

“He was thoroughly versed both in ancient and modern Learning, acquainted with the Oriental Tongues, a Master of the Greek and Latin, French and Italian Languages, deeply skilled in the Mathematical Sciences, and in Natural and Moral Philosophy, as several Pieces of his Writing witness, which have been repeatedly printed in divers Parts of Europe, and are highly esteemed by the Learned.”

*from Benjamin Franklin’s Obituary of
James Logan (1674-1751)*

The manuscript of James Logan’s master work, **Of the Duties of Man, as they may be deduced from Nature**, written in the years 1735-c.1737, was lost for over 200 years, and only rediscovered in the early 1970s— *it is published here for the first time.*

Characterized by scholars as “the only surviving non-theological tractate on moral philosophy written in colonial America,”¹ and “the crowning work of Logan’s intellectual life,”² the book sheds new light on the true philosophical roots of the American revolution, and reveals the richness and depth of America’s classical intellectual heritage.

Logan’s book, and its surprising historical context—dramatically recounted in the introductory essay by editor Philip Valenti—challenges the conventional textbook mythology that credits John Locke and Isaac Newton as the major ideological influences on Franklin and the American Founders. Valenti shows that Logan’s work was, in large part, intended for the education of the young Franklin personally, and may have been decisive in shaping Franklin’s mature philosophical outlook.

Of the Duties of Man is, in effect, a *declaration of intellectual independence from British philosophy*— an essential prerequisite to establishing political independence in 1776, as well as maintaining and strengthening it today.

¹ from the entry “James Logan” in the *Complete Dictionary of Scientific Biography*, by Edwin Wolf 2nd, Curator (1953-1955) and Librarian (1955-1984) of the Library Company of Philadelphia, and editor of major volumes cataloging the libraries of Logan (1974) and Benjamin Franklin (2006).

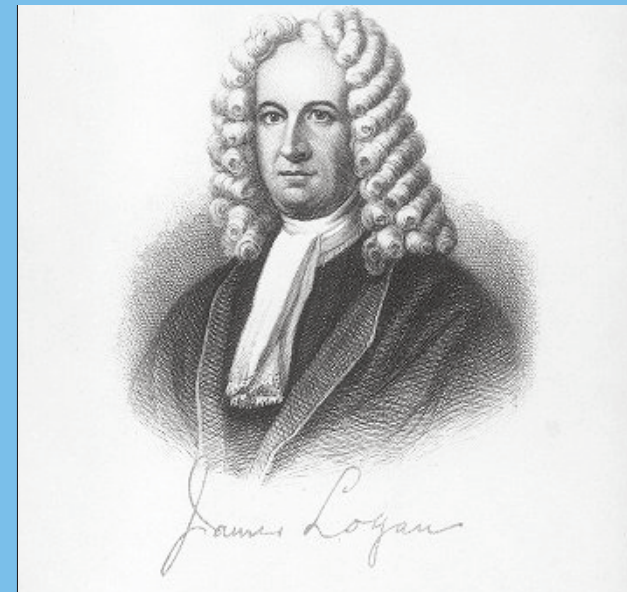
² Frederick B. Tolles, *James Logan and the Culture of Provincial America* (Boston, Toronto: Little, Brown & Co., 1957).

Logan

*Of the Duties of Man
as they may be deduced from Nature*

edited with an
introductory essay by
Philip Valenti

Of the Duties of Man as they may be deduced from Nature



James Logan

edited with an introductory essay,
*“Toward the Education of Benjamin Franklin:
James Logan’s Challenge to Locke & Newton”*
by Philip Valenti

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by Philip Valenti

Philadelphia, Pennsylvania

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and assistance over two generations.*

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November 7, 1751

The Pennsylvania Gazette

Obituary of James Logan

Thursday last, after a long Indisposition, died the honourable JAMES LOGAN, Esq; in the 77th Year of his Age; and on Saturday his Remains were decently interr'd in the Friends Burying Ground, in this City, the Funeral being respectfully attended by the principal Gentlemen and Inhabitants of Philadelphia and the neighboring Country. His Life was for the most Part a Life of Business, tho' he had always been passionately fond of Study; He had borne the several Offices of Provincial Secretary, Commissioner of Property, Chief Judge of the Supreme Court, and for near two Years govern'd the Province as President of the Council, in all which publick Stations, as well as in private Life, he behav'd with unblemish'd Integrity: But some Years before his Death he retir'd from publick Affairs to Stenton, his Country Seat, where he enjoy'd among his Books that Leisure which Men of Letters so earnestly desire. He was thoroughly versed both in ancient and modern Learning, acquainted with the Oriental Tongues, a Master of the Greek and Latin, French and Italian Languages, deeply skilled in the Mathematical Sciences, and in Natural and Moral Philosophy, as several Pieces of his Writing witness, which have been repeatedly printed in divers Parts of Europe, and are highly esteemed by the Learned. But the most noble Monument of his Wisdom, Publick Spirit, Benevolence, and affectionate Regard to the People of Pennsylvania, is his LIBRARY; which he has been collecting these 50 years past, with the greatest Care and Judgment, intending it a Benefaction to the Publick for the Increase of Knowledge, and for the common Use and Benefit of all Lovers of Learning. It contains the best Editions of the best Books in various Languages, Arts and Sciences, and is without Doubt the largest, and by far the most valuable Collection of the Kind in this Part of the World, and will convey the name of LOGAN thro' Ages, with Honour, to the latest Posterity.

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Editor's Preface:

An Historical “Rosetta Stone”

What if the hand-written manuscript of a major philosophical treatise by Benjamin Franklin were suddenly discovered, which specified in detail the philosophical motivations of his revolutionary scientific and political achievements? What if that manuscript contradicted many of the accepted academic and popular theories concerning the founding principles of the American revolution propagated today?

While such a manuscript by Franklin does not, as far as is known, exist, yet the next best thing was discovered in the early 1970s— the long-lost manuscript of a major philosophical treatise by Franklin's Philadelphia mentor James Logan, a writing which was, in large part, intended for the education of the young Franklin personally. The discovery first became widely-known with the publication of Edwin Wolf 2nd's catalog of Logan's library in 1974, which quoted some sections from it, and also included many remarkable letters of Logan never published before.¹

Immersed in the revival of American studies prompted by the 1976 Bicentennial, I was already quite keen to investigate any primary sources that might shed new light on the highly significant controversy over John Locke's alleged influence on the Founders.² When, sometime in 1975 or 1976, I visited the

¹ I was first alerted to the discovery by my good friend Bernard Salera, who was researching Logan as part of his Library Science studies at the time.

² See for example the writings of Lyndon H. LaRouche, Jr. and his associates from that period, including: Nancy B. Spannaus and Christopher White, *The Political Economy of the American Revolution* (New York: Campaigner Publications, 1977); W. Allen Salisbury, *The Civil War and the American System* (New York: Campaigner Publications, 1978); Anton Chaitkin, *Treason in America* (New York: New Benjamin Franklin House, 1984); H. Graham Lowry, *How the Nation Was Won* (Washington, DC: EIR, 1987). Also see: Garry Wills, *Inventing America: Jefferson's Declaration of Independence* (Garden City, NY: Doubleday & Co., Inc., 1978).

Historical Society of Pennsylvania to view the manuscript, archivists there explained that it had been discovered in a box of account books bequeathed to the Society a few years before. I found that it consisted of about 200 sheets, most about 12 to 13 inches long and about 8 inches wide, almost all covered with Logan's handwriting on both sides (making a total of about 400 pages of manuscript), with some letters as small as 1/16th of an inch, and some margins full of notes written both vertically and horizontally. The librarians kindly photocopied the entire manuscript for me, which allowed me to examine it in detail over the next weeks.

Eureka! I soon recognized that the work might represent a sort of “rosetta stone,” a guide to unraveling the threads of American colonial thought leading to 1776, contradicting many currently accepted theories, and with significant implications for politics today.

For example:

1. It shows that Americans tended to reject Locke's moral theories, and favored the “moral sense” doctrine propounded by Locke's political and philosophical opponents.

2. It shows that American thinkers did not accept the main scientific tenets of Newtonianism, and sheds important light on the true scientific motives of Franklin's electricity experiments, especially the “kite and key” experiment of 1752.

3. Along with Logan's correspondences, it tends to confirm that the most famous scientific controversy of all time, the Leibniz-Newton dispute over discovery of the calculus, was politically-motivated, with a surprising connection to the growing conflicts between American and British scientists and political leaders in the 18th Century.

4. It demonstrates that American thinkers had established intellectual independence from British philosophy decades before 1776.

In the process, Logan reveals himself as a brilliant and passionate lover of art, poetry, drama, and music, brimming with good humor and conviviality, far from the stereotype of the dour Quaker merchant.

Among other important political implications is certainly the significance of all this for the theory underlying the U.S.-

British “special relationship” of the 20th Century to the present, one which falsely claims that the American revolution was mainly the consequence of blundering British policies at the time, and not a persistent conflict between fundamentally opposed philosophical and moral outlooks.

Naturally, I fully expected such a work to be transcribed, edited, and published by professionals fairly quickly. In the meantime, I wrote a series of four lengthy and detailed reports in 1977 and 1978 based on my initial findings, which were privately circulated among friends. Over the following years, I produced several published articles and occasionally lectured about Logan and his ideas. However, by the time 35 years had passed, it had become abundantly clear that, if Logan's book were to ever see the light of day, I would have to take on the task myself.³

And the task was a daunting one. While some chapters are complete, and written in an elegant and legible hand, much of the rest consists of fragments, drafts and redrafts of chapters, and dozens of excerpts of classical sources hand-written in Greek and Latin. Logan also provides many footnotes, some amounting to major dissertations in their own right, while others quote Latin and Greek sources at length— his source citations are usually abbreviated, requiring some skill in classical scholarship just to decipher them. In this edition, almost all of Logan's Latin citations have been painstakingly proofread and corrected, and translations provided, usually from sources in the public domain, unless otherwise noted. Similarly, the Greek terms used in the text have been carefully proofread, but I have noted “[Greek text]” in the place of Logan's lengthier Greek citations, and usually provided a translation. In general, all of the material in brackets are my interpolations.

Another issue is what Franklin criticized as Logan's “dilate manner of writing.” An example is the following unedited “sentence”, excerpted from Chapter 5:

That Reason is a great & Noble Gift of Heaven
granted to man for the Discovery of Truth, in things

³ Andrew Laverdiere of Oakland, CA deserves the credit for a first attempt at a very rough transcription.

corresponding with our Condition here: that it enables us to observe congruities or fitnesses not only of such things & their parts as are immediately Subjected to the cognizance of our external Senses, but also more internally, of the Ideas of Actions, of Behaviour, and of Conduct in Life: that it is capable of Judging of its own Ideas & operations, of our Affections, Passions & Appetites; that it can often discover & trace up effects to their causes, discern & contemplate the Beauty, Regularity & Order that shine out in all the parts of the Creation that have relation to us & our faculties; and equally doubtless in the whole: And from this view point out how we ought proportionably to regulate our own inward Conduct & that of all our Actions: And further that by its means, we are conscious of all this, can reflect on what Passes within us, call up our past Ideas, collate & form Judgements on them, & thus from the proper attending Powers planted also in our Constitution, enjoy refined Pleasures from Knowledge & Contemplation, exceeding all others y^t we are Susceptible of from our formation.

That Reason, I say, is capable of all this, & was granted for these, & Such Ends, is what we ever ought to be persuaded of, & most gratefully acknowledge the Divine Goodness in bestowing on us so Noble a Faculty.

While I have studiously avoided any changes in Logan's words or the order of his ideas, adding nothing of my own outside the brackets, I have modernized his spelling and capitalization, modified or added punctuation where appropriate, and divided longer sentences into shorter ones consistent with his meaning. Also, while all the underlinings are Logan's, the italics are mine, and I have added subheads within each chapter to highlight the principal subject matter of each section.

Besides this, I have omitted nothing except small fragments, and a footnote of dense polemics against the writer Peter Browne, which seemed a bit too tangential to include, and which are referenced in other parts of the book in any case.

On the question of Logan's racial attitudes, let it be stipulated from the outset that both Logan and Franklin owned slaves, and that, in his manuscript, Logan refers to "American Indians and African Negroes" as examples of "the most barbarous nations." Yet, it also must be acknowledged that Logan uses these examples to demonstrate the absolute equality of all mankind as to natural inclinations and affections, in order to refute Locke's arguments denying any universal morality. Nevertheless, while arguing that standards of beauty are universal, Logan's language does belie an underlying prejudice, one which Franklin acknowledged in himself much later, upon witnessing the performance of the children of Philadelphia's "Negro School" in 1763, long after Logan's decease. In a letter, Franklin wrote that he was "much pleas'd, and from what I then saw, have conceiv'd a higher Opinion of the natural Capacities of the black Race, than I had ever before entertained. Their Apprehension seems as quick, their Memory as strong, and their Docility in every Respect equal to that of white Children. You will wonder perhaps that I should ever doubt it, and I will not undertake to justify all my Prejudices, nor to account for them." ⁴ The later activities of Franklin, and the Quakers, against slavery are very well known.

One might also question the relevance of Logan's differences with Locke. Admitting that Logan opposed Locke on the issue of morality, totally rejecting his core doctrine of pain or "uneasiness" as the motive of all human action, and upholding the contrary principle of the "moral sense," was this issue reflected at all in the ideas or actions of the Founding Fathers many decades later? Putting aside the example of Franklin himself, consider the interesting case of James Wilson of Pennsylvania, signer of both the Declaration of Independence and the U.S. Constitution, and, like Logan and many of his correspondents, born of Scottish parents and educated by Scottish scholars. A legal expert of the highest order, Wilson was a key leader of the Constitutional Convention, and was appointed Associate Justice of the first Supreme Court by George Washington in 1789. As the first professor of law at the

⁴ J.A. Leo Lemay, ed., *Benjamin Franklin Writings* (New York: The Library of America, 1987), 800.

Franklin-founded College of Philadelphia (later the University of Pennsylvania) in 1790, Wilson initiated a series of law lectures, both for his students, and for the benefit of President Washington and his administration, as Philadelphia was then the nation's capital.

Wilson felt it necessary to begin his lecture *On the Nature and Philosophy of Evidence*, with a thorough refutation of Locke. While he, of course, does not cite Logan as a source, it is clear that his and Logan's reasonings are very similar, as they were both influenced by the so-called "Scottish Enlightenment," usually identified with the ideas of Francis Hutcheson, a source frequently cited by Logan in his manuscript. After a detailed analysis, Wilson concludes that Locke's theory of ideas,

has no foundation in reason, in consciousness, or in the other operations of our minds; but that, on the contrary, it is manifestly contradicted by all these, and would, in its necessary consequences, lead to the destruction of all truth, and knowledge, and virtue; though those consequences were, by no means, foreseen by Mr. Locke....

If this theory has, as we have shown it to have, no foundation— if these ideas have, as we have shown them to have, no existence; then Mr. Locke's great principle, which represents knowledge and belief, and consequently evidence, upon which knowledge and belief are grounded, as consisting in the perception of the agreement or disagreement of those ideas, must tumble in ruins, like a superstructure, whose basis has been undermined and removed.

It is nevertheless true, that, in our law books, the great principles of evidence, so far as any notice is taken of general principles on this subject, are referred, for their sole support, to the theory of Mr. Locke.... This unfolds the reason why I have employed so much pains to expose and remove the sandy and unsound foundation, on which the principles of the law of evidence have been placed.

Let us now proceed to erect a fabrick on a different and a surer basis— the basis of the human mind.⁵

Wilson goes on to develop his own, more American, theory of the “source of evidence,” in the process contradicting other British legal authorities, including Blackstone. He prominently cites the moral sense, which he describes at length as “that faculty of the mind, by which we have the original conceptions that there is a right and a wrong in conduct; and that some particular actions are right, and others wrong.... The moral sense is a distinct and original power of the human mind.... In dignity, it is far superiour to every other power of the human mind.”⁶ Readers will recognize these ideas as identical to those of James Logan.

It is worth noting that Wilson, in a lecture titled, *Of the Natural Rights of Individuals*, also contradicts Locke on the question of slavery. “Slavery, or an absolute and unlimited power, in the master, over the life and fortune of the slave,” Wilson writes, “is unauthorized by the common law. Indeed, it is repugnant to the principles of natural law, that such a state should subsist in any social system.”⁷

Finally, I trust that the length of my introductory essay will be excused as necessary to the subject, since it endeavors to counterbalance many weighty tomes published over more than a century, all dedicated to establishing the ideological preeminence of Locke and Newton in the founding of the United States. Paraphrasing Wilson, “this unfolds the reason why I have employed so much pains to expose and remove the sandy and unsound foundation” underlying much of American historiography.

However, if American readers of Logan's work come to an increased appreciation of their profound intellectual heritage, and perhaps realize a new and better national identity as a result,

⁵ Kermit L. Hall and Mark David Hall, eds., *Collected Works of James Wilson*, Vol. 2 (Indianapolis, Indiana: Liberty Fund, Inc., 2007), 797-798.

⁶ *Ibid.*, 802-803.

⁷ *Ibid.*, 1077.

this publication would have served a great purpose by that event alone.

Philip Valenti

Philadelphia: January 22, 2013

Introductory Essay

Toward the Education of Benjamin Franklin: James Logan's Challenge to Locke and Newton

by Philip Valenti

"I think it behooves us all to join Hands for the Honour of the American Philosophy." *Benjamin Franklin to Cadwallader Colden, April 12, 1753*

This first publication of a major philosophical treatise by colonial American scholar James Logan (1674-1751) represents much more than a mere historical curiosity. The late Edwin Wolf 2nd, renowned librarian of the Library Company of Philadelphia, characterized it as "the only surviving nontheological tractate on moral philosophy written in colonial America."⁸ Adding to the interest about this work is the circumstance that the manuscript, consisting of about 400 pages of drafts, notes, and some finished sections, was considered lost for over 200 years, and only rediscovered in the early 1970s.

The significance of the work comes into focus once we consider Logan's role as a mentor of Benjamin Franklin, John Bartram, Thomas Godfrey, and other promising Philadelphia youth during the city's formative years as an American intellectual center, as Logan rose from secretary to William Penn, becoming the premier political and intellectual leader of

⁸ Edwin Wolf II, "James Logan." *Complete Dictionary of Scientific Biography*, www.encyclopedia.com.

Pennsylvania. Franklin and other ingenious young men of his *Junto* spent much time at Logan's Stenton mansion in those years, no doubt discussing the very issues addressed in Logan's treatise, which may have played a much greater role in the development of Franklin's mature philosophical outlook than has been understood hitherto by historians. Certainly, Franklin and the others also visited Logan to have access to his library, "the greatest of all American colonial libraries"⁹ —Wolf's scholarly and comprehensive 1974 catalog lists 2,185 titles in 2,651 volumes.

Logan as a mentor also represented an accomplished scientist, classical scholar, and original thinker, recognized as such by leading figures in European science. Fluent in Latin and Greek, Logan stood on an intellectual level equal to the greatest thinkers of the day. His accomplishments included an original development of Christiaan Huygen's work in optics, and studies of Pythagoras and Euclid shared with German classical scholar Johann Albertus Fabricius, both resulting in publication of Logan's writings in Europe. Logan's 1727 experiments with maize demonstrated the sexual reproduction of plants, and confirmed for Logan the "amazing Order and Beauty" of Nature.¹⁰ These findings, published in Leiden in 1739, created a sensation among European scientists, and caused the great Swedish botanist Linnaeus to communicate his thanks and congratulations to Logan, and to refer to him as an authority in his own system of classification of plants.

Logan's appreciation of Franklin's potential, and his direct support and encouragement of many of Franklin's projects, is well known. These include providing Franklin with his first large printing job; supporting his plan for the first public subscription library in America, the Library Company of Philadelphia; and placing himself and his library at Franklin's service in founding the Academy of Philadelphia, later the

⁹ Frederick B. Tolles, "James Logan—A Canterbury Pilgrim", *Address delivered before the Welcome Society of Pennsylvania on November 19, 1955, at the General Wayne Inn*.

¹⁰ Roy N. Lokken, ed., *The Scientific Papers of James Logan* (Philadelphia: Transactions of the American Philosophical Society, Vol. 62, Part 6, 1972), 87.

University of Pennsylvania. In 1744, Franklin published Logan's translation of Cicero's *Cato Major* on old age, adding in the preface his "heartly Wish, that this first Translation of a Classic in this Western World, may be followed with many others, performed with equal Judgment and Success; and be a happy Omen, that Philadelphia shall become the Seat of the American Muses."¹¹ Franklin's obituary of Logan summarized his intellectual achievements: "He was thoroughly versed both in ancient and modern Learning, acquainted with the Oriental Tongues, a Master of the Greek and Latin, French and Italian Languages, deeply skilled in the Mathematical Sciences, and in Natural and Moral Philosophy, as several Pieces of his Writing witness, which have been repeatedly printed in divers Parts of Europe, and are highly esteemed by the Learned."¹²

All of this demonstrates Logan's role as an intellectual force in the early development of what Franklin later termed "the American Philosophy." So, a study of what was intended as "the crowning work of Logan's intellectual life" ¹³ ought to be required for a full appreciation of the influences leading to the events of subsequent decades, in which Franklin played such a central role. Moreover, it is the thesis of this introductory essay that Logan's work itself constituted a *declaration of intellectual independence* from British philosophy, i.e., an *independence in the realm of ideas* essential to true political independence. While Logan wrote that his treatise was intended as a refutation of Thomas Hobbes, "taking this for my foundation against Hobbes that Man was primarily in his Nature formed for Society," Logan went on to also challenge the then-orthodox British doctrines represented by John Locke and Isaac Newton. For, notwithstanding his expressions of respect and esteem for

¹¹ *M.T. Cicero's Cato Major, or His Discourse of Old-Age: With Explanatory Notes*. Philadelphia: Printed and Sold by B. Franklin, MDCCXLIV. (Yale University Library); see Leonard W. Labaree, Whitfield J. Bell, Helen Boatfield, Helene Fineman and James H. Hutson, eds., *The Papers of Benjamin Franklin*. (New Haven: Yale University Press, 1959-2011), vol. 2.

¹² Obituary of James Logan, Printed in *The Pennsylvania Gazette*, November 7, 1751; *Ibid.*, vol. 4.

¹³ Frederick B. Tolles, *James Logan and the Culture of Provincial America* (Boston, Toronto: Little, Brown and Co., 1957), 210.

the latter British thinkers, Logan expressly rejected and opposed Locke on the crucial issue of *morality*, devoting many pages to refuting his central dictum that “uneasiness directs the will,” and also challenged the Newtonian dogmas concerning light, the “vacuum,” and “action-at-a-distance,” i.e., gravitational “attraction,” dogmas which threatened to stifle scientific and technological progress.

