacht up & read by many; there are many passages in it litle to the honour & reputation of the king." He adds the comment that although the houses are free to say what they wish within their walls, it is of advantage to have the speeches printed,<sup>63</sup> an observation of the interested citizen, but not the politician.

Interspersed among these news are comments on events of local interest. In the letter concerning the new election at Norwich, which did not end in rioting and disaster, "the competitors having the weeke before sett downe rules and agreed upon articles for their regular and quiet proceeding."<sup>64</sup> he is impressed by the number of people who flocked to Norwich for this election to "give their voyces", and he remarks upon the wine which was available, and the consumption of beer, bread, and

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62. Ibid., 161. To Edward, Nov. 28, [1679].

63. Ibid., 203. To Edward, Jan. 5, [1680-1].

64. Ibid., 121. To Edward, May 7, [1679].

cakes, and the orange cakes which are good in winter, but which give him the heartburn. In a letter preceding, we have been told that a large number of horses were in town the day of the election, some "dragoones", some coach horses, and some very good saddle horses of the better sort; and also that "some say that Mrs. Harmin is much better, butt a week ago they sayd shee was in consumption."<sup>65</sup> He tells of the summoning of the Mayor of Norwich before the king and council, and gives His Majesty credit for seeing through the ruse of the brewers and excisemen who had hoped by this summoning to benefit their own positions.<sup>66</sup>

When we consider that Browne was a Royalist, and that he lived in Norwich and not in London, and that he was first a physician by profession, these letters show a keen interest in public and local events and indicate that he was not a man apart from the affairs of his day, or a solitary man who withdrew from the turmoil and fever of the national life about him. His fondness for meditative speculation and his liking for odd facts, his manner of writing, the type of books which he wrote, have all tended to obscure from his readers that interest which his letters so plainly show, the interest of the man who watched political affairs anxiously and intelligently, even though he did not actively participate in them.

Browne was not only interested in the political affairs of his own nation, but exhibited a wide interest in general, non-political matters, and a particular knowledge of America. America, at that time, was considered to be a land of unexploited wealth and promise. It still had about it the half-fabled, romantic appeal that belongs to the new and the unknown. Browne must have read widely in the accounts that were being

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65. Ibid., 116. To Edward, April 2, [1679].

66. Ibid., 234. To Edward, Jan. 9, [1681-2].

written concerning it, for the new country appealed both to his scientific mind and to his fancy. It seems to have held no particular attraction for him as a political acquisition, but England was not yet actively aware of its nationalistic worth. Because of it, Browne felt the possibility of even more new discoveries, and he states: "That great antiquity America lay buried for thousands of years; and a large part of the earth is still in the urn unto us."<sup>67</sup> He speaks of the Andes Mountains,<sup>68</sup> the American humbird which "not much exceedeth a Beetle,"<sup>69</sup> the American crocodiles which disprove the theory that crocodiles are to be found only along the Nile;<sup>70</sup> the absence of the horse as a creature native to America;<sup>71</sup> the new "herbals which fly from American upon us;"<sup>72</sup> the American religion;<sup>73</sup> the American use of perspective in their pictures;<sup>74</sup> the theory that the American people probably originated from people of several nations, as the Chinese, who, aided by the prevailing westerly winds, might have been carried over in their boats.<sup>75</sup> He lends to the name "American" a feeling of enchantment and a charm wuch as we get when we read the oft-quoted final passage of the Garden of Cyrus that begins, "The Huntsmen are up in America."<sup>76</sup>

Browne often uses current interests as a source for many of his figures of speech, disregarding the older and more classical allusions which one might naturally associate with the latinism of his style. These metaphors are surely an outgrowth of his concern with "present day" topics. As a measure of extreme wealth, Browne uses Peru and the Indies. "I would not entertain a base design, or an action that should call me

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67. U.B., 7.

68. V.E., VI, viii, 221.

69. Ibid., 221.

70. Ibid., 223.

71. R.M., 30.

72. G. of C., 65.

73. V.E., V, xxii, sec. 18, 150.

74. G. of C., 79.

75. M.T., 269.

76. G. of C., 125.

villain, for the Indies; . . . . I have not Peru in my desires . . . .  
 . . . "77. He speaks of the then little known Australia " . . . .  
 whereby, conveniently placed, they steel and iron near the loadstone  
 do septentrionate at one extream, and Australize at another."<sup>78</sup> His  
 use of America in this manner has already been pointed out. This trait  
 does not, of course, belong exclusively to Browne. Fuller, in his Holy  
 State, writes "Thís prince Richard, Earl of Cornwall, brother to  
 Henry III, was our English Crassus or Croesus; Cornwall was his Indies,  
 where he turned tin into gold and silver."<sup>79</sup> Glanvil, in the Vanity  
 of Dogmatizing, has "The Aristotelian Philosophy is inept for New dis-  
 coveries and therefore of no accommodation to the use of life, . . . .  
 And that there is an America of secrets, an unknown Peru of nature,  
 whose discovery would richly advance them, is more than conjecture."<sup>80</sup>  
 Such allusions were almost as common as those made to things pertaining  
 to science. As Browne used "Stand magnetically upon that Axis, where  
 prudent simplicity hath fixt thee; and let no attraction invert the  
 Poles of thy Honesty,"<sup>81</sup> so Fuller drew from the new science, "Some  
 persons account this verse [Acts 13:15] their Master-piece, hoping hence  
 by their cunning Chymistrie, to extract a Licence general for all men  
 to preach; . . . .<sup>82</sup> and "I must confess it passeth my chymistry to  
 exact any agreement herein out of the contrariness of writers in regard  
 to Haymericus, Patriarch of Antioch ."<sup>83</sup>

Browne also shows an interest in Morocco and Turkey, as well as in

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77. R.M., Part II, p. 95-6.

78. V.E., II, ii, 101.

79. Thomas Fuller, Holy State and Profane State, p. 190.

80. Joseph Glanvil, The Vanity of Dogmatizing, p. 178.

81. C.M., 104.

82. Thomas Fuller, Sermons, "The Second Reconciler," II, 15.

83. Thomas Fuller, Holy War, p. 110.

America, Peru, and the Indies, and in a letter to Edward grows reminiscent:

A great part of our newes is of the king of Fez & Moroccos embassadour with his presents of Lyons & ostridges. I remember an embassadour who in K. Charles the firsts time came from the King of Morocco to help him to besedge Sally, then revolted from him; hee besedged it by land & the English with 8 shippes by sea & so the towne was taken. Hee brought with him many gallant horses for a present, with long tayles & very long maines, & pictures thereof were taken & heere is one still in this towne; and at a gentleman howse in thacountry the picture of the Moorish Embassadour on horse back as hee rid thorough London at his entry, as bigge as the life, which cost fiftie pounds & is a noble piece about as bigge as Titian's Charles the fift on horseback in the hall of the Duke's place.<sup>84</sup>

Besides such mention of Morocco, there is his comment upon the histories of these lands which his daughter Betty read to him, histories that had been translated into English and, in the case of Ricauts, had been printed but a few years before Browne's death.

Your sister Betty hath read unto mee Mr. Ricauts historie of the 3 last Turkish emperours, Morat or Amurah the fourth, Ibrahim and Mahomet the fourth. It is a very good historie and a good addition unto Knolls his Turkish historie, wch will then make one of the best histories that wee have in English.<sup>85</sup>

It has often been a source of comment that Browne did not reflect more of his travels in his works, for he had had part of his education on the continent and, while he was yet a young man, had traveled with his stepfather in Ireland. Again, the purpose for which Browne wrote gave little opportunity for discourses on what he had seen during these years. Moreover, Browne did no writing at the time of his travels. He was probably of such a nature that travels were to him only another part

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84. Letters, 234. To Edward, Jan. 9, [1681-2].

85. Ibid., 166. To Edward, Dec. 22, [1679].

of his general experience, a part of the complete education which he recommended to his son Thomas,<sup>86</sup> and which he gave to Edward. We do find, however, a few references to these journeys. He admits having seen spiders in Ireland, in spite of the common belief that none was supposed to be there.<sup>87</sup> In a letter to William Dugdale, first published in the Scottish Review by T. K. Monro in 1922,<sup>88</sup> and later included in the Keynes edition of 1928-32, he considers a question which Dugdale had tendered him concerning the trees found in the Isle of Axholme which had blackened or burned bottoms. Browne replied that he has seen trees burned in a similar way in Ireland, and that they probably had had fires lighted at their bases to serve as fuel, since wood was so plentiful that the people felt no compunction in using trees in that manner, or they might have grown in bituminous soils that sometimes take fire and smolder for days and so burn the lower parts of the trees.<sup>89</sup> He refers in the Miscellany Tracts to circumcisions which he saw at Amsterdam, Rome, and Vienna.<sup>90</sup> He speaks in another letter of the little bug on the dwarf oak containing a red pulp which produces, as he says, red flies and must be sprinkled with vinegar to prevent the multiplication of these insects. Yet according to his account, the peasants of Provence and Languedoc gather these flies and make considerable profit on them. These may be the lac insects that furnish the principal ingredient for lacquer.

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86. Ibid., 3-4. To Tom, Dec. 22, [1660].

87. V.E., VII, xv, 308.

88. T.K.Monro, "An Unpublished Letter of Sir Thomas Browne," Scottish Historical Review, January, 1922.

89. Letters, 349 ff. To William Dugdale, 16 Nov., [1659].

90. M.T., 302.



Browne was not uninterested in financial matters. In a letter to Edward, he gives advice not to invest in the East India Company stock for the double reason that it was hard to get the money out of it again, and that a considerable profit went to the officers. He reminds Edward that his Uncle Browne, who had placed 800 pounds in the stock, had complained that it was the least profitable of his investments, and was forced to sell at a great disadvantage.<sup>91</sup> Browne foresaw an interruption to the company's trade, even though it had had of late a great increase, "for the commoditie of China silks & gowmes & the like is not like to hold allwayes with a mutable & changing people, & how the trade will be interrupted I knowe not when the french growe powerful & buisie in the Indies,"<sup>92</sup> a forecast that was fulfilled a hundred years later.

Continuing the line of prophecy, we find Browne indulged at least once in making a formal prophecy. The elaborate explanation that accompanied the predictions has been omitted.

I present you with a very different kind of prediction; not positively or peremptorily telling you what shall come to pass; yet pointing at things not without all reason or probability of their events; not built upon fatal decrees, or inevitable designations, but upon conjectural foundations, whereby things wished may be promoted, and such as are feared, may more probably be prevented.

#### THE PROPHECY

When New England shall trouble New Spain,  
 When Jamaica shall be Lady of the Isles and the Main,  
 When Spain shall be in America hid,  
 And Mexico shall prove a Madrid.  
 When Mahomet's ships on the Baltick shall ride,  
 And we shall have ports on the Pacific side.  
 And Turks, shall labour to have Ports on that side.

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91. Letters, 217-8. To Edward, April 26, [1681].

92. Ibid., 218.

When Africa shall no more sell out their Blacks  
 To make Slaves and Drudges to the American Tracts.  
 When Batavia the Old shall be contemn'd by the New,  
 When a new Drove of Tartars shall China subdue.  
 When America shall cease to send out its Treasure,  
 But employ it at home in American Pleasure.  
 When the new World shall the old invade,  
 Nor count them their Lords but the fellows in Trade.  
 When Men shall almost pass to Venice by Land,  
 Not in deep Water but from Sand to Sand.  
 When Nova Zembla shall be no stay  
 Unto those who pass to or from Cathay.  
 Then think strange things are come to light,  
 Whereof but few [eyes] have had a foresight.<sup>93</sup>

Browne's prophecy is not correct in all cases, but he quite accurately appraised general tendencies. He foresaw certain imminent movements. He must have based his conclusions upon his knowledge of existing conditions, of past events, and of possible actions that might affect the status of the continent and the trade of the world. It was the prophecy of one who had watched world conditions and who had, for himself, weighed them carefully.

Perhaps one of the most surprising of his observations is his practical suggestion that a canal be cut through the isthmus of Panama, a project that was not undertaken until two centuries later, and not completed until our own century. He says, in the Vulgar Errors, that book that is supposed to deal only with antiquities,

And if policy would permit, that of Panama in America were most worthy the attempt: it being but few miles over, and would open a shorter cut unto the East Indies and China [the reference was to the attempt to shorten the trade routes with the Oriental world by cutting a canal through the Isthmus of Suez].<sup>94</sup>

Browne was not, of course, the first to see the possibilities of this plan to shorten the route to India. A sixteenth century bishop, Bishop

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93. M.T., 123.

94. V.E., VI, viii, 227.

Simpson, had suggested it. But even the mere suggestion had met with religious opposition, for it was felt that what God had joined together, no man was supposed to put asunder. But the excerpt shows Browne's ability to foresee, at least in suggestion, the possibility of an engineering feat that was accomplished only in a later mechanical age.

We find a delightfully human Browne when we see him in connection with his family, for then we have the man as he must have been when alone with those who belonged to him. We know from his letters to "honest Tom", his son, that he approved of education, travel, and a good appearance, and wished Tom to avoid the appearance of pudor Rusticus.<sup>95</sup> He took time to demonstrate to Tom the proper method of making his commas and periods;<sup>96</sup> and comforted the fourteen-year-old boy who must have been homesick during his first months alone in France, advising him to be frugal, a good husband of his resources, yet desiring that he not want for anything and sending him frequent boxes that seem to have been especially prepared for him by Dorothy Browne, his mother. His letter to Tom recounting the complimentary things he had heard of Tom's integrity and worth as a seaman are penned in true fatherly pride, and in a gentle, unboastful, but appreciative manner.<sup>97</sup> We have no letter that would indicate to us Browne's reaction to his son's death, for Tom was lost at sea at the beginning of what promised to be a brilliant sea career.

In the letters to Edward, Browne is the zealous and jealous father who wished his son to present his speeches well before the Royal Society, and who looked up materials for him, sent him drawings, even wrote out

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95. Letters, 4. To Tom, Dec: 22, [1660].

96. Ibid., 14. To Tom, Aug 3, [1661].

97. Ibid., 25 ff. To Tom, May or June, [1667].

introductions for those speeches, and advised him upon matters pertaining to anatomy. He is appreciative when his son sends the first report of the comet to reach Norwich. He suggests that Edward borrow a book from My Lord Lylesbury's house and spend most of his vacant time on it so that he can draw out most of the material that is good and desirable, returning it without allowing "Moreland should have anything to do with it, for hee will drawe out of it for himself & his owne use, & so all the towne will take notice of it. Nor would I have you shoew it to any, or very fewe & such as are not like to make use thereof, . . . ."98

He is the fond grandfather, for "Little Tom", a son of Edward, spent his early years with his grandparents and always sent his love to his parents and to little Susan, his sister. We see "little Tom" sick and well, so actively alive that only his aunt Betty can restrain him and make him sit still, and with a great longing for his promised breeches.<sup>99</sup>

Browne once found it necessary to apologize for little Tom because of his conduct, but makes the promise that he shall not act so again. He is subjected to having his manners improved, for "wee do all wee can to have sober stayd litle girles for his playfellowes that hee mai imitate them."<sup>100</sup> At the death of one of Edward's children, Browne sent simple, but deeply felt comfort, and then, oddly enough, referred uncomplainingly to the expense of the christening, education and burial of his own children, and cautions Edward against prodigality and against excess in apparell or living appearances.<sup>101</sup>

A few glimpses of the general economic and social conditions that

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98. Letters, 77. To Edward, July 14, [1676].

99. Ibid., To Edward, June 28, [1679].

100. Ibid., 98. To Edward, July 6, [1678].

101. Ibid., 178. To Edward, Aug. 22, [1680].

prevailed about Norwich may be gathered from the letters. In the matter of women's dress of the time, Browne was not without the usual masculine disparagement.

Excesse in Apparell & chargeable dresses are got into the country, especially among woemen; men go decently & playne enough. The last Assizes there was a concourse of Woemen at that they call my Lords garden in Cunsford, & so richly dressed, that some strangers sayd there was scarce the like to bee seen at Hide park, which makes charity cold.<sup>102</sup>

He is almost Miltonic in his opinion of the place women should hold in regard to that of men, for he feels that a man is the whole world and breath of God, and woman but the rib and crooked piece of man.<sup>103</sup> This was before he himself was married, but his attitude seems not to have changed radically in his later years. In his Christiah Morals, he has, "Since women do most delight in Revenge, it may seem but feminine manhood to be vindicative."<sup>104</sup> His comment is hardly fair, however, for Browne seems to have had a happy home life, and to have been well contented and satisfied with Dorothy and the children he had by her. He does, however, see some practical value in women, for they increase the demand for luxuries, and in them is the possibility of keeping up a market for ostrich plumes. "Wearing of fether fannes should come up agayne, it might much encrease the trade of plumage from Barbarie. Bellonius sayth hee saw 2 hundred skinnes with the fethers on in one shop in Alexandria."<sup>105</sup>

Music he enjoys, and in the Religio Medici he defines music as harmony, order, or proportion, and whether or not we hear it, as in the

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102. Ibid., 179. In fact, Browne was not without his financial difficulties. In the papers published after his death is a note jotted down to Edward. In it he states that he was not "able to lett out the marshes this yeare for so much as will defray their charges, as wett hath undone the marshes, so now a draught the upper grounds & cornes." M.T., 454.

103. R.M., 87.

104. C.M., Chapt. III, p. 142.

105. M.T., 325.

case of the music of the spheres, yet the understanding gets its note because of its fitness and orderliness. He complains against the Puritans because of their attitude toward music, for "Whosoever is harmonically composed delights in harmony; which makes me much distrust the symmetry of those heads which declaim against all Church-Musick."<sup>106</sup> It is with a certain satisfaction that he records the return of the organ to the church at Norwich after the Restoration, for the organ had been destroyed during the Puritan raids.<sup>107</sup> Even "that vulgar and Tavern-Musick, which makes one man merry, another mad," strikes in him a deep fit of devotion and of profound contemplation of the first Composer.<sup>108</sup>

Browne mentions cockfighting and bearbaiting, but without enthusiasm or regard. His Majesty was at Newmarket in October of 1679 and the weather, being uncertain, forced most of the diversions to be held within doors. These diversions consisted mostly of cockfighting and plays, and of them a lady "who was there at a play gave mee a very tragicall & lamentable description," for the players were so numerous that they had to send a colony to Bury.<sup>109</sup> The prevention of the plague was seemingly still the chief objection to bearbaiting, for "Tom is just now gone to see 2 beares which are to be showne, butt the Maior will not suffer them to bee bayted by reason of the contagion by drawing young people together."<sup>110</sup>

Conditions in and around Norwich were of much interest to him. He

106. R.M., Part II, p. 88.

107. M.T., 167.

108. R.M., Part II, p. 88.

109. Letters, 152. To Edward, Octob. 6, [1679].

110. Ibid., 233. To Edward, Dec. 26, [1681].

speaks of the field sports at Newmarket when a guinea was demanded for a night's lodging, which, he thinks "will make divers wearie of Newmarket."<sup>111</sup> He tells of the surplus production of oider in Norwich, and comments upon the effect that this will have upon the importation of French wines, predicting the decrease in value of apples and fruit because of it.<sup>112</sup> He sent collars from a fish to the king at Newmarket after he had helped open it and had observed the odd muscles.<sup>113</sup> He records as a postscript in a letter to Edward, "Corn is very dear, the best wheat 4 or 5 and forty shillings the comb, which is 4 bushels."<sup>114</sup> The cold weather spoiled the field sports at Newmarket, "where men are coment to drink very bad claret at 18 pence a bottle & some dearer."<sup>115</sup> The sickness about Norwich increases and he decided to send his family to Claxton and, if necessary, to remove himself two or three miles out of the city, and yet remain within call should his patients need him.<sup>116</sup> Even the penitence of the dissipated Lord Rochester does not pass unnoticed, for "Wee heare of the great penitence & Retraction of my L. Rochester, & thereupon hee hath many good wishes & prayers from good men both for his recovery here & happy state hereafter."<sup>117</sup>

The evidence presented in this chapter all points to one conclusion, that the man who has been said to let the "trampings and thunderings of the Civil War go by" while he pursued his solitary way and lived in the world of the antiquarian, was not so solitary or so unconscious of the

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111. Letters, 190. To Edward, Sept. 22, [1680].

112. Ibid., 171. To Edward, Jan. 19, [1679-80].

113. Ibid., 69. To Edward, June 14 [1676].

114. Ibid., 17. To Tom, November the 1, [1661].

115. Ibid., 252. To Edward, March 31, [1682].

116. Ibid., 32. To Edward, Sept. 22, styl. n. [1665].

117. Ibid., 176. To Edward, July 7, [1680].

world, national, and local events as we have been led to believe. It cannot be denied with justice that Browne was interested in the ancients, in quaint lore and superstitions, in odd legends and burial urns, in speculations on the possibility of determining the actual time of the beginning of the world,<sup>118</sup> or discussions of the population of the earth before the flood,<sup>119</sup> - in short, that he enjoyed the unusual. But neither can we deny that he was alive to the forces and conditions of his times and reacted to them in a manner at least comparable to that of the ordinary citizen under the same circumstances. A liking for antiquity and for the strictly modern do not ordinarily exist in such close proximity, and a combination of the two tastes in the same person is unusual, for the one tends to obscure the other. So with Sir Thomas Browne. His printed volumes emphasize his love for the curious until it obscures his interests as the modern man - the man who showed himself chiefly in his letters and who was undeniably more than the "molluscous man" who found his nourishment in the waters of his own erudition.

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118. V.E., VI, i, 159.

119. V.E., VI, vi, 190.



## CHAPTER VI

## BROWNE AND THE AGE OF REASON

It is always questionable to draw conclusions concerning anticipations in any author of a later movement, just as it is questionable to conclude that there were no such anticipations. Sir Thomas Browne died in 1682, almost at the beginning of the period in English thought known as the "Age of Reason", or the Augustan Age. If, as has been our contention, Browne was alive to the changes in thought and temper of the period in which he lived, he would of necessity have to be aware that the general trend of thought was more and more toward the "rational", the idea that the world was capable of being understood through the testimony of the senses as interpreted by the reason. Emile Legouis has said of Browne in this connection,

At times he might be mistaken for a scholar or deist of the eighteenth century. But this is a superficial resemblance, for he ignores the cult of reason, mental travail invariably leading him to contempt of knowledge. "It is better to sit down in a modest ignorance and rest content with the natural blessing of our own reasons, than buy the uncertain knowledge of this life with sweat and vexation, which death gives every fool gratis." Thus, while he constantly uses his reason, he has no hope of learning by it the things of greatest moment to him. His appetite for faith is great.

Legouis presents no other passage than the one cited to prove his point, and he has fallen either into the error of basing an opinion on the chance remark of an author without taking the trouble to note whether it is borne out by the rest of his works, or else he has interpreted all passages such as those that will be given below in the light of the single statement. There is no evidence that Browne was a direct forerunner of the "back to nature" movement, or that he was an active

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1. Emile Legouis and Louis Cazamian, A History of English Literature, p. 541.

advocate of the intelligence as a means of determining all knowledge. But in his less personal works, where his mysticism and personal meditations have been supplanted by his interest in science, he presents some interesting passages that tend to show him a man who was not only conscious of the thought of his own time, but of that of the period which lay immediately ahead of him.

Browne's toleration of misrepresentations of the natural world was limited, and he drew a line between those things that are of license to artists and poets and that which lies within the realm of the intellect. He felt that the "face and symmetry of truth" must not be distorted when it is to be regarded from the standpoint of knowing.