Furthermore, Logan pointed to the phenomenon of *electricity*, some 10 years before Franklin began his own experiments in this area, which, Logan suggested prophetically, constituted “a field opened for speculations that, if duly pursued, may probably lead us into more just and extensive notions of our bodies and the world we live in, than have hitherto been generally thought of.” Logan was quite conscious that he was challenging the very foundations of the established British orthodoxy. “And if there be no *heresy* mentioning it in the present age,” Logan wrote, “why may we not venture to question the reasonableness of asserting a vacuum as indispensably necessary to the continuance of motion.” (emphasis added) Franklin used similar language in a famous letter to his scientific co-thinker Cadwallader Colden, another protégé of Logan, where he put forward Logan-like hypotheses concerning the “electric fluid” and light: “’Tis well we are not, as poor Galileo was, subject to the Inquisition for Philosophical Heresy. My Whispers against the orthodox Doctrine in private letters, would be dangerous; your Writing and Printing would be highly criminal. As it is, you must expect some Censure, but one Heretic will surely excuse another.”¹⁴

Accordingly, a thorough study of Logan’s book, combined with the letters and writings of Franklin and Colden, may also shed important light on the circumstances of Franklin’s celebrated 1752 “kite and key” experiment concerning lightning and electricity, which can be seen in this context as intended to test Logan’s hypothesis concerning space and disprove the Newtonian “vacuum.”

¹⁴ ALS: New-York Historical Society; also draft; American Philosophical Society; Franklin to Colden, April 23, 1752; Labaree, et al., *Papers of BF*, vol. 4.

Perhaps the strongest evidence of Logan's break with established British thought in that period was his defense of Gottfried Wilhelm Leibniz against false charges of plagiarism of the calculus from Newton. Not only was this the premier scientific controversy of the day (and perhaps of all time), but unquestioning support of Newton against Leibniz became virtually a test of loyalty to England and the Empire, as, in this case at least, the British Royal Society constituted the Inquisition that Franklin feared, half in jest, in his letter to Colden. While Logan suspected that the attack on Leibniz was politically-motivated, both Locke and Newton were, in fact, important political instruments of that faction in English politics determined to create a British Empire, as Leibniz was the political ally of that opposite faction best termed *Commonwealthmen*. The latter faction gathered as a coalition of "Country Whigs" and "Country Tories" against the "Court" factions of both parties, and included renowned literary figures and thinkers such as Daniel DeFoe, Jonathan Swift, John Toland, and Anthony Ashley Cooper, the Third Earl of Shaftesbury, all led by English patriot Robert Harley during the period 1689-1714. Leibniz was crucial in providing this faction its *raison d'être*, by establishing the claims of his patroness, the Electress Sophia of Hanover, of succession to the throne of Britain. In 1701, Harley's faction caused Parliament to adopt the Act of Settlement, naming Sophia and her family as next in line to the British throne after the childless Queen Anne, which also threatened to put Leibniz into the center of power and thus foil the plans for empire.

Thus was the stage set for the political struggles of that period, so momentous for the fate of America. An understanding of this history is necessary to put Logan's work in its proper context, and fully appreciate its significance.

Locke

The 1688 "Glorious Revolution," which chased the Stuart King James II into exile in France, and replaced him with the Dutch Prince William of Orange and his wife, James's daughter Mary, is usually portrayed as a victory for the principle

of “limited monarchy” and the rights of the people. It was, however, a giant step towards creation of the future British Empire, by unifying the naval and financial power of Holland and England, consolidated in 1694 with the establishment of the Bank of England on the model of the Bank of Amsterdam.

Among the English aristocrats responsible for this change was Anthony Ashley Cooper, First Earl of Shaftesbury (grandfather of the Third Earl), and Charles Montagu, First Earl of Halifax. Montagu was a key player in the creation of the Bank of England, becoming Chancellor of the Exchequer in 1694, while also sponsoring both Locke and Newton. Shaftesbury was a leading conspirator against James II, credited with instigating the political crisis that led to the creation of the Whig party and Tory reaction against it. Although he died in 1683, Shaftesbury influenced later developments through his long-time patronage of Locke. While an *Encyclopedia Britannica* biographical note on Locke suggests, “It seems likely that he was involved to some extent in planning the Revolution of 1688,”¹⁵ his 1690 *Two Treatises Concerning Civil Government* was certainly written to provide a philosophical justification for the overthrow of an apparently legitimate monarch.

Much has been made by some historians of Locke’s *Two Treatises* as allegedly an inspiration of the American Revolution, specifically of Thomas Jefferson’s draft of the 1776 Declaration of Independence, although this has been fiercely disputed.¹⁶ Whereas there are some similar phrases, one might justly expect to see the inalienable rights of “Life, Liberty and the Pursuit of Happiness” enumerated in Locke’s *Treatises*. Instead, one finds something significantly different.

Locke argues that man in “the state of Nature... is full of fears and continual dangers; and it is not without reason that he seeks out and is willing to join in society with others who are

¹⁵ John Locke, *Essay Concerning Civil Government* (Chicago: Encyclopedia Britannica, Inc., 1952), x.

¹⁶ see for example: Garry Wills, *Inventing America: Jefferson’s Declaration of Independence* (Garden City, New York: Doubleday & Co., Inc., 1978); Wills argues that the *moral sense* philosophy of Francis Hutcheson, not Locke, was the primary influence on Jefferson.

already united, or have a mind to unite for the mutual preservation of their lives, liberties and estates, which I call by the general name—property.

“The great and chief end, therefore, of men uniting in commonwealths, and putting themselves under government, is the preservation of their property....”¹⁷

Locke’s formulations, such as, “The great end of men’s entering into society being the enjoyment of their properties in peace and safety...,” and, “the preservation of property being the end of government...,” create the suspicion that Locke is not talking about a government that is intended to promote the general welfare as in the American case, but rather of *oligarchy*, classically defined by Plato in his *Republic* as, “The regime founded on a property assessment, in which the rich rule and the poor man has no part in ruling office.”¹⁸ Locke’s case would not be the first in history where the rhetoric of “natural rights” and “liberty” was misused to defend the power and wealth of an oligarchy, e.g., the despotic oligarchy of medieval Venice, which called itself a “Republic.” Note also that Locke’s premise of the “state of Nature” is similar to Hobbes’s “condition of War, every one against every one.” But whereas Hobbes argues for tyranny, or absolute monarchy as in the case of his royal patron Charles II, Locke argues for the rule of a group of rich men of property, as in the case of his aristocratic patrons Shaftesbury and Halifax.

That this was Locke’s view is demonstrated by his political activities, especially those directed towards the subjugation of the American colonies. For example, Locke wrote the “Fundamental Constitutions for the Government of Carolina” in 1669 for Lord Ashley, who had been granted the territory of Carolina by Charles II along with seven other “lords proprietors.” Stating in the preamble that his purpose is to “avoid erecting a numerous democracy,” Locke established these lords as a hereditary nobility, with absolute power over their serfs (“leet-men”), who were tied to the land and forbidden to move without permission from their lord. Locke specified that

¹⁷ Locke, *Essay Concerning Civil Government*, 53.

¹⁸ Allan Bloom, trans., *The Republic of Plato* (New York: Basic Books, Inc., 1968), section 550d.

“All the children of leet-men shall be leet-men, and so to all generations,” and that “negro slaves” could never gain freedom, even by conversion to Christianity.¹⁹ (In the *Two Treatises*, Locke argued further that slaves can have no rights whatsoever, since, “being in the state of slavery, not capable of any property, cannot in that state be considered any part of civil society, the chief end whereof is the preservation of property.”²⁰) This abominable “constitution” was never implemented, although its legacy persisted, especially in the South.

Locke also served as secretary to the Council of Trade and Foreign Plantations from 1672-1674, which adopted the Navigation Acts and Plantation Duties Act to tax and control colonial trade. He was appointed a Commissioner of Trade in 1696, which led to further repressive actions against the American colonies, including a new and more onerous Navigation Act. The Woolen Act of 1699 and similar measures were directed towards suppression of colonial manufacturing, while William Penn and Increase Mather of Massachusetts united against these policies in London in those years. Soon after Locke’s retirement from the Board of Trade for reasons of health, the Board demanded revocation of all American colonial charters and imposition of direct imperial rule, forcing Penn to return to England from Pennsylvania to personally defend his Commonwealth there until his death in 1718, having named Harley in his will as a protector of the colony.

So, ironically, far from inspiring the Declaration of Independence, Locke’s colonial policies initiated the “long train of abuses and usurpations” excoriated in that document.

Locke’s policies towards the poor of England are further evidence of his oligarchical intentions, as seen in his 1697 plan presented to the Board of Trade. While the country was burdened with rapidly rising debt and taxes, as William borrowed heavily from the new Bank of England to finance his wars in Europe, Locke blamed the growing problem of poverty on “the relaxation of discipline and corruption of manners” of the poor themselves. He proposed to remedy the “debauchery”

¹⁹ John Locke, *The Works of John Locke in Nine Volumes* (London: Rivington, 1824), see Volume 9 (letters and misc. works)

²⁰ Locke, *Essay Concerning Civil Government*, 45.

of the poor by creating work houses, where maimed beggars should be “kept at hard labor for three years,” while able-bodied beggars in maritime counties should be put on board ship to “serve three years, under strict discipline, at soldiers’ pay (subsistence money being deducted for their victuals on board)”

Locke also complained that “the children of labouring people are usually maintained in idleness, so that their labour also is generally lost to the public till they are twelve or fourteen years old.” Locke’s solution was to create “working schools... to which the children of all such as demand relief of the parish, *above three and under fourteen years of age*, whilst they live at home with their parents, and are not otherwise employed for their livelihood by the allowance of the overseers of the poor, shall be obliged to come.” (emphasis added)

“By this means,” Locke explained, “the mother will be eased of a great part of her trouble in looking after and providing for them at home, and so be at the more liberty to work; the children will be kept in much better order, be better provided for, and from infancy be inured to work....”

His conclusion, reading like a parody of a Charles Dickens villain, advises that “they each of them have their belly-full of bread daily at school.... And to this may be added, without any trouble, in cold weather, if it be thought needful, a little warm water-gruel; for the same fire that warms the room may be made use of to boil a pot of it.”²¹

Locke’s inhuman view of the relation of a parent to his or her children, as seen in his plan for forced child labor, was attacked by Logan repeatedly in the *Duties of Man*. Logan’s manuscript includes a page of detailed notes from Locke’s 1690 *Essay on Human Understanding*, including one which reads: “Locke, that pleasure and pain are the root of all the passions, that a father loves his child because he delights in his doing well—most absurd.”

Logan expanded on this theme in Chapter 4, attacking Locke for reducing *human love* to a pleasure/pain equation. He quotes Locke’s assertion that “the being and welfare of a man’s

²¹ H.R. Fox Bourne, *The Life of John Locke* (New York: Harper & Brothers Publishers, 1876), see Volume 2, 376-391.

children or friend producing constant delight in him, he is said to constantly love them,” to which Logan replies:

In which words we see the nature of things inverted, and the effect assigned for the cause. For would any man living, if he were in his senses, on being asked why he loved his children, give for an answer that it was because he delighted in seeing them do well? It is probable indeed that he might think the querent unworthy of any answer at all. But if he gave any, and a serious one, it must be to this effect, that he loved them because they were his children, it was natural for him and he could not avoid it, for in such cases... Nature has made a sure provision, without leaving it to the work of reflection or consideration.

Logan criticized Locke further along these lines in two drafts of the final section of his Chapter 5, under the title, “Answer to Locke, after the moral sense and ground of virtue is stated.” Here, he attacks Locke for denying that the precept “Parents preserve and cherish your children” is either an innate principle or truth known to all men, and for claiming that moral good and evil are not universal to mankind, but are merely names for the pleasure and pain, or “reward and punishment,” arbitrarily imposed by the decree of a law-maker. The chapter concludes: “And thus much I judged necessary to observe on this unhappy mistake in the subject of morals in that great man, whose exactness in his proper subject has ever appeared to me to be beyond exception.”

Logan then goes on in his final Chapter 6 to thoroughly refute Locke’s doctrine of pain and “uneasiness” as the spring of all human action, sternly warning against blindly following Locke because of his established reputation— an argument crafted, as we shall see, directly for the benefit of a young Benjamin Franklin.

Newton

Isaac Newton, like Locke, was immersed in the political intrigues leading up to and following the events of 1688. He was involved in the resistance at Cambridge University to James's attempts to purge the faculty and install Catholics, and was elected to Parliament in 1689, where he came under the influence of Locke and Montagu. That Newton was under extraordinary political pressure in this period is evidenced in a remarkable letter of his addressed to Locke, dated September 16, 1693:

Sir, being of opinion that you endeavored to embroil me with women and by other means, I was so much affected with it, as that when one told me you were sickly and would not live, I answered, t'were better if you were dead. I desire you to forgive me this uncharitableness. For I am now satisfied that what you have done is just, and I beg your pardon for my having hard thoughts of you for it, and for representing that you struck at the roots of morality in a principle you laid down in your Book of Ideas, and designed to pursue in another book, and that I took you for a Hobbist. I beg your pardon for also saying or thinking that there was a design to sell me an office, or to embroil me. I am your most humble and unfortunate servant, Isaac Newton.²²

Soon after, Newton accepted an appointment as Warden of the Mint, on the urging of Montagu and Locke, with a political assignment vital to the success of the Anglo-Dutch oligarchy. This was the great recoinage of 1696, whereby the silver coin of the realm was called in, to be replaced with coins newly minted under Newton's direction, the major purpose being, as we shall see, to sabotage the establishment of a competitor to the Bank of England and secure its financial monopoly. Newton's job was also to hang alleged counterfeiters without mercy, while his scientific reputation was expected to thwart any charges of corruption against the regime. Newton

²² J.W.N. Sullivan and Charles Joseph Singer, *Isaac Newton* (New York: MacMillan Co., 1938)

was rewarded in 1699 with a lifetime sinecure of Master of the Mint.

In scientific matters, Newton is most famous for his *Mathematical Principles of Natural Philosophy*, usually referred to as the *Principia*. Like Locke, Newton prided himself on being an empiricist who allegedly framed no hypotheses, but simply drew conclusions by inference from the empirical evidence. His alleged method was expressed in the General Scholium appended to the *Principia*, where Newton asserted his famous *hypotheses non fingo*: “I frame no hypotheses; for whatever is not deduced from the phenomena is to be called an hypothesis; and hypotheses, whether metaphysical or physical, whether of occult qualities or mechanical, have no place in experimental philosophy. In this philosophy particular propositions are inferred from the phenomena, and afterwards rendered general by induction.”²³

Newton’s dictum, if taken literally, seemed to banish imagination and creative insight from science, a sure-fire formula for suppressing scientific and technological progress. However, despite his disclaimers, Newton and his followers framed many hypotheses, which they treated as self-evident truths concerning the structure and organization of Nature, and which they bitterly defended against all challengers. Among these are the suppositions that matter is passive and inert, or “dead”; that all bodies, including rays of light, are composed of irreducible hard particles; that there exists a “vacuum,” or empty space devoid of all matter, between particles which allows motion; and that gravity is a force of “attraction” which acts at a distance through that empty space.

Each of these hypotheses was challenged by the American philosophers, beginning with Logan in the *Duties of Man*, and developed further by Franklin and Colden. Logan, in his Chapter 2, goes so far as to insist that Newton, despite avoiding the term “hypothesis,” did indeed frame an hypothesis concerning light, which Logan proceeds to reject and replace with one of his own.

²³ Isaac Newton, *Mathematical Principles of Natural Philosophy* (Chicago: Encyclopedia Britannica, Inc., 1952), 371.

Meanwhile, despite being elected as, in effect, president-for-life of the British Royal Society in 1703, Newton gave priority to his political duties until his death in 1727. As an *Encyclopedia Britannica* biographical note puts it, “For the last thirty years of his life Newton produced little original mathematical work.”²⁴ That the Royal Society under Newton tended to function increasingly as a political instrument of the oligarchy, with the job of controlling ideas rather than promoting scientific and technological progress, is seen, for example, in its treatment of French scientist Denis Papin.

Papin, who had been elected a Fellow of the Royal Society in 1680, subsequently collaborated with Leibniz in Germany, applying Leibniz’s new science of *dynamics* to invent an early steam engine using a piston and cylinder in 1690, and improving it later by using the direct force of steam rather than atmospheric pressure. Papin’s 1708 proposal to the Royal Society to build and test a steam engine that could power a ship, as he said he had already done successfully in Germany, was rejected by Newton on the pretext that it would cost too much—Papin had requested £15. Until his mysterious disappearance in England in 1712, Papin complained repeatedly that his papers read before the Royal Society were never registered in his name.²⁵ Logan was later to receive similar treatment at the hands of Newton’s most prominent successor, Edmund Halley.

The Bank of England

While most Englishmen initially accepted the 1688 revolution, out of fear of James’s alleged plans for a Catholic dictatorship financed by the dreaded French King Louis XIV, resistance soon arose as the oligarchical character of the new regime emerged. The Country Party, led by Robert Harley and his brother-in-law Paul Foley, a leading iron manufacturer, coalesced in 1690, in opposition to the Court Whigs and Court Tories aligned with Montagu and company.

²⁴ Ibid., x.

²⁵ Philip Valenti, “Leibniz, Papin and the Steam Engine,” *Fusion*, December 1979, 27-46.

Harley's faction launched its first salvo in 1691, with proposed legislation to limit interest rates to four percent. In response, Montagu commissioned Locke to produce an economic tract arguing that the rich have the right to charge the "natural interest" on their money without government interference or moral considerations, and that, in any case, a cap on interest rates would be easily evaded by the wealthy, so the only ones to suffer would be "widows and orphans, and others uninstructed in the arts and management of more skillful men...."²⁶

(That Locke himself was one of those "more skillful men" is indicated by one biographer, who reports that Locke lent a large sum of money to a David Thomas, who subsequently died. "There were complaints by Mrs. Thomas that Locke had demanded too much interest," but the widow paid up.²⁷)

The stakes were raised dramatically with the incorporation of the Bank of England in 1694, which was to become a key instrument of oligarchical power in the British Empire and globally, up to the present day. However, the Bank was originally promoted by Montagu as a very short-term project to finance the war against France—its capital was supposed to be limited to £1.2 million as a loan to the government at the "moderate" rate of 8%, and its term was supposed to be limited to 12 years. When the Bank began issuing notes backed only by the IOUs of the government, and government tax revenues became committed to the Bank for years in advance, it was clear that the power of the Bank and its stockholders was not to be limited.

When a financial crisis exploded in 1695, with the pound sterling collapsing on the Amsterdam exchange, Harley's group put forward a series of initiatives designed to break the Bank's power.

A Public Accounts Commission was established in the House of Commons to investigate financial corruption and collusion between the Bank and the government. To build public support, Daniel DeFoe published his *Essays Upon Several*

²⁶ Locke, *Works*, Volume 5.

²⁷ Maurice Cranston, *John Locke—A Biography* (New York: MacMillan, 1957)

Projects in 1696, which, besides proposals for insurance companies, pension offices, highway improvements, academies, etc., featured a call for *strict regulation of the Bank of England*. “Banks being established by public authority, ought also,” DeFoe argued, “as all public things are, to be under limitations and restrictions from that authority.”²⁸ Franklin later found DeFoe’s *Essays* in his father’s library, and reported that this pamphlet, along with Cotton Mather’s *Essay to do Good*, “perhaps gave me a Turn of Thinking that had an Influence on some of the principal future Events of my Life.”²⁹

However, the centerpiece of the Country Party strategy was the authorization of the National Land Bank as a direct competitor to the Bank of England. The Land Bank was mandated to sell stock to the public, the proceeds to be lent to the government in exchange for a corporate charter, similarly to the Bank of England. But the Land Bank would be required to also lend a large amount to the public annually on the security of land, *at a maximum rate of four percent*, for the improvement of agriculture, the construction of homes and manufactures, etc.

Montagu, already created Chancellor of the Exchequer by William, played his ace card at this point, which was the great recoinage. The Land Bank legislation passed Parliament on April 27, while Montagu scheduled the coin of the realm to be called in by May 4, to be exchanged for newly minted coins *at an undetermined date*, i.e., there would be relatively little money in circulation at the time that Land Bank stock was being offered for sale. Both Locke and Newton were deployed by the oligarchy in this crisis, with Locke providing the public rationale for the recoinage with a new pamphlet once again bemoaning the plight of rich creditors,³⁰ while Newton was appointed Warden of the Mint on April 13, in time to manage the entire process. The Land Bank was doomed.

By the end of 1696, Parliament extended the Bank of England charter to 1710 and increased its powers, decreeing that “during the continuance of the Governor and Company of the Bank of England no other bank, or any corporation, society,

²⁸ Daniel DeFoe, *Essays Upon Several Projects* (London: 1702)

²⁹ Lemay, *Franklin Writings*, 1317.

³⁰ Locke, *Works*, Volume 5.

fellowship, company or constitution in the nature of a bank shall be erected or established, permitted, suffered, countenanced or allowed by Act of Parliament within this Kingdom.”³¹

Leibniz

The Commonwealthmen of England soon had a new rallying point, offering perhaps one last hope for victory. Gottfried Wilhelm Leibniz was responsible for this hope, due to his meticulous historical researches and diplomatic activity over years, which helped raise the status of his employer, Duke Ernest Augustus of Hanover, to imperial Elector in 1692. The Duke's wife, the Electress Sophia, was the granddaughter of the English King James I, and a Protestant, providing Leibniz significant grounds to argue her claim to the English throne, since William and Mary were childless. While priority had to be afforded to Anne, the other Protestant daughter of James II (who became Queen upon William's death in 1702), her last child had died in 1700.

The Harley group moved quickly to adopt the Act of Settlement in 1701, providing that Sophia and her heirs would ascend to the throne upon the passing of Anne. They saw in Sophia, who was an accomplished intellectual and protégé of Leibniz, a potential enlightened constitutional monarch of a revived English Commonwealth. They moved to educate the population along these lines, with Harley commissioning John Toland to publish a new *Life of Milton* and a *Life and Works of Harrington*, and launching a new journal, the *Review*, under the editorship of DeFoe.