We will dispence with Bears with long tails, such as are described in the figures of heaven; We shall tolerate flying Horses, black Swans, Hydra's, Centaurs, Harpies, and Satyrs; for these are monstrosities, rarities, or else Poetical fancies, whose shadowed moralities requite their substantial falsities. Wherein indeed we must not deny a liberty; nor is the hand of the Painter more restrainable than the pen of the Poet. But where the real works of Nature, or veritable acts of stories are to be described, digressions are aberation; and Art being but the Imitator or secondary representor, it must not vary from the verity of the example; or describe things otherwise than they truly are or have been. For hereby introducing false Idea's of things it perverts and deforms the face and symmetry of truth.<sup>2</sup>

In another place he called attention to the danger in using figurative expressions when dealing with "the masses", for many accept these figurative expressions as literal and "swallow absurd conceits", and, "although this be not prejudicial unto wiser Judgments, who are but weakly moved with such arguments, yet it is oft times occasion of Error unto vulgar heads, who expect in the Fable as equal a truth as in the Moral, and conceive that infallible Philosophy, which is in any sense delivered by

Divinity."<sup>3</sup> The people who are so easily misled, the "many" or the "Multitude", are not confined to the "base and minor sort of people; there is a rabble even amongst the Gentry, a sort of Plebeian heads, whose fancy moves with the same wheel as these; men in the same Level with Mechanicks, though their fortunes do somewhat guild their infirmities, and their purses compound for their follies."<sup>4</sup>

Not only did Browne see danger in fables, especially to those people who are accustomed to lend credulity even to that which was given allegorically, but he felt the necessity of caution in the manner of statement, and advised that proper qualifications or limitations be made in regard to statements concerning time, frequency, and regularity. Such limitations would obviate a great number of confusions and errors that might otherwise occur.

For things may come to pass, Semper, Plerumque, Saepe, aut Nunquam, Aliquando, Raro; that is, Always, or Never, For the most part, or Sometimes, Ofttimes, or Seldom. Now the deception is usual which is made by the misapplication of these; men presently concluding that to happen often, which happeneth but sometimes; that never, which happeneth but seldom; and that always, which happeneth for the most part.<sup>5</sup>

In the Christian Morals, the book of his mature years, we find him advocating suspended judgment as well as caution, particularly when truth and fiction are in so close conjunction that there is little to distinguish one from the other. "Some Truths seem almost Falshoods, and some Falshoods almost Truths; wherein Falshood and Truth seem almost aequilibriously stated, and but a few grains of distinction to bear down the ballance . . . Besides, many things are known, as some are seen, that is by Parallaxis, or at some distance from their true and proper beings,

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3. V.E., I, ix, 65.

4. R.M., Part II, 73.

5. V.E., VI, viii, 226.

the superficial regard of things having a different aspect from their true and central Natures. And this moves sober Pens unto suspensory and timorous assertions, nor presently to obtrude them as Sibyl's leaves, which after considerations may find to be but folious appearances, and not the central and vital interiours of Truth."<sup>6</sup>

Browne, as has been pointed out in an earlier chapter,<sup>7</sup> voiced his belief in the existence of miracles, but he did not allow miracles to be used as an explanation for the natural phenomena. He realized that dependence upon a supernatural explanation for events that could not otherwise be explained often led to grave and compromising results. He saw in such an explanation a more dangerous refuge for ignorance than if the occult sciences were resorted to, for the complete satisfaction that results from assuming that the not-understood is an expression of Divinity and more antipathetical to the pursuit of knowledge, than such partially concealed ignorance as accepts a tentative explanation on occult grounds.

Lastly, It is a very injurious method unto Philosophy, and a perpetual promotion of ignorance, in points of obscurity; nor open unto easie considerations, to fall upon a present refuge unto Miracles; or recurr unto immediate contrivance, from the unsearchable hands of God . . . . Certainly this is a course more desperate than Antipathies, Sympathies, or occult qualities; wherein by a final and satisfactive discernment of faith, we lay the last and particular effects upon the first and general cause of all things; whereas in the other, we do but palliate our determinations; untill our advanced endeavours do totally reject, or partially salve their evasions.<sup>8</sup>

Browne also felt that there is much more to knowing than a belief in the authority of the ancients and a knowledge of fables, syllogisms, proverbs. He went a step farther than did many of the Augustians of

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6. C.M., Part II, sec. 3, 122.

7. Chapter V.

8. V.E., VI, 1, 248.

the eighteenth century; he felt that advancement beyond early authorities is not impossible, but is, instead, a logical and proper path for progress and truth.

But the mortallest enemy unto Knowledge, and that which hath done the greatest execution upon truth, hath been a peremptory adhesion unto Authority, and more especially, the establishing of our belief upon the dictates of Antiquity. For (as every capacity may observe) most men of Ages present, so superstitiously do look on Ages past, that the Authorities of the one exceed the reasons of the other: Whose persons' indeed being far removed from our times, their works, which seldom with us pass uncontroled, either by contemporaries, or immediate successors, are now become out of the distance of Envy: and the farther removed from present times, are conceived to approach the nearer unto truth itself. Now hereby methinks we manifestly delude our selves, and widely walk out of the track of Truth.<sup>9</sup>

Thus unto them a piece of Rhetorick is a sufficient argument of Logick; an Apologue of Esop, beyond a Syllogism in Barbara; parables than propositions, and proverbs more powerful than demonstrations. And therefore are they led rather by Example, than Precept; receiving persuasions from visible inducements, before intellectual instructions. And, therefore also they judge of human actions by the event; for being incapable of operable circumstances, or rightly to judg the prudentiality of affairs, they only gaze upon the visible success, and therefore condemn or cry up the whole progression.<sup>10</sup>

At times, reason, for him, even supplies explanations for scriptural passages where scripture itself is silent in suggesting what the interpretations should be, for he borrowed not the rules of his religion either from Rome or Geneva, but received them from the dictates of his own reason.<sup>11</sup> In fact, he did not always hold to a literal interpretation of scripture where reason and experience did not support it. He questioned the biblical statement that the sun and the moon are the two great lights of heaven, for "if any shall from hence conclude, the Moon is second in magnitude unto the Sun, he must excuse my belief; and it

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9. V.E., I, vi, 42-3.

10. V.E., I, iii, 26.

11. R.M., 9.

cannot be strange, if herein I rather adhere unto the demonstration of Ptolomy, then the popular description of Moses." He held Archimedes to be in one instance a greater authority than scripture, for "if herein I adhere unto Archimedes who speaketh exactly, rather than the sacred Text which speaketh largely; I hope I shall not offend Divinity; I am sure I shall have reason and experience of every circle to support me."<sup>12</sup> He spoke of the "habit of faith in divinity" as fallacious in part when used as an argument for a belief in things unseen, for assent must be procured through the acquiescence of the reason to the problem or thing under consideration, for we can not "properly believe until some argument of reason, or of our proper sense convince or determine our dubitations."<sup>13</sup> Most of these quotations have been taken from the Vulgar Errors, a book that is concerned primarily with factual knowledge and that deals with probability and actuality as determined by the intellect and evaluated by the judgment. He was an older man when he wrote this book than when he wrote the Religio Medici. It was not a "memorial unto me", nor was it a private religious exercise wherein the emotions and the fantasy played the larger part. His regard for the reason here as a means of knowing was the result of sober reflection.

Browne held that the distinction between man and beast lies first in man's ability to reason. This view occurs with more or less frequency in the thought of all ages. It was emphasized in such periods of thought as that of the eighteenth century, when the reason was held to be capable of understanding all things dealing with life and the earth on which it was found. Browne shows a marked tendency toward assuming a rational

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12. V.E., I, ix, 65-6.

13. V.E., VII, xviii, 329.

world. According to him, the earth had been made to be studied by man, but only to be inhabited by the beasts. Because of this distinction between man and the other existing animal forms, it was man's duty to make that study active, not passive, for such a study was the "homage we pay for not being beasts." "The Wisdom of God receives small honour from those vulgar Heads that rudely stare about, and with a gross rusticity admire his works; those highly magnifie him, whose judicious inquiry unto his Acts, and deliberate research into his Creatures, return the duty of a devout and learned admiration."<sup>14</sup> This, of course, is heavily tinged with the religious purpose that had colored the contemplations of almost all thinkers since the beginning of the Christian era, but the "proper study of mankind" was no longer that of God and his divine or supernatural manifestations, but of his handiwork, the world which the Deists regarded as the finished product of the Divine Will.

Reason, or natural logic, was to him, therefore, the core of all conclusions, and, if its decisions so contradicted those of the philosophers, that the assertion of one must be discarded in the face of the other, Browne recommended that the philosophers be sacrificed.

However, the old tetrick Philosophers look'd always with Indignation upon such a Face of Things, and observing the unnatural current of Riches, Power and Honour in the World, and withall the imperfection and demerit of persons often advanced unto them, were tempted into angry Opinions, that Affairs were ordered more by Stars than Reason, and that things went on rather by Lottery than Election.<sup>15</sup>

Where natural Logic prevails not, artificial too often faileth. Where Nature fills the Sails, the Vessel goes smoothly on, and when Judgment is the Pilot, the Ensurance need not be high.<sup>16</sup>

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14. R.M., 19.

15. C.M., 113.

16. C.M., 123.

For our advanced beliefs are not to be built upon dictates, but have received the probable inducements of truth, we become emancipated from testimonial engagements, and are to erect upon the surer base of reason.<sup>17</sup>

For reason being the very root of our natures, . . .<sup>18</sup>

Reason and Sense, coupled always with experience, were then the two great criteria by which all things are to be measured, for they transcend in their conclusions such discoveries as are the result of chance.

Let thy Studies be free as thy Thoughts and Contemplations, but fly not only upon the wings of Imaginapn; joyn Sense unto Reason, and Experiment unto Speculation, and so give life unto Embryon Truths, and Verities yet in their Chaos. There is nothing more acceptable unto the Ingenious World than this noble Eluctation of Truth; wherein, against the tenacity of Prejudice and Prescription, this Century now prevaiileth.<sup>19</sup>

Hee that found out the line of the middle motion of the planets holds an higher mansion in my thought then hee that discovered the Indies, and Ptolemie that sawe no farther than the feet of the Centaur, then hee that hath beheld the snake by the southern pole. The rationally discoverie of things transcends their simple detections whose inventions are often casuall, & secundarie unto intention.<sup>20</sup>

Such a discovery of the Sense and Reason was that of the circulation of the blood by Dr. Harvey, "which discovery I prefer to that of Columbus,"<sup>21</sup> for Columbus, according to the implication given by Browne in this statement, chanced upon the discovery of the American continent, while Harvey described the circulation of the blood because it was in accordance with what was "reasonably" so.<sup>22</sup>

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17. V.E., I, ii, 51.

18. V.E., I, vii, 52.

19. C.M., 123.

20. M.T., 245.

21. Letters, 277. To Henry Power, 1646.

22. The proof for Harvey's theory was not given until the time of Malphigi, when he discovered in 1661 the capillary system that connected the veins and arteries.



Not only does Browne offer these views on the value of reason and its importance in a formulation of the true state of affairs, but he puts into practice his own contentions and often proceeds to his conclusions by the way of "Reason and Sense". Only three of the numerous passages that might be quoted are given here, but these are typical of the many others of like context and may serve to indicate his attitude toward the place reason and the experimental method held in physical and anatomical science, and with regard to those very common errors that he felt need not lend themselves to actual experimentation.

[In his discussion of the loadstone and magnetism.] Now upon this foundation, how uncertain soever, men have erected mighty illations, ascribing thereto the Cause of the Needle's direction, and conceiving the effluptions from these Mountains and Rocks invite the Lilly toward the North. Which conceit though countenanced by learned men, is not made out either by experience or reason, for no man hath yet attained or given a sensible account of the Pole by some degrees.<sup>23</sup>

If any therefore affirm an Horse hath no gall, that is, no receptacle or part ordained for the separation of Choler, or not that humour at all; he hath both sense and reason to oppose him. But if he saith it hath no bladder of Gall, and such as is observed in many other Animals, we shall oppose our sense, if we gainsay him.<sup>24</sup>

That a Brock or Badger hath legs on one side shorter then of the other, though an opinion perhaps not very ancient, is yet very general; received not only by Theorists and unexperienced believers, but assented unto by most who have the opportunity to behold and hunt them daily. Which notwithstanding upon enquiry I find repugnant unto the three Determinators of Truth, Authority, Sense, and Reason.<sup>25</sup>

As Browne was interested in things of his own times and those of the past, he was also conscious that the future held the promise of many things, a promise that his own study and work had made it possible for

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23. V.E., II, iii, 121.

24. V.E., III, ii, 186.

25. V.E., III, vi, 195.

him to appreciate. He was, in his later years at least, a forward-looking man. In the preceding chapter, it was pointed out that he was aware of the commercial, economic and political affairs of England, and also of the affairs of other nations whose fortunes touched that of England, for he took time to speculate upon such events as might lie ahead. In the science of knowing, it was much the same. He retained his interest in the past, and regretted certain circumstances that hindered true deductions from tombs and relics left by an earlier people.

When Alexander opened the Tomb of Cyrus, the remaining bones discovered his proportion, whereof urnal fragments afford but a bad conjecture, and have this disadvantage of grave ententments, that they leave us ignorant of most personal discoveries.<sup>26</sup>

But even though he regretted that the past was to remain always a closed book in part, he regretted still more that he was not to live to witness and experience the events of the future. The most poignant realization of this comes in his Christian Morals, the book of his old age, written when he was acutely aware of the approaching end of his life. In it, he appears in the role of an old man, who by this time had been shorn of the exuberance and intense mysticism of his earlier Religio Medici, an old man who had almost completed his quota of years and who realized the promise of the decades ahead, a promise that was to be fulfilled without him. It is with a certain bitterness that he gives utterance to a wistful longing as he accepts for himself the fate of all men.

Let thy Studies be free as thy Thoughts and Contemplations, but fly not only upon the wings of Imagination; joyn Sense unto Reason, and Experiment unto Speculation, and so give life unto Embryon Truths, and Verities yet in their Chaos. There is nothing more acceptable unto the Ingenious World, than this noble Elucation of Truth; wherein, against the tenacity of Prejudice and Prescription, this Century now prevaieth. What Libraries of new Volumes after times will behold, and in what

a new World of Knowledge the eyes of our Posterity may be happy, a few Ages may joyfully declare; and is but a cold thought unto those who cannot hope to behold this Exaltation of Truth, or that obscured Virgin half out of the Pit. Which might make some content with a commutation of the time of their lives, and to commend the Fancy of the Pythagorean metempsychosis; whereby they might hope to enjoy this happiness in their third and fourth selves, and behold that in Pythagoras, which they now but foresee in Euphorbus. The World, which took but six days to make, is like to take six thousand to make out; meanwhile old Truths voted down begin to resume their places, and new ones arise upon us; wherein there is no comfort in the happiness of Tully's Eligium, or any satisfaction from the Ghosts of the Ancients, who knew a little of what is now well known. Men disparage not Antiquity who prudently exalt new Enquiries, and make not them the Judges of Truth, who were but fellow Enquirers of it. Who can but magnify the Endeavours of Aristotle, and the noble start which Learning had under him; or less than pity the slender progression made upon such advantages, while many Centuries were lost in repetitions and transcriptions sealing up the Book of Knowledge? And therefore, rather than to swell the leaves of Learning by fruitless Repetitions, to sing the same Song in all Ages, nor adventure at Essays beyond the attempt of others, many would be content that some would write like Helmont or Paracelsus; and be willing to endure the monstrosity of some opinions, for divers singular notions requiting such aberrations.<sup>27</sup>

This is the cry, the commission, the observation of the thinker who, even though he is not great, realizes that he is upon the threshold of new discoveries, but that he is to be deprived of the privilege of entering the new age when men were to build up learning through independent and careful thinking and repeated experimentation. This was not written by a man who existed as an intellectual mollusc who took no cognizance of the tremendous possibilities of the age before him, a man apart, wrapped in the gloom of his own mystic and antiquarian meditations, who thought only exquisite thoughts. While Browne did not contribute a great deal to the new age that was coming in, and probably did not clearly foresee what was to take place in the decades that were to

follow, he felt the stirrings of empiricism and was well aware of the on-coming reign of the "reason". He was not a deist, for his own religious nature was that of the mystic who worshipped the unknown and that which touched the emotions. But this mysticism did not constitute the whole man. It satisfied his religious longings and gave him a tolerance that belongs to those who find satisfaction in such quiet contemplations as are often suggested by church doctrine although not in the doctrine itself.

Such contemplations were but a part of his being. His profound erudition covered too wide a field to allow them to be all. He had read and thought too much upon those things that appealed to the reasonable intellect to be satisfied with mysticism as an explanation for all things, or to make it the thoughtful occupation of all his waking hours. The authority of the mind superseded that of the emotions, and the indications of truth or falsity as evidenced by experimentation were of greater import than authoritative or occult or mystical explanations. When Browne considered the material world, the world of objects and of real things, he felt that the mind and its judgment were the final determiners of what was true and what was not. He was a rationalist in degree; he believed in "Sense and Reason"; he leaned heavily toward a belief that the world was regulated by well-defined laws that had been placed into operation by a Divine Will and that suffered little or no deviation in the accuracy and precision with which they were carried out. The world was, for him, a world of the real, the knowable real; his mysticism belonged to that part of him that felt the mystery of the continued stream of human existence, and that was not averse to the hunt for an explanation for the purpose of that existence.

## CHAPTER VII

## CONCLUSION

A great deal need not be said in conclusion. The period in which Browne lived was one of compromise and paradox. Medieval superstition and old wives' tales existed side by side with empirical knowledge expressed mathematically and in such terms as mass, volume, and acceleration. The period was one in which almost all men who had any interest in intellectual pursuits found the whole field of investigation open to them with no reason for specialization or for concentration upon any particular phase or part. Almost every man of education was an experimenter. A large part of the experimentation was valueless, for many who experimented did so simply because it was the fashion or mode. Only in the latter part of the century did the process of investigation become selective. Until then, with the exception of some few men, such as Galileo and Kepler, men tested and investigated trivial and important details at random. Unsolvable problems were exchanged between thinkers, and questions for solution were proposed that were ingenious but useless, as what song the sirens sang, and which type of locust John the Baptist ate in the wilderness. The hold of religion and authority over all thought was still profound and the church was rigorous in its demand that nothing should be advocated that was contrary to church doctrine or detrimental to its teaching. Most of the investigations were made in the name of God and in an attempt to understand the majesty and precision of his handiwork; the earth and its animal and plant life. The age was classical in its teachings, just as it was religious. Every educated man knew Latin and Greek and his fundamental knowledge for all study or investigation was that which he had gained from the classical

authors. Only in the last part of the century did constant references to the ancients and copious quotations from them begin to disappear from the pages of scientific treatises.

This, in brief, is the thought background against which Browne must be placed. We find, principally in his Vulgar Errors, a reflection of the general tendency to speculate upon questions that to us seem valueless and pointless as well upon topics that were pertinent to the new science. He was interested in what classical authorities had to say about chronology, numerology, the creation of the earth, the existence of the phoenix and the basilisk, as well as what had been done recently in the study of magnetism, electricity, and dissections. His manner of writing is that of the earlier part of the century, and much of what is telling or valuable in his work is hidden under a mass of quotations from classical authorities, references to what others had thought, and long discussions upon intricate details and possibilities of interpretation that oftentimes tend to weary the reader or to convince him that Browne is merely giving a resumé of what had been thought, and is reveling in his own erudition. He was, as Legouis has said, a "very learned man, a humanist astonishingly widely and variously read." But it is a little unfair to add, as did Legouis, that "he lived in studious retirement, complacently following the thread of his thought. He too was an eccentric . . . ." <sup>1</sup> He was not an eccentric. His habit of thought and his interests were similar to those of his contemporaries; he was, perhaps, more individual in his manner of writing, more musical in his prose, more inclined to long circumlocutory con-

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1. Emile Legouis and Louis Cazamain, op. cit., 539.

sideration of the material about which he writes or the question which he is attempting to solve, than were many of the other authors who wrote at that time. But this individuality is not accentuated enough to be peculiarly his. Digby, Glanvil, Burton, and many others, some not as well remembered as Browne, were writing in the same manner, and, at that time, were probably better known than he. Many of them were victims of the same faults in knowledge, gave credence to the same errors, and made references to the same popular superstitions.

Browne's experimental method was much like that of most of the other men of the century, a hit and miss process that found its material in whatever field of investigation happened to present itself at the moment, or wherever his interest led him. He followed out no one line of research; in fact, he did little research in the sense in which we now usually use the term. He was an intensely religious man, and the world for him was but the handiwork of God that lent honor and glory to His name. Yet his religion did not lead him into a blind acceptance of a religious or supernatural explanation for natural phenomena. He seldom made that error, even though those about him made it with surprising frequency. His mysticism did not extend to the natural world. Medieval superstitions were well known to him, and he delighted in their consideration, but he also knew what was taking place in the field of science. He watched eagerly the work of Dr. Harvey and of Galileo. He found interest in telescopes, microscopes, tides, sun spots, and the news that was brought back from the travels of those who braved the seas and explored in small part the wilds of America and who wrote concerning the animals and plants that were found there. His mind was open to new ideas, and he was not averse to discarding authority for

empirical proof, or of substituting for theological explanations that which had been derived from observation. Geoffrey Keynes has aptly stated,

Except in matters of religious faith, he was unwilling to accept anything without carefully examining it in the light of such facts as he could gather.<sup>2</sup>

Travel books, new maps, experiments with the loadstone, the pendulum clock, all crowded into his consciousness and received the careful attention of his critical mind.

The national history of England at the time of the life of Browne was stormy and fraught with religious and political intolerance and persecutions. It is of this turmoil that the majority of critics think Browne remained complacently unaware. His religious tolerance has been made much of, and, on the whole, Browne was surprising tolerant for an age when religious feeling ran high and when various acts of parliament stirred up deep hatred among the various sects that found themselves forced into conformities with sects of which they did not approve. But while Browne may have thought it "madness to miscall and rave at the times", while he may have been a "Protestant without enmity with Romanism, . . . Anglican, without animosity toward dissenters, . . . [refusing] to call names, however much as his own positions may be maligned,"<sup>3</sup> we have seen in him a shadow of intolerance in his insistent plea that his son Thomas attend to the Protestant faith. The preceding chapters have not been written to deny such a statement as E.A. George makes in his Seventeenth Century Men of Latitude when he says,

This seventeenth century doctor, to whom life meant something more than a pulse beat, felt the presence in humanity of something which anatomy cannot reveal.<sup>4</sup>

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2. Geoffrey Keynes, A Bibliography of Sir Thomas Browne, p. 48.

3. E.A. George, Seventeenth Century Men of Latitude, p. 161.

4. Ibid., p. 165.



But they have been intended to correct his later statement that "the seventeenth century was deluged with controversy, but the 'Religio Medici' is as the olive leaf which the dove brought back to the ark, an indication that at least from the elevation of some high souls the waters of conflict had subsided,"<sup>5</sup> that during the Civil War Browne was busy with his patients, "employing his leisure moments in reading in many languages, in corresponding with kindred spirits, in studying flowers, trees, and stars," and that during these strenuous times "the Norwich doctor could go calmly about his practice, jotting down exquisite thoughts in all serenity, while the partisans were approaching their life-and-death struggle" and their minds "were framing the Solemn League and Covenant."<sup>6</sup>

The letters that Browne wrote to his sons show him interested in the welfare of his country, conscious of its faults and its attempts at religious as well as political reform, and impatient with such acts as did not meet his approval. He saw beyond the horizon of the "known earth" of his own day and predicted events that were to take place a hundred or more years later. He felt, in his later life, the burden of the continuous national dissension and struggle and prayed that men might be guided in their zeal to bring to a satisfactory close the many problems that confronted them. Had we had any of his personal correspondence with a member of his family before 1660, we might have found that he watched the course of the earlier disturbances as closely as the later ones and that he was not without opinions concerning them. As it is, our conclusions must be drawn entirely from the letters to

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5. E.A. George, op. cit., p. 166.

6. Ibid., p. 154.

Thomas and Edward dated 1660 and after, the time of the Restoration and the reign of Charles II and James II. It is also necessary, in this connection, to remember that Browne lived in Norwich, a city of sufficient size and industry to satisfy his wants and those of his family, and not in London, the center of the revolution.

Mingled with this interest in public affairs found in his letters, is the friendly gossip of a man who was interested in the people and the conditions in and around Norwich. Browne was not averse to the production of plays at a time when the drama was under the black disapproval of Puritans, and he speaks of the plays that were given at the time of the coronation. He liked music and was glad to see the return of the organ that the Puritans had banished from the church. His tolerant good nature was somewhat ruffled by the absurdities of women's dress. He mentioned the price of corn and commented on the overproduction of fruit in the region about Norwich. The plague, bear-baiting, the rains that spoiled the Newmarket games but increased the price of lodging, all attracted his attention. The contested local election was followed and recorded carefully. He mentioned occasionally his patients, and spoke of the mutual friends who he had recently seen or who had met with misfortune.