Toland was dispatched as the English envoy to Hanover, and wrote glowing reports of the quality of that Court, especially of Sophia, comparing her to Elizabeth I.³² Toland, in coordination with Leibniz, wrote a pamphlet soon after the Act of Settlement was adopted, urging that Sophia and her grandson, the electoral prince George (later King George II), be invited to

³¹ Albert Feaveryear, *The Pound Sterling: a history of English money* (London: Oxford University Press, 1931)

³² John Toland, *The Courts of Prussia and Hanover* (London: 1714)

England immediately to consolidate the succession. Montagu and the Court Whigs fought tenaciously over years to prevent such an invitation, fearing that this would create a new center of power and break their control. They manipulated Anne, convincing her that Sophia's presence would undermine her authority. Their long-term strategy involved the corruption of Sophia's son George Lewis, in the hope that Sophia, at age 73 in 1701, would die before Anne and thus bring him to the throne instead.

The Anglo-Dutch oligarchy had much to fear from the accession of Sophia, not the least of which was Leibniz himself. No doubt she would bring him to England with her, as a trusted advisor and confidant of the Queen, with great influence over the Court. The British Empire might be crushed in the egg.

As a philosopher, diplomat, and political leader, Leibniz was, in many ways, the antithesis of Locke and Newton. Although born and educated in Germany, Leibniz's genius blossomed in Paris as a member of the Academie Royale des Sciences, which had been established there in 1666 by the great French Minister Jean Baptiste Colbert—Leibniz arrived in Paris in 1672 at the age of 26, and left in 1676 to accept his fateful appointment in Hanover. Colbert represented policies comparable to those which saved France under Louis XI, after the victories of Jeanne d'Arc in the 15th Century, namely, the creation of a strong central government of a sovereign nation powerful enough to control the oligarchy and nobility, and dedicated to public works, internal improvements (infrastructure), education, and scientific and technological progress.

Leibniz explained the idea in a letter to Germany:

After the king had entrusted the Royal Revenues to the famous Colbert ... it became Colbert's greatest care to inquire how to organize the shipping, manufacture and trade of a France that was now at peace. The prosperity of such things, however, derives from a study of Nature and mathematics, for he who can improve upon the production of those goods which are necessary or useful to the life of men, either by

making them better for the same money, or as good but with less effort, or transport them with less risk and difficulty, will— even without privileges and monopolies, merely because of his good trading— find customers in every nation and even among enemies, and thus have the whole world even against its will for his market.³³

In Paris, convinced that “the value and even the mark of true science consists, in my opinion, in the useful inventions which can be derived from it,”³⁴ Leibniz began his decades-long collaboration with Denis Papin on the project of harnessing the “force of fire” in an engine. He advanced his mathematical studies with the help of the Academie’s director Christiaan Huygens, which led to his discovery of the calculus during those years, and invented a calculating machine capable of all four arithmetical operations—Colbert ordered three production models, one each for the King, the Royal Observatory and his own financial bureau.

In a larger sense, Leibniz became committed to bringing about a collaboration among nations and peoples based on the advancement of science and knowledge, including efforts to reunify the Catholic and Protestant Churches. He met with Peter the Great (as did William Penn), and wished that Russia would act as a bridge to connect Europe and China. He also had a plan to deal with poverty, which contrasted starkly to that of Locke. He wrote of this plan in a memo called *Moyens*:

Above everything else one must seek means of obviating public misery. Conscience, honor, duty and interest equally oblige one to do it. For extreme poverty is the mother of crimes and also the source of sickness; plague and famine can come of it, and these are, when joined with war, the three principal scourges of God, intimately bound together, which come from

³³ Rudolf W. Meyer, *Leibniz and the Seventeenth Century Revolution* (Chicago: Regener, 1952), 200-201.

³⁴ Philip P. Wiener, ed., *Leibniz Selections* (New York: Charles Scribner’s Sons, 1951), 187.

the malice or from the imprudence of men, and are the punishment of them. From which it follows that one must furnish the poor with the means of earning their livelihood, not only by using charities and [charitable] foundations to this end, but also by taking an interest in agriculture, by furnishing to artisans materials and a market, by educating them to make their productions better, and finally by putting an end to idleness and to abusive practices in manufactures and commerce.³⁵

As a young man, Leibniz had written to Hobbes, whose views he found abhorrent, but received no response. With Locke's influence growing in England, Leibniz attempted to initiate a dialogue with him as well, forwarding some comments on the *Essay on Human Understanding* to his correspondents in England in 1696. Locke also refused to reply, except for sarcastic and disparaging remarks implying that Leibniz did not understand his ideas. Leibniz's English friend Thomas Burnet wrote to him of one such incident in a letter dated July 23, 1697: "I must tell you a joke of Locke's the other day on this matter. We began to speak of the controversies of savants with those of this country. He said: 'It seems to me we live very peaceably as good neighbors of the gentlemen in Germany, for they do not know our books, and we do not read theirs, so that the tale (or account?) was well adjusted on each side.'"³⁶

Leibniz went on to complete his book-length *New Essays on Human Understanding*, which answered Locke's arguments virtually page-by-page. Leibniz decided not to publish it after Locke's death in 1704, and it remained in manuscript form until a group of professors at Göttingen University published it in the original French in 1765, along with other philosophical and mathematical works uncovered in the library of Hanover. These were the same scholars, including Abraham Gottholf Kästner and Rudolph Eric Raspe, who were visited by Franklin at Göttingen and Hanover the very next year.

³⁵ Patrick Riley, trans. and ed., *The Political Writings of Leibniz* (Cambridge: 1972), 106-107 note.

³⁶ Alfred Gideon Langley, trans., *New Essays on Human Understanding* (New York: The MacMillan Co., 1896), 6 note.

(A copy of the 1765 edition is listed in the catalog of the Library Company of Philadelphia as, *Oeuvres philosophique latines & françoises de feu Mr. de Leibnitz, Tirées de ses manuscrits qui se conservent dans la bibliothèque royale à Hanovre, et publiées par Mr. Rud. Eric Raspe.; avec une préface de Mr. Kästner.*)

Someone evidently took Locke's "joke" about not reading books from Germany seriously, since Leibniz's *New Essays* was not translated and published in English until 1896. The translator, Alfred Gideon Langley (evidently an American) included the following explanation in his Preface: "The translation of Leibnitz's *Nouveau Essais sur l'Entendement Humain* was first suggested by the following sentence of the late Professor George S. Morris, of the University of Michigan, in a note to his *Philosophy and Christianity*, page 292: 'It suggests no favorable comment on the philosophic interest of the countrymen of Locke that the above-mentioned reply of Leibnitz to Locke has never (so far as I can ascertain) been translated into English.'"³⁷

Leibniz concisely summarized his differences with Locke in his Preface to the *New Essays*:

Indeed, although the author of the *Essays* says hundreds of fine things which I applaud, our systems are very different. His is closer to Aristotle and mine to Plato, although each of us parts company at many points from the teachings of both of these ancient writers....

Our disagreements concern points of some importance. There is the question whether the soul in itself is completely blank like a writing tablet on which nothing has yet been written—a *tabula rasa*—as Aristotle and the author of the *Essay* maintain, and whether everything which is inscribed there comes solely from the senses and experience; or whether the soul inherently contains the sources of various notions and doctrines, which external objects merely rouse up on suitable occasions, as I believe and as do Plato and even the Schoolmen and all those who understand in

³⁷ Ibid., xi.

this sense the passage in St. Paul where he says that God's law is written in our hearts (*Romans*, 2:15).³⁸

Leibniz goes on to argue that ideas and truths are innate, not as full-blown commandments and precepts, but "as inclinations, dispositions, tendencies, or natural potentialities," also pointing out that human knowledge, unlike the beasts', can transcend mere empirical data to comprehend universal truths—"That is what makes it so easy for men to ensnare beasts, and so easy for simple empirics to make mistakes."³⁹

Locke presumes to prove that moral principles (including, again, parental love) are not innate or universal to mankind by citing the disgusting alleged practices of various societies, such as the "Mingrelians" who bury their children alive, a people in Peru who bred children to be eaten, and "an Egyptian fakir who was regarded as a holy man because he never lay with women or boys but only with she-donkeys and mules."

⁴⁰ He goes so far as to assert, "Virtue generally approved, not because innate, but because profitable," i.e., that men consider "virtuous" only that which is in their self-interest.

Leibniz's development of the idea of "instincts of conscience" in his response, foreshadows the later "moral sense" doctrine of the Third Earl of Shaftesbury and of Scottish philosopher Francis Hutcheson, both of whom became major influences on Logan. "[A]lthough there may be no wicked custom which is not permitted somewhere and in some circumstances," Leibniz writes, "nonetheless most of them are condemned most of the time and by the great majority of mankind. This did not come about for no reason; and since it has not come about through unaided reasoning it must in part be related to natural instincts. Custom, tradition and discipline play their part, but natural feeling is what causes custom to veer mainly in the right direction as regards our duties."⁴¹

³⁸ Peter Remnant and Jonathan Bennett, eds., *New Essays on Human Understanding* (Cambridge: Cambridge University Press, 1981), 47-49.

³⁹ *Ibid.*, 50.

⁴⁰ *Ibid.*, 92.

⁴¹ *Ibid.*, 93.

Considering the future history of the British Empire, the *New Essays* includes a quite prophetic warning of the consequences of allowing writers with “opinions which are dangerous to morality and public order” to go unchallenged. Their “disciples and imitators,” Leibniz writes, would feel license to

give their brutish passions free rein and apply their thoughts to seducing and corrupting others. If they are ambitious and by nature rather callous, they are capable of setting fire to the four corners of the earth, for their pleasure or advancement—I knew men of this stamp whom death has carried off. I even find that somewhat similar opinions, by stealing gradually into the minds of men of high station who rule the rest and on whom affairs depend, and by slithering into fashionable books, are inclining everything towards the universal revolution with which Europe is threatened, and are completing the destruction of what still remains in the world of the generous sentiments of the ancient Greeks and Romans, who placed love of country and of the public good, and the welfare of future generations, before fortune and even before life. This “public spirit”, as the English call it, is dwindling away and is no longer in fashion; it will die away all the more when it ceases being sustained by the good morality and true religion which natural reason itself teaches.... But these people may come to experience for themselves the evils that they believe will only befall others.⁴²

Opposition to Locke represented a strong philosophical bond between Leibniz and the English Commonwealthmen, seen most clearly in the writings of the Third Earl of Shaftesbury. This Shaftesbury spent the years 1695-1698 in the House of Commons, and 1701-1711 in the House of Lords, as an unwavering ally of Harley. His early education, which included training in Greek and Latin, was supervised by Locke himself,

⁴² Ibid., 462.

which made Shaftesbury's break with Locke, and friendly correspondence with Leibniz, an especially significant political issue of the day. Logan owned and studied Shaftesbury's writings, and expressed his philosophical debt to Shaftesbury in the *Duties of Man*.

While arguing that Locke followed on the "self same track" as Hobbes, Shaftesbury insisted that Locke was much worse and a greater threat to morality and society:

Twas Mr. Locke that struck the home blow: for Mr. Hobbes' character and base slavish principles in government took off the poison of his philosophy. Twas Mr. Locke that struck at all fundamentals, threw all order and virtue out of the world, and made the very ideas of these, which are the same of those of God, unnatural, and without foundation in our minds....

Thus virtue, according to Mr. Locke, has no other measure, law, or rule, than fashion and custom: morality, justice, equity, depend only on law and will.... And thus neither right nor wrong, virtue nor vice are anything in themselves, nor is there any trace or idea of them naturally imprinted on human minds. Experience and our catechism teaches us all!

Shaftesbury also dismisses Locke's "barbarian stories of wild nations" as hearsay, arguing, as Logan does later, that such stories are probably false or exaggerated. In sum, Shaftesbury's thesis is the same as Logan's, that man is created for society and benevolence:

The end or design of nature in man is society, for, wherefore are the natural affections towards children, relations, fellowship and commerce, but to that end? ... Now, if the ultimate design and end of nature in the constitution of man be, that he be framed and fitted for society, and if it be the perfection of human nature to be thus fitted, how should not this, which is the end and perfection of human nature, be also the good of man?

Leibniz wrote a *Judgment of the Works of the Earl of Shaftesbury* in 1712, full of praise and warm compliments, as well as some friendly criticism. As to Shaftesbury's writings on *Virtue and Merit*, Leibniz commented, "It seems to me that I could reconcile this quite easily with my [own] language and opinions."⁴³ Shaftesbury responded in a letter to Pierre Coste, expressing his honor in having received "the criticism of the worthy and learned Mr. Leibniz," and requesting Leibniz's permission to have his comments published in Europe.⁴⁴

The Leibniz-Newton controversy

English politics approached a *punctum saliens* as the 18th Century entered its second decade. The worst nightmare of the oligarchy threatened, as Anne became more sickly and the Electress Sophia, now well into her 80s, still remained vigorous. Could the political motives for launching a slanderous attack on Leibniz at that moment be more obvious?

The attack began in earnest with a "scientific paper" by mathematician and court official John Keill, published in the *Transactions of the Royal Society* in late 1710, reviving accusations against Leibniz of plagiarism of the calculus from Newton:

All these (laws) follow from that very celebrated arithmetic of fluxions, which without any doubt Dr. Newton invented first, as can readily be proved by anyone who reads the letters about it published by Wallis; yet the same arithmetic afterwards, under a changed name and method of notation, was published by Dr. Leibniz in the *Acta Eruditorum*.⁴⁵

⁴³ Riley, *Political Writings of Leibniz*, 198.

⁴⁴ All quotations from Shaftesbury are from: Benjamin Rand, ed., *Life, Unpublished Letters, and Philosophical Regimen of Anthony Ashley Cooper, the Third Earl of Shaftesbury* (London: S. Sonnenschein and Co., 1900)

⁴⁵ Sullivan and Singer, *Isaac Newton*.

When Leibniz demanded a retraction, Keill replied with greater provocations and chauvinistic insults, charging that Leibniz

wishes to load himself with spoils stolen from others.

Accordingly when I perceived that his associates were so partial towards him that they heaped undeserved praise upon him, I supposed it no misplaced zeal on behalf of our nation to endeavor to make safe and preserve for Newton what is really his own. For if it was proper for those of Leipzig to pin on Leibniz another's garland, it is proper for Britons to restore to Newton what was snatched from him, without accusations of slander....

There you have, famous Sir, what I am induced to write on this subject whence I believe you will easily perceive that this zeal (such as it is) of mine on behalf of our nation was so little out of place that I have detracted not a jot from Leibniz that was not Newton's. ⁴⁶

In December 1711, Leibniz wrote to Royal Society secretary Hans Sloane, acknowledging, as he had done before, that Newton had “arrived by his own efforts at basic principles similar to our own,” but demanding that Keill’s “empty and unjust brayings” be suppressed, “of which I believe even Newton himself would disapprove, being a distinguished person who is thoroughly acquainted with past events.” ⁴⁷

On March 6, 1712, the Royal Society convened a select committee to investigate and decide the issue, which rushed to issue its findings on April 12. The committee’s report (later published as the *Commercium Epistolicum*) referred to Newton’s and Leibniz’s letters of the 1670s, and concluded: “For which reasons we reckoned Mr. Newton the first inventor; and we are

⁴⁶ A. Rupert Hall and Laura Tilling, eds., *The Correspondence of Isaac Newton* Vol. V (Cambridge: 1975)

⁴⁷ Sullivan and Singer, *Isaac Newton*.

of opinion that Mr. Keill in asserting the same has been no way injurious to Mr. Leibnitz.”⁴⁸

While pretending to be objective, it is known that the entire affair of the committee and its report was “masterminded” by Newton, who went so far as to draft the committee’s conclusions himself.⁴⁹

Besides the attacks on Leibniz, political intrigue in and around the Royal Society was rife in that period. There was much controversy over the decision to move its headquarters to Crane Court in the City of London financial district in 1710, after having been located at Gresham College for over 60 years.⁵⁰ Another thorn in the side of the Newtonians was dealt with in those years as well, when the fiercely independent Royal Astronomer John Flamsteed was placed under control of the Royal Society by a “Royal Warrant to Newton” of December 12, 1710.⁵¹ Flamsteed had distinguished himself by, among other achievements, being the first, in 1680, to suggest that comets orbited the Sun, an idea now generally credited to his adversary, Edmund Halley, who was made Royal Astronomer after Flamsteed’s death in 1720. Newton initially rejected Flamsteed’s idea, but changed his mind in time to include Flamsteed’s results in the first edition of the *Principia* in 1686. But when the second edition was being prepared for publication in 1714, Newton was careful to make changes reflecting political considerations.

Newton’s politically-motivated editing did not escape the notice of James Logan, who condemned it in a September 22, 1715 letter to New York Governor Robert Hunter:

We see by all the public news how high divisions and distinctions run in Britain, but I have lately seen a particular instance of it beyond what could have entered into the heart of man (mine at least)

⁴⁸ Hall and Tilling, *Correspondence of Isaac Newton*, Vol. V.

⁴⁹ Steven Shapin, “Licking Leibniz”, *History of Science*, xix (1981), 293-294; see also: A. Rupert Hall, *Philosophers at War* (Cambridge: Cambridge University Press, 1980).

⁵⁰ Hall and Tilling, *Correspondence of Isaac Newton*, Vol. V.

⁵¹ The text of the Royal Warrant can be found in: Hall and Tilling, *Ibid.*

to imagine; it is in the new edition of Newton's *Principles* which I had a few weeks ago from England. The author in the first edition (which I also have) in the third book *de Systemate Mundi* generally quoted Flamsteed's observations where he had occasion to make use of any, but since that time, poor Flamsteed has appeared a violent Whig and therefore an opposite to Halley, etc., for which he was, not a little, persecuted about three or four years ago by the head of the Society, and the better (I suppose) to express their abhorrence of his principles, they have now almost everywhere left out his name....⁵²

After Anne survived a severe illness in December 1713, political maneuvering intensified until Sophia finally passed away on June 8, 1714 while walking in the gardens of the *Herrenhausen*, followed by Anne on August 1. Days later, on August 6, Keill wrote to Newton, confident that the slanders of Leibniz had done their work: "Mr. Leibnits after this will not have the impudence to show his face in England. If he does I am persuaded that he will find but few friends."⁵³ Moreover, Montagu's grooming of Sophia's son George paid off, as the new King George I forbade Leibniz from traveling to England and rejected his requests for an appointment there. Harley was impeached for treason and eventually acquitted, but his political coalition was shattered.

Logan expressed his dismay over the political turmoil of this period, at the end of the letter to Hunter quoted above:

And indeed upon the whole they seem on all sides to be ripening for their own destruction. Our unhappy divisions in the last years of the Queen appeared terrible, And now after so favorable a conjuncture thrown in by Providence that one might

⁵² *Letterbooks of James Logan*, Historical Society of Pennsylvania; also: Edwin Wolf 2nd, ed., *The Library of James Logan of Philadelphia* (Philadelphia: The Library Company of Philadelphia, 1974), 347.

⁵³ Steven Shapin, "Of gods and kings: Natural philosophy and politics in the Leibniz-Clarke disputes", *Isis*, lxxii (1981), 191.

have expected would set all to rights they are rendered more dreadful than ever. It is true the power is all on one side, and on the right one, too, but the unhappiness of having a nation generally distempered seems to me to be inexpressible....⁵⁴

Still, Sophia's accomplished daughter-in-law Caroline, now the Princess of Wales, maintained her intellectual independence in London, and pressed for Leibniz's works to be translated and published in English. This led to a philosophical dispute over Leibniz's ideas between Caroline and the proposed translator, the Newtonian Samuel Clarke. When Caroline wrote to ask his assistance, Leibniz finally had the opportunity to force the direct exchange of ideas with the British philosophers which he had sought for so long.

Thus was initiated the famous Leibniz-Clarke correspondences, a collection of five letters on each side, which was published in England in 1717 with a preface by Clarke dedicated to Caroline. A copy of this edition, under the title, *Collection of Papers, which passed between the late Learned Mr. Leibnitz, and Dr. Clarke, In the Years 1715 and 1716, Relating to the Principles of Natural Philosophy and Religion*, is listed in the 1741 catalog of the Library Company of Philadelphia.

Leibniz's arguments against the Newtonian dogmas of "hard atoms," the "vacuum," and "action-at-a-distance" are remarkable to read, as all these ideas appear later in the writings of Logan, Franklin, and Cadwallader Colden.

For example, Leibniz attacked Clarke's "proof" of the vacuum in these terms in his fifth paper:

The author objects against me the vacuum discovered by Mr. Guericke of Magdeburg, which is made by pumping the air out of a receiver; and he pretends that there is truly a perfect vacuum, or a space without matter (at least in part), in that receiver. The Aristotelians and Cartesians, who do not admit a true

⁵⁴ *Letterbooks of James Logan*, Historical Society of Pennsylvania; also Wolf, *Library of James Logan*, 347.

vacuum, have said in answer to that experiment of Mr. Guericke, as well as to that of Torricellius of Florence (who emptied the air out of a glass-tube by means of quicksilver), that there is no vacuum at all in the tube or in the receiver: since glass has small pores, which the beams of light, the effluvia of the lodestone, and other very thin fluids may go through. I am of their opinion.⁵⁵

Logan's lengthy note to his Chapter 2 includes the same argument against the vacuum, in the course of developing his hypothesis concerning electricity:

Can we say an exhausted receiver is a vacuum because the air is drawn out of it, while at the same we see it filled with light, the matter of which in the true nature of things, and on a just estimate of them, though not according to our apprehensions, may possibly be a more essential substance than the earth and stones we tread on? But if a vacuum be not absolutely necessary, as that allotted by some to the ethereal spaces cannot, then undoubtedly to have all space in the Universe possessed by some kind of matter is much more consistent with the dignity, beauty, and order of the whole, than to imagine those vast voids which carry even a kind of horror in the thought.

Leibniz dismissed gravitational "attraction" in these terms:

For, it is a strange imagination to make all matter gravitate, and that towards all other matter, as if each body did equally attract every other body according to their masses and distances; and this by an attraction properly so called, which is not derived from an occult impulse of bodies: whereas the gravity of sensible bodies towards the center of the earth, ought

⁵⁵ Wiener, *Leibniz Selections*, 247-248.

to be produced by the motion of some fluid. And the case must be the same with other gravities, such as that of the planets towards the sun or towards each other. (A body is never moved naturally except by another body which impels it by touching it; and afterwards it advances until it is stopped by another body which touches it. Every other operation on bodies is either miraculous or imaginary.)⁵⁶

Colden, as we shall see, rejected Newtonian “attraction” and the other dogmas in his treatises, *An Explication of the First Causes of Action in Matter, and of the Cause of Gravitation*, published in New York in 1745, and *The Principles of Action in Matter, the Gravitation of Bodies, and the Motion of the Planets, explained from those Principles*, published in London in 1751. Colden and Franklin exchanged letters on the issue in 1753:

Colden to Franklin:

How can two bodies whether they be great or small act at any distance whether that distance be great or small without some thing intermediate on which they act? For if any body act on another at any distance from it however small that distance be without some medium to continue the Action it must act where it is not which to me seems absurd.