Browne's unsystematized mysticism in the Religio Medici is attractive, for it is "not of the type that despises the material world; and his science is not of the type that despises the spiritual world."<sup>7</sup> But in spite of this, the two are kept separate and neither encroaches upon the domain of the other. We cannot accuse him of a life of "exquisite thoughts" because he indulged in retrospection, or because his

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7. Ibid., 134.

sensitive spirit was stirred by the unearthing of ancient burial urns, or by the death of a consumptive friend. The evaluation of a man cannot rest solely upon his ability to speak effectively of the realms of mystical speculation and appreciation to which his mind had occasional recourse; nor can we assume his vast erudition and knowledge of ancient customs and superstitions to be an indication that these things blinded him to the upheavals in church and government that were making England a virtual hot bed of Civil War. Browne was at no time a "professional" writer, for he was first a physician. He wrote on topics that appealed to him, perhaps in his "leisure moments", as Mr. George suggests, but his entire life was not made up of leisure moments. He was not consistently the man of the Urn Burial, who meditates on death and the modes of interment, or the man who thought the "exquisite thoughts" of the Religio Medici and "spent his time jotting them down in all serenity when the partisans were approaching their life and death struggle."

Yet Browne must not be hailed as a leader in the thought and endeavor of his age. He represented its faults as well as its virtues, and we remember him for little in the way of actual advancement in the way of knowledge. He approached discoveries and new determinations many times, but failed to follow through his speculations or observations to what should have been their proper conclusions. He was often medieval in his manner of reasoning, and much of the material on which he expended his mental energy belonged to the ages preceding him. But these characteristics were common to the age in which he lived and even such men as Boyle and Harvey were not free of them.

Browne, then, was a versatile mental cosmopolitan who gathered knowledge from writers and investigators of all nations, and his versa-

tility led him into many fields. He was conscious of the political and religious situation of his age, although he took no active part in it. He was interested in the current books on travel, philology, history, geography, reports on archaeology, the Transactions of the Royal Society, maps, chronology, treatises on botany and ornithology.<sup>8</sup> And, quoting in part a passage already given, he was painfully aware that the future held much that he would not see and in which he would not participate.

There is nothing more acceptable unto the ingenious world than this noble elucation of truth; wherein, against the tenacity of prejudice and perscription, this century now prevaileth. What libraries of new volumes after times will behold, and in what new world of knowledge the eyes of our posterity may be happy, a few ages may joyfully declare; and is but a cold thought unto those who cannot hope to behold this examination of truth, or that obscured virgin half out of the pit.

Here is a man, conscious of the thought movement that was taking place in the world about him, one who was interested and forward-looking, who had forgotten that earlier in his life he had, with quiet satisfaction, written that while the number of days could measure his body, it could not comprehend his mind, and that as a microcosm he had found himself more than great.<sup>9</sup> No antiquarian who saw only the past could speak so poignantly of the fact that he was not to live to know the "new world of knowledge" which the eyes of posterity were to behold and in which future generations were to find interest. What he had learned was to live after him; what he had not yet discovered lay ahead and was fraught with possibilities that he would not know. Only a man who never had felt the pain of the shortness of life in view of the promise

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8. Cf. Appendix B.

9. R.M., Part II, sec. xi, 91.

that the future held of discoveries and learning, who had seen and participated in a few of such discoveries in his small way during his own lifetime, could long so deeply for participation in them. The best was "yet to be", but Sir Thomas Browne could only commend it to that younger generation that was to build upon the foundation which he had been instrumental, in a small part at least, in laying.

Browne will probably never be known as a great scientist. He will not be remembered as a great thinker. All of his experimentation yielded nothing of lasting value to future generations, for what he did has either been done better, or has had significance added to it by those who followed him. Even the famous collection of birds that John Ray borrowed for his Ornithology and that John Evelyn wrote of in his Diary gave him no lasting fame. The vulgar errors that he so carefully considered hardly needed his elucidation, for they were to be disproved by means of observation, experiment, measurement, and reason, and their eradication was hardly dependent on his printed page. The field that he longed to enter quickly forgot him. He has remained the author of the Religio Medici, a man of "exquisite" thoughts. His contribution has been, so far, to literature, for none can deny the haunting beauty of his prose. But those who wish to know the paradoxical knowledge and interests of the seventeenth century, the temper of the period that gave birth to modernity and saw the death of medievalism, will find food for contemplation within the pages of his books. He was a man conscious of his period; he was, in fact, to the detriment of his reputation, a product of it.

## APPENDIX A

## SIR THOMAS BROWNE AND THE TRIAL OF WITCHES AT BURY ST. EDMUNDS

One of the most commonly known facts about Browne is that he took part in the trial for witchcraft of Amy Dury and Rose Cullender held before Chief Justice Hale in 1664 at Bury St. Edmunds. Browne, who was present at the trial, whether by chance or by summons is not known, testified to his belief in the existence of witches, and made reference to certain similar instances of witchcraft in Denmark. Although he gave no direct testimony in regard to the case itself, but made only the general statement that he believed that witches did exist, he is commonly thought to have given the testimony that determined the course of the trial and influenced the jury to return a verdict of guilty, a verdict that entailed the sentence of hanging.

Browne's appearance in court has been unfortunate for his later reputation. Belief in witchcraft is often considered the darkest of medieval superstitions, the mark of an ignorant and credulous man, and even admirers of Browne have found it difficult to mention his part in the trial without adding an apology or expressing regret. But the emphasis usually placed upon the importance of Browne's testimony in the outcome of the trial has been exaggerated, for, as I hope to show by comparing Hutchinson's account of the trial with that authorized by Chief Justice Hale himself, Browne did not give the deciding evidence, nor did his testimony have any direct influence upon the verdict rendered.

The error concerning the part Browne played in the trial may be attributed to Francis Hutchinson, whose "Essay Concerning Witchcraft", published in 1716, almost fifty years after the trial took place, gave

a garbled report of what actually happened. The major part of the Essay is a compilation of statistics concerning the prevalency of witchcraft in England and a recounting of cases of witchcraft and the subsequent trials from the time of Henry VIII until 1718, the year in which the essay was published. It is a denunciation of the belief in the Black Art as practiced by those who were supposed to have sold themselves to the devil and who consorted with "familiars" and attended Witches' Sabbaths. Although this account of the Bury St. Edmunds trial is not complete, it is as nearly so as any unofficial study published for almost two centuries, and as late as 1893 its figures were used by Sir J.F. Stephen in his "History of Criminal Law."<sup>1</sup> In it, Hutchinson refers with melancholy disparagement to the "learned doctor" who gave the evidence that was supposed to have determined the decision of the jury. Had Browne been fortunate enough to have given his testimony in a case that had not resulted in the hanging of the prisoners, his belief in witchcraft might have been regarded with no greater disfavor or prejudice than the similar belief of Sir Robert Boyle. It might, indeed, have been all but forgotten. But he was not so fortunate. The women were hanged, and a feeling of outraged humanitarian sentimentality has made his commentators and critics refer to his part in the trial as a "blot" upon his name, and an indelible mark against his sagacity.

A true account of the trial can be obtained either in Hale's Tryal of Witches or Cobbett & Howell's State Trials, VI, 647-702. No author contemporary with Browne seems to have thought enough of Browne's

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1. C. L'Estrange Ewen, Witch Hunting and Witch Trials, the Indictments for Witchcraft from the Records of 1373 Assizes held for Home Circuit A.D. 1559-1736, intro., x.

connection with the trial to mention it in any way, except for the account contained in the Tryal of Witches. It was only after the publication of Hutchinson's Essay that we find the incident assuming an important place in the biography of Browne and the criticism written about him. It was not mentioned by Whitefoot, Samuel Johnson, or Keppis, Browne's principal biographers before the nineteenth century. Following Hutchinson's Essay, Aikin, in his Biographical Dictionary, completed in 1815, was the first to incorporate it as an important episode in the life of Browne. Simon Wilkin, who edited Browne's works in an edition published in 1836 and later in 1853, attempted, as Sencourt has pointed out, "to prove that in Polynesia the black art still survived, and the travellers in the Solomon Islands, especially in their account of the Veli charm, bear this out even to the present day."<sup>2</sup> With this statement, Wilkin seemed to feel that he had vindicated Browne somewhat for his testimony. In 1864, one who signed himself 'Quivis' inquired in Notes and Queries concerning the authenticity of the account contained in Hutchinson's Essay and asked where he might find some statement of the trial printed during Browne's lifetime. The editor suggested Hale's Tryal of Witches, both the first edition of 1693, printed during the lifetime of the Chief Justice, and the later edition edited by John Russel Smith in 1828, both of which were to be found in the British Museum.<sup>3</sup> The inquiry bore no fruit, however, and Hutchinson's account remained the source for criticism and comment until 1911, when Forrest Reid, in an article contained

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2. Robert Sencourt, Outflying Philosophy, p. 96.

3. Notes and Queries, published by John Francis. Series 3, volume 5, page 400. May 14, 1864.



in the Westminster Review, stated that Hale was satisfied with the trial and the outcome, quoting Hale's words to the jury in proof that he did not feel it to be a crime against the best interests of a people to convict these women on a charge of witchcraft, and that he made no mention of the testimony given by Browne.<sup>4</sup> In December of that same year, two articles appeared in the Norfolk Chronicle, both protesting against the account of the trial as usually given, and particularly Gosse's acceptance of it.<sup>5</sup> In 1912, Malcolm Letts, again in Notes and Queries,<sup>6</sup> questioned the details given by Hutchinson and pointed out that Hutchinson had placed the testimony given by Browne at the end of the trial instead of where it actually occurred, somewhere close to the middle. This, he felt, had helped to give rise to the erroneous idea that the testimony was an important factor in deciding the merits of the case. Letts called attention to the following facts: In the Cobbett & Howell State Trials, the testimony of Browne occurs before the full evidence had been given; the tests<sup>that</sup> were made were made after Browne's testimony, and not before, as Hutchinson would lead one to believe; the judge makes no mention of Browne's name in his final statement to the jury, refusing, in fact, to do so much as to sum up the evidence, although his last injunction showed clearly that he was himself convinced of the legitimacy of the charge, although not necessarily of its justness in this case. All of this is contrary to Hutchinson's account. "All that can be held against him [Sir Thomas Browne] ," Letts states, "is that he is not of his own notion, but when

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4. Forrest Reid, "Sir Thomas Browne and a Trial of Witches", Westminster Review, February, 1911.

5. December 23 and 30, 1911.

6. March 23, 1912, Series 11, volume 5, pages 221-3.

directly appealed to by the Judge - gave testimony as to his belief in witchcraft - an expression of belief in which 99 out of every 100 of his educated contemporaries would have concurred." Two more recent writers, Robert Sencourt and Dorothy Tyler, have advocated that Hutchinson's Essay be discarded as a source for the account of the trial. Sencourt, in his Outflying Philosophy, criticises Edmund Gosse for his acceptance of the Essay as a source of his information concerning the trial,<sup>7</sup> and D. Tyler, in the July 1930 issue of the Anglia, reviews the two accounts as given by Hutchinson and Hale, pointing out again that Hutchinson misplaced the testimony in the course of the trial and added undue emphasis to its importance.<sup>8</sup>

With these few exceptions, the version usually given of the trial is that contained in the Essay. Gilbert Coleridge said that "possibly even the judge, like Pilate, wished to save these two miserable women from the rigor of the law as it then stood, for we are told that he purposely refrained from repeating the evidence to the jury at the trial for fear of biasing their minds, but since so eminent a savant as Sir Thomas had given his opinion in open court that it was a genuine case of witchcraft, the prisoners at the bar were doomed."<sup>9</sup> The Essay also furnished the account included in the life of Browne as given in the Dictionary of National Biography. The life prefixed to the Cassell edition of the Religio Medici made a less emphatic but no less definite statement, for it said that eighteen years after the publication of the

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7. Robert Sencourt, Outflying Philosophy, pp. 94-96.

8. Dorothy Tyler, "Review of the Interpretation of Sir Thomas Browne's Part in a Witch Trial in 1664." Anglia, July 1930.

9. Gilbert Coleridge, "Writings of Sir Thomas Browne", Fortnightly, July, 1914.

first edition of the Vulgar Errors, Browne had calmly given his opinion concerning witchcraft at the trial held at Bury St. Edmunds, and had helped to bring down upon two poor women the sentence of death for the bewitching of children.

Gosse probably relied entirely on Hutchinson, for he seems to have accepted the account as given in the Essay in its entirety. In fact, he gave additional emphasis to the importance of Browne's testimony by elaborating upon Judge Hale's reluctance that the two women be adjudged guilty of the crime of bewitching. He represented Sir. Matthew Hale as an unflinching judge who was extremely dubious about the existence of witches, and who had been impressed by the apparent worthlessness of the testimony and the questionable character of the witnesses. Unhappily, Gosse states, Sir Thomas Browne was in court. Lord Cornwallis and Sir Edmund Bacon, as well as Sergeant Keeling, all friends of Browne, had stated that the charges against the two women were "mere imposture". The court, according to Gosse, was against the prosecution; a word in the favor of these two miserable women, or silence alone, would have saved their lives. At this solemn juncture, Browne "declared that he was clearly of the opinion that the fits were natural, but heightened by the Devil, cooperating with the malice of the witches and at whose instance he did the villanies". Browne also stated that similar cases had been but recently discovered in Denmark, which, Gosse would have us believe, was submitted as additional evidence why the two women on trial at Bury St. Edmunds should also be considered as witches. "He solemnly explained his opinion to be that the devil had co-operated with the 'malice' of Amy Dury and Rose Cullender to stir up and excite the humours of the children's bodies so as to

bring on distempers . . . . heightening these natural diseases 'to a great excess by his subtilty'. Whether he ultimately had, or had not, a scruple in his mind as to the wisdom of his judicial opinion, we cannot surmise. But he made a curious entry in his Common Place Book: 'We are no way doubtful that there are witches, but have not been satisfied with the application of their witchcrafts.'<sup>10</sup> . . . . Browne's declaration influenced the jury against mercy. We are told that 'it turned back the scale, that was otherwise inclining to the favour of the accused persons.' The judge still hesitated, but 'put it off from himself as much as he could,' resting on Browne's opinion. Still troubled in his conscience, Sir Matthew Hale finally left it to the jury, praying 'that the great God of Heaven would direct their hearts in that weighty matter', but it was the opinion of the great doctor of Norwich that weighed with them . . . . They [the women] were hanged at Bury, protesting their innocence, and their blood, poor creatures, was on the head of the author of Religio Medici."<sup>11</sup> . . . . It is observable that the Rev. Francis Hutchinson, the first of those who openly and courageously denounced witch-trials as one of 'the worst corruptions of religion and the greatest perversions of justice', was a child at Bury St. Edmunds when this ghastly crime was committed."<sup>11</sup>

The substance of this opinion is repeated with varying emphasis by almost all commentators. Leslie Stephen, in his Hours in a Library stated, "In one well-known case Sir Thomas' peculiar theories received

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10. Gosse is somewhat misleading here. It is not known that this entry was made after the trial, for the items in the Commonplace Book are not dated. While Gosse does not definitely state that Browne wrote this after the trial, the manner of statement might well lead to that inference.

11. Edmund Gosse, Sir Thomas Browne, pp. 148-150.

a more unfortunate application; he contributed by his evidence to the death of the witches tried by Hale in 1664; and we could wish that in this case his love of the wonderful had been checked by his sense of humour."<sup>12</sup> Legouis gives the same idea more pointedly, "His evidence as a doctor caused two poor women to be put to death as witches."<sup>13</sup> Even Dunn, a more recent critic, felt that "It is the one circumstance of his life for which his admirers have to offer any apologies."<sup>14</sup> Such a statement does not belong only to the field of English literature. Medical men and those interested in other fields of science who have had occasion to mention Browne, repeat the same comment. Howard Haggard, in a recent book, The Lame, The Halt, The Blind, says, "Sir Thomas attempts to reconcile scientific skepticism with religious faith. Underneath his words is often a credulous attitude toward the things he ridicules. He denounced all superstitions but gave his professional aid to the condemnation of Amy Duny and Rose Cullender for witchcraft at Norwich in 1664."<sup>15</sup> This is merely a repetition of the common attitude toward the episode. There can be no question that Sir Thomas Browne believed unqualifiedly in witches, that he was at the trial, and that he gave his testimony in favor of the existence of witchcraft; a question remains, however, how important all this was to the outcome of the trial, and how much censure he should reap because of his part in it.

The worst period of witch-persecution in England came in the seven-

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12. Leslie Stephen, Hours in a Library, I, 273.

13. Emile Legouis and Louis Cazamian, A History of English Literature, p. 540.

14. William Dunn, Sir Thomas Browne, A Study in Religious Philosophy, p.23.

15. Howard Haggard, The Lame, the Halt, the Blind, p. 56.

teenth century.<sup>16</sup> At that time, witchcraft was considered a scientific and philosophical fact. Few denied the existence of witches, for to deny this was to deny the existence of spirits. Such a denial was equivalent to a declaration of atheism, for it cast doubt upon the devil, his spiritual existence, and his powers. It also cast doubt upon the existence of angels, for the bad spirits were the lowest order of a hierarchy of angels. The real question was not whether spirits existed, and whether men might sell themselves to the devil for certain considerations, but whether the charge of witchcraft made in individual cases was true in that particular instance. The few who questioned witchcraft did not question the existence of spirits or the devil, and usually they said little about their skepticism, for their doubt was unpopular. Browne believed that witches might well exist, but he questioned their "manifestations" and shows none of the hysteria that was so prevalent during the period of witch-hunting and witch-hanging in England.

In the Religio Medici, written while still a comparatively young man, Browne gives a metaphysical explanation for his belief in witches. "It is a riddle to me . . . . how so many learned heads should so far forget their Metaphysicks, and destroy the ladder and scale of creatures, as to question the existence of Spirits. For my part, I have ever believed, and do now know, that there are Witches: they that doubt of these do not onely deny them, but Spirits; and are obliquely and upon consequence a sort not of Infidels, but Atheists."<sup>17</sup> He goes on, however, to put limitations on his belief. After a statement that the Devil does not appear to those who are skeptical since disbelief is an aid to his

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16. George Kittredge, Witchcraft in Old and New England, p. 6.

17. R.M., 38.

plan for mocking God, Browne continues: "I do not credit those transformations of reasonable creatures into beasts, or that the Devil hath a power to transpiciate a man into a Horse, . . . . I could believe that Spirits use with man the act of Carnality, and that in both sexes . . . . without a possibility of generation; I hold that the Devil doth really possess some men, the spirit of Melancholy others, the spirit of Delusion others; that, as the Devil is concealed and denyed by some, so God and good Angels are pretended by others, whereof the late detection of the Maid of Germany [who lived on the smell of a rose] hath left a pregnant example.<sup>18</sup>

This compares favorably with a later statement that he has no doubt that witches existed; he questions only the authenticity of the possessions and the acts committed in the name of witchcraft. Not all sorcery he feels is legitimate, and certainly not all is a result of the wiles of the devil. Natural human wiles have corrupted even his art, and - an observation that might well be looked at carefully before denying - witchcraft might have been the source of much of our philosophy.

Again, I believe that all that use sorceries, incantations and spells, are not Witches, or, as we term them, Magicians. I conceive there is traditional Magick, not learned immediately from the Devil, but at second hand from his Scholars, who, having once the secret betrayed, are able, and do empirically practise without his advice, they both proceeding upon the principles of Nature; where actives, aptly conjoined to disposed passives, will under any Master produce their effects. Thus I think at first a great part of Philosophy was Witchcraft; which, being afterward derived to one another, proved but Philosophy and was indeed no more but the honest efforts of Nature; what, invented by us, is Philosophy, learned from him, is Magick. We do surely owe the discovery of many secrets to the discovery of good and bad Angels.<sup>19</sup>

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18. R.M., 39.

19. R.M., 39-40.

Witchcraft here belongs to the realm of Philosophy, not necessarily to the realm of the occult.<sup>20</sup> It was thought to have a metaphysical basis, and, in its proper consideration, had little in common with "Black Magic". Browne here seems to give the term an interpretation that might be construed as a denial that real "witches" were in league with the devil and had sold themselves into his service.

Browne is somewhat less philosophical in a statement concerning witchcraft found in his later Miscellany Tracts. Here he attempts to make a distinction between the purely metaphysical belief in witches and the demonstrations of witch powers in actual cases where sorcery had been practised. Whether or not this passage was written before or after the Bury St. Edmunds trial cannot be determined, but it must have been written after the publication of the first edition of the Vulgar Errors, and so after the depredations of Matthew Hopkins, the notorious witch-hunter, between the years of 1645-1650. Hopkins, and other celloused hunters, had engendered in the English people a frenzied interest in witch persecutions. Much of the evidence given against those unfortunate enough to be suspected as witches was merely a figment of the imagination enlarged and made to appear real by a wave of hysteria which swept over all England.

Wee are no way doubtfull that there are witches, butt have not been alwayes satisfied in the application of their wichcrafts or whether the parties accused or suffering have been guiltie of that abomination, or persons under such affliction suffered

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20. The most interesting book on the philosophical justification of witchcraft is probably that of Joseph Glanvill, Sadducismus Triumphatis, 1681. Glanvil firmly believed that one could not intelligently deny the existence of witches, unless one would also deny the existence of spirits, or of God, or of the Devil. He is more credulous on this point than Browne, for where Browne often questions actual manifestations of such powers as were supposed to belong to witches, Glanvil accepts them in all seriousness and uses them as demonstrative proof for his more abstract points.



from such hands. In ancient time wee reade of many possessed & probably there are many still, butt the common crye & generall opinion of wiches hath confounded that of possession, men salving such strange effects from beneficiall agents & out of the partie suffering. Many strange things have been done beyond the salvo of human reason wch might proceed as well from possession as veneration. If the man in the gospell had now lived who would not have sayd hee had been bewiched wch few or none might then suspecte; Or who now sayeth that Saul was bewiched. Many examples may occurre of the like nature among us wherin whether possession bee not sometimes mistaken for veneration may well bee considered.<sup>21</sup>

Browne had no belief in ghosts, which are not witches, for he thought ghosts to be but impersonations of the Devil to deceive us. They appeared principally at "Coemeteries, Charnel-houses and Churches, . . . . because those are the dormitories of the dead, where the Devil, like an insolent Champion, beholds with pride the spoils and Trophies of his Victory over Adam."<sup>22</sup> It is for this reason that he does not believe in necromancy, which he holds to be an error of the Christians, "who holding the dead do rest in the Lord, do yet believe they are at the lure of the Devil; that he who is in bonds himself commandeth the fetters of the dead, and dwelling in the bottomless lake, the blessed from Abraham's bosome, that can believe the real resurrection of Samuel; or that there is any thing but delusion in the practise of Necromancy and popular raising of Ghosts."<sup>23</sup> Combined with this wile, the Devil "endeavours to propagate the unbelief in Witches, whose concession infers his co-existency; by this means also he advanceth the opinion of

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21. M.T., 252. The question of Saul and the Witch of Endor attracted much attention, for upon that episode rested much of the Biblical proof of, and justification for, a belief in witches. Joseph Glanvil's Sadducimus Triumphatus contained a treatise signed by Henry More defending his belief in the actuality of the Witch of Endor. In it, More hurled a great deal of bitter personal satirical invective at those who chose to question his stand. His arguments now are amusing, but there is no mistaking his barbed thrusts that must have stirred up keen personal animosity between him and those at whom he directed them.

22. R.M., 47.

23. V.E., I, x, 72.

total death, and staggereth the immortality of the soul; for, such as deny there are spirits subsistent without bodies, will with more difficulty affirm the separated existence of their own."<sup>24</sup>

It is difficult to determine just what definition of witches Browne would have given and to know whether the meaning which we usually associate with the word is a distorted reflection of what he meant when he used it. Our definition is close enough to Browne's to be in a large part similar to it, but it still seems distant enough from it to suggest a discrepancy between his thought and ours. But at least we may be certain of one thing. He had not yet determined just where his metaphysical explanation of the existence of witches, which was his ultimate consideration, ceased when applied to actual cases of witchcraft, even though he felt that the Devil, when the Oracles were dispelled, was forced to run "into corners, exercising minor trumperies, and acting his deceits in Witches, Magicians, Diviners, and such inferious seducers."<sup>25</sup>

The information just offered in the several preceding paragraphs may serve as a background for an understanding of the testimony that Browne gave at the trial and as an indication of the real implications of his assertions. The comparison of the two accounts of the trial that follows, those of Hutchinson and Hale, is not to explain or justify Browne's position, but to confute the idea that Browne's testimony was the deciding factor in the case, and that to him belongs the blame for the condemnation of two women, when, according to Gosse, even silence might have turned the scale in their favor.

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24. V.E., I, x, 76.

25. V.E., VII, xii, 295.

According to Hale's Tryal of Witches, the trial of Amy Duny and Rose Cullender was held on March 10, 1664, at Bury St. Edmunds, for the County of Suffolk, before Matthew Hale, Knight, Lord Chief Baron of His Majesty's Court of the Exchequer. The charge was that of bewitching Elizabeth and Deborah Pacy. The two women pleaded not guilty, but after a long trial, they were found guilty and sentenced to hang.

The case for the prosecution was as follows. Dorothy Durent had left her child in charge of Amy Duny while she left home, but had requested Amy not to give the child suck, which, upon the mother's return, Amy confessed that she had done. The mother's anger was met by a veiled threat which Amy made as she departed. That night the baby fell into strange fainting fits. The doctor, Dr. Jacob, advised Mrs. Durent to hang the child's blanket in the chimney corner all day, and whatever she found in it, to put in the fire. A toad, one of the common forms taken by witch's familiars, hopped out of the blanket and she cast it into the fire. The toad exploded with a loud report, but left behind no ashes. The next day Amy was found to be suffering from burns on her face and body, although there was no fire in the house. She claimed that Mrs. Durent was the cause of the burns.

Elizabeth Durent was next stricken, for Amy had made the statement that Mrs. Durent should live to see some of her children dead and herself on crutches. After the burning of the toad, the baby recovered, but Elizabeth, aged ten, complained of Amy Duny and was taken sick in the same manner as had been the baby. Amy came to the house with the excuse that she wished to give the child water, but she was thrust out

of doors. She then made the statement that the child would not live long. The child died the following Monday. According to Amy's curse, Mrs. Durent was forced to go on crutches, and she appeared in court on them. After the conviction of the witches, she was able to leave the court without them.

Elizabeth and Deborah Pacy were often stricken dumb, and lay in strange fits, during which time they understood what others said to them, but they could not speak or move. Elizabeth appeared in court under the influence of one of these fits. When Amy, during the trial, touched her, the child, although blindfolded, leaped up and scratched Amy until the blood came. Deborah was so ill that her life was despaired of and she did not appear in court. Samuel Pacy, father of the girls, testified to the fits of his children, declaring that at the time of the seizures, the girls coughed up crooked pins and, at times, two-penny nails. He stated that Amy Dury had been denied the privilege of selling herring, and that when denied this privilege, she had gone away grumbling things not understood. At the time of her departure, the child, who was suffering of lameness and who had asked to be carried out of doors, was taken with a violent fit. The child had cried out against Amy, and the father had the supposed witch put in stocks for sorcery. Amy had been asked the reason of the child's distemper, but she had only replied that there should be done to it as had been necessary with her own child, that a tap should be used to feed it. This finally was done. The strange fits occurred in various forms for about two months. When given the New Testament to read, both of the children would fall into fits when they pronounced the name of Lord, Christ, or Jesus, but when they came to the name of Satan, or

Devil, they clapped their fingers on the books crying, "This bites, but makes me speak right well." The children said that Amy Dury had forbidden the use of the names of Lord, Christ, or Jesus. They often saw Amy Dury and Rose Cullender while they were in their fits and cried out against them, striking out as if the women were present. They were closely watched during the seizures and all pins and nails kept from them. Even their clothing was sewed on so they could not feign coughing up the pins that might otherwise be used, but the pins appeared regardless. They often chased imaginary mice, and once they had chased an imaginary duck across the floor, throwing whatever they caught into the fire, where it burst with a loud explosion.

Ann Baldwin swore to a bewitching similar to that of Ann Durent. Jane Backing, another victim, was too weak to appear in court. Diana Backing had also had similar fits of coughing up pins, and during her fits she protested against some person who was clearly not present, but who seemingly put pins in her hand, and once a lath nail. She frequently saw the two women then on trial. Mary Chandler gave an account of the bewitching of her daughter that was similar to those already reviewed.

Rose Cullender had been examined by Sir Edmund Bacon, Justice of the Peace, and a strange physical abnormality had been discovered. Such an abnormality was usually adjudged a mark of carnal contact with the devil, and was accepted as a definite proof of witchcraft. The deponent stated that Rose had seemingly tried to go to bed with her daughter, or at least her daughter had cried out against her. On one occasion she had said that she saw Rose and a black dog. It was at first feared that the children had been cunningly deceptive concerning

the witching and the fits, but the general opinion was "For admitting that the Children in truth bewitched, yet, said he (Mr. Serjeant Keeling), it can never be applied to the Prisoners, upon the Imagination only of the Parties Afflicted: For if that might be allowed, no Person whatsoever can be in safety, for perhaps they might fancy another Person who might altogether be Innocent in such matters." which would set a grave precedent.

Dr. Browne, of Norwich, "a Person of great knowledge; who after this evidence was given, and upon view of the three Persons in Court, was desired to give his Opinion what He did conceive of them:" He testified that in Denmark a great discovery of witches who used the same way of afflicting their victims had been made. He gave his opinion "That the Devil in such cases did work upon the Bodies of Men and Women, upon a Natural Foundations, (that is) to stir up, and excite such Humours superabounding in their Bodies to a great excess, whereby he did in an extraordinary manner afflict them with such Distempers as their Bodies were most subject to, as particularly appeared in these Children; for he conceived, that the swooning Fits were Natural, and nothing else but that they call the Mother, but only heightened to a great excess by the subtilty of the Devil, co-operating with the Malice of those which we term Witches, at whose Instance he doth these Villanies."

Experiments were then tried to see what effect the touch of the witches had upon the children. At the least touch of the two women, the children cried out. The court then had them blindfolded, but they still cried out upon being touched. There was one "ingenious Person" who objected, thinking that the children might be perpetrating a hoax on the court, and Lord Cornwallis, Sir Edmund Bacon, and Mr. Serjeant

Keeling, with others, took the children to the farther end of the hall, blindfolded them, and sent for the witches. The experiment was again attempted, and several besides the witches were asked to touch the children. The children cried out indiscriminately. These gentlemen then returned, declaring that the whole thing was an imposture. Mr. Pacy explained, however, that his daughter probably believed that the witch had touched her, for her understanding was clear during these fits. The girl bore out this assertion in testimony. Seemingly, the court was satisfied with this dubious explanation, for there is no other mention of the experiments or the results.

John Soam of Leystoft then testified that at harvest time one of his three carts had touched the window of Rose Cullender's house in passing. When the carts were returning from the field, only by hard work could the men force this one through the gate, although it did not touch the gate on either side. It was also with difficulty that the cart was dragged across the yard. Robert Sherringham, testified that two years before an axle-tree of his cart touched her house, and she had threatened that his horses should suffer. The horses, four in number, died a short time after. His cattle also died, as did his little new-born pigs. He himself had suffered a lameness in his limbs, and then was afflicted with lice that only by burning his clothing had he been able to rid himself of them. Richard Spenser said that he had heard Amy Duny say that the Devil would not let her rest until she was revenged on one Cornelius Sandeswell's wife, Ann, who had offended her some seven or eight years previous. Amy, upon meeting Ann one day with some geese, had told her that if she did not fetch her geese home,

they would all be destroyed, which came to pass in a few days. Amy was also said to have predicted that a certain new chimney would fall. The newness of the chimney had offset worry, yet the chimney fell in a short time. Ann had also stated that her brother, who was a fisherman, had sent her a firkin of fish at her request. Upon going down to get the fish, she had desired Amy to go along to help carry them home. Amy had replied, "She would go when she had it," and Ann had gone to the shore without her. There was no firkin of fish, however, for the boatmen said they had not been able to keep the firkin in the boat. It had fallen into the sea. They thought that it was gone to the Devil, for they had never seen the like before. This firkin was the only goods in the boat that had acted in an unruly manner.

"This was the Substance of the whole Evidence given against the Prisoners at the Bar; who being demanded, what they had to say for themselves; they replied, Nothing material to anything that was proved against them. Whereupon, the Judge in giving his direction to the Jury, told them, that he would not repeat the Evidence unto them, least by so doing he should wrong the Evidence on the one side or on the other. Only this acquainted them, That they had Two things to enquire after. First, Whether or no these Children were Bewitched? Secondly, Whether the Prisoners at the Bar were Guilty of it?

"That there were such Creatures as Witches he made no doubt at all; For First, the Scriptures had affirmed so much. Secondly, The Wisdom of all Nations had provided Laws against such Persons, which is an Argument of their confidence of such a Crime. And such hath been the Judgment of this Kingdom, as appears by that Act of Parliament which hath proved Punishments proportionable to the quality of the



Offence. And desired them, strictly to observe their Evidence; and desired the great God of Heaven to direct their Hearts in this weighty thing they had in Hand: For to Condemn the Innocent, and to let the Guilty go free, were both an Abomination to the Lord.

"This was upon Thursday in the Afternoon, March 13, 1664.

"The next morning the three children appeared with their parents before Hale at his lodgings. They were all restored to health, but Susan Chandler, who appeared thin and wan. They had all been restored in less than a half hour after the witches were convicted. They had slept well and had felt no pain, except Susan, who had a pricking of pins in her stomach.

"In Conclusion, the Judge and all the Court were fully satisfied with the Verdict, and thereupon gave Judgment against the Witches that they should be hanged.

"They were much urged to confess, but would not."

"That Morning we departed for Cambridge, but no Reprieve was granted: And they were Executed on Monday, the Seventeenth of March following; but they Confessed nothing."<sup>26</sup>

This, in brief, is a summary of the account given by Hale in the Tryal of Witches. No changes have been made in the sequence of the events as he gives them, and those passages have been quoted that might be of value in judging Browne's importance in the trial and Hale's attitude toward the case. It would be well to remember that four of the eight witnesses were called after Browne's testimony; that Browne

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26. Matthew Hale, A Tryal of Witches, included in Pleas of the Crowne, or A Methodical Summary of the Principal Matters relating to that Subject, fifth edition, printed by J. N. Assignee, London, 1716.

dealt only with the possibility of witchcraft being considered as an accepted fact, not with the evidence upon the particular case at hand. He did not contribute anything that seemed in any way to have affected the proceedings. The court must have been quite favorably inclined toward a belief in the guilt of the women, for even after the failure of the blindfold test suggested by an "ingenious person" and carried out by Lord Cornwallis, Edmund Bacon, and Serjeant Keeling, the very weak explanation made by Pacy that his daughter believed the witches to have touched her seems to have overridden whatever other construction might have been placed upon the failure of the test. A great deal of supplementary evidence concerning incidents connected with the malicious powers of the women, but not dealing directly with the case in hand, had followed Browne's testimony. And, in spite of Hutchinson's statement, there is nothing hesitant or reluctant in Judge Hale's directions to the jury, for he does not declare against witchcraft, as Hutchinson and Gosse would have us believe, nor does he dwell upon the grave responsibility of the jury if they convict the two women on such a charge. Hale did not sum up the evidence, but not because he was afraid to do so because the effect might be deleterious to a wanted verdict of Not Guilty. In fact, he had no doubt that there were witches,<sup>27</sup> for Scripture proved it, and it was further confirmed by the fact that all nations had made against it. His last

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27. The trial at Bury St. Edmunds is not the only one in which Hale had given a sentence for execution in a case of witchcraft. C.L'Estrange Ewen, in Witch Hunting and Witch Trials, says that in the Home Circuit records for 1657, the third from the last entry is a record of the conviction and execution of Judith Sawkins under a Judge Hale. This was about seven years before the trial in which Browne figured.

injunction, to remember that to "condemn the innocent and to let the guilty go free, were both an abomination to the Lord," is hardly one that can be said to indicate partiality ~~by~~ either side. It is comparable to the final statement that any judge might give to a jury before turning a case over to it.

Hutchinson's account, except for the section indicated as omitted, I quote verbatim. The report is in the form of a dialogue between a Clergyman, a Scotch Advocate, and an English juryman. The advocate has just given a resumé of the first report of the trial, a resumé that is correct in its account of what happened. The clergyman then proceeds to comment upon it.

Clerg. I have as true an Honour and Reverence for that great and good Man [Justice Hale] as you have; but we must not so far forget the common Frailty of our humane Nature, as to think it strange for a great Man to be once mistaken. And since an Account of the Tryal of those two poor Women was printed in his Lordship's Lifetime, for an E Appeal to the World, I will take the Liberty to make some Remarks upon it.

In the first place, it seems to me, that there are several Signs of a great Zeal and Eagerness in the Prosecutors. They laid thirteen several Indictments against them. By that means they gave in Evidence of Things that had been said and done long before, at distant Times and Places; and when they were laid together they supported one another, and made a greater Appearance of Guilt than they had at the several Times when they were done.

[Hutchinson then includes the account of all the testimony and the trial by blindfolding before giving the testimony of Sir Thomas Browne.]

Adv. Sir Thomas Browne of Norwich, the famous Physician of his Time, was in Court, and was desired by my Lord Chief Baron to give his Judgment in the Case: And he declared, That he was clearly of Opinion, that the Fits were natural, but heighten'd by the Devil, cooperating with the Malice of the Witches, at whose Instance he did the Villanies. And he added, That in Denmark there had been lately a great discovery of Witches, who used the very same way of afflicting persons, by conveying Pins into them.

Cler. This Declaration of Sir Thomas Brown's, could not but much influence the Jury; and I count it turned back the Scale, that was

otherwise inclining to the Favour of the accused Persons. And with Submission, I think it should not have been said; For this was a Case of Blood, and surely the King's Subjects out not to lose their Lives upon the Credit of the Books from Denmark. Besides this was an Indictment upon a Crime, concerning which it is a very hard Question, Whether ever any one single Person was guilty of it, as it stood there charg'd. There were as many probable Signs of it in this Case, as had ever been in any; the Witnesses, the afflicted Parties, the suppos'd Witches, and very much of the Fact, were all before them. The Eyes of all curious Persons were upon this famous Court, in hope of a Decision that might have put the Matter beyond Controversy; but instead of this, we meet with a vehement Prosecution, and a perplex'd Case. Some declare their Opinions one way, and some another. The Judge puts it off from himself as much as he can, and desires Sir Thomas Brown's Opinion; which very Request supposes much Difficulty and Uncertainty. Sir Thomas decided the Case, not with the Addition of any argument, but with the Authority of some Books from Denmark. Now this leaves us as far from Satisfaction as we were; for those Books from Denmark cannot be a sufficient Warrant for so great a Judgment. Perhaps these Tryals in Denmark were in a superstitious Time, and before a Judge that had not been used to those Cases. Perhaps, afterward, when they had Time to consider what they had done, they might be as much concern'd as they were for such Mistakes in New-England. And if those Danish Witches were the Four that were burnt at Koge two Years before that Time, I must add, that the Case hath been answered since by Bekker; and tho' all the Notions in his Books are far from being right, yet as far as I can judge by his Abridgment of that Case, it seems to have been a very rash Prosecution, and an injudicious Sentence.

Adv. But what did my Lord Chief Baron add beside his desire to Sir Thomas Brown to give his Judgment? And how came he to be satisfy'd so far as to condemn them?

Clerg. There was the Spectre Evidence, and Pins and Nails; and if the Witnesses spake Truth, there was a Diabolical Interposition in some of the Facts; and this makes such an Appearance of fixing the Guilt upon the Persons accus'd, as few have seen thorough it, till they have had much Experience of its Mischief; and seldom till they found those kind of Proofs used against their own Relations, or Persons of the better Rank, whom they knew to be Innocent.

This make that great and good Man doubtful; but he was in such Fears, and proceeded with such Caution, that he would not so much as sum the Evidence, but left it to the Jury, with Prayers, That the great God of Heaven would direct their Hearts in that weighty Matter.

But Country People are wonderfully bent to make the most of all Stories of Witchcraft; and having Sir Thomas Brown's Declaration about Denmark for their Encouragement, in half an Hour they brought them in Guilty upon all the Thirteen several Indictments.

After this my Lord Chief Baron gave the Law its Course, and they were condemn'd, and died, declaring their Innocence. And for my part, I cannot but believe their dying Words, and the strong Arguments of their Side, rather than the Presumptions and conjectural Proofs that there were against them. I am much of the same Mind with the Gentleman

and Sarjeant Keeling, who was afterward Lord Chief Justice, and whose Judgement I cannot count inferior to Sir Thomas Brown's; and with the Alteration of a Word of two, I will conclude this Case with his Opinion, which he declared plainly in open Court. Said he, Admitting that the Children were in Truth bewitch'd. (I would rather say, Admitting that there was an Interposition of invisible Agents) Yet it could never be applied to the Prisoners, upon the Imagination only of the Parties afflicted; For if that might be allow'd, no Person whatsoever could in Safety; for, perhaps, they might fancy another Person, who might be altogether innocent in such Matters.<sup>28</sup>

The discrepancy between the interpretation made by the Clergyman in Hutchinson's account and the report authorized by Matthew Hale is easily seen. According to the Tryal of Witches, Browne was not called upon by Hale to decide the merits of the case. There is no real evidence that he was in court for that purpose, or that his testimony was given because Hale found himself in a quandary, or because he hated the turn the case seemed to be taking. Hale did not relinquish his own opinion for that of the "learned doctor", for there is no evidence that Browne's testimony swayed the case either way. The blindfold tests were made after Browne's deposition had been taken, and four more witnesses were later called to give evidence concerning the powers and practices of the two women. At no time is Browne or any part of his testimony referred to during the course of the trial. Neither is there any evidence that his statement concerning the cases of witchcraft in Denmark determined in any way the course of the English law in Bury St. Edmunds. Certainly Gosse is wrong and the "blot" on Browne's name may assume lesser proportions than Gosse imagined. It is unfortunate, of course, that Browne was connected with the trial, that he could not have stood out staunchly against witchcraft as a man ahead of his age,

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28. Francis Hutchinson, An Historical Essay concerning Witchcraft, with Observations upon Matters of Fact, Tending to clear the Texts of the Sacred Scriptures, and confute the vulgar Errors about that Point, and also Two Sermons: One in Proof of the Christian Religion; the other concerning Good and Evil Angels. The Second Edition, with considerable Additions, London, 1720.

but he was a religious man and a product of his century.

In his adherence to a belief in witches, Browne was not alone, for a goodly number of men of his day professed their credulity. Francis Bacon believed both in spirits and witches.<sup>29</sup> In 1596, Thomas Lodge held it to be a sin to seek cures by witches or enchanters, but admitted that one could thwart the power of bewitchment by pulling out the pins from a waxen image, if such an image were found.<sup>30</sup> Joseph Hall did not doubt the existence of witches, for their existence had been proved by the various stories of the ejection of the devil through prayer and fasting.<sup>31</sup> Walter Raleigh, Dr. Cudworth,<sup>32</sup> Jeremy Taylor,<sup>33</sup> Nicholas Culpeper,<sup>34</sup> Thomas Fuller,<sup>35</sup> Kenelm Digby,<sup>36</sup> Robert Burton,<sup>37</sup> James Howell,<sup>38</sup> Joseph Glanvil,<sup>39</sup> Dr. Henry More,<sup>40</sup> Dr. Meric Casaubon,<sup>41</sup>

29. Francis Bacon, Advancement of Learning, p. 144; Natural History, Cent. IX, sec. 859.

30. Thomas Lodge, "The Devil Conjured," 15 April, 1596.

31. Joseph Hall, "Autobiography", Works, 1837.

32. Ralph Cudworth, The True Intellectual System of the Universe, Book I, chapter iv, sec. 15.

33. Jeremy Taylor, Holy Living.

34. Nicholas Culpeper, The English Physician Enlarged, p. 2.

35. Thomas Fuller, The Profane State, pp. 293 ff.; Sermons, "Comment on Christ's Temptation to Presumption," Matthew 4:5, II, 49.

36. Kenelm Digby, "Observations", prefixed to the Cassell edition of the Religio Medici, p. 155.

37. Robert Burton, The Anatomy of Melancholy, pp. 84, 93, 94, 131.

38. James Howell, Familiar Letters, To Endymion Porter, Febr. 3, 1646; To Endymion Porter, Febr. 20, 1646; To Sir Edward Spencer, Febr. 20, 1647.

39. Joseph Glanvil, Philosophia Pia, p. 27; Sadducismus Triumphatus; Some Philosophical Considerations touching Witches and Witchcraft.

40. Dr. Henry More, He joined forces with Glanvil in the Sadducismus Triumphatus. The book went through five editions after its publication in 1666, the last edition appearing in 1672.

41. Dr. Meric Casaubon. He answered John Wagstaff's "The question of Witchcraft Debated," 1669, 1671, 1711, with his book, "Credulity and Incredulity", 1670.

Robert Boyle,<sup>42</sup> Richard Baxter,<sup>43</sup> Sir Matthew Hale,<sup>44</sup> Nathaniel Homes,<sup>45</sup> John Evelyn,<sup>46</sup> - these are but a few of the names of those who believed in a philosophical explanation of witchcraft and who did not question the existence and power of witches.<sup>47</sup> Even the skeptic, John Selden, in

42. Robert Boyle gathered material concerning witch trials for Glanvil's book, Sadducismus Triumphatus. He thought Glanvil's book would do "a good service to religion." In 1678, he declared his belief in the performance of the devil at Mascon.

43. Richard Baxter, Saints Everlasting Rest, p. 119.

44. Sir Matthew Hale, cf. The Tryal of Witches.

45. Nathaniel Homes, Doemonology and Theology, The first, the Malady . . . The Second, the Remedy, 1650. Homes was minister of S. Mary Stayning's.

46. John Evelyn, Diary, entry for Febr. 3, 1692-1693. "Unheard-of stories of the universal increase of Witches in New England; men, women and children devoting themselves to the devil, so as to threaten the subversion of the government. At the same time, there was a conspiracy amongst the negroes in Barbadoes to murder all their masters, discovered by over-hearing a discourse of two of the slaves." There is no indication that Evelyn regarded either of these conspiracies as less possible of concurrence than the other.

47. Joseph Addison, in a later period, takes a hardly less skeptical view than Enowne. In the Spectator for July 14, 1711, he has: "There are some opinions in which a man should stand neuter . . . . It is with this temper of mind that I consider the subject of witchcraft . . . . I endeavor to suspend my belief till I hear more accounts . . . . I believe in general that there is, and has been, such a thing as witchcraft; but at the same time can give no credit to any particular instance of it."

Even Samuel Johnson was not without interest in the possibilities of witchcraft. In Boswell's Tour to the Hebrides, pp. 31-2, Everyman's edition, we have: "Witchcraft was introduced. Mr. Crosbie (advocate) said, he thought it the greatest blasphemy to suppose evil spirits counteracting the Deity, and raising storms, for instance, to destroy his Creatures. - Johnson. 'Why, sir, if moral evil be consistent with the government of the Deity, why may not physical evil be also consistent with it? It is not more strange that there should be evil spirits, than evil men; evil unembodied spirits, than evil embodied spirits. And as to storms, we know there are such things; and it is no worse that evil spirits raise them, than that they rise.' - Crosbie. 'But it is not credible, that witches should have effected what they are said in stories to have done.' -Johnson. 'Sir, I am not defending their credulity. I am only saying, that your arguments are not good, and will not overturn the belief of witchcraft. -(Dr. Fergusson said to me, aside, 'He is right.')

-And then, sir, you have all mankind, rude and civilized, agreeing in the belief of the agency of preternatural powers. You must take evidence: you must consider, that wise and great men have condemned witches to die.' -Crosbie. 'But an act of parliament put an end to witchcraft.'