It seems to me for the same reason equally absurd to give a mutual attractive power between any particles supposed to be at a distance from each other without any thing intermediate to continue their mutual action. I can neither attract nor repel any thing at a distance without something between my hand and that thing like a string or stick, nor can I conceive any mutual action without some such middle thing.⁵⁷

Franklin replies:

⁵⁶ Ibid., 248-249.

⁵⁷ Draft (letter and enclosure): New-York Historical Society; copy (enclosure only): American Philosophical Society (Novr 29th 1753); Labaree, et al., *Papers of B.F.*, vol. 5.

I agree with you, that it seems absurd to suppose that a Body can act where it is not. I have no Idea of Bodies at a Distance attracting or repelling one another without the Assistance of some Medium, tho' I know not what that Medium is, or how it operates. When I speak of Attraction or Repulsion I make use of those Words for want of others more proper, and intend only to express *Effects*, which I see, and not *Causes*, of which I am ignorant.⁵⁸

Logan and Leibniz

The vendetta against Leibniz did not end with his death in Hanover on November 14, 1716. While King George and his retinue happened to be nearby at a hunting lodge, they refused to attend the funeral.⁵⁹ A political ally, the Scotsman John Ker, arrived in Hanover the same day, and reported, "I must confess it afforded me Matter of strange Reflection, when I perceived the little Regard that was paid to his Ashes by the Hanoverians; for he was buried in a few Days after his Decease more like a Robber than, what he was, the Ornament of his Country."⁶⁰

Meanwhile, Newton, in preparing the third edition of the *Principia* in 1726, endeavored to erase even the memory of Leibniz. The first edition had included a *scholium* to the 7th proposition of the 2nd book, which acknowledged that Leibniz had independently developed a calculus ("...that famous person replied that he too had come across a method of this kind, and imparted his method to me, which hardly differed from mine except in words and notation."), while Newton admitted he had concealed his method by transposing the letters of key words.⁶¹

⁵⁸ Letter: ALS: New-York Historical Society; enclosure: draft: American Philosophical Society (Dec. 6, 1753); Ibid.

⁵⁹ E.J. Aiton, *Leibniz—A Biography* (Bristol and Boston: Adam Hilger Ltd., 1985), 349.

⁶⁰ John Ker, *Memoirs of John Ker of Kersland* (London: John Ker, 1727)

⁶¹ Hall, *Philosophers At War*, 33.

In the 1714 edition, Newton changed this *scholium* to weaken it, but in the third edition erased it completely.

Again, this did not escape the attention of James Logan. According to Wolf, “He noted on p. 246 [of his copy of the third edition-PV], what he spoke of with great indignation, that the note concerning the invention of the calculus by Leibnitz which appeared in the first edition was edited in the second and suppressed in the third.”⁶² Furthermore, in a series of remarkable letters to Hunter’s successor as Governor of New York, William Burnet, Logan not only defended Leibniz against Newton, but also pointed to the political motives behind the controversy. He questioned Newton’s mental competence, and expressed his wish that both Newton and Queen Anne had “both been gathered to their Ancestors by the year 1710, before that fierce, unnatural Dispute broke out between him and Leibnitz, which I always believed had been blown up by the Forces of the Society in opposition to the house that had so long employ’d Leibnitz....” As we know, that eventuality would have made Sophia Queen of England.

In the process, Logan expressed outrage and disgust over the flattering portrait of Newton printed on the frontispiece of the new edition, making him look much younger than his 85 years, which Logan called “that fantastic picture said to be his.”⁶³

The letters to Burnet deserve to be quoted at length:

February 7, 1727:

As in the 2d edition, that gentleman, truly wonderful in other respects, to show the weakness of human nature and the prevalence of the passions even in the greatest, was led either by his own or other people’s resentments, to expunge honest Flamsteed’s name as often as they could do it where it was used in the first edition, in the 3d book of which it frequently occurred.

So now in this third they have done what I doubt [not] impartial men of sober thought and solid judgment, who alone ought in such cases to be

⁶² Wolf, *Library of James Logan*, 348-349.

⁶³ *Ibid.*, 350.

considered, will look upon as a yet greater instance of the same infirmity, in dropping the scholium to the 2 lemma between the 7 or 8th propp. of the 2d book, wherein Leibnitz was named and his discovery of the differential method was justly taken notice of, and substituted another mentioning the author's letter to J. Collins in 1672, which I doubt will scarce give so honorable an idea of that great man.

It is certain the world was obliged only to Leibnitz for the publication of that method, who was so fair as to communicate it in a great measure to Oldenburg in 1677, when Sir Isaac was so careful of concealing his, that he involved it in his letter of 1676 in strange knots of letters, that all the art and skill of the universe could never decipher, as giving only the number of each letter that entered his short proposition. And yet foreigners have generally been so just as to pay all possible deference to Sir Isaac as an inventor, though until his publication of the *Principia* in 1687, they never had anything of it from him.

I have often indeed wished that Sir Isaac himself had never entered into the dispute, but would, if it must be disputed, have left it to others, for then the world would have been inclined to do him more justice, than now perhaps they will, when he is considered as a party, which he has so warmly made himself.⁶⁴

May 10, 1727:

Scarce any man living has had a greater veneration for that surprising genius [Newton-PV], formed for an admission into the secrets of Nature unknown to the whole race of mankind before, than myself, and thy observations on him are so exceeding just that they leave nothing further to be said on that head. He is, however great, but a man, and when I last saw him in 1724 walking up Crane Court and the stairs

⁶⁴ *Letterbooks of James Logan*, Historical Society of Pennsylvania; also: Wolf, *Library of James Logan*, 349.

leading to the Society's room, where I also had the opportunity of viewing him for about two hours, he bent under his load of years exceeding unlike what they have represented him two years after as in body. It is but reasonable to expect a declension elsewhere, so that for his own honor, as well as the nation's, to which he has been a very great one, had he and Queen Anne both been gathered to their ancestors by the year 1710, before that fierce, unnatural dispute broke out between him and Leibnitz, which I always believed was blown up by the forces of the Society in opposition to the house that had so long employed Leibnitz, they might have set in their horizon, as I formerly thought, with a somewhat greater glory.

It is only from this way of thinking I dropped what I did of him, in which, if I have not altogether thy concurrence, my tenderness for his reputation, I hope, will be easily excused. I verily believe Leibnitz had the first hints from Newton's letter and others concerning his inventions, and that from thence, that great genius, which we find in no man else, did build his great superstructures, but from all I can find in the *Commercium*, I nowhere perceive that Sir Isaac intended any mortal should discover his method of working, or what we call his algorithm of his fluxions, and his having afterwards given us nothing new beyond what Leibnitz had published of that kind in the *Acta Eruditorum* of 1682, is not altogether so much to his advantage as might be wished in his favor.⁶⁵

In a later letter to Burnet, dated May 28, 1728, Logan discusses an article about the calculus ("Fluxions") by an English author, and takes the opportunity to confirm his view of Leibniz as an independent inventor of the calculus, explicitly rejecting the charge of plagiarism:

But upon the article Fluxions it is a question whether he will please all his English readers, for after

⁶⁵ Ibid.; also Wolf, *Library of James Logan*, 350.

a summary historical account of their invention, he has these words: "It must be owned there are strong presumptions in favor of M. Leibnitz; Presumptions we mean that he was no Plagiary. For that Sir Isaac Newton was the first inventor is past all dispute: his glory is secure. The reasonable part, even among the foreigners, allow it; and the question is only whether M. Leibnitz took it from him, or fell upon the same thing with him. From his Theory of Abstract Motions, which he dedicated to the Royal Academy 1671 before he had seen any thing of Sir Isaac Newton's, he already supposed infinitely small quantities, some greater [than] others, which is one of the great principles of the system." This however shows his [i.e., the author of the article-PV] impartiality, and I cannot but be pleased to see my own notion of that matter so fully expressed; but I never saw that piece he mentions.⁶⁶

A letter to Royal Society member Sylvanus Bevan, February 7, 1727, is remarkable in that Logan expresses his fear that the flattery of Newton, and the unjust attacks on Leibniz, are evidence of the deep political corruption of England. He adds, "and those should think themselves happiest who are farther out of their reach," a clear reference to himself and Americans generally:

I am informed thou art now a member of that [Royal] Society, and as I know thee to be a person of great candour, I request thee to inform me who they are that were concerned in that conspiracy against the honour of England to dress up the chief Hero of it in science in such a figure in the front of the last edition of his Principles, which W. Innys has sent me.... For certainly all you who weekly see him at the head of your Board must know how absurd the representation is, and how much it must expose him. Of the same kind or worse I take to be the leaving out of the

⁶⁶ *Letterbooks of James Logan*, Vol. III, Historical Society of Pennsylvania.

Scholium to the 2nd Lemma, Book 2nd, which has been in the hands of the learned world for near 40 years past, and putting into place of it that fine flour out of an old letter... and certainly men of sober thought and solid judgement abroad must look on these little resentments and effects of the weakest passions with contempt and pity for the worthy old gentleman, that he should suffer his honour to be exposed and made the ridicule of those who delight in detraction.

Should the management of the more momentous councils about a mile further up the Thames be like these, we might have reason to tremble, and those should think themselves happiest who are farther out of their reach. But it may be hoped our state politics far exceed those in the way of learning. How it may prove time only must show.⁶⁷

Neither did Leibniz's accuser John Keill escape censure. Logan ridiculed Keill's supposed mathematical demonstration of the Newtonian dogmas of "attraction" and the "vacuum" in the *Duties of Man*, and cited Governor Hunter's evaluation of him as "an intolerable Debauchee, whimsical, irregular in all his Conduct..."⁶⁸

That Logan was a highly qualified judge of the Leibniz-Newton issue is evidenced not only from his annotations in all of Newton's published works in his library, but also from his expertise in the ideas of Leibniz and his co-thinkers among continental scholars. Logan was keen to purchase the most complete set possible of the *Acta Eruditorum*, the Latin periodical published in Leipsig, which was the principal vehicle for dissemination of the views and discoveries of Leibniz, Huygens, Papin, Jean and Jacques Bernoulli, et al. The entry in Wolf's catalog lists volumes of the *Acta* from 1688 to 1727, described as containing "43 vols and 3 Supplements in 39 vols...." As Logan told a correspondent in 1749, "I have all the *Acta Eruditorum* from 1688 to 1727 except for three

⁶⁷ Ibid.

⁶⁸ Wolf, *Library of James Logan*, 263.

intermediate years between 1700 & 1710 & some Supplemta.”⁶⁹ Logan also worked through Leibniz’s ideas for himself—Wolf reports, “Inserted at p 467, vol for 1684 is a four-page English explanation by JL of ‘The first Accot of fluxions delivered by Leibnitz In the Act Eruditorum of Leipsic Octob 1684 pa 467.’”

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Logan’s fierce intellectual independence and concern to foster the development of the young Franklin and his circle, would soon lead him into his own personal conflict with the Royal Society, as he found himself confronting the same Edmund Halley he had previously denounced for the persecution of Flamsteed.

Franklin

In his *Autobiography*, Franklin describes a sort of Damascus road conversion he underwent upon his return from an ill-fated 18 month sojourn in London. He formed a *Plan of Conduct* while still at sea. “I have never fixed a regular design in life; by which means it has been a confused variety of scenes,” the 20 year old Franklin wrote. “I am now entering upon a new one: let me, therefore, make some resolutions, and form some scheme of action, that, henceforth, I may live in all respects like a rational creature.”⁷¹

Franklin landed back in Philadelphia on October 11, 1726, and within a year had formed the philosophical and political association called the *Junto*, as well as launching his own printing business in partnership with *Junto* member Hugh Meredith, which became Franklin’s sole proprietorship in 1729. He soon started his first newspaper, the *Pennsylvania Gazette*, making major interventions into the politics of the colony. Logan and another Quaker Friend provided Franklin his first large print order in 1731, and when Franklin devised his first public project, a subscription library, he and fellow *Junto* member Thomas Godfrey went to Logan for advice and support.

⁶⁹ Ibid., 4.

⁷⁰ Ibid.

⁷¹ Lemay, *Franklin Writings*, 72.

When the Library Company of Philadelphia opened in the fall of 1732, the directors ruled that no one but subscribers could withdraw books, “Mr. James Logan only excepted.”⁷²

In his account of this transformation, Franklin particularly condemns a pamphlet he had published in London in 1725, *A Dissertation on Liberty and Necessity, Pleasure and Pain*, calling it “another *erratum*.” He circulated some copies to friends, “and afterwards disliking the piece, as conceiving it might have an ill tendency, I burnt the rest, except one copy....”

⁷³ He came to see that he had been corrupted in London, as he had callously cut off communication with his fiancé Deborah Read in Philadelphia, with tragic consequences, and tried to seduce the lover of his best friend, James Ralph.

As might be gathered from the pamphlet’s title, the work was based on the pleasure/pain calculus of John Locke, that, in Franklin’s words, “*uneasiness* is the first Spring and Cause of all Action,” and that, “*Freedom from Uneasiness* is the End of all our Actions....” However, Franklin draws out the immoral implications of Locke’s doctrine, arguing that the distinction of virtue and vice is meaningless since all men act out of self-interest to avoid pain. “How can any Action be meritorious of Praise or Dispraise, Reward or Punishment,” Franklin asks, “when the natural Principle of *Self-Love* is the only and the irresistible Motive to it?” In his conclusion, Franklin gloats that his argument proves that human life has no value above the “Beasts of the Field,” since pleasure and pain cancel each other, so that “*Life is not preferable to Insensibility*.”⁷⁴ After this, the elite of London evidently recognized Franklin as one of their own, as he was invited to meet Bernard Mandeville, author of the *Fable of the Bees, or Private Vices, Public Benefits*—a writing which brings to mind Leibniz’s warning of immoral doctrines “slithering into fashionable books”—and Sir Hans Sloane of the Royal Society, with some promises of meeting Newton himself, which never materialized.

In his *Autobiography*, Franklin discusses the radical change in his thinking once back in Philadelphia. He concluded

⁷² Tolles, *Logan and the Culture of Provincial America*, 213.

⁷³ Lemay, *Franklin Writings*, 1016.

⁷⁴ *Ibid.*, 57-71.

that his pamphlet “appear’d now not so clever a Performance as I once thought it; and I doubted whether some Error had not insinuated itself unperceiv’d, into my Argument, so as to infect all that follow’d, as is common in metaphysical Reasonings.—I grew convinc’d that *Truth, Sincerity & Integrity* in Dealings between Man & Man, were of the utmost Importance to the Felicity of Life, and I form’d written Resolutions, (wch still remain in my Journal Book) to practise them ever while I lived.”

⁷⁵ Franklin’s new convictions are also evident in his *Articles of Belief and Acts of Religion*, dated November 29, 1728, and the two dialogues between Philocles and Horatio *Concerning Virtue and Pleasure* published in the *Gazette* in the summer of 1730.

There is little doubt that discussions with Logan played an important role in Franklin’s transformation. For one thing, Franklin says that his pamphlet was inspired by reading William Wollaston’s *Religion of Nature Delineated*, whose principles he opposed, “Some of his Reasonings not appearing to me well-founded.” ⁷⁶ After also reading Wollaston’s book in 1726, Logan praised its “excellent system” and called it “a piece for which one may justly... congratulate the age.”⁷⁷ Logan also credited Wollaston with inspiring his botanical researches of 1727,⁷⁸ so that Logan and Franklin had much to discuss on this subject in that period.

As we have seen, Logan strenuously opposed Locke on the subject of morality, also the subject of Franklin’s pamphlet, and upheld the “moral sense” doctrine of Shaftesbury and Hutcheson. Franklin may have been summarizing a dialogue with Logan on this issue in a 1732 article in his *Pennsylvania Gazette*, where arguments that the reader will find very familiar from the *Duties of Man*, are opposed to those of Locke:

It is the Opinion of some People, that Man is a Creature altogether selfish, and that all our Actions have at Bottom a View to private Interest; If we do good to others, it is, say they, because there is a certain

⁷⁵ Ibid., 1359.

⁷⁶ Ibid., 1346.

⁷⁷ Tolles, *Logan and the Culture of Provincial America*, 198.

⁷⁸ Lokken, *Scientific Papers of James Logan*, 77.

Pleasure attending virtuous Actions. But how Pleasure comes to attend a virtuous Action, these Philosophers are puzzled to shew, without contradicting their first Principles, and acknowledging that Men are *naturally* benevolent as well as selfish. For whence can arise the Pleasure you feel after having done a good-natured Thing, if not hence, that you had *before* strong humane and kind Inclinations in your Nature, which are by such Actions in some measure gratified?

I am told that a late ingenious Author, enquiring why we approve and disapprove of Actions done many Ages since, which can in no way be suppos'd to affect our present Interest, conceives that we have a certain internal *Moral Sense*, which tastes the Beauty of a rational benevolent Action, and the Deformity of an ill-natured cruel one; and that our consequent Judgment is as involuntary as when the Tongue is apply'd to Aloes, and we can by no Act of the Will prevail with the Mind to acknowledge it tastes like Honey. However this be, the Fact is certain, that we do approve and disapprove of Actions which cannot in the least influence our present Affairs. How could this happen, if we did not in contemplating such Actions, find something agreeable or disagreeable to our natural Inclinations as Men, that is, to our benevolent inclinations?⁷⁹

Franklin's former opinion that "*uneasiness* is the first Spring and Cause of all Action" would also have received an extremely sharp rebuke from Logan, as it does in Chapter 4, Section II of his manuscript. There, Logan argues that those who have "led a vicious life and gone on in a course of crimes" are forever tormented by their guilty consciences, and dare not "venture on a solitary retirement... without some provision for a constant succession of means to divert self-examination. Or, if they attempt it," Logan concludes, "*those are they who, from their own feeling experience (but preposterously) lay it down for a principle that pain or uneasiness is the spring of all our*

⁷⁹ Lemay, *Franklin Writings*, 200-201

actions...." (emphasis added) After thus asserting that the hardened criminal left alone with his thoughts is the one who believes that "uneasiness is the spring of all our actions," Logan goes on in Chapter 6 to quote Locke as the author of that "preposterous" idea, warning against blindly following Locke because of his authority and reputation— *advice which was personally directed at Franklin.*

At some point after his 1726 return to Philadelphia, Franklin must have given Logan a copy of his London pamphlet and asked his opinion of it, as Logan in Chapter 6 cites the same "little pamphlet published in the year 1725" as a prime example of the "dangerous consequence" of slavishly accepting the erroneous opinions of famous authors, such as Aristotle and Locke. In the course of refuting Locke's "uneasiness" doctrine at some length, Logan shows how the acceptance of Locke's false assumptions resulted in a chain of reasoning leading to the absurd and immoral conclusions of the pamphlet. As Franklin later explained, "I doubted whether some Error had not insinuated itself unperceiv'd, into my Argument, so as to infect all that follow'd...."

However, Logan develops his polemic much further in Chapter 6, referring to Franklin as "the unhappy author of the pamphlet" and "that distressed and uneasy author," one of those dissolute men who "corrupt and destroy their adjusted constitution of body and mind, and then ungratefully complain, or, at best, to support themselves, would impiously fix their own absurdest schemes on the Author of Nature, and represent the chaos they have reduced themselves to as the real condition for which they were designed."

After particularly scathing remarks on another of Franklin's Lockean arguments from the infamous pamphlet, Logan concludes: "What then are we to conceive of those unhappy creatures who have reduced themselves to so deplorable a state as to be obliged to run into such extravagancies of thought as these to support them, under that compacted and substantial structure of uneasiness they have built up in and for themselves by their vices and follies? They scarce even deserve pity."

Logan thus directly addresses the issue of Franklin's corruption in London, arguing that the "unhappy author" had

seized upon Locke's ideas in order to refute Wollaston and defend the "atheistical tenets" that he "and probably his friends had embraced." One can imagine Logan verbally delivering these devastating polemics to a chagrined and chastened Franklin over many months of discussions, perhaps over supper, or in his library, in the period after 1726.

We know furthermore that Logan asked Franklin to read and comment on his Chapter 5, *Of Moral Good or Virtue*, where Logan's arguments for the "moral sense" are also developed in opposition to Locke's moral theories—Franklin's letter to Logan commenting on this chapter is included in this volume.⁸⁰ While Franklin thought "the design, and the management of it in the main, good," and proposed no cuts since "the whole is so curious and entertaining, that I know not where any thing can be spared," he had several criticisms and suggestions, which Logan evidently incorporated in later drafts of the chapter. For example, Franklin thought that the virtues should have been listed and explained—the draft we have does discuss "the several species of virtue."⁸¹ Similarly, it appears that Franklin's remarks on the "state of Nature" and music are also addressed by Logan in the draft transcribed in this volume.⁸²

All of this suggests that the *Duties of Man* as a whole was intended by Logan largely for Franklin's benefit, and may have been the fruit of their discussions over years.

Franklin's 1731 plan for an international "united Party for Virtue," and his conviction that "one Man of tolerable Abilities may work great Changes, & accomplish great Affairs among Mankind,"⁸³ should also remind readers of Logan's panegyric to Pythagoras, and the virtue of the small society of Pythagoreans in routing tyranny and defending liberty, also presented in Chapter 5. "And this order of men with these institutions," Logan concludes there, "are sufficient to convince

⁸⁰ also see: Lemay, *Franklin Writings*, 424-425.

⁸¹ Franklin's "Project for arriving at moral perfection" ultimately included "Thirteen Names of Virtues." *Ibid.*, 1384-1385.

⁸² Remarkably, Franklin's comments are the only ones extant among all of Logan's correspondents—the fate of Logan's drafts sent to England is, to my knowledge, unknown.

⁸³ Lemay, *Franklin Writings*, 1397.

us what a powerful ascendant virtue may be attended with when proper methods are applied to excite its full force in subduing all opposition, and giving it its natural prevalence over the mind.” Franklin writes that his idea came to him as a result of “Observations on my Reading History, in Library, May 9, 1731,” explaining further that Pythagoras’s *Golden Verses* was indeed the inspiration of his “Project for arriving at moral perfection” and a projected book, the *Art of Virtue*.⁸⁴

Franklin much later concisely summed up his relation to Logan in a note included in his outline of the *Autobiography* —“Logan fond of me. his library.”⁸⁵

Godfrey

Logan became personally acquainted with another *Junto* member during this period, when the young glazier Thomas Godfrey asked to borrow a copy of the *Principia*. Godfrey, of such modest means that he and his family were sharing a house with Franklin at the time, made a deep impression on Logan as a natural genius self-taught in mathematics and Latin. “Inquiring of him hereupon who he was,” Logan later recounted, “I was indeed astonished at his request, but after a little discourse, he soon became welcome to that or any other book I had.”⁸⁶ About 18 months later, in 1732, Godfrey revealed that he had invented an improved mariner’s quadrant, which promised to advance the solution of the age-old problem of determining longitudes at sea. Logan satisfied himself with the quality of the device, and wrote a detailed description to royal astronomer Edmund Halley, dated May 25, 1732, hoping that Godfrey would receive recognition for his discovery, which would surely redound to the honor of the American philosophy.