-Johnson. 'No, sir; witchcraft had ceased; and therefore an act of parliament was passed to prevent persecution for what was not witchcraft. Why it ceased, we cannot tell, as we cannot tell the reason of many other things.'"

his Table Talk, while he does not commit himself to a belief in them, at least sees no real reason for not having laws against the manifestation of assumed powers of witchery. "The law against witches does not prove there be any; but it punished the malice of thos people that use such means to take away men's lives; one should profess that by turning his hat thrice, and crying buz, he could take away a man's life, though in truth he could do no such thing, yet this were a just law made by the State, that whosoever should turn his hat thrice, and cry buz, with an intention to take away a man's life, shall be put to death."<sup>48</sup> This is not belief, but it does not show any zeal toward destroying the laws against it, nor even of teaching its impossibility. As far as belief in witchcraft goes, Browne was in good company.

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48. John Selden, Table Talk, p. 186.



## APPENDIX B

## SIR THOMAS BROWNE'S REFERENCES TO HIS CONTEMPORARIES

Much can be learned from a study of Browne's references to his contemporaries, for not only do we get the impression from such a study that he was a widely read man, but we discover that a great number of the vulgar errors that he discussed were often referred to and considered by men who were, in many cases, better known than Browne himself. The men living and writing during the late sixteenth and the early and middle seventeenth centuries were a versatile group. They produced a mass of material written on almost every conceivable subject. A great part of what they wrote was of so little importance as now to be all but forgotten even to the historians and the students of that period. Much of it had no intrinsic literary value, and its subject matter has long since been superseded. The productions of these men were not epoch-marking, for they represent a transitional period in thought during which much that was both medieval and modern was blended with little discrimination.

It has been almost impossible to trace many of the men to whom Browne refers, although a large number of the authors read and commented upon by him were, at that time, not only prominent, but leaders in the various fields of thought. Many of them have been buried under the errors of their science and the faults of their own intelligence. They wrote at a time when men were breaking away from the hold authority had upon thought. But when they worked independently, they were frequently in error. Nevertheless, they were an interesting, if somewhat unimportant group, and a knowledge of them is necessary in order to relate Sir Thomas Browne to his age and to place a proper evaluation

upon his works.

The list of men to whom Browne referred and who were contemporary with him is incomplete because of the difficulty met in tracing many of the names. Oftentimes the information given concerning the men had also been found incomplete, but it represents all that was available. I have included in the list the names of a few men who do not belong to the period, but of whom Browne is accused of having been ignorant, such a name is that of Gesner, who immediately preceded him. Except for those few, I have given only those men who were alive at the turn of the century or who did their work during its course.

Browne knew the ancients and had read his Aristotle and Galen with care, although not always with acceptance. No man of the period was considered well educated until he knew the old masters. But Browne did not stop with such authorities. We find evidence in his writings of a wide knowledge of contemporary publications, wide even according to our standards. This is doubly evident when we consider that private libraries were then unknown except in the homes of the more learned and wealthy, that books were not cheap, that there was no advertising system whereby new editions and publications were brought quickly to the attention of the reader, that news traveled slowly, and that the sale of books was centered mostly in London. In fact, most of Browne's books probably came from London, for in 1668 he wrote to his son Edward who was then journeying on the continent, "Buy no bookes, what are small and portable if any, for by London wee can send for such bookes as those parts afford."<sup>1</sup> Foreign originals were usually not carried into England until they had circulated some time on the continent, and translations

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1. Letters, 34. To Edward, 22 Sept., 1668.

came even later. Movements of thought advanced much more slowly than they do now, and held their adherents in a firmer grasp. New ideas were met with distrust, and their religious, as well as their scientific and philosophical meaning was long pondered. Men remained "authorities" long after they should have been discarded, and the century was more consistent in its allegiance to these authorities than in its choice of them. Browne, however, often shows a marked tendency to accept the newer ideas even before the old were definitely disproved.

Several pertinent observations can be drawn from the list that follows.

1. But few of the references quoted from Browne are taken from the Religio Medici, the Urn Burial, The Garden of Cyrus, and the Christian Morals; the books that are known to the majority of readers. This might account for the conclusion so often made that Browne was not well versed in the thought and movements of his age.
2. The usual scholar of the century was versatile and explored a number of fields into which he dipped with varying degrees of success. A similar trait is plainly discernable in Browne.
3. Numerous "modern" discoveries were made but were not followed up because of the diversified interests of the discoverer. He did not apply himself seriously to any single line of research, or even to related fields, and often failed to see the significance of his conclusions or the results of his experimentation. Much of the knowledge that could have been available for use during the period was to lie dormant for one or two centuries until someone again discovered and used it. Browne's discovery of the circulatory system of the earthworm may serve as an example of this.

4. Intermingled credulity and skepticism, ignorance and knowledge, acceptance from authority and tradition and from independent determinations are found in many of the men listed. We have seen these same paradoxes in Browne.

5. New books, particularly those published after 1660, seem to have come with relative quickness to Browne's attention, for soon after their publication he makes mention of them in his letters to Edward or in the papers now collected and known as the Miscellany Tracts. Browne was not a worshipper of the printed page, nor was he without enough curiosity to make him interested in all new ideas that might have a possibility of contributing to more accurate and more comprehensive knowledge.

Attention should also be called to the book lists given in Appendix C in connection with the interpretation of Appendix B. The lists are for the most part made up of publications of the seventeenth century. It would be well to notice that Browne owned many of the books mentioned in Appendix B; an indication that he must have had first hand knowledge of their contents and have known their authors by reputation at least.

Section "a" of each item contained in the list gives the name and date of the author and his nationality, as well as some indication of the fields in which he worked. Where a wider knowledge of his particular beliefs and endeavors would help to give a greater understanding of the period and aid in an explanation of the paradoxical interests and credulities of Browne, I have included briefly material that might, at a glance seem irrelevant, but whose significance is germane to the broad purpose of this study. I have not attempted to emphasize any particular belief of any of the men included, or to ferret out any odd facts that

might parallel passages in Browne's works. It has been my purpose to avoid the tendency to eulogize or to condemn any single accomplishment, or to point out perspicuity or error. I have made no special effort to match Browne's "vulgar errors" and interests as they appeared in his works with similar vulgar errors and interests that appeared in the books of contemporary writers merely to prove a point.

Section "b" indicates the various places in which references made to these authors are to be found in Browne's works, and in what connection he mentions them.

The significance that lies in the relationship between the "a" and "b" parts of the list will readily be seen. Men in the foremost rank of the new thought had often within their pages considerations of the same errors Browne gives his attention to; in fact, they often act as sources and authorities for his discussions. The varied interests of the men must not be overlooked, for while many of them were greater scientists and thinkers than Browne, they also took "all knowledge" to be their province.

## PHYSICIANS, SURGEONS, ANATOMISTS

- (a) PROSPER ALPINUS, 1553-1617. Italian botanist and physician.  
 (b) V.E., VI, viii, 225. Reference to Alpinus' medical treatise on Egyptian medicine.
- (a) GERONINO FABRIZIO AQUAPENDENT, 1537-1619. Italian anatomist and surgeon.  
 (b) Letter to Edward, March 27, [1679], in regard to the comparative structure of the larynx of the various animals. Letters, 114.  
 Letter to Dr. Henry Power, [1646]. Recommended as an authority to be studied. Letters, 277.  
 To a medical correspondent no date concerning the cure of a tumor. Letters, 411.  
 V.E., III, xxviii, 303. Held the chicken to be developed from the germ of the egg.
- (a) THOMAS BARTHOLIN (BARTHOLINUS), 1616-1680. Danish physician.  
 (b) To Edward, June 14, [1676]. In regard to the dissection of a dolphin. Letters, 69.  
 To Edward, June 16, [1676]. D. J. Beale, Robert Boyle, and Bartholinus mentioned with regard to the "shining flesh of a veal". Bartholinus had mentioned this in his medical tracts. Letters, 71.  
 To Edward, 7 Aug., [1676]. Discussion of the skin. Letters, 82; 83.  
 To Edward, March 7, [1676-7]. Reference to Bartholoni Centuria historia virgesima titues Anatomie Gulonis. Letters, 85.  
 To Edward, April 8, [1677]. Reference to Centuries of rarer Observations, concerning a ball taken out of the stomach of an ox. Letters, 87.  
 To Edward, Feb. 24, [1678-9]. Suggests to Edward that he read Bartholinus. Letters, 108.  
 To Edward, May viii [1678]. Observed as had Columbus, a heart without a pericardium. Suggested a method of getting a leech out of the ear. Letters, 93-4.  
 To Edward, July 6, [1678]. On the medulla apinalis. Letters, 98.  
 To Edward, Sept. 16, [1680]. Suggests to Edward that he read Bartholinus de praegnantium medicina. Letters, 188.  
 To Henry Power, [1646]. Recommended as an authority. Letters, 277.  
 To Henry Power. 15 Sept. [1648]. Recommended as an authority on anatomy. Letters, 283.  
 V.E., III, xxiii, 274. The unicorn's horn is but the tooth of a narwhale.
- (a) BRICE BAUDERONI, 1540-1623. French physician.  
 (b) To Dr. Henry Power, [1646]. Recommended as an authority to be studied. Letters, 277.
- (a) DANIEL BECKER (BECKHERUS), 1594-1655. German physician.  
 (b) V.E., II, iii, 126. Account of the use of loadstone in surgery. From the De cultrivoro Prussiaco, 1636.
- (a) LAURENTIO BELLINI (BELLINIS), 1643-1704. Italian anatomist and physician.  
 (b) M.T., 199. The best 'acustick' instruments contrived for the advantage of hearing.

- (a) BASIL BESLER, 1561-1629. German botanist and pharmacist.  
 (b) M.T., 233. Refers to his Hortus Eystentensis.

- (a) LODEWIJK VON BILS (LEWIS DE BILLS), 1624-1670. Dutch anatomist and author of anatomical works.  
 (b) To Edward, September 22. "Wee have not heard a long time of Lewis de Bills, his practice of preserving bodyes." Letters, 35.

- (a) GERARD BLASIUS, died 1682. Flemish physician. Published Latin treatises on anatomy and medicine.  
 (b) To Edward, July 14, [1676]. Reference to the "lately published" Blasii Observationes Anatomico-practicae, published 1674. Letters, 77.

- (a) NICOLAS DE BLEGNY, 1652-1722. French surgeon and writer. He became physician to the king in 1687.  
 (b) To Edward, June 16, [1676]. "You may take notice of a booke writt by Monsr. de Blegny, chirurgion to the Queen of France, of newe & curious observations concerning the French disease, translated by Dr. Walter Harris, in 8vo." Letters, 72.

- (a) GIOVANNI ALFONSO BORELLI, 1608-1879. Italian physician and savant.  
 (b) To Edward, December 26, [1681]. On muscles. Reference to De Motu Animalium opus posthumum, Romae, 1680-1. Letters, 232.  
 To Henry Power, June 8, [1659]. Natural sensation in plants. Letters, 294.

- (a) GIULIO CASSERIO (CASSERIUS), 1556-1616. Italian physician. Student of anatomy and physiology.  
 To Edward, June 14, [1676]. Recommends his de dentibus, Letters, 71.  
 To Edward, March 27, [1679]. Comparative structure of the larynx of different animals. Letters, 114.

- (a) MOYSE CHARAS, 1618-1698. French physician and Protestant. Taught in Royal College of Paris until forced to emigrate. Later court physician to Charles II of Spain.  
 (b) To Edward, May viii, [1678]. Browne received book which he has not yet read. Reference probably to The Royal Pharmacopoea Galenical and Chymical, Faithfully English'd from the French, London, 1678. Letters, 93.

- (a) WALTER CHARLETON (CHARLTON), 1619-1707. English physician. Physician to Charles I and Physician in Ordinary to Charles II. One of the first elected fellows to the Royal Society in 1662.  
 (b) To Christopher Merrett, May 8, [1669]. The "crackling teal" as mentioned in Charleton's Onomasticon, Letters, 381.  
 To Edward, November xi, [1680]. "I have perused D.C. oration wch is good, butt long." Enquiries into Human Nature, in vi Anatomic Praelections in the New Theatre of the Royal Colledge of Physicians in London, London, 1680. Letters, 194.

To Edward, December 13, [1680]. Reference to "Dr. Charles Orat." Letters, 199.

To Edward, Jan. xii, [1680-1]. "D.C. in his oration hath butt 8 pages wch are close to the bussinesse and those at the end . . ." Letters, 206.

(a) WILLIAM CROONE, 1633-1684. First registrar of the Royal Society. Author of De Ratione Motus Muscularum, London, 1664. Reprinted at Amsterdam, 1667.

(b) To Edward, Octob. 2, [1679]. Reference to Dr. Croone's book on muscles. Letters, 151.

To Edward, Febr. 27, [1679-80]. A sick friend has been under the care of that "honest worthy gentleman Dr. Croone . . ." Letters, 172.

(a) GEORGE ENT (ENTS), 1604-1698. English physician. Wrote in defense of Harvey's circulation of the blood.

(b) To Edward, Jan. 19, [1679-80]. "Sir George Ent's booke lately printed in answer to Dr Thurston; . . ." whose book was full of paradoxes in physic. The book was Sir George Ent's Ἀντιδιὰ Τριβή, sive animadversiones in M. Thurstonie M.D. distribam de Respirationis usu primario, London, 1679. Thurston's book was published in London, 1670. Letters, 171.

V.E., III, xiii, 229, the toadstone is not taken from the head of a toad but out of the mouth of a fish, "as was publicly declared by an eminent and learned Physitian." The learned physician is Sir George Ent.

(a) FRANCIS GLISSON (GLESSON), 1597-1677. English physician. Published Tractatus de Ventriculo et Intestines. Cui praemittitur alius, de partibus continentibus. London, 1677. . . . calls him "the most accurate of all anatomists which ever lived."

(b) To Edward, Feb. 24, [1678-9]. Reference to his "last work" which is probably the work mentioned above. Letters, 107.

(a) THOMAS GILSON, can find no dates. English physician. Published Anatomy of Human Bodies Epitomized, London, 1682.

(b) To Edward, Dec. 26, [1681]. The Anatomy had arrived at Norwich at 7 sh. six pence, "which is deare for an epitomie." Letters, 232.

(a) OBADIAH GREW, 1607-1689. English physician.

(b) To Edward, July 4, [1679]. "My service to Dr. Grew e. Letters, 139.

To Edward, June, [1681]. Edward Browne is often mentioned in Dr. Grew's book, Musaeum Regalis Societatis, or a Catalogue & Description of the Natural and Artificial Rarities Belonging to the Royal Society And Preserved at Gresham College. Made by Nehemiah Grew, M.D. London, 1681. Letters, 224.

To Edward, Febr. [1681-2]. The anatomy of the ostrich. Letters, 241.

To Edward, March [1682]. Subscription for a book by Dr. Grew. Letters, 252. Also May 29, [1682]. Letters, 261. And June 6, 1682. Letters, 265.



(a) SAMUEL HAFENREIFFER ( HAFENREFFERUS), 1587-1660. German physician and author of medical books.

(b) To Edward, 7 Aug. [1676]. Diseases of the skin. Reference to De cutis affectibus, Tübingen, 1630. Letters, 82.

(a) WILLIAM HARVEY, 1578-1657. English physician. Discoverer of the circulation of the blood. In 1628, published Anatomical Dissertation upon the Movement of the Heart. The discovery had been made in 1615. The theory was not demonstrated until the time of Malpighi, who, in 1661, discovered the capillary system which completed the necessary cycle by which the blood passes from the artery to the vein. It was not until Richard Lower, 1631-1681, that it was discovered that the blood in the veins was the same as that in the arteries, the change of color being due to the exposure of the blood to the air in the lungs. Dr. William Wotton in 1694 again called attention to this reason for the difference in color between the arterial and venal blood. Harvey's de Generatione was published in 1651. His knowledge as given in the book was insufficient for his generalizations, and he did not include in his theory all insect life which was thought to reproduce by equivocal generation. Harvey had earlier been made a fellow in the College of Physicians and in 1654 was chosen its president, an honor he refused. He had been a court physician since 1618.

(b) To Henry Power, [1646]. Recommended for study, especially the de Circul. Sang., which discovery Browne preferred "to that of Columbus." Letters, 277.

To Henry Power, 15 Sept. [1648]. Recommends that he read Harvey's book on the circulation of the blood. Letters, 283.

To Henry Power, 28 Aug., [1649]. Harvey cautiously comments on the cessation of the heart beat of insects during the winter season. Letters, 285.

To Henry Power, 8 June [1659]. Discusses Harvey's omne ex ovis theory. Also the natural sensation in plants. Letters, 294.

To Edward, May 3, [1676]. Commends De Generatione, "an excellent peece and full of observations." Letters, 68.

To Edward, Dec. 13, [1680]. Refers to the burning of the books given by Dr. Harvey to the Oxford Library. Letters, 199.

V.E., III, xxii, 270. The value of iron in the diet of an ostrich.

V.E., xxviii, 304. Reference to De generatione, "so strongly erected upon the two great pillars of truth, experience and solid reason."

H.T., 322. The shell of an egg is hardened before it is laid.

G. of C., 65. Men without issue have written excellently of generation. Dr. Harvey is not mentioned by name, but the implication is hardly questionable. Dr. Harvey had no children.

(a) EDWARD JORDAN, 1569-1632. English physician. He wrote regarding the oftentimes successful results of medical formulae, or charms, because of the psychological effect of the formula on the patient rather than its supernatural virtue.

(b) To Edward, April 28, [1669]. Mentions having made a note from Dr. Jordan's book of mineral waters and baths. Letters, 51.

To Edward, June 25, [1669]. Mentions the same note. Letters, 53.

V.E., III, xxi, 262. Dr. Jordan, and his book on Mineral waters, does not believe that air feeds the flame.

V.E., VI, xii, 250. Mentions Dr. Jordan's discourse on mineral waters.

(a) FORTUNIO LICETI (LICETUS), 1577-1657. Italian physician and professor of philosophy and medicine. A good example of the "versatile" scientist of the seventeenth century. He has a few interests that are similar to those Browne includes in his Vulgar Errors.

(b) V.E., II, iii, 114. The attraction of the magnetic needle.  
 V.E., II, v, 156. Discovery of the imposture of an Indian stone.  
 Quotes from de quaesit. per Epistolas and de lapide Bononiensi.  
 V.E., III, xxi, 258, 267. Denied that the chameleon lives on air.  
 V.E., V, iii, 94. Disputes that the grasshopper lives on dew.  
 V.E., VII, xiii, 298. In a marginal note, Keynes attributes one of Browne's comments on the death of Aristotle to Licetus' de quaesitis epist.

Branyston Urns, 57. Concerning the inscriptions found on the urns.

(a) MARTIN LISTER, 1638-1712. English physician. A member of the Royal Society. In 1709 he was appointed physician to Queen Anne.

(b) To Edward, June xii, 1682. An account of a monstrous animal vomited up and observed by Dr. Lister contained in the "philosophicall collection Transactions of the Royal Society of Last March 1682." Letters, 263.

To Edward, Sept. [1680]. Lister's table on spiders. Letters, 182.

(a) ANTON VAN LEEUWENHOEK, 1632-1723. Dutch microscopist. He made good observations with the microscope, although his work was not followed up until Müller in 1773.

(b) To Edward, December 9, [1679]. Reference to the "last transaction" of the Royal Society which contained an account of a "vast number of little animals in the melt of a cod with liquer wch runnes from it, . . . & computeth them they much exceed the number of men upon the whole earth at one time . . ." Letters, 163.

(a) RICHARD LOWER (1631-1691) English physician and physiologist. He was a member of the Royal Society. His chief contributions to science related to the heart and the circulation of the blood. He discovered that blood transfusions were possible. He was a much younger man than Browne and most of his work was done during the latter part of Browne's life.

(b) M.T., 309. "Dr. Lower hath also writt well de pericardio. And if hee hath not observed whether the center therein being heated and a litle evaporated will coagulate and gellie like that from blistering plasters in the skinne, you may trie it."

To Edward, Dec. 20, [1677]. Refers to Lower's de corde. Letters, 1901.

To Edward, May 22, [1679]. Dr. Lower's book de corde is dedicated to Dr. Millington, a friend of Edward's. Letters, 138.

To Edward, June 7, [1681]. Dr. Lower and Edward were acting physicians for Mr. Deane Astley. Letters, 226.

(a) JOHN MAYOW, 1643-1679. English physiologist and chemist. Made the discovery of oxidation in the body, and held the source of the body heat to be in the muscles. The idea was dormant until Helmholtz, 1821-

1894. Mayow also made the discovery of the double articulation of the ribs with the spine and held that the heart could not be dilated by the blood fermenting in its cavity as was then commonly believed.

(b) To Edward, Decemb 21, 1668. Refers to the publication of Mayow's de respiratione et Rachitide newly come out. Speaks of Mayow to Edward as "your friend". Letters, 42.

To Edward, Decemb 23, [1668]. Mentions the same book again. Letters, 45.

(a) CHRISTOPHER LOVE MORLEY (DR. LOVE) cannot find date English physician. De morbo epidemico, 1678 et 1679, narratio. London, 1679.

(b) To Edward, August 22, [1680]. Acknowledgement of Love's book sent by Mrs. Feltham. Letters, 178.

To Edward, August 22, [1680]. The book by Love has been read. Letters, 179.

(a) GIROLAMO MERCURIALE (MERCURIALIS), 1530-1606. Italian physician. Hardly a contemporary of Browne. Burton, Anatomy of Melancholy, p. 434, mentions his regard for the emerald for medicinal purposes, as it pacified the affections of the mind. Cf. the use of precious stones in medicine, Chapter IV.

(b) To Edward, 7 Aug., [1676]. Refers to a book on the skin written by Mercurialis, probably his Tractatus varii de Re Medica, published 1618. Letters, 82.

V.E., III, 1, 181. In a discussion on whether elephants lie down.

V.E., V, vi, 101. On the pictures of Jews at their feasts.

V.E., VII, xviii, 325. On the story of Milo who had the strength to carry a bull.

(a) DR. CHRISTOPHER MERRETT. Cf. "Correspondence" in Letters, pp. 361-383.

(a) DR. JASPER NEEDHAM, 1622-1679. English physician.

(b) To Edward, Octob. 6, [1679]. Mr. Colt, a friend of Prince Rupert, had seen Edward and Dr. Needham together. Letters, 152.

To Edward, Novemb. vii, [1679]. Mentions death of Dr. Needham, Letters, 156.

To Edward, Nov. 24, [1679]. Another reference to the death of Dr. Needham. Letters, 160.

To Edward, Jan. 5, [1679-80]. Dr. Needham has shown himself "a kind & right honest gentleman." Letters, 167.

(a) PETER PAUW or PAAW (PETRUS PAVIUS or PAU), 1564-1617. Professor at Leyden.

(b) To Edward, March 7, [1676-7]. The anatomy of the Gulo. Letters, 86.

To Edward, July 6, [1678]. The anatomical observations of "Petrus Pavius or Paw of Leyden, a noted man in his time about 50 yeares agoe." Letters, 98.

(a) JAMES PRIMROSE, died 1659. English physician. In 1638 published De vulgi in Medicina Erroribus, and included as one of the errors that

of Dr. Harvey's circulation of the blood. He made denial of the new science and the results of the method of experimentation.

(b) V.E., "To the Reader," "For though not many years past, Dr. Primrose hath made a learned Discourse of vulgar Errors in Physick." A source for the plan of Browne's Pseudodoxia Epidemica. p. 5.

(a) HENRICK DUROY or DEROY (Latin REGIUS), 1598-1679. Dutch physician. Wrote works on physiology, natural philosophy, and medicine.

(b) To Henry Power, 8 June, [1659]. Discussion of preformation theory in regard to the seeds of plants. Letters, 293.

(a) MARK RIDLEY, 1560-1624. English physician who was interested in magnetical studies, mathematics, and science in general.

(b) V.E., II, ii, 107. Tables of declination for magnetical readings sent Ridley by Briggs, geometry professor at Oxford.

V.E., II, iii, 114. On the polar attraction of the magnet.

(a) JEAN RIOLAN (RIOLANUS), 1580-1657. French anatomist and medical writer. Published Encheiridium Anatomicum, 1649. An earlier book still widely known had appeared in 1610, Anatome Corporis humani. He was chief physician to Queen Marie de Medici.

(b) To Edward, Feb. 24, [1678-9]. Mentions his "small peculiar tract, De unguibus in his Encheiridion." Letters, 107.

To Edward, June 21, [1675]. Reference to Riolanus' discussion of the umbilicus in his Animadversions upon Laurentius his Anatomie. Letters, 65.

To Edward, March x, [1678-9]. Suggested manner in which Edward might quote him in his lecture before the Royal Society. Letters, 112.

To Edward, July 7, [1679]. Refers to a case of softening of the bones which Riolanus had seen. Letters, 142.

To Edward, Octob. 2, [1679]. His book on the muscles esteemed "very well." Letters, 151.

V.E., III, viii, 205. On the priority of vision of the wolf.

V.E., III, xxii, 268. Riolan denied that an ostrich eats iron for benefit.

M.T., 230. Questions whether the operation for the stone shortens life.

M.T., 307. On the capacity of the stomach.

(a) LAZARE RIVIERE (RIVERIUS), 1589-1640. French medical writer and lecturer at Montpellier. He was a professor here from 1622-1655, at a time when Browne might have heard him lecture. His Praxis Medica, 1640, was long a text book used in medical schools.

(b) To Henry Power, [1646]. Recommended to be studied. Letters, 278.

To Edward, July 28, [1671]. Quoted with regard to catarrh, from "Cap. de Astmate." Letters, 61.

(a) SIR CHARLES SCARBURGH, 1616-1694. English physician and one of the original members of the Royal Society. Physician to Charles II. Anthony Wood, Cowley, Waller all consulted him. His works are varied and include Syllabus Muscularum; A Treatise on Trigonometry; A Com-

pendium of Lily's Grammar; The Elegy upon Abram Cowley, and a posthumous edition by his son of an English translation of Euclid's Elements, with notes.

(b) M.T., 377. Sent eagles which had been feeding for two years to "my worthy friend Dr Scarborough."

To Dr. Christopher Merrett, Sept. xiii, -16, [1668]. Mentions again the eagles he sent to Dr. Scarborough. Letters, 369.

(a) DANIEL SENNERT (SENNERTUS), 1572-1637. German physician. In the discussion of gunpowder referred to by Browne in the Vulgar Errors, the reference is probably to his book De consensu Chymicorum &c.

(b) To Henry Power, [1646]. Recommended to be studied. Letters, 278.

To Henry Power, 15 Sept., [1646]. Refers to a new book by Sennertus which he has not been able to procure but which he intends to buy. Letters, 283.

V.E., II, 1, 88. Rejected theory that crystals were ice congealed.

V.E., II, iii, 126. The use of the loadstone in medicine.

V.E., II, v, 152. Gunpowder. The antipathy between the nitrous spirits of Aqua Regis "commized per minima with the sulphur of Gold."

(a) ADRIAM SPIGELIUS, 1578-1625. Flemish anatomist and physician. Professor at Padua.

(b) To Henry Power, [1646]. Recommended to be studied. Letters, 277.

V.E., III, xiii, 229. On the toadstone.

V.E., V, xxii, 150. Cause of cowls on the heads of infants.

V.E., VII, 1, 263. Spigelius refers to all round fruits as apples.

(a) JAN SWAMMERDAM, 1637-1680. A microscopist of note. To Swammerdam goes the credit for the discovery of the red blood cells. He felt that it was his sacred duty to explore the minute works of a Creator.

(b) To Edward, Sept. 22, [1680]. Browne has read Swammerdam's Miraculum Naturae, sive uteri muliebris fabricae. Ad Illustriss. Regiam Societatem Londinensem, 1672. Letters, 189.

(a) FRANCISCUS DUBOIS DE LA BOE (FRANCISCUS SYLVIUS), 1614-1672. A German physician of French extraction. Professor at Leyden after Browne's schooling there. Attributed all disease to acidity.

(b) V.E., VII, xvii, 318. On the tenth wave being the largest.

(a) THOMAS SYDENHAM, 1624-1689. English physician. It might be well for those who marvel that Sir Thomas Browne never belonged to the Royal Society to note that Sydenham was not a member. In 1666, he published The Method of Treating Fevers, dedicated to Robert Boyle. He insisted on a material cause of disease. The book to which Browne refers is his Dissertatio de Febre Putrida, Variolis confluentibus, etc., London, 1682. Here are the first descriptions of certain special diseases, such as chorea and hysteria. He also advocated the "cooling method" of treating small pox.

(b) To Edward, May 8, [1682]. Reference to Sydenham's book treating smallpox, hysterical and hypochondrical symptoms. It is "well writt." Letters, 259.

(a) THOMAS WILLIS, 1621-1675. English physician. First to demonstrate the transpiration of plants. Best known on account of his anatomy of the brain and his discovery of saccharine diabetes. The anastomosis at the base of the brain between the branches of the vertebral and the internal carotid arteries is still known as the "circle of Willis."

(b) To Edward, March 7, [1676-7]. Dr. Willis and brain dissection. Letters, 85.

To Edward, June 9, [1679]. Mentions the "Mathewes" pills said to have been taken by Willis in his last illness, and of which he speaks in his Pharmaceutice Rationalis. (Oxon. 1674). Letters, 131.

#### NATURALISTS AND BOTANISTS

(a) ULYSSES ALDROVANDUS, 1524-1607. Italian naturalist. Died in the year that Browne was born. I quote references to him at length to show that immediately behind Browne was a list of "vulgar errors" by a man who was an authority in natural history. Some of the "vulgar errors" Aldrovandus refutes himself, but many he clings to, and Browne attempts to prove him wrong. Aldrovandus was the author of the Antidotarii Bononiensis Epitome which was supposed to contain everything about natural history. It was his object to rewrite the natural history of the world as Pliny had conceived it with suitable plates for illustrations. He gathered around him a group of naturalists who spent long hours of laborious research and study. The first volume on birds was published in 1599, but was not entirely completed until 1642. His work was carried on long after his death by his associates. A large part of his work was futile, for, as Miall in his History of Biological Science, p. 14, says, "The true path of biological progress had been missed." While Gosse may speak of Browne's "lack of enthusiasm for Aldrovandus," (Sir Thomas Browne, p. 78.) which is in Browne's favor, he certainly cannot complain that Browne did not know him.

(b) To Edward, March 1, [1668-9]. Browne advises Edward to learn the Dutch fishes and birds that are set down by Aldrovandus. Letters, 48.

To Edward, Febr. 3, [1681-2]. Refers to him in his discussion on the ostrich. Speaks also of the diet of geese. Letters, 237, 238.

To Edward, Febr. 5, [1681-2]. Ostrich head given by Aldrovandus compared with that in Willoughby and Ray. Letters, 239.

To Edward, Febr. x, [1681-2]. Comment on the voice of the ostrich. Letters, 241.

To Edward, Febr. xij, [1681-2]. Number of bones in ostrich's tail. Letters, 243.

To Christopher Merrett, [April, 1669]. Head of Ostrich - illustration. Letters, 380.

V.E., II, i, 94. Crystallization in the "Fayrie stone."

V.E., II, ii, 105. "Loadstone'd Iron of Caesar Moderatus."

V.E., II, vi, 162. Mandrake.

V.E., III, iv, 191. That the beaver bites off the testicles when pursued.

V.E., III, v, 195. Inequality of the legs of the badger.

V.E., III, vi, 197. Bear cubs licked into shape.

V.E., III, vii, 201. Book of Fishes.

V.E., III, ix, 211. Length of life of deer.

- V.E., III, xi, 216. Griffins.  
 V.E., III, xii, 220. Phoenix.  
 V.E., III, xiii, 227. Toadstone.  
 V.E., III, xv, 235-236. Bicipitus serpents.  
 V.E., III, xviii, 250. Sight of moles.  
 V.E., III, xxii, 268. Diet of ostrich.  
 V.E., III, xxiv, 277. History of fishes.  
 V.E., III, xxiv, 279. Stones that are named according to their shapes resemble animals.  
 V.E., III, xxvi, 288. Omits mention of the whale in his natural history.  
 V.E., III, xxvii, 291, sec. 1. Swan's song.  
 V.E., III, xxvii, 292, sec. 2. Vanity of peacocks.  
 V.E., III, xxvii, 293, sec. 4. Sound made by bittern.  
 V.E., IV, xi, 49. On pigmies.  
 V.E., V, iiii, 93. Picture of grasshopper.  
 V.E., V, xix, 133. Mermaids and unicorns.  
 M.T., 32. Studies in ornithology.  
 M.T., 322. Picture of curious goose egg.  
 M.T., 324. On the ostrich.  
 M.T., 378. Great number of kites along the Thames.  
 M.T., 398. The 'Lump', a festival dish.  
 M.T., 400. Sand eels.

With Aldrovandus is made frequent mention of his "co-workers," Johnston or Johnson, whom I am not considering separately.

- (a) PRINCE FEDERIGO CESI (CAESIUS), 1585-1630. An Italian naturalist, Duke of Acqua-Sparta.  
 (b) V.E., II, vii, 174. On the explanation of fern spores.

(a) CHARLES DE LECLUSE or L'ESCLUSE (CAROLUS CLUSIUS), 1526-1609. Dutch botanist. Director of emperor's garden at Vienna. His Ten Books of Exotic Wonders describe the American humming bird, the cassowary, the dodo, and various strange beasts unrecognizable from his descriptions.

(b) To Edward, March 1, [1668-9]. "Clusius, the learned botanist that writ de stirpibus pannonikis, was over the emperours garden." Letters, 48.

To Edward, Aug. 22, [1679]. Epitaph, "famous physitian and Hearbalist." Letters, 147.

- V.E., III, xxiii, 275. Unicorn's horn.  
 V.E., III, xxvi, 288. Omits description of sperm whale in his Exoticks.  
 M.T., 379. Description of a bird.

- (a) FABIO COLONNA (FABII COLUMNAE), 1567-1650. Italian botanist. Browne refers to his Orchis Anthropophora.  
 (b) G. of C., 101. The quincuncial form.

(a) JOHANNES FABER, born 1570. German botanist and physician. Practiced in Rome and acted as physician to Pope Urban VIII. He published the Rerum Medicarum Novae Hispanae in 1649.

- (b) V.E., II, xii, 174. The discovery of spores on the fern leaves.  
 V.E., III, xv, 235. Bicipitus serpents.  
 M.T., 320. Observations on the tortoise.

(a) CONRAD GESNER, 1516-1565. Gesner, naturalist, and professor of Greek at Lausanne, is not contemporary with Browne, but I include him because of Gosse's remark concerning Browne's "almost complete neglect of Konrad Gesner, whose great work, the Historia Animalium he barely refers to once or twice." (Gosse, Sir Thomas Browne, p. 78). Gesner published a Catalogue of Plants, in 1542. The History of Animals was never completed. He made preliminary studies for a History of Plants, as well as for a book on fossils. He brought together about 1500 figures, about 400 of which he drew himself, to illustrate his books. He also wrote a Universal Dictionary of ancient and modern biography, and attempted to include all writers in Latin, Greek, and Hebrew, with a methodical index to all knowledge recorded in books. He also made an attempt to arrange all languages of the world according to affinities. Only a sixteenth or seventeenth century scholar would undertake so much.

- (b) V.E., II, v, 154. The hardening of coral in the water.  
 V.E., III, iv, 191, 193. The beaver bites off his testicles to escape the hunter.  
 V.E., III, xiii, 228. On Toadstones.  
 V.E., III, xxiv, 277. There are animals on land that do not have their prototypes in the sea.  
 V.E., III, xxvi, 288. The description of the sperm-whale is omitted by Gesner.  
 V.E., V, ii, 92. On the dolphin.

(a) JOHN GIRARD (GERARD), 1545-1612. English herbalist, surgeon, and botanist.

- (b) Henry Power to Sir Thomas Browne, 15 Sept., 1648. "I shall embrace Gerard above all because you pleased to honour him with your approbation." Letters, 282.

(a) PETER LAURENBERG (LAURENBERGIUS), 1575-1639. German botanist and anatomist.

- (b) M.T., 55. Tares among the corn. De Horticultura.  
 G. of C., 66. Refers to Laurenberg's arrangement of "old and new Plantations" in "Garden Discourses."  
 G. of C., 92. Prolificacy of small seeds.

(a) MATHIEU LOBEL (LOBELIUS), 1538-1616. French botanist.

- (b) V.E., II, vi, 165. Ginger resembles the common reed.  
 M.T., 15. Plants in scripture.

(a) ROBERT MORISON, 1620-1683. English botanist. The book referred to is Plantarum Historia Universalis Oxoniensis, Pars. II, Oxon, 1680.

- (b) To Edward, June 6, [1681]. Advises Edward not to buy Dr. Morison's Herbal at the price then asked. Letters, 222.



(a) THOMAS MOFFETT or MOUFFET (MUFFETUS), 1553-1604. English naturalist. With Thomas Penny, Moffet attempted to complete Gesner's Theater of Insects. Both of them died before it was completed. The book finally came out in a 1634 Latin edition by Sir Theodore Mayerne entitled Insectorum sive Minimorum Animalium Theatrum. The English translation of the Theatre of Insects appeared as an appendix to the second edition of Edward Topsell's History of Four-Footed Beasts and Serpents, 1658. Moffet was a firm believer in spontaneous generation.

- (b) V.E., III, xv, 236. Hundred footed insect discussed.  
 V.E., III, xxiii, 272. Four kinds of nasicornous beetles.  
 V.E., III, xxvii, 299. Spiders of red color.  
 V.E., III, xxvii, 301. The source of light in the glow-worm.  
 V.E., V, iii, 93-94. The diet of the grasshopper.  
 M.T., 261, again on 262. Amulet of spider's legs.  
 M.T., 328. Description of a woodtick.

(a) GIAMBATTISTA DELLA PORTA, 1539-1615. Italian natural philosopher. He was a native of Naples, a resident of Rome where he founded one of the earliest of the exclusively scientific societies, the Accademia dei Lincei. His writings vary from natural science to Italian comedies. In his Magic Naturalis he gives the first description of the camera obscura, describing also the properties of lenses. He hints at the telescope in De Refractione and in 1613 laid claim to having invented it. His works are disorganized and he spent much of his time experimenting with the "curious".

- (b) V.E., II, iii, 120. On Magnetism.  
 V.E., I, viii, sec. 14, 63. The doctrine of sympathies and antipathies in nature.  
 V.E., II, iii, 124. The suspended needles between two magnets.  
 V.E., II, iii, 131. The magnetic telegraph.  
 V.E., II, vi, 156. Borax and butter mixed in due proportion will deaden the explosion of gunpowder.  
 V.E., II, vi, 160. Plants shaped as animals.  
 V.E., II, vi, 170. Does not adhere to the idea that a plant with a horseshoe shaped seed can draw shoes from the hoofs of horses.  
 V.E., II, vi, 170. Bay trees protect from thunder and lightning.  
 V.E., III, xiii, 228. Found no toadstone although looked for it.  
 G. of C., 72. Planting of graves in desusated plots.  
 G. of C., 101. Poor resemblance of the spikes of the Phalaris as given in della Porta.  
 To Edward, Dec. 20, [1677]. Dispute between Porta and Columbus concerning the fat of the heart. Letters, 90.

(a) JOHN RAY, 1627-1705. Ray was the first outstanding English botanist. Willoughby had left at his death the imperfect Ornithology and Ichthyology with scattered observations on insects. Ray, who had been collaborating with him, finished Willoughby's work as well as his own parts of the books. Among the ones to whom he gives acknowledgement is Sir Thomas Browne who had let him use his collection of birds and had written an account of the birds found in Norfolk. Ray became a member of the Royal Society in 1667. He took opportunity to refute such fables as the antipathy between the lion and the cock, and while he makes no mention

of gryphons, harpies, phoenixes and rocs, he admits incredulity concerning the transformation of barnacles into geese, the renewal of youth in the eagle, the incessant flight of the birds of paradise, etc. He came at last to believe that fossils were the remains of actual organisms, but according to Miall, (History of Biology, p. 44), he was greatly hampered in his work by his theological views. His major contribution was the theory of sex reproduction in plants.

(b) To Edward, Febr. 5, [1681-2]. On the ostrich. Letters, 239-40.

To Edward, March 28, [1682]. Account of lending Ray "many draughts of birds in colours," for his Ornithology, which prints Ray had not yet returned. Letters, 250.

M.T., 324. On the ostrich.

(a) FRANCISCO REDI, 1626-1695. Italian naturalist and poet. He studied spontaneous generation and showed that maggots did not appear in matter screened from flies and that the kind of fly, not the matter, determined the kind of insect that would be generated from putrifying matter. He made a study of the life cycle of the eel, which Aristotle had said might be generated from earthworms. He tested Pliny's statement that buried crabs produce scorpions and determined that the hind legs of a frog are not formed by the splitting of the tail of the tadpole. He explained the worms in the heads of sheep and deer by a 'unifying' principle, an odd conclusion after his attack on spontaneous generation. He even turned some attention to the purpose and action of the gizzards in birds. He acted as physicist to the Duke of Tuscany. How much of Redi's work was known to Browne cannot be determined. The On the Generation of Insects came out in 1668, too late for mention in the Vulgar Errors, but not for the revision of the Vulgar Errors. At least Browne still held to the theory of generation by corrupting matter, seemingly uninfluenced by whatever he might know of Redi's books. It is interesting to notice that any number of the errors that Redi refuted, are the same errors that Browne includes in his Vulgar Errors.

(b) V.E., III, xvi, 242. Comments on the theory that vipers contained no poisonous humor nor could the teeth be the conveyors of these traditional poisons.

(a) HENDRIK ADRIAAN DRAAKENSTEIN VAN RHEEDE (HENRICUS VAN RHEEDE, VAN DRAAKENSTEIN), died about 1700. A Dutch naturalist who was Governor-general of the Malabar Coast.

(b) M.T., 233. "Hortus Malabaricus" was published at Amsterdam 1678, in two parts. The first was de Arboribus; the second, de Fructibus. "It containeth the most considerable plants to be found in the country of Malabar & hath the largest & fayrest cutts of any Herball I have seen & exceeding those in Besler's Hortus Eystentensis."

(a) FRANCIS WILLOUGHBY, 1635-1672. English naturalist. His Ornithology was published in 1678, six years after his death. He was the first to employ the dividing of flowering plants into mono- and dicotyledons. He based his system upon the fruit and in part on the flower. He indicated many of the natural orders to be used by later botanists and made one of the early steps towards a natural system of plant classification. He unfortunately retained the primary divisions of plants

into herbs, shrubs, and trees, and held that there were no buds on herbaceous plants.

- (b) To Edward, Febr. 5, [1681-2]. On the ostrich. Letters, 239.  
M.T., 324. Mentioned with Ray for his Ornithology.

#### HISTORIANS, CHRONOLOGISTS, BIBLICAL COMMENTATORS, ANTIQUARIANS, MAP-MAKERS

(a) HENRY AINSWORTH, 1571-1622. English student of the Bible who made a private translation of it.

- (b) V.E., V, xxi, 140. "A good annotation of ours" on Deuteronomy 21.  
M.T., 43. Translation of Jeremiah 10:5.

(a) CESARE BARONIO, 1538-1607. Italian cardinal and writer on church history.

- (b) V.E., V, xvi, 127-8. Reference to his annotations on Roman Martyrology.  
V.E., V, xvii, 130. On the picture of St. George.  
V.E., VII, viii, 282. That the three Wise Men were three kings of Collein.

V.E., VII, ix, 284. On the food of John the Baptist.

V.E., VII, xi, 292. On the death of Judas.

V.E., VII, xii, 293. The cessation of oracles at the coming of Christ.

V.E., VII, xvii, 317. Of the suffering of Belisarius, chieftain of Justinian.

M.T., 154. The papers of Bishop Richard Montague against Baronius and others.

(a) SAMUEL BOCHART (BOCHARTUS), 1599-1667. French scholar and protestant theologian. Wrote his Sacred Geography, to which Browne refers, in 1646.

(b) V.E., VI, vi, 204. Deduction of ancient names of countries from the Phoenician remains.

V.E., VI, ix, 228. The name of the Red Sea of Phoenician origin.

V.E., VII, v, 275. That Noah and Saturn were the same person.

(a) SIR HENRY BLOUNT (BLUNT), 1602-1682. English author and traveler. He took part politically during the period of the Commonwealth and the Restoration. Anthony Wood, II, 712-13, speaks of him as a gentleman "of a very clear judgment, great experience, much contemplation (tho' not much reading) and of great foresight into Government." In 1636 he published his Voyage into the Levant, which Anthony Wood says was translated into both French and Dutch.

(b) V.E., IV, x, 46. On Jews.

(a) JACOB BONTIUS, 1590-1631. Dutch naturalist and physician and traveler. He visited the East Indies 1627-31. He brought back a description of the animals he saw there including the amphisbaena, a two-headed snake, of which he had a picture.

(b) V.E., III, xxviii, 306. Bontius, "late physitian at Java in the East Indies" denies the excessive swiftness of tigers.

(a) GIOVANI BOTERO, 1540-1617. Italian ecclesiastic and writer. Also an economist. He wrote The Reason of the State in 1589, in which he indicated that population tends to increase faster than the means of subsistence - hence the rate of increase of one depends upon the other.

(b) V.E., VI, vi, 198. Estimated population of the world before the flood.

V.E., VI, viii, 221. The time of the overflowing of the Nile.

V.E., VII, xiii, 299. The irregularity of tides.

(a) DAVID BUCHANAN, 1595-1652. Scotch historian.

(b) V.E., III, xv, 235. The Christian practice of giving many names for the many divisions of the soul.

(a) JOHAN BUXTORF (BUSTORFIUS), 1564-1629. Hebrew Scholar.

(b) M.T., 54. The explanation of the tares that were sown in the wheat, Matthew 13: 24-25, mentioned in the Rabbinical Lexicon.

V.E., IV, ix, 40. The Rabbinical account of sneezing.

(a) WILLIAM CAMDEN, 1551-1623. English antiquarian.

(b) To William Dugdale, 10 Nov. [1658]. The draining of the fens. Letters, 336.

To William Dugdale, 11 Dec. [1658]. The Roman highways in England are much defaced. Letters, 344.

To Christopher Merrett, 8 May, [1669]. Classification of a fish. Letters, 381.

To John Aubrey, 24 Aug. [1672]. Camden a member of Pembroke College. Letters, 396.

M.T., 102. On the "Mounts of Barklow Hills in Essex."

M.T., 405. There were formerly beavers in the river of Cardigan in Wales.

V.E., VII, xiii, 299. Camden's description of Great Britain in

U.B., 22. The "monument of Rollrich stones in England."

(a) JOHN DIODATI, 1576-1649. Italian protestant theologian. He made both French and Italian translations of the Bible.

(b) V.E., VII, vii, 278. The mandrake mentioned in the scripture.

M.T., 43. Diodati speaks of laurels instead of cedars. Jeremiah 10:5.

M.T., 53. The tares sown in among the wheat.

(a) WILLIAM DUGDALE, 1605-1686. Cf. "Correspondence," pp. 331-358 of the Letters. Dugdale was the most celebrated English antiquary of his day. Browne supplied him with material for his The History of Imbanking and Drayning, published in 1662.

(a) MONSIEUR DULOIR, fl. 1654. French traveler and writer.

(b) V.E., VII, xiii, 300. On tides.

M.T., 78. Refers to Monsieur Du Loir in his tract on cymbals.

L. to a F., 172. ". . . scarce twenty years ago Monsieur du Loir observed that a third part of that People [of Ravigno] halted."

(a) THOMAS GAGE, 1597-1656. English missionary and traveler in the West Indies. Wrote Survey of the West Indies.

(b) To Edward, Octob. 15, '80. "When I read Gages travells in America many yeares ago, I was much surprized to find that there were Twentie thousand coohes in Mexico." Letters, 191.

(a) PIERRE GASSENDI (GASSENDUS), 1592-1655. French historian, philosopher, naturalist, mathematician, astronomer, logician, Hellenist, metaphysician, and critic.

(b) V.E., VII, xvii, 323. On Epicurus, De vita et Moribus Epicuri.

(a) GALEAZZO GUALDO-PRIORATO (GLEAZZI GUALDI), 1606-1678. Count of Comazzo. Italian soldier, historian, and diplomat.