That was not to be, for subsequently the Royal Society *Philosophical Transactions* contained an article by Royal Fellow John Hadley, claiming to have invented a quadrant almost identical to the one previously described by Logan. Halley, having never even acknowledged Logan’s original letter,

⁸⁴ Ibid., 1383-1396.

⁸⁵ Ibid., 1553.

⁸⁶ Lokken, *Scientific Papers of James Logan*, 29.

accompanied this claim of Hadley with imprecations of his own directed against Logan personally, all but accusing him of the familiar charge of *plagiarism*.

What followed could be characterized as a skirmish between British and American forces in the realm of ideas, as Logan and Godfrey mobilized Pennsylvania in support of his right of invention, even gathering affidavits to that effect for presentation in London. Several other Royal Fellows were willing to argue Godfrey's case as an equal inventor to Hadley, and Logan wrote to one of these, William Jones (November 12, 1734), blasting Halley and thanking Jones for

thy generosity and justice in asserting before the Royal Society, the right of an inventor (at least), if not absolutely the first, of the reflecting instrument, to Tho. Godfrey, as well as in vindication of my reputation from the slur, that Dr. Halley's unhandsome conduct towards me had like to have thrown on it, in which he was highly ungrateful; since nothing but my respect for him could induce me to communicate to him, preferably to all others, what he might easily judge, from my letter, I thought would be wholly new to him. And to suspect a trick or sham in it, he must have considered me as one of the most senseless or maddest creatures upon earth, if I should voluntarily, in so wild a manner, expose myself even to a hazard of the vile imputation of an imposter in a matter, wherein I proposed to myself neither credit nor profit, nor any advantage whatsoever.⁸⁷

After being compelled to acknowledge him as a co-inventor and awarding him and Hadley each £200, the Royal Society added insult to injury by replacing the money to Godfrey with a clock of equal value, on the grounds that he was allegedly a "heavy drinker."⁸⁸ Despite the fact that the invention went down in history as "Hadley's quadrant," Logan and his Pennsylvania co-thinkers never conceded Godfrey's claim. An

⁸⁷ Ibid., 31.

⁸⁸ Ibid., 14.

article in Bradford's *American Magazine* of July 1758 presented documentary evidence on the issue, asking whether the world "ought not in justice to call that instrument for the future Godfrey's, and not Hadley's quadrant?"⁸⁹ In that part of the *Autobiography* written in 1771, Franklin pointedly introduces Godfrey as "a self-taught Mathematician, great in his Way, & afterwards *Inventor of what is now call'd Hadley's Quadrant.*" (emphasis added)⁹⁰ As late as 1843, a monument was erected at Godfrey's grave in Laurel Hill Cemetery, celebrating his claim to the invention.⁹¹

Logan continued to collaborate with Godfrey on mathematical issues. For example, in 1736, during the period of his composition of the *Duties of Man*, Logan decided to investigate Newton's claims in the *Commercium Epistolicum* for himself. He selected an example from one of Newton's letters of 1676, wherein Newton illustrated his "doctrine of infinite series with fluxions," but found, upon working through the mathematics, that Newton's example diverged, rather than converged on a solution. He asked Godfrey to check his work, but he confirmed Logan's result. "I then threw away my whole work with indignation," Logan wrote to William Jones, "and with no small amazement to find it possible for Sir Isaac Newton to commit such a blunder."⁹² Logan accused Newton of deception, telling Jones that Newton "appears to have designedly concealed, under pretence of avoiding tediousness, his method of

⁸⁹ Ibid., 28.

⁹⁰ Lemay, *Franklin Writings*, 1361.

⁹¹ The original plan, according to documents contained in the Godfrey file at Laurel Hill Cemetery, was to erect a monument to four great Philadelphia intellectuals— Godfrey, David Rittenhouse, Alexander Wilson, and Thomas Say— whose remains were to be reinterred there under a huge pyramid containing inscriptions and sculptures commemorative of each man's achievements. "Of Godfrey," reads one document, "too little has been said and known; few even of his fellow citizens of the present day are familiar with the facts and observations upon which rest his undoubted claims to the invention of the Quadrant in 1730, subsequently with great injustice attributed to Hadley of London, whose name the instrument bears even now."

⁹² Lokken, *Scientific Papers of James Logan*, 66.

applying fluxions to series....”⁹³ All of this served to reconfirm Logan’s view of Leibniz as an independent inventor of the calculus, and further discredit Newton’s claims to the contrary.

Logan’s continuing conflict with the Royal Society was by no means limited to the Godfrey case. He found serious mistakes in several of his articles published in the Society’s *Transactions*, one of which, he said, made him appear to “speak utter nonsense,” and others “making me inconsistent with myself.” He complained of his mistreatment to Hans Sloane, writing sarcastically, “’tis true we in America are little inferiour things in comparison of you great folks in London.”⁹⁴ He felt he was “ill used” by the Society, and suggested that his Latin treatise improving Huygen’s optical demonstrations be forwarded to Holland, “where I know they will be glad to publish it.... But I should rather choose to see it first appear in England.”⁹⁵ It was published in Leiden in 1739, after the Royal Society declined the honor. His experiments with maize were published there in that same year, after Logan accused Halley of mangling his article on the subject in the October 1737 *Transactions*,⁹⁶ thus establishing Logan, despite the antagonism of the Royal Society, as a world-class scientist, philosopher, and independent thinker, standing on an equal footing with the elite of the mother country.

Of the Duties of Man

It was in this context of extremely promising developments among the youth of Philadelphia, and dismay over the political and intellectual degeneration of England, that Logan, in his 61st year in 1735, began to compose his philosophical treatise. In a letter of May 12, 1736, he informed his old friend Thomas Story, “that for several months past, I have been on a *Treatise Of the Duties of Man as founded in Nature*, and these words will fully shew thee that I am to consider them only Philosophically, without any view to any

⁹³ Ibid.

⁹⁴ Wolf, *Library of James Logan*, xxxii.

⁹⁵ Lokken, *Scientific Papers of James Logan*, 38-39.

⁹⁶ Ibid., 76.

profession of Religion whatever.”⁹⁷ He had already forwarded the first chapter to a friendly Royal Society member, Peter Collinson, and to Quaker scholar Josiah Martin in London, and the fourth chapter, “On the Affections & Passions,” dealing largely with anatomical issues, to his physician brother William in Bristol and to another prominent doctor in London— Logan notes on the cover page of a draft of Chapter 4, “Sent to England in 1736 all except the last sheet, fully finished.”

In a subsequent letter to Story, November 15, 1737, Logan discusses the philosophical motivation for his writing:

[F]or as in my youth I had an Inclination for knowledge, tho’ I was at first well pleased with every Attainmt of Skill, as with the practical parts of the Mathematics, yet I never could acquiesce in these without knowing also the first and deepest principles on wch the Rules for that Practice were founded. So, in a maturer State, tho’ engaged, as thou knows, in a vast hurry and Load of business, I could not forbear making reflections on the Springs both of thought and Action in Mankind, and latterly concluded that all our Knowledge is but relative to our own beings & constitution here, and having long fixed on this thought, tho’ in variety of other occupations, I had also this further one, that some time or other I would make some little Essay towards digesting and putting those Conceptions in writing.

On this I began in 7br or 8br, 1735, about two years since, taking this for my foundation against Hobbes that Man was primarily in his Nature formed for Society, for proof of wch I discovered & adduced Several Argumts that had never to my knowledge been advanced before....⁹⁸

⁹⁷ Norman Penney, ed., “The Correspondence of James Logan and Thomas Story, 1724- 1741”, *Bulletin of Friends’ Historical Association*, Vol. 15, Number 2 (Autumn Number, 1916), 57.

⁹⁸ *Ibid.*, 59-60.

Logan goes on to discuss the significance of the anatomical speculations of his fourth chapter, providing a concise statement of the thesis elaborated in the *Duties of Man* as a whole, and warning that even “ye great J. Lock” does not escape criticism:

My sole Scope in that Chapt was, as far as I could carry it, to prove that the head, wch is the only Seat of thought & consequently of Reason, and ye Heart, ye Spring of all Action, are two distinct regions of themselves, tho’ of ye strictest communication: that from hence every motion of the heart (its Affections, &c.) may be watched over and guarded as a Chymist does by his fires, stills & bottles, and therefore that every Affection & Passion may, by a careful exercise, be brought into Subjection, & under a just Regulation, by which, when directed by a good Understanding, Morality is perfected, and this is the true foundation of all social Duties, and, when there is joined to this a true Sense of our dependence on the Supreme and Divine Author of all things, a constant contemplation of his Wisdom & Goodness, and a Sincere Love springing from thence, influencing us by the bent of Affection, to observe and practise, in what relates to us & is in our power, the same good Ordr that he has established throughout his Creation (wch I make the subject of a 5th Chaptr on Moral Good or Virtue) this is true Religion and Holiness. Yet I purposely forbear to treat these subjects otherwise than Philosophically, for, adding a 6th Chaptr on ye Will, in wch I should use some freedom even with ye great J. Lock, for whom notwithstanding I have a very great Esteem, I would conclude the first part, and in a 2d but much shorter one, proceed to apply ye whole.⁹⁹

Although Logan adds that, because of his age, he did not expect to finish his project, he nevertheless reports that by the winter of 1735 he had also “drawn up a Sketch” for his second

⁹⁹ Ibid., 61-62.

chapter, “on the Senses,” and proceeded to his third, “on the Intellect.” Furthermore, from his position as Chief Justice of Pennsylvania, he assured a wide circulation of his core reasonings on moral philosophy, by making them the substance of his *Charge Delivered from the Bench to the Grand Inquest*, on April 13, 1736, an address that was published and widely circulated at the time.¹⁰⁰

The 400 pages of manuscript rediscovered in the early 1970s corresponds well to Logan’s account in the letters to Story. The first, fourth, and fifth chapters are complete, and there are several drafts and outlines of the second and third chapters. While there are criticisms of Locke throughout the book, a lengthy fragment of the sixth chapter is entirely devoted to refuting Locke’s core doctrines. There are also notes “for the 2d part.” All of this material is contained in this volume.

However, to further support the thesis that the work represents a declaration of intellectual independence, let us examine the hypothesis which Logan puts forward in his second chapter *as an alternative to Newton*, and its likely impact on Franklin and “the American Philosophy.”

The electricity hypothesis

The manuscript of Chapter 2, “Of the exterior senses,” shows that Logan considered his challenge to Newton carefully. Logan either wrote in an elegant hand, which probably indicated a finished section intended for circulation, or a more common, though still legible, hand, probably indicating a rough draft intended for polishing. There are four drafts of this chapter totaling 61 pages of manuscript, written in both hands—one has the note, “ye first draught”; another, “2d draught not at all finished”; a third, “written in ye Winter 1737 my 64th year”; while the fourth is not annotated.

While much of the chapter contains anatomical discussions of the eye and ear, Logan’s intention is to show that the senses cannot convey the real intrinsic nature of objects, but

¹⁰⁰ Wilson Armistead, *Memoirs of James Logan, a distinguished scholar and Christian legislator* (London: Charles Gilpin, 1851)

only images relative to ourselves, e.g., colors have no reality in the world outside of the impressions conveyed to our mind by our eyes. He also suggests that the most important physical phenomena probably cannot be directly sensed at all, using the significant example of *magnetism*. Again implicitly attacking Locke's empiricism, Logan later goes on to show how the innate creative power of the mind can work up sense impressions into ideas and concepts vastly different, like caterpillars changing into butterflies. He also emphasizes in this chapter the inferiority of mankind relative to the beasts in the keenness of the senses and other bodily capabilities, arguing rather for the improvement of the human mind and intellect, which is the subject of Chapter 3.

Logan asks the reader to imagine being a witness to the creation of the world, as portrayed by Plato in his dialogue *Timaeus*. Once the medium of light is created, how would an organ of sense be framed to convey impressions from that medium? Hence the eye, and similarly with the ear and the medium of air. This leads to delightful discussions of painting and music, which are continued in later chapters, but also to a lengthy footnote addressing hypotheses concerning the nature of light itself.

Consistent with his commitment to investigating "the first and deepest principles" of science, the two drafts of Logan's footnote take up most of 22 pages of the manuscript of Chapter 2. Clearly, Logan considered and reconsidered his challenge to the orthodox doctrine here, since in one draft, written in his rougher hand, the footnote is crossed out with one diagonal line on each page, with the marginal comment: "I intirely condemn all this note as it now stands"; while another draft of the footnote, virtually identical to the first, is written in his elegant hand as if ready to be circulated or published. Yet another version, annotated "ye first draught," does not have the footnote at all. Nevertheless, his argument in this chapter is consistent in all versions, which is the rejection of the Newtonian dogmas about light and space, and the development of his own hypotheses on these issues. All these versions are coherent, and are combined as such in this volume.

Logan credits Newton with important discoveries about colors in his *Optics*, but questions his supposition that light is an emanation of rays composed of hard particles traveling in straight lines from a lucid body. How, Logan asks, can such rays, when infinitely reflected from point to point, infinitely cross each other without interfering with each other? And all while traveling “with an incomprehensible celerity, such as 150,000 miles in one second of time.” Logan uses various ways of expressing his disapproval, such as: “And this hypothesis appearing to me, from the first time I considered it, to be attended with insuperable difficulties...”; “But as often as I have considered this hypothesis, it seemed to be attended with very great difficulties....”; and, “But whether this be truly the case may be questionable....”

Neither does Logan accept Newton’s *hypotheses non fingo*, insisting that Newton’s dictums about light were indeed hypotheses, “though upon all occasions he [Newton] most carefully avoided even the term hypothesis.” He expressed this in stronger terms in a sentence crossed out in the manuscript: “And although the celebrated author, who has in this discourse and in the note below been diverse times mentioned, most carefully avoided using the term hypothesis, yet it is plain from the whole doctrine of his *Optics* that the above-mentioned which is assigned to him was truly his.”

Logan acknowledges that he originally preferred Descartes’ hypothesis concerning light as a vibration of the “second element,” but went on to formulate his own ideas—in a letter, Logan reports that he also reviewed Huygens’ *Traité de la Lumière* before writing Chapter 2, where the wave theory of light is developed.¹⁰¹ Logan points out that Newton himself left hints about the possible existence of “a certain most subtle medium” which pervades space and bodies, seemingly contradicting the orthodox doctrine. These occurred at the end of the second edition of the *Principia*, and in several Queries appended to the second edition of the *Optics* in 1716. “But since we are now to have nothing further from that great hand,” Logan concludes, “why may we not, for solving the difficulties

¹⁰¹ Wolf, *Library of James Logan*, 244.

attending the theory he appears at first to have embraced, proceed to consider the matter thusly.”

After examining the nature of two well-known media, water and air, Logan puts forward his own “heretical” hypothesis concerning *electricity*:

We have now in these two fluids, which make up so considerable a part of our sphere, two mediums, the one attractive and the other repulsive, and that there is another which may be both attractive and repulsive, we have not only the authority of that great genius who has been quoted, but the more we look into Nature, the more reason we may have to be convinced of it.

Electricity was formerly regarded but as a trifling appearance in Nature, and therefore in the last curious age was very little considered; for that quality was supposed to be excited only by putting into motion the finer parts of the body it was found in, and yet the excellent R. Boyle had observed that these parts being once put in motion, excited also the same quality in any other body, as silver, iron, marble, etc. that was brought within the sphere of their action. (see Boyle’s works abridged, Vol 1, pa. 512) But now more lately by F. Hawksbee’s experiments in producing light, and particularly by the surprising phenomena arising from electricity in those of Step. Gray, we may see a field opened for speculations that, if duly pursued, may probably lead us into more just and extensive notions of our bodies and the world we live in, than have hitherto been generally thought of.

And if there be no heresy in mentioning it in the present age, why may we not venture to question the reasonableness of asserting a vacuum as indispensably necessary to the continuance of motion? The argument indeed may hold in relation to all such bodies, the matter of light excepted, as our senses are formed to take cognizance of, but shall we from thence presume to judge of all the kinds of subtle matter that space may be filled with? *Can we be sure that there is*

no electric or elastic medium that instead of obstructing or retarding motion, may be the very means of continuing it, or rather, have we not from the discoveries lately made, powerful reasons to believe it? Can we say an exhausted receiver is a vacuum because the air is drawn out of it, while at the same time we see it filled with light, the matter of which in the true nature of things, and on a just estimate of them, though not according to our apprehensions, may possibly be a more essential substance than the earth or stones we tread on. But if a vacuum be not absolutely necessary, as that allotted by some to the ethereal spaces cannot be, then undoubtedly to have all space in the Universe possessed by some kind of matter is much more consistent with the dignity, beauty, and order of the whole, than to imagine those vast voids which carry even a kind of horror in the thought. (emphasis added)

This subtle elastic medium filling space, which Logan suggests may be *electric*, put into vibratory motion by various impellents, may explain the instantaneous diffusion of light, “without supposing any of those infinite reflections, crossings, and interferences that have before been mentioned.” Logan also discusses the remarkable properties of the *magnetic medium* later in the chapter.

Did Logan discuss his ideas about electricity with Franklin, who began his electricity experiments some years later in 1746? Not only is this likely simply because of their close intellectual relationship, as seen in their dialogue concerning Locke's moral theories, but Logan uses one of Franklin's experiments as evidence for his hypothesis about light in the footnote in question. From the fact that ribbons of different colors placed on the snow in bright sunshine will sink to different depths in proportion to their degree of refraction, Logan concludes that the least refractable (“refrangible”) also most strongly *vibrate*, thus heating the ribbon and causing it to sink more deeply. Explaining the experiment, Logan notes parenthetically that “a friend of mine tried it on a different

view.” In a letter written many years later, Franklin explained that he had conceived and performed this experiment to investigate the different degrees of the Sun’s heat absorbed in clothing of different colors.¹⁰²

Logan concludes Chapter 2 by upholding the doctrine of the *plenum*, which “was constantly maintained until toward the end of the last age, but now the opinion of a vacuum prevails among us, which in the sense its great late author Sir I. Newton conceived it, may be very just.” (Here Logan had crossed out the words “is certainly,” and replaced them with “may be.”) Yet, Logan boldly points out, Newton contradicts himself. While acknowledging that light from distant stars reaches us through space, Newton at the same time supposes that light is a kind of body—therefore, “it is impossible he should conceive any of those spaces a mere vacuum.”

“If we duly reflect on the order of the Universe,” Logan concludes, “it will probably be found that the notion of a plenum, in the sense of the note below, renders the system of the Universe more regular, consistent, and beautiful, and therefore more rational and worthy of its Author, than any other.”

In his footnote on the plenum, Logan explains that “By the word *full* here is not understood that there is not interstice void of matter, which would render it in Sir I. Newton’s sense and words much denser than quicksilver or gold, but according to the common acceptance of the word, as we say a cask is full of ashes, feathers, or air....” While Logan goes on to explain further what he means by *full*, nevertheless he leaves open the question of *what kind of matter space may be full of*. This was the issue to be addressed in the speculations and experimentation of Franklin and Colden, bringing them both ineluctably into conflict with the Newtonian establishment.

Colden

Like Logan, Cadwallader Colden was born in Ireland of Scottish descent. He graduated from the University of

¹⁰² Nathan G. Goodman, ed., *A Benjamin Franklin Reader* (New York: Thomas Y. Crowell Company, 1945), 462.

Edinburgh, and pursued the study of medicine until economic hardship led him to emigrate to Philadelphia in 1710, where he became Logan's friend and scholarly interlocutor. He spent the momentous years of 1715-16 in England and Scotland, where he participated in some proceedings of the Royal Society, and returned to Philadelphia to practice medicine. When New York Governor Hunter offered him a position as surveyor general, Logan, although reluctant to see him leave, wrote a letter of recommendation.

Colden launched a long career of political leadership in New York. His extensive dealings with the Iroquois Confederation made him a zealous advocate of just relations with the Indian tribes, which he developed in his 1727 *History of the Five Indian Nations of Canada*. He argued for protective tariffs in a treatise printed in 1726 by John Peter Zenger, and was an early advocate of government-run public health measures to prevent epidemics. Although Colden, at age 87 in 1776, did not support independence, his grandson, Cadwallader D. Colden, served with distinction in the War of 1812 against Britain, and played a leading role in the early economic development of the United States as a friend and sponsor of Robert Fulton, as well as serving in a number of elected positions, including Mayor of New York and member of the U.S. Congress.

As we have seen, Colden also rejected the Newtonian dogmas of the "vacuum" and "attraction." As part of his investigation of these issues, he wrote a study of "fluxions" and circulated a paper on the differences between Leibniz and Newton on the question of *dynamics*.¹⁰³ Colden came to the conclusion that Newton had erred in his concept of matter as fundamentally inactive or "dead." The Newtonians believed that this concept necessarily followed from the phenomena of *inertia* since, as stated in Law I of the *Principia*, "Every body continues in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it." However, Colden argues that the fact that bodies *actively resist* a change of state, demonstrates that all matter is *active*, i.e., that inertia is *a power, force, or activity of resisting*. "For this

¹⁰³ Cadwallader Colden, *Remarks on Mr. Reid's Essay on Quantity*, New York Historical Society, Manuscript Department

Reason,” Colden writes, “some of the antient Philosophers said, all Nature is alive; that is, all Nature is active. Try to describe Matter without Action, Power or Force, the whole Description must consist of Negatives, that is, it must be the Description of *No Thing*....”¹⁰⁴

Colden goes on to hypothesize the existence of three species of matter or *principles of action*: one that is characterized by inertia; another that is “self-moving” without inertia, e.g., *light*; and a third which is an *elastic medium* that fills space and is responsible for gravitation. Colden shows that his hypothesis overcomes the Newtonian argument for the vacuum:

Sir Isaac Newton and his followers on the contrary think there must be a vacuum, and their reason is that all matter has the *vis inertiae* or the force of resisting. If it were so, then the supposition of a *vacuum* would become absolutely necessary; for without it there could be no motion. If all matter were equally endowed with the power of resistance, as Sir Isaac supposes, the supposition of a vacuum becomes necessary; but if it be true, as I think I have proved, that there are different species of matter, and that only one species has the power of resisting, and that this (as will appear upon the least reflection) is by far the least part of the universe, all the difficulties as to motion on the supposition of space being everywhere full, vanish.

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In other words, with Colden’s theory the Universe can be full of matter without becoming “much denser than quicksilver or gold.” Colden became very interested in possible experimental evidence of his hypothesis, and accordingly engaged in an extensive dialogue with Franklin on the nature of electricity.

¹⁰⁴ Cadwallader Colden, *An Explication of the First Causes of Action in Matter and of the Cause of Gravitation* (New York: James Parker, 1745), 11.

¹⁰⁵ Scott L. Pratt and John Ryder, eds., *The Philosophical Writings of Cadwallader Colden* (Amherst, N.Y.: Humanity Books, 2002), 86.

Franklin and Colden met in 1743, and immediately began a correspondence and collaboration that continued for at least 20 years. Although Colden was 18 years Franklin's senior, the two conversed as intellectual equals, and constantly sought Logan's opinion on their ideas. By the Fall of 1744, Colden had transmitted his paper on fluxions and his treatise on the different species of matter to Franklin, asking his and Logan's comments. Although Franklin offered to print the latter treatise at his own expense, it was published in 1745 in New York as, *An Explication of the First Causes of Action in Matter, and of the Cause of Gravitation*, and forwarded to England for the consideration of the Royal Society.

Franklin reported that Colden's work had ignited a firestorm of intellectual ferment in Philadelphia, writing that "Some of our Gentlemen to render themselves more capable of comprehending your Doctrine, have been mustering up and reading whatever else they could find on Subjects anyway akin to yours." Franklin's reading led him to question the very existence of inertia, leading to an intense discussion of that issue, while Logan, who characterized Colden as "the ablest Thinker ... in this part of the World," suggested that his ideas were based on Newton's hints of a "most subtle medium" or "aether." According to Franklin, Logan also compared Colden's ideas to those developed by Leibniz's circles: "... the Doctrine of Gravity's being the Effect of Elasticity was originally Bernoulli's, but he believ'd you had not seen Bernoulli."¹⁰⁶

While Colden strenuously objected to the comparison of his ideas to Newton's "aether," it was only many years later, in a postscript to a 1755 letter to South Carolina botanist Alexander Garden, that Colden revealed what may have been his true inspiration:

P.S. Turning over a book since I wrote what is above, I accidentally met with an extract from Mr. Leibnitz's *Specimen Dynamicum*, which though I have certainly seen before, had entirely escaped my

¹⁰⁶ ALS: New-York Historical Society, letters of Franklin to Colden, October 25, 1744 and October 16, 1746; Labaree, et al., *Papers of B.F.*, vol. 3.

memory, by reason probably of my not being in the same way of thinking I am now, and therefore giving little attention to it. In this I find my opinion confirmed, that an active principle constitutes the essence of substance. Though I be well pleased to have my thoughts confirmed by so great an authority, I suspect this agreement with Mr. Leibnitz will not recommend my performance to the gentlemen in London to whom it is submitted. The sentiments of these two great men in philosophy, Sir Isaac Newton and Mr. Leibnitz have been strangely misrepresented by their commentators in their altercations with each other.¹⁰⁷

In fact, Colden's view of inertia as an active force of resistance, was precisely the beginning point of Leibniz's 1695 essay on dynamics, which was later applied by him and Papin to develop the steam engine.¹⁰⁸

Colden's well-founded suspicions concerning his reception in England were also borne out, as his work was greeted with extreme hostility there, outside of the few scholars friendly to America like Peter Collinson. That hostility only intensified when Colden published an elaboration of his ideas in London in 1751, under the title, *The Principles of Action in Matter, the Gravitation of Bodies, and the Motions of the Planets, explained from those Principles*.

The American scholars involved in this dispute interpreted this British hostility as an arrogant disdain for them as "colonials" and intended to suppress their independent intellectual activity. As Collinson concisely reported the Royal Society's reaction to Colden: "[T]he state of the case seems to be this—that every one is so satisfied with Sir Isaac's that they have no curiosity to examine yours. Was it in Latin—in Germany or France it would not want for Perusal."¹⁰⁹ Colden wrote

¹⁰⁷ Pratt and Ryder, *Writings of Cadwallader Colden*, 223.

¹⁰⁸ Valenti, "Leibniz, Papin and the Steam Engine."

¹⁰⁹ *The Letters and Papers of Cadwallader Colden*, Vol. V (New York: New York Historical Society, 1923), Collinson to Colden, March 13, 1755.

sarcastically that the English elite considered his work as a presumptuous “attempt by a man in the woods of America to correct or improve Sir Isaac.”¹¹⁰

“One, who had the perusal of the first edition,” Colden wrote Garden, “turned up his nose in saying, ‘What! does a man in the woods of America pretend to teach us of the sublime parts of philosophy, which have escaped the researches of the most sagacious among us?’ Perhaps therefore it may die in obscurity in America with its author.”¹¹¹

Although Franklin had his criticisms and uncertainties about Colden’s treatise, he expressed his enthusiasm about it in equally political terms: “On the whole it gives me great Satisfaction, when I consider it as a Work that will not only improve Philosophy, but *do Honour to America*.” (emphasis added)¹¹²

Such patriotic sentiments were probably encouraged by Logan. Friends’ historian and Logan scholar Frederick B. Tolles argued in the 1950s that Logan represented an early, purer form of “Americanism: love of the American soil as distinct from loyalty to the British empire.” Tolles quotes the charge to the Grand Jury delivered by Logan as Presiding Judge in 1723:

Perhaps, he said, “the lateness of this our settlement will scarcely allow men to account it their country, because they can remember that they were born and bred up in another”—as he himself had been. Nevertheless, “while our estates and families are here, while our children are born and must subsist here, it becomes truly ours and our children’s country, and it is our duty to love it, to study and promote its advantages.”¹¹³

In his correspondences with Colden, Alexander Garden, another Scotsman educated at the University of Edinburgh, also

¹¹⁰ Pratt and Ryder, *Writings of Cadwallader Colden*, 226.

¹¹¹ *Ibid.*, 223.

¹¹² ALS: New-York Historical Society, Franklin to Colden, February 28, 1753; Labaree, et al., *Papers of B.F.*; vol. 4.

¹¹³ Tolles, “James Logan—A Canterbury Pilgrim”.

did not mince words in expressing his disgust at the “English Society.” Garden, after whom Linnaeus named the *Gardenia*, had a low opinion of Royal Society President Hans Sloane, calling him, “That most pompous, confused, and illiterate Botanist Sir Hans Sloane,” and denouncing one of his botanical works as a “Hotch Potch which has conferred no honor on the English Botanists...”¹¹⁴ While he, like Colden, opposed independence in 1776, his son joined the Continental Army and became an officer of the patriotic Society of the Cincinnati.

When Colden wrote to Garden of the prejudice of the Newtonians against him, Garden replied with indignation:

I have a real and sincere satisfaction in seeing truth gain ground, but you have not been the first whose works have been denied the Countenance of the English Society; They Appear to me to be either too Lazy and indolent to examine or too conceited to receive any new thoughts from any one but from an F.R.S. [Fellow of the Royal Society-PV]...

Your works I think are another testimony Against them, for its a thousand to one but they will implicitly receive your notions if only countenanced by Foreigners, tho they would stumble at them promulgated by one in America tho supported by the Clearest reasoning and Demonstration.¹¹⁵

Garden, however, was delighted with Colden’s comparison of his ideas to Leibniz’s *Dynamics*. “What you lastly observe about Mr. Leibnitz gives me great pleasure,” he wrote to Colden, “for tho I believe your principles are sufficiently supported by your consequent natural account for the Phenomena, yet so great an authority is very agreeable.”¹¹⁶

Garden later forwarded some of Colden’s writings to the Royal Society of Edinburgh, hoping for a better reception in

¹¹⁴ *The Letters and Papers of Cadwallader Colden*, Garden to Colden, 1755-1756.

¹¹⁵ *Ibid.*, Garden to Colden, March 14, 1758.

¹¹⁶ *Ibid.*, Garden to Colden, November 22, 1755.

Scotland, but was disappointed, reporting to Colden, “they are all rigid and literal Newtonians.”¹¹⁷

Colden’s friend Captain John Rutherford at Albany had also offered encouragement, while neatly knocking Newton off his pedestal. “To humble you a little further about Sir Isaac...,” he wrote Colden, “remember he differs 500 years in his Cronology from the rest of Mankind, in which he has not yet been followed by one Author at home or abroad, nor can I ever envy a man or call him truly great who never enjoyed any pleasure in society, died a virgin, and wrote upon the Revelations...”¹¹⁸

As Collinson had predicted, the response from Germany was quite different. Colden’s work intersected an intense debate there over Leibniz’s ideas, as Newtonians were attempting to dominate the Berlin Academy of Sciences, founded by Leibniz in 1700. In this context, University of Leipsig professor and Leibniz scholar Abraham Gotthelf Kästner was directed to translate Colden’s 1745 treatise into German, which was then published in Leipsig in 1748 with Kästner’s critical comments appended. Thus was Franklin’s wish fulfilled concerning Colden’s work, expressed to him in those years: “I long to see from Europe [some] of the deliberate and mature Thoughts of their Philosophers upon it.”¹¹⁹

“I have received a Copy of the Translation of my first piece into High Dutch with Animadversions on it at the end of it,” Colden wrote Franklin in 1752, “printed at Hambourg and Leipsic but I do not understand one word of them. I find my name often in company with those of very great ones Newton, Leibnitz, and Wolfius and Leibnitz’s Monades often mentioned a New Doctrine which perhaps you have seen and is of great repute in Germany.”¹²⁰ He soon had Kästner’s remarks translated into English, and collaborated with Franklin in composing a response. As we shall see, this dialogue led to a

¹¹⁷ Ibid., Garden to Colden, April 15, 1757.

¹¹⁸ Ibid., Rutherford to Colden, April 19, 1743.

¹¹⁹ AL: New-York Historical Society, Franklin to Colden, Jan. 27, 1747/[48]; Labaree, et al., *Papers of B.F.*, vol. 3.

¹²⁰ Draft: New-York Historical Society, Colden to Franklin, May 20, 1752; Ibid., vol. 4.

lasting connection between Franklin and the Leibnizian circles in Germany.

Intellectual independence secured

Franklin reports in the *Autobiography* that he began electricity experiments after witnessing a demonstration of them in Boston in 1746 by “a Dr. Spence, who was lately arrived from Scotland.” The ever-helpful Peter Collinson made a present of a glass tube to the Library Company, and Franklin soon had several other similar ones made by glass-blowers in the city. In the process, Franklin was assembling the experimental capability of testing Logan’s electrical hypothesis, which would take the dispute with the Newtonians out of the realm of speculation and into physical reality.

Franklin soon came to the conclusion that electricity was indeed no “trifling appearance in Nature,” limited merely to sparks sometimes created by friction, but was likely present in all of matter and all of space. If it could be proved that electricity existed in the atmosphere or beyond, then it might qualify as that “subtle elastic medium” hypothesized by Logan and Colden, let alone by Jacques Bernouilli, Huygens, Leibniz, and others of that school. More than this, if electricity represented a different species of matter present everywhere, what could this imply for the progress of humanity if its power could be harnessed by technology?

Was this the train of Franklin’s thinking leading up to his celebrated “kite and key” experiment in June 1752, demonstrating the identity of lightning and electricity? If so, the popular portrayal of Franklin as an eccentric tinkerer, a supremely practical inventor who framed no hypotheses, must be discarded. The letters exchanged with Colden in those years well-document the profound philosophical considerations leading to Franklin’s earth-shaking discovery. Logan was an important presence throughout this process, even though he had suffered a stroke in 1740, and eventually suffered fits of palsy and paralysis, leading to his passing on October 31, 1751.

A few months after Franklin began his investigations in 1746, Logan wrote an excited letter asking him to visit Stenton

as soon as possible. “Yesterday was the first time that I ever heard one syllable of thy Electrical Experiments,” Logan wrote on February 23, 1747, “when John Bartram surpriz’d me with the account of a Ball turning many hours about an Electrified Body, with some other particulars that were sufficiently amazing.” Logan added that he had pulled Francis Hawksbee’s book of electricity experiments off his shelf to review them, and also reviewed Stephen Grey’s electrical discoveries, both of which Logan had referenced in the footnote to Chapter 2 of the *Duties of Man*, discussed at length above. “But your experiments exceed them all,” Logan wrote enthusiastically. “I could therefore wish as soon as it can suit thee that thou wouldst step up hither bringing an Account with thee....” He added in a postscript, “It would be no small addition to the favour if thou couldst conveniently bring with thee some of the Apparatus as the Glass Tube.”¹²¹

Franklin also involved Colden in the process early on, dispatching his son William to personally deliver a glass tube and his electrical journal to him, with instructions on how to duplicate the experiments. Franklin accompanied these with a letter, dated June 5, 1747, reporting a major breakthrough, and indicating that the Americans were now *ahead* of the British in electrical discoveries. “It is now discovered and demonstrated, both here and in Europe, that the Electrical Fire is a real Element, or Species of Matter,” Franklin wrote, “not *created* by the Friction, but *collected* only. In this Discovery, they were beforehand with us in England; but we had hit on it before we heard it from them. What relates to the wonderful Effect of *Points*, the Difference between *Candle Light* and *Sun Light*, and several other Things in these Papers, the Philosophers at home, are still, as far as we know, ignorant of.”¹²²

Again, that electricity is a “real Element, or Species of Matter, not *created* by the Friction, but *collected* only,” is precisely what Logan had guessed at in the *Duties of Man*.

¹²¹ Transcript: Harvard College Library (Sparks), Logan to Franklin, Feb. 23, 1747; *Ibid.*, vol. 3.

¹²² ALS: New-York Historical Society, Franklin to Colden, June, 5, 1747; *Ibid.*, vol. 3.

By 1750, Franklin had written an “Essay towards a new Hypothesis of the Causes and Effects of Lightning,” which he forwarded to Colden on June 28. Franklin had also kept his correspondents in London informed of his progress, and later reported the results in the *Autobiography*:

Oblig’d as we were to Mr. Colinson for his Present of the Tube, &c. I thought it right he should be inform’d of our Success in using it, and wrote him several Letters containing Accounts of our Experiments. He got them read in the Royal Society, where they were not at first thought worth so much Notice as to be printed in their Transactions. One Paper which I wrote for Mr. Kinnersley, on the Sameness of Lightning with Electricity, I sent to Dr. Mitchel, an Acquaintance of mine, and one of the Members also of that Society; who wrote me word that it had been read but was laugh’d at by the Connoisseurs: The Papers however being shown to Dr. Fothergill, he thought them of too much value to be stifled, and advis’d the Printing of them.... It was however some time before those Papers were much taken Notice of in England.¹²³

In the same June 28 letter to Colden, Franklin reported that “My good old Friend Mr. Logan, being about three Months since struck with a Palsey, continues Speechless, tho’ he knows People, and seems in some Degree to retain his Memory and Understanding. I fear he will not recover.” Nevertheless, all through this period, the Logan/Franklin collaboration on electrical experiments continued, as Franklin applied electric shocks to Logan in an attempt to treat his paralysis. Despite his ailments, Logan wrote a long letter to Collinson in early 1750, recommending Franklin in the most glowing terms for his many political and scholarly initiatives. “In short he is an excellent yet a humble man,” Logan wrote, adding, “Pray do not imagine that

¹²³ Lemay, *Franklin Writings*, 1453-1454.

I overdoe it in my character of BF for I am rather short in it....”

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In an October 28, 1751 letter, Colden prodded Franklin to address the question of the *cause* of electricity. “My Notions on Electricity are confused and indigested,” Colden wrote, asking for clarification of certain electrical phenomena. “In the time I have been allowed amidst perpetual avocations to think on your experiments,” Colden added, “they seem to me to lead more directly to the discovery of the cause that any set of experiments which I have seen.” Nevertheless, Colden suggested a line of investigation that “may lead us a great deal farther in discovering the cause of electricity and the laws of its action that we have as yet got,” and went on to ask Franklin’s views of the matter.¹²⁵

Franklin replied promptly on October 31, answering Colden’s queries and offering to pursue any experiments that he might suggest. He went on to report the astounding results of his own new experiments, including melting brass and steel, firing gunpowder, and giving “Magnetism and polarity to Needles that had none.” Franklin had concluded that electricity could lead to the greatest technological revolution in history:

There are no Bounds (but what Expence and Labor give) to the Force Man may raise and use in the Electric Way: For Bottle may be added to Bottle in infinitum, and all united and discharg’d together as One, the Force and Effect proportion’d to their Number and Size. The greatest known Effects of common Lightning, may, I think, without much Difficulty be exceeded in this way: Which a few Years since could not have been believed, and even now may seem to many a little extravagant to suppose. So we are got beyond the Skill of Rabelais’s Devils of two Year old, who, he humourously says, had only learnt to thunder and lighten a little round the Head of a Cabbage. ¹²⁶

¹²⁴ Letterbook copy: Historical Society of Pennsylvania, Logan to Collinson, [February] 28 1749/50; Labaree, et al., vol. 3.

¹²⁵ Draft: New-York Historical Society, Colden to Franklin, Oct. 28, 1751; *Ibid.*, vol. 4.

In his next letter, dated March 16, 1752, Colden explained that he was endeavoring to apply his theory of the different species of matter to electrical phenomena. "In my opinion no set of experiments which I have read lead so directly to form any conception of the cause of electricity as yours do," he again assured Franklin. "However I find it difficult to form any conception of this cause which in any degree satisfies my mind. I conceive it to be a most subtle elastic fluid like our air but incomparably more subtle and more elastic." Colden went on to propose electrical experiments that he suggested might advance the knowledge of medicine and agriculture, once again advertent to his physical theories—"For I suspect that all Fermentations Vegetation and Animal Motion is principally produced by this subtle elastic fluid which I imagine to be the cause of Electricity and is more or less to be found in all bodies strongly, retained by some, and separating easily from others."

Colden indicates that a proposition advanced in his *Principles of Action in Matter* "may be of use or serve as a hint for explaining the electrical fire. I propose to add to this a copy of an illustration of that proposition because the illustration will not be found in the printed book."¹²⁷

Franklin responded to Colden's speculations with an explosion of creative hypotheses and insights of his own, expressed in his next letter of April 23, 1752. Franklin was beginning to think of electricity as a fluid filling space *above the atmosphere*, coherent with Logan's conjectures in the *Duties of Man*. If lightning were proved to be electricity, then these conjectures could be vindicated. This is how Franklin expressed these ideas to Colden:

Your conception of the Electric Fluid, that it is incomparably more subtil than Air, is undoubtedly just. It pervades dense Matter with the greatest Ease; But it does not seem to mix or incorporate willingly with mere Air, as it does with other Matter. An Electric

¹²⁶ ALS: Historical Society of Pennsylvania, Franklin to Colden, Oct. 31, 1751; *Ibid.*, vol. 4.

¹²⁷ Draft: New-York Historical Society, Colden to Franklin, March 16, 1752; *Ibid.*, vol. 4.

Atmosphere cannot be communicated at so great a Distance thro' intervening Air, by far, as thro' a Vacuum [i.e., a space without air-PV]. Who knows then, but there may be, as the Antients thought, a Region of this Fire, above our Atmosphere, prevented by our Air and its own too great Distance for Attraction, from joining our Earth? Perhaps where the Atmosphere is rarest, this Fluid may be densest; and nearer the Earth, where the Atmosphere grows denser, this Fluid may be rarer, yet some of it be low enough to attach itself to our highest Clouds, and thence they becoming electrified may be attracted by and descend towards the Earth, and discharge their Watry Contents together with that Etherial Fire. Perhaps the Aurorae Boreales are Currents of this Fluid in its own Region above our Atmosphere, becoming from their Motion visible. There is no End to Conjectures. As yet we are but Novices in this Branch of Natural Knowledge.

Franklin went on to address Colden's proposition about light, putting forward views which the reader will recognize as identical with those of Logan on the subject:

I thank you for communicating the Illustration of the Theorem concerning Light. It is very curious. But I must own that I am much in the *Dark* about *Light*. I am not satisfy'd with the Doctrine that supposes Particles of Matter call'd Light continually driven off from the Sun's Surface, with a Swiftess so prodigious! Must not the smallest Particle conceivable, have, with such a Motion, a Force exceeding that of a 24 pounder discharg'd from a Cannon?...

May not all the Phaenomena of Light be more conveniently solved, by supposing Universal Space filled with a subtle elastic Fluid, which when at rest is not visible, but whose Vibrations affect that fine Sense the Eye, as those of Air do the grosser Organs of the Ear? We do not, in the Case of Sound, imagine that

any sonorous Particles are thrown off from a Bell, for Instance, and fly in strait Lines to the Ear; why must we believe that luminous Particles leave the Sun and proceed to the Eye?... May not different Degrees of Vibration of the above-suppos'd Universal Medium, occasion the Appearances of different Colours? I think the Electric Fluid is always the same, yet I find that weaker and stronger Sparks differ in Apparent Colour, some white, blue, purple, red; the strongest white, weak ones red. Thus different Degrees of Vibration given to the Air, produce the 7 different Sounds in Music, analogous to the 7 Colours, yet the Medium, Air, is the same.

Well would Franklin raise the specter of an “Inquisition for Philosophical Heresy” in this letter, joking to Colden that “one Heretic will surely excuse another.”¹²⁸

Franklin’s death-defying experiment with the kite and key in June 1752 established the American Philosophy as the equal of any in the world, including the mother country. The *Philadelphia Experiments* were carried out before the French king and court that same year with sensational effect, and Franklin’s writings, as well as Colden’s, quickly appeared in French translations. The duplication of the experiments throughout Europe, and translation of Franklin’s electrical writings into many languages, signaled the intellectual independence of America.

Less well-known are the circumstances of Franklin’s momentous 1766 visit to Hanover and the Göttingen Academy of Sciences, which also ties together many threads of our story. Among his hosts was the same Professor Kästner who had translated Colden’s work and engaged the Americans in dialogue years before—he welcomed Franklin to Göttingen with a science festival including electrical experiments, and a special paper on the subject.¹²⁹ Another was Rudolph Eric Raspe, who was in

¹²⁸ ALS: New-York Historical Society; also draft: American Philosophical Society; Franklin to Colden, April 23, 1752; *Ibid.*, vol. 4.