(b) To Edward, Jan. 19, [1679-80]. Browne wonders if Gualdo is still writing, for the late years should have offered him copious material.

(a) HUGO GROTIUS, 1583-1645. Dutch historian, known as the "Father of International Law." He was proficient in law, history, mathematics, astronomy, and the sciences. In 1616, he was made Grand Pensionary of Holland and West Friesland. He was later imprisoned as a champion of the weaker party in the American controversy. He contributed to history his History of the Dutch War of Independence.

(b) V.E., I, vii, 53. Authority of valme only in its own field, even though "Hugo Grotius, a Civilian, did write an excellent Tract of the verity of Christian Religion." Id

V.E., III, xxv, 281. The line of Seth ate flesh only at sacrifices.

V.E., VI, viii, 218. On the river Nile and its confusion in biblical interpretation with the Euphrates.

(a) JAN GRUTHER (GRUTERUS), 1560-1627. Professor at Wittenberg and Heidelberg. He was of Dutch and English parentage. He is supposed to have suggested to Browne that his Vulgar Errors be translated into Latin, although nothing seems to have come of the plan. Collected Gruteri Inscriptiones Antiquae 1602.

(b) M.T., 179. Collected epitaphs and inscriptions.

U.B., 45; 59; 60. References to Gruther's Gruteri Inscriptiones Antiquae totius orbis Romani, (2 vol.) 1602.

(a) HENRY HAMMOND (D. HALMOND), 1605-1660. English divine and author.

(b) M.T., 44. "A learned Interpreter of our own," on the barren fig tree.

(a) DANIEL HEINSIUS, 1580-1655. Dutch scholar and linguist.

(b) M.T., 44. On the barren fig tree.

V.E., III, xviii, 252. Heinsius holds that the congenital blindness of the man whom our Savior made see might be interpreted that he had no eyes.

(a) CHRISTOPH HELVICUS, 1581-1617. A German philologist. He wrote A System of Chronology [1609]. He put forward a system for the measurement

of time based on nearly 3000 eclipses, and proposed a reform of the calendar.

- (b) V.E., VI, i, 164. On the age of the world.  
V.E., VI, ii, 175. That the duration of the world began in the autumn.

(a) DIEGO HERNANDEZ (Dates not found). Spanish soldier and historian. Wrote a History of Peru that appeared in 1591.

- (b) V.E., III, xv, 236. The double-headed serpent mentioned by American travelers. Pictured in Hernandez' History of America.

(a) PETER HEYLIN, 1600-1662. English traveler and geographer. He must have had an erratic and turbulent life during the period of the civil wars, for his geography had a passage on which Charles took offense and it was necessary to make explanation. He was accused of papacy. He completed a History of St. George in 1630 under difficulties and disfavor. He was a champion of Laud and wrote a History of the Life of Dr. Laud. The death of Laud caused Heylin to flee from London. His earlier geography was later enlarged into a Folio and went through four editions from 1652 to 1682. He censured Fuller's Holy War severely, to which Fuller replied with an "Appeal of Injured Innocence." He also wrote a History of the Reformation, London, 1661.

- (b) To Edward, Dec. 2, [1668]. Browne wished that Edward knew Heylin's book, probably "A Little Description of the Great World," Oxford, 1621. Letters, 37.

To Edward, Decemb. 23, [1668]. Gives account that Germany has 21 universities. Letters, 44.

- V.E., V, xvii, 129. On the picture of St. George. Reference is made to "Dr. Heylin's" History of St. George.

(a) JODOCUS HONDIUS, 1563-1611. Flemish engraver and map maker. In 1611 he engraved and drew a map of the world in two hemispheres which was based on the latest information obtained from travelers and on the surveys of European lands.

- (b) V.E., VI, viii, 218. The Map of Africa.

(a) ROBERT HUES, 1553-1632. Born at Hereford, A mathematician and geographer.

- (b) V.E., XI, xiv, 258. On Longitude.

(a) CORNELIS JANSEN (JANSENIUS), 1585-1638. Dutch commentator on the Bible.

- (b) V.E., III, iii, 187. That the dove has no gall.

V.E., III, xvi, 242. The scriptural interpretation of the murder of the male viper by the female immediately after mating.

- V.E., VII, xi, 292. On the death of Judas.

(a) JOHANN KIRCHMANN (KIRCHMANNUS), 1575-1643. German author and scholar. Published his De Funeribus Romanorum 1605.

- (b) V.E., 32. The position of the body in burial.

(a) RICHARD KNOWLES, 1550-1610. English historian who published his Turkish History, 1638.

(b) V.E., VII, xvi, 314. Tamberlaine was a Scythian shepherd.  
L. to a F., 170. At the death of Duke John Ernestus Mansfield, his heart was found to be no larger than a nut.

(a) LEO OF MODENA (LEO THE JEW), 1572-1650. A Jewish Rabbi born in Venice.

(b) V.E., III, xvii, 246. The first man was a hermaphrodite.  
V.E., VI, i, 166. The heavens to perish in the Seventh or Sabbatical millennium.

V.E., VI, xi, 246. Has excellently discourses on the Genealogy of Love.

(a) JAN HUGO VAN LINSCHOOTEN, 1563-1633. Dutch voyager. His idea of vegetable horns is a vulgar error not scorned even by Buffon in the eighteenth century.

(b) V.E., II, v, 155. On china dishes, from Oriental Navigations.  
M.T., 50. Indians climbing palm trees described in his Travels.  
M.T., 141. Vegetable Horns mentioned by Linschoten.  
G. of C., 110. Ram's horns take root about Goa.

(a) JUSTUS LIPSINS, 1547-1606. Flemish scholar, critic, philologist. He was also an antiquarian and an archeologist as well as a defender of withcraft and superstition.

(b) V.E., V, vi, 101. That the Romans reclined at their meals.  
V.E., V, xiii, 121. How the Cavaliers mounted their horses without stirrups.

V.E., V, xxi, 141. The early confusion between the word suspension and crucifixion.

V.E., VII, i, 263. That the cross of Christ was made of oak.

G. of C., 72. The shape of the cross of St. Andrew.

(a) JOB LUDOLPH (LUDOLF), 1624-1704. German scholar and orientalist. He is said to have known 25 languages. The book referred to is the History of Abyssina, an Aethiopian Grammar.

(b) To Edward, May 8, [1682]. The History of Aethiopia, "translated into English & now published in a thimne folio with some cutts in it. . . . the Author seemes to bee a learned sober person." Letters, 258.

(a) JEAN PAPIRE MASSON (MASSONIUS), 1544-1611. A French author whose Elogue contained a collection of biographies of eminent persons.

(b) V.E., VII, xvi, 313. References to his lives of the Popes.

(a) JUAN GONALES DE MONDOZA, 1540-1618. Spanish missionary.

(b) V.E., II, v, 154. "a man employed into China from Philip the second King of Spain," his opinion on china dishes.

(a) GIOVANNI BATTISTA NICOLOSIO (JOHN BAPTISTA DE NICOLE), 1610-1670. Sicilian geographer.

(b) V.E., II, v, 153. Coral hardens before taken out of water.

(a) JOSEPH MOXON, 1627-1700. French hydrographer and mathematician. The book referred to is Concerning the Use of Globes, 1659.

(b) To Thomas, Jan. I, [1664-5]. In regard to the compass, "Moxon will teach you severall things." Letters, 22.

(a) JOHANN EUSEBIUS NIEREMBERG (NIEREMBERGIUS), 1590-1658. Spanish Jesuit of German extraction. Published theological and miscellaneous works, including a natural history of the Indies called the Historia Naturae maxime peregrinae.

(b) To Edward, Febr. 5, [1681-2]. "speakes of some oestriges to bee found in America, butt not so well fether'd as in Africa." Letters, 240.

V.E., I, viii, 58. Recommended to be read instead of ancient authors.

V.E., II, iii, 119. Holds that the body of man is magnetical and, if placed in a boat, the vessel will never rest until the head is turned toward the north.

V.E., III, xxvi, 288. The sperm whale omitted from the Natural History of Nieremberg.

(a) SIR ROBERT PASTON, Earl of Yarmouth, English antiquarian.

(b) To Thomas, Aprill the 22, 1661. "Sir Robert Paston will send me his box of Saxon and Roman coyns next week." Letters, 9.

To Edward, Jan. 24, [1680-1]. "My Lord Paston" will be chosen for Parliament. Letters, 207.

To Edward, Febr. 14, [1680-1]. "My Lord Paston had voyces 1509" for Parliament. Letters, 211.

To John Evelyn, 21 Jan. [1657/8]. The letter addressed to Evelyn at the command of Paston. Letters, 299.

To John Evelyn, 28 Jan. [1657/8]. Asked that his service be offered Paston. Letters, 305.

To John Evelyn, o. April, [1658]. Sends his service to Sir Robert Paston. Letters, 306.

U.E., 61. Fragments of urns found in Paston's fields.

(a) DENYS PETAU (PETAVIUS), 1583-1652. French scholar and Jesuit. Published the outstanding work of the time in chronology, De Doctrina Temporum, 1627. He had been influenced by Scaliger and carried on his works. He was the first to attempt to treat the development of the Christian doctrine from an historical point of view. His most successful book was an elucidation of ancient astronomy and a chronology published in 1606 called a Repertory of Date.

(b) V.E., IV, xiii, 84. Discussion of Dog star.

V.E., VI, i, 164-5-6; 172. The age of the world, by "Dionysius Petavius a learned Chronologer."

V.E., VI, vi, 198. The population before the flood.

V.E., VII, v, 274. Of Seth, Ham, and Japhet.



(a) HENRI PHILIPPI (HENRICO PHILIPPI), 1575-1636. French Jesuit and chronologer.

(b) V.E., VI, ii, 176. The season at which the world began.

(a) SIR WALTER RALIEGH, c. 1552-1618. English courtier and historian. His History of the World was intended to cover the whole of the history of man's life on earth from creation to his own day. He advanced no further, however, than to the conquest of Macedonia in 146 B.C.

(b) V.E., V, xiii, 120. Alexander pictured on an elephant; Hector on a horse instead of in a chariot.

V.E., VI, vi, 192. The population before the flood.

V.E., VI, vii, 215. The resting place of the ark.

V.E., VI, ix, 229. The redness of the Red Sea.

V.E., VII, vi, 276. Men of Mesopotamia feared no second flood.

M.T., 287. Rebuilding of an Italian town as prophesied by an oracle.

(a) PAUL RYCAUT, 1628-1700. English writer, The History of the Turkish Empire, 1679, was a continuation of The General History of the Turkes by Richard Knolls.

(b) To Edward, Nov. 4, [1679]. "There is a book in a middle folio, lately published by Paul Ricaut, Esqr, of the lives of ~~Murat~~ or ~~Ahrat~~. . . ." Letters, 160.

To Edward, Dec. 22, [1679]. "Your sister Betty hath read unto mee Mr. Ricauts historie of the 3 last Turkish emperours, . . . . It is a very good historie and a good addition unto Knolls his Turkish historie . . . ." Letters, 166.

To Edward, Jan. xiiij, [1679-80]. A fuller account of the book and the stated intention to send it to Edward. Refers to Ricaut's book on the American and Greek churches. Letters, 169.

To Edward, Jan. 19, [1679-80]. "Since I last writt unto you I have found out a way how you shall receive Ricauts historie without sending it by the carts." Letters, 170.

(a) GEORGE SANDYS, 1577-1644. English traveller who traveled in Palestine, Egypt, and Turkey, and who wrote an account of his journey in four volumes.

(b) To Edward, Febr. xiiij, [1681-2]. An account of the cry of an ostrich as recorded by Sandys in his Travels. Letters, 243.

V.E., IV, x, 47. On the Jew.

V.E., VI, viii, 218. On the Nile.

(a) WILLEBROAD SNELL (SNELLIUS), 1591-1626. Dutch mathematician.

(b) V.E., II, v, 148. The cause of the noise in the exploding of gunpowder.

(a) JOHN STOWE (STOWE), 1525-1605. English chronicler and antiquary.

(b) U.B., 17. The Urns found in the "Spittle Fields by London," reference to Stowe's Survey of London.

(a) ISAAC VOSS, 1618-1689. Voss was born at Leyden. He was reputed by Wood to have the finest library in the world. He was principally a chronologer. The Polygot came out in 1657. He also wrote a treatise to prove that the world was created by 5200 B. C. Macaulay remarks (History of England, I, 273) "Thus Isaac Vossius, a man of undoubted parts and learning, strenuously maintained that there were only two millions of human beings in England, Scotland, and Ireland taken together."

(b) To Edward, Nov. 23, [1677]. "I am glad to hear that Isaac Vossius is living and in England." Letters, 88.

V.E., II, iii, 122. An account of Mahomet's tomb.

V.E., V, x, 113, 115. The scutcheons of the tribes of Israel.

V.E., VI, i, 167. The nativity of the world.

M.T., 84. The origin of language in the world.

M.T., 113. On oracles.

(a) PETER WALSH, 1618-1688. English writer who published A Prospect of the State of Ireland, from the years of the world 1756 to the years of Christ 1652.

(b) To Edward, June 6, [1682]. Reference to his State of Ireland. Letters, 265.

#### ASTROLOGERS, ASTRONOMERS, SCIENTISTS, PHILOSOPHERS, MATHEMATICIANS

(a) FRANCIS BACON, 1561-1626. English statesman and lay-scientist. His "inductive method" has won him a place in the history of both science and philosophy, although he seemed unable to do much of value with his own method. He was an anti-Copernican and a believer in witchcraft. His Natural History displays how little he really knew about natural phenomena, even though it was based on observation and experiment. His 'Idols' are often said to be a source for the introductory book in Browne's Vulgar Errors, and while there is a general resemblance, no definite conclusion can be made and substantiated.

(b) V.E., II, vi, 166. The mistletoe grows from the underside of the bough as well as from the topside, as Lord Verulam also takes notice.

V.E., III, xxi, 262. On fire and the necessity of fire.

V.E., IV, vii, 36. Iron does not lose weight in aqua fortis.

"Nor is it to be taken strictly which is delivered by the learned Lord Verulam."

(a) JOHN BAINBRIDGE, 1582-1643. English physician and astronomer. The year before his death he pointed out the vanity of astrological predictions based on Saturn and Jupiter.

(b) V.E., IV, xiii, 77. "late professor of Astronomy in Oxford," with reference to the dog-star and dog-days.

(a) JEAN BERGUINUS, b. 1600. French chemist who wrote Tyrocinium Chymicum.

(b) V.E., II, v, 153. On coral.

(a) ROBERT BOYLE, 1627-1691. English man of leisure and scientist. He was the first scientist to study chemistry for its own sake. Robert Hooke, a poor student, became his assistant. In 1660, Boyle published his "The Spring and Weight of the Air,"; in 1661, "The Skeptical Scientist." In 1662, he formulated his famous gas laws. Thirty of his forty-two works deal with scientific treatises, the rest being a mixture of physics, chemistry, physiology, medicine, philosophy, and theology. The weight of air, the thermometer, barometer, mixtures, gas laws, definition of chemical elements, phosphorescence, electricity are all intimately associated with his name. Yet he believed in witchcraft, would not deny alchemy, believed in faith cures and had himself made a trip to Ireland to be 'touched'. His theology often hindered his science. Thomas Hobbes in 1662 attacked Boyle's experiment on the air-pump. Boyle replied with his "Examen of Mr. Hobbes his Dialogues."

(b) To Edward, Decemb. 23, [1668]. "Mr. Boyls's continuation of new experiments concerning the spring & weight of Ayre" as given in the Transactions of the Royal Society. Letters, 45.

To Edward, June 16, [1676]. The shining flesh of veal. Letters, 71.

To. Dr. Merrett, May, [1669]. An electrical experiment by Boyle. Letters, 383.

(a) WILLIAM BRIGGS, 1642-1714. English physician and oculist. The book sent to Edward was Ophthalmographia, Cambridge, 1676.

(b) To Edward, Octob. 2, [1679]. "I heare that Dr. Briggs is going or gone to live in @ London." Letters, 151.

To Edward, Novemb. 3, [1779]. "I sent you a pretty optick booke by Mr. Briggs . . . ." Letters, 155.

To Edward, Novemb. vij, [1679]. Suggests that Edward be friendly with Austin Brigs of London, a brother of Dr. Briggs. Letters, 157.

To Edward, Nov. 28, [1679]. "Dr. Briggs wrote a letter to mee concerning the bronchoede of his sister who was touched." Letters, 162.

To Edward, Jan. vii, [1680-1]. Asks that his service be presented to Dr. Briggs. Letters, 204.

To Edward, June xij, [1682]. "Dr. Parham brought mee a philosophical collection of Last March, sent mee from Dr. Briggs." Letters, 265.

Also "A newe Theorie of vision communicated to the R.S. by Dr. Briggs, . . . ."

(a) NICCOLO CABEO (CABEUS), 1585-1650. Italian Jesuit and mathematician.

(b) V.E., II, i, 95. On crystals.

V.E., II, ii, 112. The first knowledge of the compass.

V.E., II, iii, 115. On the loadstone.

V.E., VI, xiv, 259, The purpose of the motion of the heavens.

G. of C., 91. Bodies are first spirits.

(a) MERIC CASAUBON, 1599-1671. Student of the classics. In 1611 his father brought him to England and educated him at Oxford. Meric spent most of his time editing the works of his father, Isaac Casaubon. He believed thoroughly in witches and in 1668 wrote his "Of Credulity and Incredulity against the Sadducism of the Times in denying Spirits, Witches, etc" 1668. He also published a "Letter to Peter de Moulin concerning Natural Experimental Philosophy, 1669" among other works.

(b) To Elias Ashmole, March, [1674]. Casaubon's mention of the Book of Spirits by John Dee, Letters, 325.

To William Dugdale, 10 Nov., [1658]. The "Latin translation of Polybius sett forth by Casaubon" in regard to Hannibal crossing the Alps. Letters, 335.

V.E., I, viii, 60, 61. Styled Athenaeus as "Graecorum Plinius."

V.E., IV, xi, 52. On Pigmies - "in his learned Admadversons."

V.E., V, vi, 106. On John leaning on the breast of Jesus.

V.E., V, xxii, 144. On smoke following the fairest. A passage quoted by Casaubon to Athenaeus.

M.T., 87. "The learned Casaubon conceiveth that a Dialogue might be composed only of such words as are derivable from the Greek."

U.B., 27. Marginal reference to "the most learned and worthy Mr. M. Casaubon."

U.B., 57. The colors of the urns.

(a) OSWALD CROLL (CROLLIUS), d. 1609. German alchemist and a partisan of Paracelsus. His Basilia chymica came out the year of his death, 1609.

(b) V.E., II, v, 152. On gunpowder.

V.E., II, vi, 160. On plants shaped like animals.

To Henry Power, [1646]. Recommended to be studied. Letters, 277.

(a) RENE DESCARTES (DES CARTES), 1596-1650. The influence of Descartes reached England in the 1640's. He held space and extention to be the fundamental reality of the world, motion the source of all chance, and mathematics the only relation between its parts. His corpuscular theory gave explanation to change, for it included his idea of the formation of vortices. Descartes did not have implicit faith in the Copernican system and the trial of Galileo undoubtedly made him cautious in his cosmological explanations. Cf. Chapter III.

Gosse (Sir Thomas Browne, p. 37) is quite wrong when he says, "With much that is curiously in common in R.M. with Descartes - of whom, however, he Browne never once makes mention in any portion of his writings - he differs radically from him in the breadth of his vision. . . . It is a vain, but a tempting speculation to wonder what kind of an influence Browne would have exercised if - instead of living (as it would seem) side by side with Descartes, yet ignorant of his existence - Browne would have been born a generation later, and subjected to the full tide of Cartesian ideas."

(b) V.E., II, ii, 101. Theory of vortices.

V.E., II, iii, 113. The Principles of Philosophy quoted in connection with the loadstone.

V.E., II, iv, 136. Browne accepts the explanation for electrical attraction as given in the Principles of Philosophy.

(a) KENELM DIGBY, 1603-1665. Digby was one of the more popular courtiers of the seventeenth century, and a versatile thinker and writer, but of little worth. His Of Bodies and Of Souls are extremely interesting in their curious explanations for natural phenomena, but he is often quoted by men of the century and was seemingly at one time looked upon as a

promising author and scientist. His connection with the Court and Queen Henrietta Marie he was her secretary forced him to leave England for a while during the Civil War and the Protectorate. When he returned, it was not to the same popularity. The account of his reading Browne's Religio Medici one night and hastily penning his Observations and publishing them in spite of Browne's entreaty that he wait for an authorized edition is too well known to bear repeating.

(b) V.E., II, ii, 101. Concerning the loadstone, as a counter explanation to that of Descartes.

V.E., II, iv, 136. Accepted with Descartes and Gilbert their explanation for electrical attraction.

Cf. "Correspondence," Letters, 271-274.

(a) JOHN EVELYN, 1620-1706. Evelyn, although he met Browne but once, in 1657, asked Browne to aid in the compiling of a book on gardens. Browne contributed the chapter "Of Garlands and Coronary Garland-Plants" to the unfinished Elysium Britannicum. Gosse speculates that the Garden of Cyrus might also have been written for the Elysium, but was published independently in 1658 because Evelyn may have sent it back to its author as being admirable in itself, but not fitted to his particular design. (Sir Thomas Browne, p. 132.)

(b) Cf. "Correspondence," Letters, 299-317.

(a) THOMAS GADBURY, 1627-1704. English astrologer imprisoned for treason, but later released and given compensation for his humiliation.

(b) To Edward, Novemb. vij, [1679]. "I am sorry Mr. Gadbury is in trouble . . . ." Letters, 158.

(a) GALILEO, 1564-1642. Italian investigator and experimenter. He was primarily a mathematician who formulated laws for natural phenomena. He also showed that air had weight, discovered the spots on the sun, attempted to find an explanation for tides, was connected with Toricelli in his discovery of the principle of the barometer, proved and modified parts of the Copernican system, etc. He was truly an exponent of the 'new science.'

(b) V.E., IV, xii, 56. There are more than seven planets in the lower orbs of Heaven, "as Galileo hath declared."

V.E., VII, xiii, 301. On the explanation of tides.

M.T., 415-6. Speed of falling bodies. Browne accepts Galileo as an authority.

(a) WILLIAM GILBERT, 1540-1603. English scientist. One of the first adherents of the Copernican system. Author of De Magnete, the first printed work on experimental science to be published in England, 1600. He regarded the earth as a magnet and attributed the earth's rotation to its magnetical character. He extended this idea to include the heavenly bodies, with an animistic tendency. The book has the force and spirit of modern science. To him is given the credit of the first use of the word 'electric'. To this, Browne added the word 'electricity'. Little advance over Gilbert's work was made until about the nineteenth century. He was, by profession, a physician.