¹²⁹ David Shavin, “Leibniz to Franklin on ‘Happiness,’” *Fidelio*, Spring 2003, 45-73.

charge of the manuscripts in Hanover, including the voluminous archives of Leibniz's unpublished writings. Perhaps not coincidentally, Kästner and Raspe had collaborated the year before to issue the first publication of Leibniz's *New Essays* and other writings, an edition which found its way into the catalog of the Library Company of Philadelphia. And furthermore, the University of Göttingen itself had been founded in 1734 on the initiative of the same Caroline who had been such a staunch partisan of Leibniz in his disputes with the Newtonians, once her husband had ascended to the throne as King George II.

Upon his return from Germany, Franklin wrote to Raspe from London on September 9, 1766, discussing the progress of their arrangements to exchange seeds, fossils, a "Mohawk Grammar," maps, etc., but especially *books*. "When the Books from Frankfurt arrive," Franklin wrote, "I shall see what I have, and what I still want, of the Lists given me at Göttingen." Six scientific treatises by Kästner are included in the catalog of Franklin's library¹³⁰ —perhaps other books went directly to the Library Company at that time, including the *New Essays*. Franklin concluded his letter with special greetings to his principal German host, the Baron von Münchhausen, who also had been Caroline's adviser in the creation of the University.¹³¹

Franklin continued to develop his scientific hypotheses throughout his life. Many years after the kite and key experiment, he confided to Colden "a Suspicion I have, to wit, that Magnetism fills all Space."¹³² As late as 1784, while serving as United States commissioner to France, Franklin noted down ideas also very familiar to readers of the *Duties of Man*, under the heading *Loose Thoughts on a Universal Fluid*: "Universal Space as far as we know of it, seems to be filled with a subtil Fluid, whose Motion, or Vibration, is called Light...."¹³³

¹³⁰ Edwin Wolf 2nd and Kevin Hayes, *The Library of Benjamin Franklin* (Philadelphia: American Philosophical Society and Library Company of Philadelphia, 2006)

¹³¹ ALS: Landesbibliothek, Kassel, Franklin to Raspe, Sept. 9, 1766; Labaree, et al., vol. 13.

¹³² ALS: New-York Historical Society; draft (incomplete): American Philosophical Society; Franklin to Colden, Feb. 26, 1763; *Ibid.*, vol. 10.

¹³³ Lemay, *Franklin Writings*, 988.

In his obituary of Logan, after extolling his integrity as a political leader and citing his many intellectual accomplishments, Franklin concluded that “the most noble Monument of his Wisdom, Publick Spirit, Benevolence, and affectionate Regard to the People of Pennsylvania, is his LIBRARY; which he has been collecting these 50 Years past, with the greatest Care and Judgment, intending it a Benefaction to the Publick for the Increase of Knowledge, and for the common Use and Benefit of all Lovers of Learning.” Franklin prophesied that the library “will convey the Name of LOGAN thro’ Ages, with Honour, to the latest Posterity.”¹³⁴

Perhaps we, representing that posterity today, shall contribute in some measure to the immortality of Logan and his ideas with this publication, thus vindicating Franklin’s prophecy.

¹³⁴ Obituary of James Logan, November 7, 1751; Labaree, et al., vol. 4.

Of the Duties of Man, as they may be deduced from Nature

Chapter One

It must to every thinking person be a melancholy consideration that after two or three thousand years that knowledge and learning, as the books extant show us, have been cultivated by men of study, they have not yet been able to agree on any sure principle on which they might with certainty found the duties of life, and from thence infer and clearly deduce the obligation on mankind to practice them. The cause of which, nevertheless, will probably be found their failing to carry their inquiries deep enough into Nature, in searching and discovering what are the laws originally impressed on Man in his formation, which, by their inherent force, he is impelled to obey, and what are the clear and plain dictates of reason in union with those laws.

For Man, consisting of an organized and animated body and a mind endowed with the powers of reason, in the first of which (though better adapted to the purposes of the other) he differs no more from those of other animals, even on anatomical inquiries, than they do one from another, but, in the other, his supereminency above all the irrational, and of every other part of the known Creation, consists. It is certainly strange that, on the improvement of this superior part, by which alone he claims an affinity with Heaven, there have been no surer foundations laid. Nor the whole of Man, as a compound of the rational with the irrational, has, as it ought, been duly considered together, without which notwithstanding, it cannot be reasonably

*Of the Duties of Man, as they may be deduced
from Nature* (Part. 1. finished)

It seems to every thinking Man to be a melancholy Consideration, that after two or three thousand years that Knowledge and Learning, as the books extant shew us, have been gathering by men of Study. They have not yet been able to agree on any clear Principle, on which they might with certainty found the Duties of Life; & from thence infer and clearly deduce the obligation on Mankind to practise 'em. The cause of which notwithstanding will probably be found, their failing to carry their Inquiries deep enough into Nature; in searching and discovering what are the Laws originally impressed on Man in his formation, which by their inherent force he is impelled to obey; and what are the clear and plain dictates of Reason, in union with those Laws. For Man consisting of an organic and animated Body, and a Mind endowed with the Powers of the senses, & the first of which the latter adapts to the purposes of the other, the latter no more from those of other animals, even in doctrinall Inquiries, than they do one from another. But in the other his Supereminence above all the irrational & every other part of the known Creation consists. It is certainly strange that in this improvement of this Superior part, by which alone he claims an affinity with Heaven; there have been two Foundations laid, Nor the whole of man, as a compound of the Rational with the Irrational, has, as it ought, been only considered together. Without which notwithstanding it cannot be reasonably expected, that the Subject should ever be fully penetrated and justly understood; or till then, that such Deductions should be drawn, as must universally carry a clear conviction with them on the sense, and understanding of all mankind.

To carry on such an Inquiry and fully to establish such Principles, that shall be in all points unexceptionable, the writer is too conscious of his own Weakness to imagine in his Power yet having had some thoughts on this important Subject, which he has met with in the Authors, who have treated of it, he is willing to submit them to the judgement of such, as may be capable of making a just one; and of applying them, if found to have weight, to the best of purposes in rendering them generally useful. And these have been his Considerings.

I will (so presumed) be universally allowed, that it is impossible for any Deduction of Nature to be, to B, or to B to B, or to B to B, or to B to B, by any thing, or to Superintend any new Power, for which Nature has not provided adequate abilities. By Nature here is meant the energetic Powers implanted in the

element.

expected that the subject should ever be fully penetrated and justly understood, or, until then, that such deductions should be drawn as must universally carry a clear conviction with them on the sense and understanding of all mankind.

To carry on such an inquiry, and fully to establish such principles that shall be in all points unexceptionable, the writer is too conscious of his own weakness to imagine in his power. Yet, having had some thoughts on this important subject which he has not met with in the authors who have treated of it, he is willing to submit them to the judgment of such as may be capable of making a just one, and of applying them, if found to have weight, to the best of purposes in rendering them generally useful. And these have been his reasonings:

It will be universally allowed that it is impossible for any production of Nature to BE, to ACT, or to BE SENSIBLE to any thing, or to superinduce any new powers, for which Nature has not furnished adequate abilities. By Nature here is meant the energetic powers implanted in the several parts of the Creation by its omnipotent Author for supporting and continuing them in the order by himself established, and in his laws at first impressed on them. And therefore Nature, in this sense, signifies the same as its divine Author, though otherwise the word is used to signify that order and those laws so established.

But that this fundamental principle may be the more effectually fixed in the readers' minds and make the deeper impression, it may not be improper to begin with a representation from a subject very familiar and intelligible, but so direct to the grand purpose of these sheets, that it will be found no unsuitable introduction.

“A large quantity of eggs”

Let us then suppose a large quantity of eggs, from a great variety of animals, all duly impregnated, to be laid in view before us. Those, though different in color and size, would be all found nearly to agree in figure and shape, that is, to be generally roundish and smooth, and all of them, without exception, to be so many lifeless lumps of matter, consisting, if they were to be further examined, of only two homogeneous liquids at most, and some of them but of one, with a small shapeless cicatricula, together enclosed within a thin shell or tough pellicle. Now it is well known that diverse species of animals, as ostriches, tortoises, etc. are produced into life from eggs by the sole heat of

the Sun. And we know by experience that diverse of other kinds, which in a common way owe their lives to the incubation of their dams, may effectually be produced from the egg by being kept in a constant genial heat, and also reared to their full growth without the assistance of their dam, or any other such animal. Let us further suppose that of every distinct kind of these eggs, two or more of each sort were, by a suitable care and management, without any such help, not only brought to exclusion, but actually so reared, until they attained their just size and perfection that their dams were in when they laid those eggs that produced them.

We should then behold a transformation that, were it not familiar to us, might be justly accounted astonishing: that a heap of lifeless eggs, which some few months since showed not the least resemblance of any animal, not from either their exterior or interior appearance the least indication of a capacity of becoming such, solely by the operation of a proper warmth and the energetic powers of Nature, converted, without any concurrence or consciousness of their own, into a large variety of animals, as eagles, crocodiles, swans, tortoises, poultry, snakes, peacocks, turkeys, guanas, doves, partridges, linnets, nightingales, etc. All perfect in their kind, and each furnished with peculiar and distinguishing instincts, by the force of which alone, when left to their liberty, they would repair to the several scenes for which they were respectively fitted, as to the open fields, woods, mountains, waters, marshes, or caverns of the earth. Those of the domestic kind would choose still to continue about houses; those of the social would resort together; the rapacious would severally part; and each species would apply themselves to seek their proper food respectively fitted to their organs of digestion. But all would, at the proper season, associate with the other sex and proceed to the great work of generation, the grand Plot of Nature, to perpetuate each species.

And in order to this, the females being impregnated, while their eggs were forming and enlarging to their full growth in them to furnish out the entire bodies of their succeeding brood, yet without the least knowledge or consciousness of the process in themselves, would, some singly, others with the assistance of the males previously associating with each other for

that purpose, provide proper depositories for those eggs by forming nests in the most covert and secure places. Some of them more simple, though sufficient for their purpose, but others with what we should call the most exquisite art and skill, and such as the most ingenious hand, with the same materials, would attempt in vain, each several species in a severally different form. For which, though according to our supposition of their having all been produced the last season, they could not possibly have any exemplar, yet each of them most strictly observing the same methods and rules in relation to place and situation, as whether on the ground, bushes, loftier trees, clefts of rocks, caverns in the ground, etc. and of the same or like materials, and exactly of the like fashion, that others of the same kind have been at any time known to observe since the foundation of the world.

Though this representation, taken from a view of eggs in all appearance absolutely lifeless in themselves, may serve more strongly to impress a just sense of the powers of Nature, we may assure ourselves the case is exactly the same universally in all the several kinds of viviparous animals. Each kind acts perfectly agreeable to the respective powers and impressions of Nature, some with greater variety of instincts which they can variously exert in proportion to the fineness of their constituent parts, from whence some of the same species are found more docile and tractable than others. And in these varieties, a speculative mind may be furnished with an inexhaustible fund of entertainment and delight, while it contemplates the exquisite skill shown in these several operations for which each species was primarily and particularly fitted. While in all other points for which they are not furnished with a proper sense and peculiar abilities, they are found as incapable as a watch is to strike the hour, which is not furnished with the wheels and motions for it, that is, as the lifeless sticks and stones.

From such speculations as these, the most unthinking of mankind may be awakened to reflect and consider their own abilities, that they give none of these to themselves. But as we are generated, born, nourished, grow, and discharge all the several functions of life solely by the powers of Nature implanted in us, so from the same powers it is that we can either

love, hate, rejoice or grieve, be angry, hope or fear, etc., of none of which we could be capable without receiving the faculty or disposition for them from Nature, nor could we without this be sensible to, or exert, any passion, affection, or natural inclination whatsoever. For though it is said some of these, or some others like these, are the operations of the rational soul or mind, as others are of the body, yet as with this, we could not walk, work, see, hear, or taste without feet, hands, an eye, ear, or palate, and so in others, no more could any of our inward operations be performed, or affections displayed, unless the proper powers for them were truly implanted in us. We may regulate and sometimes, with application, raise them by volition, but cannot make any one of them for ourselves but what virtually, and truly, had its roots in us before.

We may observe further that, as every distinct species of animal that ever was truly known to be in the world does to this day subsist in it (at least we have no sufficient reason to believe the contrary), and each of these has the same parts and instincts, as each of the winged kind, as was observed before, as far as can be discovered, build their nests with the same or like materials, and in the same manner, they ever did, since their first existence, so also all the several natural powers and faculties of whatsoever kind that ever were in our own species (though in very different degrees in individuals) subsist still the same, notwithstanding all the varieties of modes and pursuits, and of habits contracted from these. Yet the root of all is unchangeably still the same, without variation.

Hobbes “defective in his philosophy”

This, as it will be found in itself incontestable, being laid down as a principle, it will appear equally evident that Man was formed for Society and Benevolence. Therefore that he, who in the last age got himself a name by denying this and asserting the state of Nature to be a state of war, was as defective in his philosophy (though then believed by numbers to have searched into human nature deeper and more successfully than any who had gone before him) as he was proved by demonstration to be in

the mathematics, to which also he made the highest pretenses. And the proofs for what is here advanced are these:

Man, as was observed before, differs not more in his body from other animals than these do one from another, but no one species of them differs from the other but in such parts, qualities, or dispositions as were peculiarly adapted (though all their distinctions in these are not fully known to us) to the ends for which they were severally formed. In general, they and we have the same external senses, the like wants, hunger and thirst, digestion and egestion, the like muscular motion, propensity to propagate our kinds, etc. And all the particulars wherein we differ from them must, in like manner, have been intended by the great Author of our being for a peculiar end proper to us alone, who are so distinguished. Some of these selected in this place for the purpose are such as follow, which may be considered, not each singly by itself only, but the whole taken together.

Love and marriage

1. The males of no other kind are ever known to be sensible to, or touched with, the passion we call falling or being in love with one particular alone, and to court one preferably to all others. The birds choose their mates at the season the whole breed are influenced to carry on the affair of generation, because, in those that build nests with any contrivance (and perhaps this will be found in no others, for the writer never observed it in those whose chicks follow the dam presently after exclusion), the mutual help of both sexes is necessary there, not only to relieve each other alternately in sitting, for these sicken not as the others do, but more especially to provide and bring to their young ones, while wholly confined to the nests, sufficient food, which might prove too heavy a task for the dam alone. But then it is not known that, after the young are fully fledged or can sufficiently provide for themselves, the same pair keep longer together. It is affirmed otherwise, it is true, of the dove kind, and especially of the turtles. But then it will appear they entirely fail in another great point, viz., in regarding their young, after they are thus enabled, without which this no way contributes to society, nor reaches any further than to make one couple. But Man,

frequently without any determination of his judgment, and not seldom against it, until mastered by his passion, is swayed by such an ardency of desire as, without a provision for it in Nature, he could not possibly give himself by an act of his will or by the strongest resolution. And the end of such a limitation in choice, we shall see anon.

2. As this is perfectly natural on the male side, amongst those who are educated in their native innocence, and also frequently seen in others, so in the softer sex a natural coyness appears, which, though some wits are pleased to ridicule and expose it under the name of affectation, yet the greatest have been fully sensible it has a much deeper foundation. As the most excellent Milton, where he makes Adam relate Eve's behavior on his first address to her, has beautifully expressed it in these affecting lines,

She heard me thus; and tho' divinely brought,
Yet innocence and Virgin Modesty,
Her virtue and the conscience of her worth,
That would be woo'd, and not unsought be won,

Not obvious, not obtrusive, but retired,
The more desirable. Or to say all,
Nature herself, tho' pure of sinful thought,
Wrought in her so, that seeing me, she turn'd.
I followed.

Or as Dryden makes herself answer:

Somewhat forbids me, which I cannot name
For ignorant of guile I fear not shame:
But some restraining thought, I know not why
Tells me you long should beg, I long deny.

And, as it is well known from experience that affection is, by this means, heightened on the side of the applicant, and by it there is time allowed to the beloved object to conceive and kindle the same on hers, it is a manifest indication that this special provision in human kind alone was made by Nature for

strengthening and riveting that tie, which is of such vast importance in what is to follow. And thus it is ever found where Nature in its innocence is pursued, as, on the contrary, where looseness and debauchery, in rebellion against Nature, have prevailed, her most sacred laws are not only perverted, but even inverted.

3. The next argument, relating to the conjugal state when entered into, it is thought proper to express in these lines, such as, on this occasion, the writer could put together:

Rarior Aspirat reliquis Animantibus, Uni
At constans homini famulatur mater amorum:
Cynthia Signiferum quotiesque perambulat orbem
Alma parat Cnidice fecundans Arva Sorori.

The first thought in which is brought by Socrates in his discourse with Aristodemus, an atheist, in Xenophon, for an argument to prove divine Providence in its peculiar regard and favor to Man above all other creatures [1], who, though they have only their stated times for it, we see fail not of sufficiently propagating their kinds.

The end of its being otherwise dealt to Man most manifestly is, that there should be a constant fund for mutual delight and the tender endearments, to soften cares and strengthen the bands of affection that are to continue for life, to carry on the business of providing for, and regulating, their families, and that they should by their own conduct set before the rest an example of tenderness and reciprocal love in themselves, whom the others are constantly to honor and obey. This also shows how vilely and unnaturally those prostitute themselves, and pervert the wise and kind end of Providence, who misapply this indulgence to extraneous embraces. The other part of these lines hint at the emmenial provision, made in the absence of pregnancy and lactation, for proliferation.

4. Other animals generally, though their affection to their young is at first so strong that they will freely venture their own lives in their defense, are not seen to regard them, or even know them, more than the others of their kind with which they are wont to feed, longer than until these can provide for themselves,

which is commonly before the dams bring forth again, after which the succeeding issue for the time engrosses their whole care. But with us, the parents' affection, after repeated parturition, continues still the same as before, and the same tenderness and concern endures to extremest old age. The children also, vastly different from the case of all other animals, continue many years unfurnished with either strength or skill to provide for themselves, and therefore still depending on their parents' care. It is remarkable also that the breasts, differently from most other creatures, are placed between the arms, that the mother, while her child is sucking, may have its face directly in her view, and embrace it. And that with her fondness, that of the child also may grow and be increased, by all which means the family is kept more closely together in unity, duty, and affection, and the only band of society, mutual Benevolence, thereby takes the deepest root.

5. The females of other kinds generally breed and bear, if they have the opportunity, during their whole lives, or until they are so enfeebled with age as to be rendered unable to discharge the other functions necessary for their support. But women, though otherwise strong and vigorous, become utterly incapable of it at least twenty years before they reach the natural period of life, that by this means they may have full time to raise their youngest and last issue to a proper age to provide for themselves, and enter into the like engagements in families of their own. And to convince us how extensive and unlimited this Benevolence was designed by Nature, we see that, after the whole issue are raised, and all rendered so capable of taking care of themselves that they no longer want their parents' aid, yet the like affection is continued and extended also to their grandchildren, in a degree not much inferior to their first with which they were animated for those of their own production. Brothers and sisters also not only (as we shall see below) love each other, but they are likewise sensible of a tender concern and affection for each other's issue.

But though in considering a family thus founded by the laws and provision of Nature (regarding mankind only), it was necessary to begin with adult persons, yet before we proceed further, it may be proper to inquire what affections or passions

manifestly appear to have been implanted in infants or children before they are capable of reflection, or at least of making any free use of reason, exclusive of those effects of bodily pain or pleasure, fear, grief, or joy, which seem incident to all animals, though they cannot, to our sense, all express them. And the first and principal of these we shall find to be *self-love*, a word that may be thought to carry a very disadvantageous sound in some people's ears. Yet which, in the thing itself, is so highly consistent with the same divine wisdom by which any other excellency was formed, that it must, by those who consider it, be confessed absolutely necessary, and that a creature without it must have been exceedingly imperfect and defective, and, in the present order of things, could not have subsisted.

The first instances of this that display themselves in children are seen in their desire of getting to themselves whatever pleases them, that is, whatever in their eye appears to be good. And next, in the pleasure they show, as soon as they can understand it, in being praised, or in any thing that shall make them fine in their own eyes and agreeable to those of others. Now these two dispositions or affections, when afterwards duly limited and regulated by reason, must be acknowledged to be of the highest importance in life, as the first contributes directly to their immediate support, which doubtless was the primary intention in implanting it, and by the other they are naturally incited to improve themselves, acquire worth, and render themselves valuable in the eyes of others. Dispositions that must be owned, for their use and excellency, when they are duly considered, to be of the utmost consequence as well to the well-being, as the very being, of every sensible production of Nature. Yet these very dispositions, though intended for such noble purposes which they as greatly answer when duly governed, when let loose, and not directed by the powers of reason, degenerate into the most pernicious of all others: avarice, pride, and ambition, the grand sources of most of the miseries and calamities of human kind. But this being a subject more proper for another place, we shall defer taking further notice of it here.

The next two passions, of which children give very early and plain indications, are *anger* and *love*. Nor is it easy to

determine which of the two ought to be first named. Anger is implanted in all the animal kind as necessary to avert or prevent injuries, and consequently to the safety and well-being of the individual. A like passion with love is also seen in the other creatures, yet seldom of any long duration, but in human breasts it was designed to have the most exalted empire. And were it duly nurtured and not checked by other prevailing passions, it would exert itself to a degree that would sweeten every other affection, render life truly a blessing, and raise mankind to the perfection first intended for him in his formation. This appears early and strong in children [2]—not only to their parents, or those that nurse them or are their benefactors, towards whom they first and most evidently express it, which shows also the principle of gratitude is as natural as that of love— but it is further remarkable that infants, even within their first year, will, on the first view, show themselves affected with the sight of another infant like themselves more than with any other object, and as soon as they can walk and play, will be more delighted with the company of such others, though never seen before by them, than almost any play-thing they can be entertained with. This also is observable, that if they see any person they know, or any such little stranger, suffer or grieve, though they were but just before angry with them, compassion will immediately arise and show itself in tears or cries. Nothing being more common in young children, before they are hardened by the contentions and little quarrels that arise when many of them, as at schools, promiscuously meet together, than when one of them is chastised or suffers, to see the others deeply sympathize with the sufferer, insomuch that it is frequently found necessary to give correction to one out of the presence of others.

Tyrants, pirates, and writers

It is, however, proper by the way to make this observation, that, as in forests, orchards, or other plantations that have a suitable soil and exposure, the trees generally grow with an upright stem, beautifully expanding their branches and fruitful in their kind, while some others prove crooked, knotty, unthriving, and perhaps barren; and amongst animals, some are

not only less strong or swift, but some also less tractable, or, in a word, more ill-natured than others of the same species; so in mankind, who have a greater diversity of faculties than any other species of vegetables or animals, there are found some much more defective in particular abilities, qualities, or dispositions than others. For as some have a weak sight, are dull of hearing, have very little of a palate, can scarcely smell, or are frigid; others bring bodily vicious humours with them into the world that give them a sickly and crazy constitution during their whole lives. As some again have no taste to the beauties of painting, sculpture, or poetry, and some no ear to harmony or music. In like manner it is, we find, with these natural dispositions, for some we see appear to a great degree insensible to all the tender emotions and sentiments of love and compassion, and all the kind affections that constitute the sweets of life, which, at first, may be owing to some unhappy defect in their nature, but afterwards, from contracted habits, they become exceedingly strengthened in the opposite vices.