- (b) V.E., II, 11, 105, 106. The properties of the loadstone.  
 V.E., II, 11, 108, 110. The variation of the compass.  
 V.E., II, iv, 133. Browne adds to Gilbert's list of substances that attract electricity.  
 V.E., II, iv, 136. The principle of electrical attraction.  
 V.E., VI, vii, 216. On the river Nile.
- (a) JOHN GREAVES, 1602-1652. English mathematician.  
 (b) V.E., II, iii, 118. The still active attraction of an Egyptian idol cut out of a loadstone. Reference to Greaves' Pymadiographia.  
 V.E., VI, viii, 225. The "Learned Mr. Greaves, in his accurate description of the Pyramids."
- (a) EDMUND HALLY, 1656-1742. English astronomer. He made a voyage to observe the stars about the south pole, leaving England in 1676 and returning in 1678. He was a member of the Royal Society.  
 (b) To Edward, June 13, [1678]. "It was very ingeniously done by Mr. Hally to take such a voyage." Letters, 95, 96.  
 V.E., IV, xii, 67. The question of what hour should be considered in astrological determinations as the hour of nativity.
- (a) JAN BAPTISTA VAN HELMONT, 1577-1644. Famous Belgian chemist, physiologist, and visionary. He was professor of chemistry at Leyden. Preserved Smith says of him, History of Modern Culture, p. 85 "His works are a mass of superstition, pedantry and quackery, relieved by an occasional flash of insight and by a laudable attempt to bring to notice new phenomena." He insisted upon the curative power of the magnet. He is credited with the recipe for the artificial reproduction of mice from a mixture of corn and sweet basil. He tended toward alchemy, and expounded the iatro-chemical doctrine, that every process of the body is presided over by a special spirit or archeus, which he called blas. All physiological processes he held to be chemical, and the different arrangements of the gas, or blas, produces different diseases to be cured by odd and fantastic methods. He is, however, the discoverer of carbonic gas, and the first to use the term "gas". Here again is a queer mixture of ignorance and science.  
 (b) V.E., II, iii, 114. The cause of the magnetic quality of the loadstone.  
 V.E., II, iii, 118. On the use of the magnet in making glass.  
 V.E., II, iv, 138. Explanation of the stone bred in the kidney.  
 V.E., II, vii, 172. Spiders and flies never on the same tree.  
 V.E., III, xxviii, 307. On mice generated out of wheat.  
 M.T., 186. On dreams.  
 M.T., 359. Growth of trees in water.  
 G. of C., 114. Same experiment as recorded in M.T., 359.  
 To Edward, 22 Sept., [1668]. "What esteeme they have of van Helmont in Brabant his owne country?" Written to Edward while he was at Frankfort. Letters, 35.
- (a) JOHANN FRIEDRICH HELVETIUS, 1625-1709. A German alchemist. His Vitulus Aureus was first printed at Amsterdam, 1667, and a translation of it, The Golden Calf, was published in London, 1670.

(b) To Edward, 22 Sept., [1668]. "When you were at Amsterdam I wish you had enquired after Dr Helvetius, who writ Vitulus Aureus and saw projection made and had peeces of gold to shewe of it." Letters, 35.

(a) JOHN HEVEL or HEVELIUS (HEVELIUS OF DANZIG), 1611-1687. A member of the Royal Society. He had built an observatory in his home and did his work there.

(b) To Edward, November 23, [1677]. Hevel had sent the Royal Society an account of an eclipse and of a "newsstarre in Cygnus, butt what new starre or when appearing I knowe not, for there was a new starre in that constellation long ago & writ of by many." Letters, 88.

V.E., VI, xiv, 257. The "learned Hevelius in his accurate Selenography, or description of the moon."

(a) THOMAS HOBBS, 1588-1679. English philosopher and author of the Leviathan. Translated Thucydides and published it in 1629.

(b) M.T., 221. Reference to the map prefixed to Hobbe's translation of "Thucydides."

(a) ROBERT HOOKE, 1635-1703. English anatomist and microscopist. He was an original member of the Royal Society and its first curator by election. He was the discoverer of the cellular structure of plants, although he was so busy with his search for new topics of interest that he did not follow up his own discovery. It was not until 170 years later that Scheiden formulated the generalization that all plants are made up of cells. Hooke was a correspondent with Leeuwenhoek. He experimented with gunpowder. He acted as assistant and aid to Robert Boyle.

(b) To Edward, Aug. 7, [1676]. "You may read Mr. Hookes micrographia, page 156, observation 32, of Hayre and the texture of the skime." Letters, 84.

(a) THEODORUS JONSSON (THEODORUS JONAS), Pastor of the Parish of Hittendale, Iceland, and in correspondence with Browne.

(b) V.E., II, v, 157. The eagle stone.

(a) ANATHANASIVS KIRCHER (KIRCHERUS), 1601-1680. A German Jesuit who held the chair of mathematics in the Roman college at Rome. Prior to this he had taught philosophy, mathematics, and Oriental Languages at Wurzburg until driven from there by the Thirty Years War. He was the first scholar to call attention to Egyptian hieroglyphics. In 1658, in a book called an Investigation of the Plague Scrutinium pestis he stated that the disease, then common in Europe, was caused by minute 'worms' which he had seen in the blood of sick persons put under the magnifying lenses. This has often been taken to be an advance discovery of the bacilli, but Preserved Smith, [History of Modern Culture p. 14, thinks more probably it was merely the pus cells and rouleaux of blood corpuscles. He was an inventor of the magic lantern.

(b) To Edward, April 28, [1669]. Reference to his "sixt & tenth booke of his Mundus Subterraneus." Letters, 50.

To Edward, April 2, [1679]. The mention of ginseng in his China illustrata. Letters, 114.

V.E., I, ix, 67. Knowledge of Egyptian writing or hieroglyphics.

V.E., II, ii, 110. Quoted on explanations of variation of magnetic needle.

V.E., II, iii, 114. On the attraction and repulsion of the magnetic needle.

V.E., II, iii, 117. Discovered the loadstone not to attract hot iron or steel. An experiment tried also by Browne.

V.E., II, iii, 132. The effect of magnetism on tides.

V.E., II, vi, 162. On the mandrake.

V.E., III, x, 216. The suspending of a bird by the feet to serve as a weather vane.

V.E., III, xi, 218. On griffins.

V.E., III, xxviii, 305. The value of music in the cure of the bite of the tarantula.

V.E., VI, xiv, 258. On the different accounts of longitude.

V.E., VII, xviii, 325. Questions the burning of the ships of Marcellus by means of speculums.

M.T., 206, 208. The medicines Hippocrates made use of in the great plague of Athens. (Scutinium pestis.)

M.T., 269. The origin of the Indian in America.

(a) CHRISTIAN LONGOMONTAN (LONGOMONTANUS), 1562-1647. Danish astronomer.

(b) V.E., VI, i, 172. The age of the world.

(a) HENRY OLDENBURG, c. 1615-1677. Original member of the Royal Society. Acted with Dr. John Wilkins as secretary of the Society after 1663.

It was in this capacity that he corresponded with Browne.

(b) Cf. "Correspondence," Letters, 387-391.

(a) RUDOLPH II (RUDOLPHUS), 1552-1612. Emperor of Germany. Studied astrology and alchemy.

(b) To Edward, March 1, [1668-9]. Written to Edward who was at that time at Vienna. "How came you to see Rudolphus his glasse & what credit doth it beare? Dee I think was at Prag in his time." (John Dee, father of Arthur Dee, and associated with the alchemist Edward Kelley, a close friend of Browne, claimed to have seen and with the help of Kelley, achieved projection.) Letters, 48.

(a) CLAUDIUS SALMASTIUS (SALMATIUS), 1588-1653. French scholar. A friend of Casaubon and Gruther.

(b) V.E., I, viii, 60. In the "A brief enumeration of Authors."

V.E., II, i, 88. Held the crystal to be a diamond.

V.E., IV, xii, 72. De annis Climactericis.

V.E., V, vi, 101, 102. That the Romans reclined at their meals.

V.E., V, xi, 116. On the pictures of the Sibyls.

V.E., V, xix, 136. Figures of the Signs and Planets perverted.

G. of C., 81. The arrangement of the Roman cohorts.



(a) CHRISTOPHER WREN, 1632-1723. Christopher Wren, the architect of St. Paul's, was no mean scientist. He left Westminster School at fourteen. He was chosen by Dr. Scarborough as his assistant in anatomical lectures and demonstrations. He later worked under Willis (1621-1625). He did successfully an operation to remove the spleen, which Boyle mentions in his Essays of Experimental Natural Philosophy, 1663. In 1679 he invented a method of intravenous injection of drugs. He also invented the method of etching on copper, as well as painting on marble so that the figure would penetrate through. He made the first microscopic drawings of insects as seen under the microscope. He aided Lower in his experiments with blood transfusion. He advanced before the Royal Society a "Doctrine of Motions" in which by experiment he demonstrated Descartes' doctrine and drew his own conclusion from his many experiments. He proposed a History of the Seasons, which would be handled in much the same way as our present weather bureau records climatical data. He contrived a rain gauge. He studied the movements of the pendulum. He was an astronomer, and made many improvements in the accuracy and possibilities of observations made by the telescope. He discoursed on refractions and dioptics. He made maps of the constellations and a lunar globe. He made a study of navigation and demonstrated his findings by mechanical set-ups. He discovered a way for regulating temperature in artificial heating devices. All of this, and more, the architect of St. Paul's, a versatile, seventeenth century scientist, who had been forgotten in the general consideration of scientists. (Sprat: History of the Royal Society, pp. 311-317.)

(b) To Edward, Sept. 22, [1665]. "I hope Dr Wren is still in Paris." Letters, 31.

To Edward, April 28, [1669]. "Sr John Denham is dead & they say Dr Wren shall have his place." (Denham, president of the Royal Society, died in 1668 and was succeeded in the presidency by Christopher Wren.) Letters, 51.

## APPENDIX C

## BOOKS CONTAINED IN SIR THOMAS BROWNE'S LIBRARY

The book lists given here are taken from lists given by Malcom Letts in Notes and Queries, Robert Sencourt in Outflying Philosophy, and Hearne's Collections, volume 4. Unfortunately, Browne's library seems to have been sold in sections, and the two sales catalogues, since they do not contain the same lists, may suggest that there were other lists that have been lost. These two lists will, however, give an indication of the size and quality of Sir Thomas Browne's private library, as well as the variety of subjects in which he found interest.

The first list is that given by Letts in Notes and Queries, Series 11, volume 10, for October 24, 1914, pp. 321-3, and continued in the following numbers on pages 342 and 361. According to the sales catalogue, the books were divided into: 1. Greek and Latin; 2. French; 3. Italian; 4. Spanish; 5. Libri Tuetonice et Belgice (including Latin books and books in German and Dutch); 6. English. The library probably contained something under 2500 volumes. 420 of these were dated after 1682 and must have belonged to Edward, the surviving son of Thomas Browne. The list is as follows:

Athenaeus: Greek and Latin edition, 1612. Notes by J. Dalechamp and Isaac Casaubon. Contained books on theology, astrology, alchemy, magic, catalogues of auction sales, books on Egyptian plants and medicines, a treatise on potable gold, dictionaries, a work on bills of exchange, Acts of Parliament, books on seamanship, travel, coins, and medals. A description of the Grand Signoir's seraglio; a tract on the fall of purple rain at Brussels in 1647.

## On Seamanship:

1. Tim Gadbury, "Young Seaman's Guide," 1659.
2. Vossius, "On the Motion of the Sea and the Wind," 1677.
3. Blundiville, "Exercises," 1622.

## On Travel:

1. Moxon, "Tutor to Astronomy and Geography," 1659.
2. Leo, "Geographical History," - A record of extensive journeyings in Africa, Arabia, Persia, Barbary, Armenia, Syria and Egypt. The book was popular in Browne's day. Browne had a Latin version (not in the catalogue) and Porie's English translation of it.
3. Job. Ludolphus, "A New History of Ethiopia, &c." Ludolphus was also author of the "Ethiopic Lexicon," the first book of which was "Englished" by J.P. in 1682.
4. Vansleb, "Description of Egypt." English translation, 1678.
5. Rycaut, "Turkish History," 1679.
6. "Ortellius his Geography."
7. Braun, "Book of Cities."
8. Radziwill, "Journey to Jerusalem," translated from Polish into Latin.
9. Moses Pit, "New English Atlas," 1680. Published at the Sheldonian theatre at 2 l. a volume. It was probably the most expensive book in England at the time. Browne owned four out of the eleven volumes.

## On Medicine:

1. Hippocrates.
2. Avicenna
3. Galen
4. Averrhoes
5. Paracelsus
6. Seraphion the Moor
7. Matthiolus, "Commentary." French translation.
8. Dioscorides, 1598. In both Greek and Latin, by J. A. Saracenus, with copious and learned notes.
9. Bartolinus, "His Centuries of Rarer Observation," 3 volumes in 12mo or small octavo.
10. T. Love Morley, "De Moro Epidemico," 1678-9. London
11. Sir George Ent, a book printed in answer to Dr. Thurston, 1680.
12. Joubertus, "De Vulgi Erroribus," 1600.
13. Daniel Beckher, "Medicus Microcosmus."
14. Daniel Beckher, "Dissertatio de Cultrivoro Prussiaco." An account of a patient swallowing a knife ten inches long, and his subsequent recovery.
15. Jacob Horstius, "Vital Germanorum Medicorum." An account of a ten year old boy who had a gold tooth. The boy had been born in 1586, when the sun was in conjunction with Saturn in the Sign of the Ram and the heat engendered because of this conjunction changed the hard substance of the tooth into gold. A controversy ensued, and the boy was inspected by many doctors who wrote numerous tracts "de aureo dente." Horstius thought this was a sign predicting that the Golden Age was at hand and that the Turks would be driven out of Europe. The incident was a hoax, as the boy had had the tooth covered with gold leaf. None of the tracts other than the one by Horstius is included in Browne's library. He did have a tract by Adalbert Tylkowski, a learned Jesuit, on "de aureo dente," concerning a similar occurrence in 1673. A boy of three, born at Vilna, had a gold tooth that Tylkowski had inspected and found to be genuine, although no one else seems to have interested himself in the case.

On Natural History - Plants, Animals, and Minerals:

1. Dr. Grew, "Anatomy of Plants, with Sculptures," 1662.
2. Garcias ab Horto, "Simples and Drugs of India," a Portuguese book that was translated in full into the English in 1913 by Sir Clements Markham. The book Browne had was the abridged translation in the "Exotica" of Clusius, 1605. Clusius was in charge of the Emperor's garden while Edward Browne was in Vienna in 1668.
3. Aldrovandus, his collection on plants, animals, and minerals in the catalogue.
4. Belon, "De la Nature des Oyseaux," 1555.
5. Willoughby, "Ornithologia," Ray's edition, 1676.
6. Athanasius Kircher, "Hieroglyphical Doctrine of the Egyptians," 1652. Letts says he was "well represented." Kircher was founder of the Museo Kircheraneo at Rome, which still includes his collection of Roman and Italian coins. Edward Browne visited him at Rome.
7. Alexander ab Alexandro, a Neapolitan lawyer. "Geniales Dies," which contains a mass of learning on every subject of Roman philology and antiquities.
8. Gruter, "Corpus." On ancient inscriptions.
9. Jovius, "Elogia," 1571.

Classics:

1. Homer, in both the Greek and Latin. )
2. Aristotle )
3. Strabo )
4. Pausnias ) All in two editions
5. Thucydides )
6. Herodotus )
7. Plutarch )
8. Athenaeus )
9. Virgil, with a commentary by Servius.
10. Solinus with the Exercitations of Salmasius.
11. Pliny, in Greek and Latin.
12. Licetus, "De Quaestis Epist.," 1640.
13. Julius Scaliger, "Historia Animalium," with a commentary and printed at Tholouse in 1619. Both Greek and Latin editions.
14. North, "Plutarch's Lives," translation.
15. Holland, "Pliny," translation.
16. Holland, "Suetonius," translation.
17. Holland, "Plutarch's Morals," translation.
18. Ogilby, "Iliad," translation.
19. Stapylton, "Juvenal," translation.
20. Eutropius, "History," 1614. Translated by several hands.
21. Dante. (Venice, 1578)
22. Tasso, "Gierusalemme Liberata,"
23. Pineda, "Monarchia Ecclesiastica," 1620. (Spanish)
24. French translation of Boccaccio's "Decameron."
25. Amyot, "Plutarch's Lives," translation.
26. French edition of "Natural History of the Antilles."
27. Butler, "Hudibras," Part III only listed.

28. Michael Drayton, a book of poetry dated 1612.)  
 29. Spenser  
 30. Milton  
 31. Ben Jonson  
 32. Beaumont and Fletcher  
 33. Cowley  
 34. Walton and Cotton, "The Compleat Angler."  
 35. George Herbert, "The Temple."  
 36. Samuel Daniell, "Poetical Essays."  
 37. Evelyn, "Sylvia; or a Discourse of Forest Trees," 1664.  
 38. Evelyn, "A Parallel of Ancient Architecture."  
 39. Evelyn, "A History of Three Late Famous Impostors," published by J.E. Esquire, 1669.
- ) Letts lists these  
 ) only as authors.

There is but one work on witchcraft listed, and that is an unimportant tract by one R.T., Price 10d. "The Opinion of Witchcraft vindicated in an Answer to a book Intituled the Question of Witchcraft Debated. Being a letter to a friend. By R.T. 1670."

Sencourt's list is as follows:

"The catalogue of the Libraries of the learned Sir Thomas Browne and Dr. Edward Brown, his son late President of the Royal College of Physicians" was printed by Thomas Ballata, Bookseller, at the Rising Sun in Little Britain. The auction was to begin at the Black Boy Coffee House in Archway Lane near Ludgate on Monday the 8th day of January 1711-10. The Catalogue, according to the custom, gives the date and place where each book was printed, and we may infer that Sir Thomas bought most of the books which appeared before his son grew up, especially as we notice that those bearing the dates of Sir Thomas' youth are so much more tinged with metaphysics and theology. Amongst the English books in 8<sup>vo</sup> and 12<sup>mo</sup> are

St. Augustine's <u>Confessions</u> with Notes	1550	London
<u>Eikon Basilike</u>	1648	"
Lewis de Granada, <u>Meditations</u>	1633	"
Thomas à Kempis, <u>Following of Christ</u>	1620	"
G. Herbert, <u>Temple, Sacred Poems</u>	1641	"
Henry More, <u>Immortality of the Soul</u>	1659	"
Bishop Taylor, <u>Dissuasion from Popery</u>	1664	Deb.
" " , <u>On the Liberty of Prophecy</u>	1674	London
Sir Richard Baker, <u>Meditations on the 7 Penitential Psalms</u>	1639	"
Sir Richard Baker, <u>Meditations on the 7 Consolatory Psalms</u>	1640	"
Sir Richard Baker, <u>The Lords Prayer</u>	1640	"
St. Augustine, <u>City of God.</u>	1630	"
Bishop Joseph Hall, <u>Works</u> , volumes 1 and 3	1647, 1662,	London
Bishop Stillington	1665	London
Der Wey der Saligheyt	1638	Brussels
Vine Maria d.S. Caterina de Siena <u>Viaggio al lad Orient Sic</u>	1672	Rome
R. Descartes, <u>Les Passions de L'Ame</u>	1650	Amsterdam
<u>Theologia Platonica de Immortalitate Ammor Sic</u>	1559	Paris

Thomas More, <u>Utopia a Mendis Vindicata</u>	1629 Amsterdam
Lud de Morain villier <u>Examen Philosophiae Platonicae</u>	1656 Macl.
Diogenes Laertius	1570 H. Steph.
Bellarmino de Ascensio Mentis in Deum	1615 Tulli.
Philonus Judaei Opera	1613 Col. All.
Clementis Alexandr Opera	1629 Paris
S. Dionysii Areopag Opera	1644 Paris
Origenis Opera	1571 Bas.
S. Hieronyny Opera	1645 Paris
2. Sept. Flor. Tortulliani Opera	1617 Col. Agr.
S. Ambrosii	1586 Paris
S. Thomas Aquinatis <u>Summa Theologica</u>	1638 Paris
S. Bonaventurae, <u>Meditations</u>	1638 Rome
Thomas White, <u>Contemplation of Heaven</u>	1660 Paris
George Herbert, <u>Temple</u>	1641 London
R. Descartes, <u>Of a Method for the Well-Guiding of Reason</u>	1649 London
Thomas Ashmole, <u>Theatrum Chemicum Britannicum</u>	1652 London
T. Fuller, <u>Pisgah Sight</u>	1650 London
Edward Herbert, <u>Baron de Cherbury de la verite</u>	1639 Em.
He also had divers works of Bacon	

From Hearne's Collections, volume IV, 214., 321.

Entry for July 19, 1713. Catalogue of Sr Tho. Br's Mss. Amongst these (1) A Genealogical Account of y<sup>e</sup> Families in Suffolk, with their Arms curiously drawn & illuminated. (2) Original Letters by K. Charles I. (3) Genealogical Account of the Families of Norfolk. (4) Account of ancient Medals. (5) An Historical and Chrographi(c)al Description of Suffolk, written in y<sup>e</sup> year 1602. (6) An Historical & Chorographical Description of Norfolk. (7) A Collection of 90 very curious Drawings (some in Colours) of Public Buildings, Habits, Fishes, Mines, Rocks, Tombs, & other Antiquities, observed by S<sup>r</sup> Thos. and Dr. Ed. Br. in their travels.

Entry for Aug. 22, 1730. . . . He Mr. William Beckett hath in a MS. in Physick and chirurgery that belong to Sir Thos. Browne of Norwich. It is in Vellom. The Author was John Ardern, Arden, or Adreson.

## APPENDIX D

The Garden of Cyrus

In the foregoing chapters, an attempt has been made to show that Browne was not the solitary man who lived oblivious to or uninterested in the events that were taking place about him, as so many critics have asserted. Such a criticism has been largely based upon the evidence offered by the Religio Medici, the Urn Burial, and the Garden of Cyrus. Indications why the first two books could scarcely be expected to show many allusions to current national events have been given many times. A word might be added concerning the Garden of Cyrus. It is strange that this book, instead of the other two, has not been the principal basis for such a conclusion, for the Religio Medici is so obviously written by a young man who was interested in his own religious reactions, beliefs, and sentiments, and the Urn Burial is so clearly an occasional piece, that one might well wonder why anything more than what they offer could be expected. The superb language and manner of the Religio Medici and the aptness with which Browne has been able to give expression to that undefinable thing - personal mysticism - should have allowed it to remain in the category where it properly belongs, among those few pieces of personal meditations that show the author intimate with himself and not at the same time, concerned with the events taking place about him.

The Garden of Cyrus is, perhaps, Browne's most curious work and has all the marks of having been written because its author enjoyed playing with his own knowledge, and liked the feel of the quincunxes under his pen. To one not versed in the history and the use of this particular mathematical arrangement, or who has neither the knowledge nor the desire to follow Browne as he arranges these quincunxes to suit his own fancy, the book presents a formidable appearance. It might well be

a greater argument for Browne's lack of interest in public affairs than the other two books. It is much more the product of the mature, serious mind than the Religio Medici, and it reflects to a greater extent than either of the other two the desire to indulge the fancy by collecting the numerous instances in which this particular mathematical arrangement can be found until it presents a panorama of such natural and artificial arrangements. Even this book, however, indicates that Browne could not get away from his period, and, besides the famous "hunter" statement at the close, one of the most whimsical and appealing in all of his works, there are indications that this book also arises from contemporary interest, for it was written because the author had the desire to experiment with the possible application of a "mathematical truth" and of generalities U finita (rules without exception) in Nature.<sup>1</sup>

The book is unique, and was written in the heat of its conception. The explanation included in the "Epistle Dedicatory" to Nathaniel Bacon accounts for the composition and shows clearly that it belongs to the seventeenth century. The letter suggests that the "volume", as Browne calls it, might well be classed with those letters exchanged between men of learning that concerned both strange and true things to which the attention might be called.<sup>2</sup>

You have been so long out of trite learning, that 'tis hard to finde a subject proper for you; and if you have met with a Sheet upon this, we have missed our intention.<sup>3</sup>

His interest in the numerous quincuncial arrangements to be found both in natura and in the artifices of man must have so held the author that he was impelled to finish the treatise before he laid down his pen.

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1. G. of C., 66.

2. Cf. chapter III.

3. G. of C., 65.



It was produced, not because the author had spent all of his time thinking of such examples as he might use in it, or accumulating those facts that would make it possible for him to write such an unusual tract, but because the same brain that made him investigate the blood system of earthworms, and notice that certain substances did not have the property of electrical attraction, also made him speculate upon the prevalence of quincuncial arrangements in nature. The book has the marks of being the sudden outgrowth of an engaging fancy, but it is not quite typical of the usual Browne. It lacks his skepticism, his insatiate curiosity concerning the things about him except as it reflects close and accurate observation of natural arrangements, and his love for experimentation as shown even in the Urn Burial. Nevertheless, when one has read it for the third or fourth time, he begins to feel in it the essence of Browne's style, the beauty of his manner of statement, and the curious play of his mind as he arranges his collections of quincunces. The theory that it was the result of a mental whim is somewhat further substantiated by the fact that we find no other work that is similar to it either before or after its composition, nor does Browne anywhere in his other writings refer to its theme. No pet "brain-child" is so easily and completely discarded unless the sudden caprice for which it was written has been satisfied, and if the topic presents no permanent interest. For this reason, even the Garden of Cyrus cannot be used too unqualifiedly as proof of his withdrawal into his own interests.

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