When such dispositions or habits are found in conjunction with strong abilities of the brain or other outward advantages, they become the plagues and enemies of mankind, as, in one way, tyrants, conquerors, pirates, robbers, sharpeners, etc., in another, *writers*, to poison the principles and sap the foundation of all order, and of every notion that can render life truly worth living. But, as in considering any species, either vegetable or animal, we take its characteristics from what generally appears in the whole composition to have been intended by Nature, so we ought in our own, leaving such unhappy defects to the proper application of those concerned in them.

Then we may collect, and shall find it irrefragably proved from the preceding articles, that Nature has peculiarly provided these determinate laws for Man: that families should commence and be continued by the strongest ties of affection, in conjugal, parental, filial, and fraternal love, and that on the first discovery of our passions, together with that love which every individual must necessarily bear to itself for its own preservation, this affection also discovers itself (in a competent degree) more generally to other like objects and to benefactors.

Love, therefore, gratitude, and compassion, we find, are truly founded in our natures, and clearly manifested to be inherent in our compositions, as any instinct can be discovered in any animals whatsoever.

It may, however, be alleged that other creatures, when perfect of their kinds and left to themselves, never fail, unless some insurmountable impediments interpose, of pursuing their several instincts, yet mankind, we see too frequently, act from other principles so very different from these kind affections, that some have been found guilty of the greatest barbarities, even towards those to whom they stand in the nearest and dearest relation. But this arises from the perverse use they make of that free will, to which, on their being endowed with that noble and greater gift, the powers of reason, from which alone our species derives all its excellency and superiority, it appears absolutely necessary they should be left, for otherwise they could not be accountable, could have no merit, nor become the proper objects of either rewards or punishments. It suffices that by Nature they are furnished with those affections, silently to point out, or at least incline them, to their duty, and render the discharge of it easy and truly delightful, and that the powers of reason, if duly exercised and applied, are sufficiently able to check and curb every exorbitancy of the passions, when not at first indulged. For thus and by these means only, Man becomes a rational, and, consequently, an accountable, creature. But to proceed.

These kind affections, so far as we have hitherto seen them as they arise, so they are exercised within the limits of one family. Let us now see how far further they are to be extended.

6. The brothers and sisters descending from the same parents and being equally the objects of their tenderest care, from thence, and from their being educated together, generally conceive a strong mutual affection for each other, as we see when any one of them lives single to a state that renders it proper for them to dispose of what they have by will, they generally prefer those in that relation. So, were there not some strong impediment in the way, it might, from the appearances of things, be rationally concluded they should, from the same affection they are already possessed of, make choice of one in that relation, preferably to all others, to cohabit with for life. Yet

Nature, we see, has taken care to order it vastly otherwise, and over all that affection has implanted an abhorrence and utter reluctance to the thought of entering into the conjugal union under that relation, without which reluctance it would be thought they should unavoidably be led to make the objects of their first love the same for their embraces. But instead of this, we find those affections, mentioned in the first articles, run not only out of the family, but frequently to strangers, and sometimes to persons never known or seen before, to whom a stronger affection commonly arises, and more imperious, than all the others together. And herein the most barbarous nations, as the American Indians and African Negroes, exactly agree. Now unless this were a law to Man, as it truly is to Man alone, for other animals make no distinction between dams, their own issue, sisters, or others [3], it could never, in all ages and in all countries, as well those who have no other laws than their common sense from the dictates of Nature, as others who pretend to more, have so universally prevailed.

It is true, and it will undoubtedly be objected, that in some nations, as Persia, Egypt, etc., not only brothers and sisters were known to intermarry, but even parents and their own children, as in that of the lascivious poet [4] often quoted on this occasion: “*Nam magus ex matre et gnato gignatur oportet.*” [“Needs it a Magus begot of a son upon mother who bare him.”] That all manner of trespasses and possible violations of Nature have not only been frequently practiced, but studiously improved, is unquestionable, and nowhere more than in those nations called civilized, where the way was opened for them by aspiring to dominion, affecting of pomp and magnificence, luxury in clothing, feasting, etc., when simple Nature became scorned as too mean to give laws to its own productions, and those who could deprave her most by new invented arts to refine, or, more properly speaking, to vitiate her pleasures, were the highest rewarded. Thus in the same countries obtained the practice of castration, and, from thence, being served with eunuchs, mewing up of women, murdering of brothers, tyrannical government, all of them directly contrary to Nature, as well as the others, etc. Bardesanes, a Syrian author quoted by Eusebius, *Praeparatio Evangelica*, L.6, c.10, says the Persians

had a law to allow of such marriages. If that were true, as but few things of this kind are much to be depended on, it is a plain proof—since nothing is more natural than marriage, and therefore a law for it could be no more necessary than to make one to allow people to eat and drink—it is a proof, I say, they were conscious such marriages were unnatural, and therefore wanted a law to render them excusable. But no violations of this kind can be of any force in the argument before us, where the question solely is, what are the pure and genuine dictates of Nature from her implanted laws when not contravened or corrupted, and not how they have been violated and perverted.

**“Benevolence should be universally
diffused, and take in our whole species.”**

Then it will, from the preceding observations, evidently appear that a provision has been as carefully made by Nature in our formation to direct our inclinations to conjugal union beyond and clear of all the meager ties of blood that conciliated affection before, as first to implant in us these very inclinations. And the great end and design of this most evidently is, that those kind affections, which are the true and natural foundation of society, should not be confined to the limits of one family, or within the narrow compass of those ties of consanguinity, but should be directed to strangers or new objects, that more families should be united in affection. And that love which is not limited, as we have seen in its first appearances in children, of those of the same family only, if others are presented, should by these engagements of affinity be still more extensively propagated. From hence, we may rationally conclude it was the intention of Nature, by all these several instances of inclinations and affections implanted in us, that Benevolence should be universally diffused, and take in our whole species, though not all in equal degrees, wherever situate, when there is no opposition of contrary qualities to obstruct its influence and operation.

As the force of the Sun's rays, the sole invigorating spring of all life and motion within his system, is undoubtedly the greatest at the least distance from their fountain, and gradually lessen according to some certain proportion, being greater on Mercury than on us, on us than on Saturn, and more on him than on the other planets beyond him, if such there be, which, considering the immense distance of the fixed stars, is not unreasonable to suppose. Yet those rays are everywhere, with that diminished force, sufficiently capable of producing all the enlivening or invigorating effects requisite to the texture of those bodies placed in such a situation, and can never change their nature, so as to become what we call cold. As we see the remotest fixed star that can be discovered by a telescope fails not to extend its luminous rays to us, without the intermediation of which it must be impossible for us to have any sense of them, or know they were there.

No more can these kind affections ever lose their nature, and become their contraries, though they may, as a smaller heat is overcome by a greater cold, be overwhelmed and obliged to yield to their opposite rising passions. To carry on the same comparison: as we find the same rays, though the primary cause of all heat to us (unless according to the notion lately renewed by some [5], fire here in our Earth be a distinct body and element of itself), have comparatively but little efficacy where they meet not with proper matter to cooperate with them, by reverberation and reflection—so that one of our bodies, if carried in an instant at only half the distance of our Moon from us, supposing no other inconveniency to arise from the thinness of the aether, etc. would probably expire with cold, or, which would be the same to us, for want of sufficient heat—yet where they strike perpendicularly, or nearly so, on the Earth, they become excessively strong; [6] so this love or Benevolence, though in its own nature the same, when universally diffused to all the species exerts itself more weakly, but when it meets with suitable objects, it is not seldom found to glow up into a fervent passion, and establishes friendships united sometimes by as strong and endearing ties as any of those that are founded on any other natural relation.

These are the observations the writer has made on Society and Benevolence as founded in Nature, which he had

never happened to meet with thus applied in authors who have wrote on these subjects. Of what force they are, every reader will determine in his own judgment for himself. But besides these, there are some others which have frequently been applied, and are of very great weight, such as these that follow.

A correction of Locke

Mankind is the only species to whom the gift of speech has been indulged. Some have believed that many kinds of brutes, and especially the feathered, have each a peculiar language of their own which they mutually understand, and some have been so vain as to assert that there have also been men, as Apollonius Tyaneus, who understood them. That some of them have vocal signals by which they can call or give notices to each other is not to be doubted, but to imagine they have any such thing as can properly be called speech is in the highest degree absurd.

J. Locke seems to have been of opinion that the perfect distinction between mankind and brutes consists in this, that the latter are not capable of forming abstracted or universal ideas. But perhaps we may very justly stop much short of this, and fix it in their not being capable of reflecting at all on their ideas received from sensible and outward objects, for it is not certain that any of them have ever been known to perform anything, neither the dancing mares (so called), dogs, elephants, apes, or any other, but what might be performed without this. And without such a power, they must of consequence be incapable of speech, however their organs might be (as some of them we find by their imitation are well enough fitted for this purpose). But the sole use of speech is in company and conversation, nor could society, without vast inconveniencies, and very great imperfection, subsist without it. The grant itself, therefore, of this faculty to human kind alone, evidently shows it was designed by Nature that men by means of this should commune together, impart their thoughts, and express their sentiments arising from the affections implanted by Nature, as well as reason together and agree on measures for carrying on, by mutual aid, the necessary affairs of life, either relating to

themselves or to the community. And that nothing contributes more to raise mutual affection and goodwill than such conversation is so well known, that wherever two or more persons are seen to be frequently conversing together, it is the most common inference and conclusion that there is some degree of friendship or goodwill subsisting between them. As on the contrary, it has been noted of old [7], and is everywhere observed, that where persons fail to see and converse with each other, a coolness and distance, as in fire parted, takes place. And therefore this gift of speech, as it directs us to company and conversation, so it is a most plain proof that, as speech was given solely for the benefit of Society, so mankind, to whom alone it has been granted, were also designed for the same.

But there is further another observation to be made on Man, which, though of no small importance to the same argument, seems to have been very little regarded, which is that no other species of creatures, as far as we know, have any such muscles in their faces as are capable of giving any remarkably distinguishing alterations to their countenances. But in Man, a provision has been made of these so very largely, that there is scarce one passion can arise in the mind, especially if it be at all sudden, but it may be read as clearly in the countenance as if it were vocally expressed. Hence arises the perfection of art in painters, who, in drawing history pieces, express the prevailing sentiments in the face; hence the skill of the pantomimes of old, and of the best actors at this day; and hence the judgment of men of experience, who, in transacting affairs, for the truth of things often choose to rely more on the countenance which they carefully eye, than on the words that the speaker intends should be taken for his meaning. Some other creatures shed tears, which are sometimes imputed to grief or pain, but smiles or laughter have always been limited to Man alone, as are also all the other delineations or discoveries of the affections in the countenance. Of what use these are to Society, none can be ignorant. Serenity and smiles and the marks of joy heighten the pleasure of conversation on congratulations and other cheerful occasions, as those of grief and dejection more endear on condolence. And wherever sincerity is used, the countenance of the friend, which in itself alone is cheering, going along with the

heart, and visibly displaying to the eye the signals of each tender emotion, adds inexpressible sweets, and highly improves all the other pleasures of friendship in conversation.

Another convincing argument is that human infants are, of all creatures, born the most helpless. Of others, some can immediately follow the dam, and the weakest, even those that came blind into the air, can at least nuzzle and find the teat, while ours can only express their want by cries, suck when the nipple is given it, and swallow that it receives. While all other creatures without tasting know the food suited to their natures and where to apply for it, we have no other guide than our palate, which alone serves not at all to distinguish the healthful from the noxious. But what is yet more to be regarded, we are born, and so continue, altogether destitute of any manner of clothing for a defense against the inclemency and rigors of the seasons, and of arms against assailants. Nor are we, like other animals that are equally unfurnished with these latter, favored either with a necessary swiftness, or that acuteness of some of the senses and vigilance to avoid dangers. Some indeed, as sheep, appear not much better provided for defense than ourselves, but these, it is evident, were immediately designed for the use of Man, and therefore for his protection. Nor are mankind only altogether unprovided by Nature with any manner of clothing. But there is further a most remarkable distinction, that in other creatures the *verenda in the sexes Altera Vagina velantur, et altera Cauda* [the female and male private parts are covered], and to this distinction is further superadded, that Man alone is sensible to shame on this account, in which all the most barbarous nations that have ever been known, who seemed in other respects to have a title to humanity or the character of rational, have been universally found to agree.

Yet all these wants, how great soever they may appear, are not only abundantly compensated to Man in his hands and fingers that can be used with so much readiness and dexterity, and the supereminency of the abilities of his mind that direct the use of them for supplying those wants, but they also clearly indicate to him that he is to live in a state which indispensably requires the aid of others to be mutually lent and applied in that

Society, in which the many several motives that have before been mentioned are irresistibly to engage him.

To proceed yet further in the comparison with other creatures, we do not find that any of them, further than the dams to their own young, ever contribute any help to other individuals of their species, save that such of them as live in a society, as bees, ants, beavers, etc. join in working up their common habitation, in which, while each forms its own cell, their common instinct guides them. [8] Some also that feed in herds will join their forces against a common enemy. Yet notwithstanding their several instincts direct them thus, where they are designed in their way for Society, yet, as far as the writer could ever learn, it has not been known that one individual will seek to help or relieve another when in distress, but, on the contrary, some, as the cow kind, deer, and diverse others, when they find one of their company in appearance disabled, the others will join and destroy it. But Man could not subsist, or at least not in any such comfortable state as the several inclinations with which he is furnished by Nature would lead him to crave, without more help than his parents alone, unassisted by the labors of others, could well procure for him. Which, by the mutual aid of more in Society, are amply provided in food, clothing, and dwellings, not only so far as they are necessary to our being, but also to our well-being, in an easy and comfortable enjoyment of the several bounties extended to us by Nature.

Industry and agriculture: “be completely happy”

And here it may be worth a digression to observe that as Man, so differently from all other animals, is launched into the world in perfect indigence, yet with full natural abilities to supply his wants, so if we look into the creation about us, we shall find there appears everywhere to be a most exact provision suitably made to exercise his industry and employ those abilities upon.

For to what other end were those thick fleeces given to the helpless sheep, and some other animals that yearly cast them,

when thicker pelts without these loads, such as those of horses, kine, hounds, and such like, might in all appearance have done as well?

For what end was the despicable silk-worm formed, that comes into life only to swell and fill itself with a clammy liquid which, immediately after, it spins out into the softest finest threads, wrought into an oval ball, not for a dwelling to itself, for it continues there no longer, than as if it were to allow Man time to take it to his use, that is about 6 or 8 days. In which space, if not taken, it works out its own way, and appears furnished with wings, but such as are only sufficient to carry its body so far as that the male and female may meet, on which they engender for one day. The next she lays some hundreds of her eggs, wherever she happens at the time to be, without the least provision for their preservation or future exclusion, and there leaving them to the care of Man, they both die in about 40 days in the whole from their first gaining life and sufficient strength to feed, enjoying it no longer than was just sufficient to perform this wonderful work for Man and then leave it to his further care. As if by this process they were to tell their feeders, "We came into life, and these scenes, solely to make this provision for you; it is done, we have no further business here, it is yours now to make use of it, and there we leave a large increase of our eggs; take care of them, if you intend to have any more."

For what end are all those exceeding tough rinds of plants the earth produces, as flax and hemp with us, or to what use the full pods of the softest cotton? Are not all these, with diverse others, most manifestly intended to clothe us?

Again, for what purpose did the earth furnish minerals, that we see have with industry been turned into metals, and from thence all manner of tools formed to render other productions useful?

For what end the forests of lofty trees, many of which produce neither fruit nor seed that serve for food, or any thing more than to continue their own kinds? But are not their bodies, with the quarries of all manner of stones with diverse other materials, manifestly pointed out for the use of building? And why is the weight of the timber of most of those trees and that of water so proportioned, as that the first should float in the latter,

but to render deep water passable by them, which otherwise might exclude one part of mankind from any possibility of communicating with others?

Or why are there such large quantities of combustible matter provided, fit for firing and Man's use, and at the same time greater quantities of other, that resist fire, without the intervention of which no fire could be used?

And further for our nourishment, why are all other animals, except the carnivorous, supplied with natural food from vegetable productions that can, if at all, be but very little improved for their use, but are generally most agreeable both to their palates and bodies in the condition Nature produced them, and yet all the several sorts of bread corn as well as other food that are most suitable to ours, require some further management to render them truly agreeable, even to simple Nature? For what end was the swelling grape so filled with a delicious juice and produced by so slender a tree, that requires both a support and constant culture to render it fruitful? Or why the olive, though also a vegetable, replenished in great plenty with another admirable liquor, of so different a nature, and useful for innumerable other purposes? Or why was the little animal the bee possessed with that wondrous skill to prepare, only from the exterior parts of flowers, that natural and wholesome sweet, its honey, and its fragrant inflammable wax, which, though both seeming to be first intended for the animal's use, yet different from most of the other insect kinds which generally lie dead in Winter, are laid up in abundant store, as provided for the use of Man when he is pleased to take it?

Again, why are the brute animals, of which a competent number of kinds appear naturally fitted for burden and draught, possessed just with so much sense as to feed themselves and perform their labor, and yet not enough to avoid it, which with a little addition of more would easily be in their power?

Or why has Nature, whose general or fundamental laws can never be eluded, left so much room in those things that are proper for the use of Man, for the improvement of her productions, in agriculture, gardening, etc.? Are not all these, with infinite more, plain lessons to mankind, that in most significant language say to them: Naked you are born, it is true,

and I have left you under many wants, but to supply them I have given you hands, and above all other creatures understanding to use them. Behold the most provision here made for your industry. Join together in that Love and Benevolence that I have implanted in you, and by your mutual aid, and united endeavors, render them truly useful. But enjoy them under a due sense of gratitude to your bountiful donor, your Creator and Supreme Lord of this Universe, the beautiful and exact order of which, in all its outward parts, you here behold, and how wisely and determinately each is made to answer its proper end. This order you are to imitate in what is left in your own power, your wills and your affections.

Thus therefore do, and be completely happy.

LOGAN'S NOTES

[1] [Greek text; "They limited the season of the year in which they gave other animals the pleasures of sexual intercourse, but to us they granted these continuously until old age." Anna S. Benjamin, trans., *Xenophon: Recollections of Socrates*. Indianapolis: Bobbs-Merrill, 1965, page 25.] Xenophon, *Memorab. Socrates*, L.1, of which E. Bysshe has in his version given the sense thus, to prove that the gods take care even of our pleasures, they have determined no season for the loves of men, who may at any time even to their extreme old age, enjoy a pleasure which beasts taste not of, except in a certain season of the year.

[2] "Idemque de infantibus dicendum, in quibus ante omnem disciplinam ostendit sei ad bene aliis faciendum propensio quaedam, prudenter a Plutarcho observata: Sicut et in caetate misericordiae sponte prorumsit." ["The same thing must be said of children. In children, even before their training has begun, some disposition to do good to others appears, as Plutarch sagely observed; thus sympathy for others comes out spontaneously at that age." Francis W. Kelsey, trans.] Grotius, *De jure belli ac pacis*, Prolegomena, §7.

[3] Some instances have been given in exception to this, particularly two mentioned by Aristotle, *Historia Animalium*, L.9, c.46, and from him by others, of a Camel and a Scythian

horse, the first of which was said to have killed his keeper, and the other himself by taking a precipice, on discovering they had been betrayed to serve their own dams designedly covered for that purpose; Pliny also, L.8, c.42, gives the like of another mare in Italy; Varro also, *Rerum Rusticarum*, 2 cap. 7, reports the same, but prefaces it with [illeg.] incredible; but now far these stories are to be depended on is very doubtful. From common observation it is certain brutes generally appear to be under no manner of restraint of the kind, but yet as Ovid, *Metamorphoses*, L.10, expresses it:

... Coeunt animalia nullo
Cetera dilectu, nec habetur turpe juvencae
Ferre patrem tergo, fit equo sua filia conjunx,
Quasque creavit init pecudes caper, ipsaque, cujus
Semine concepta est, ex illo concipit ales.

[“Other creatures mate indiscriminately: it is no disgrace for a heifer to have her sire mount her, for his filly to be a stallion's mate: the goat goes with the flocks he has made, and the birds themselves conceive, by him whose seed conceived them.” Anthony S. Kline, trans.]

[4] Catullus, Epigram 87, in *Gellium*

[5] Boerhave in his *Chemistry*.

[6] That the different degrees of heat and cold in the several climates of the earth are principally owing to the Sun's rays falling more directly or obliquely on its surface, is generally known. And that this can be owing to nothing but the reiterated reverberations between the earth and the atmosphere, is evident from the vast difference of heat between the rays reflected from large caustics into a focus early in a fair frosty morning, and the same when thus reflected in June or July a little afternoon. For in both cases they have one reflection exactly the same, but with this further difference, that in Winter their fountain the Sun, is now generally allowed to be nearer us, by at least a million of miles, and yet his rays have then the least force.

[7] According to the old Greek proverbial verse [Greek text], “Many friendships have been dissolved for want of mutual conversation.”

[8] and more beavers will join together in carrying one piece of wood to frame their dam for their common security,

which are put together with so much art and so effectually answer the design of raising the water, that the most perfected engineer would in vain attempt the like with the same materials.

The lies of historians

Wrote for a note on my first chapter of the *Duties of Man* on the objection to my 6th argument from the natural aversion to a conjugal union between brothers and sisters.

It may not be amiss to add a note here and observe that, as the passion of love is the most natural and endearing of all others, and therefore what relates to it is read with an eager pleasure, which has encouraged the writing of such vast numbers of voluminous romances, lesser novels, stories, and fictions of every kind, so even writers who professed truth and seriousness have shown a greater proneness to be telling tales relating to love at all adventures than on any other subject. Herodotus, the oldest Gentile historian we have almost, begins with that odd story of Candaules's Queen and Gyges. But of him and others such, the excellent historian Diodorus Siculus says with equal justice and elegance that they wrote [Greek text], "voluntarily preferring to truth the pleasure of telling wonders and fables to amuse and divert their readers."

Thus even the honest and judicious Strabo, L.15, p.m. 538, not only says the Arabs of Athrulla married their own sisters, but upon it tells that very odd story of fifteen brothers, sons to the king, who had amongst them one beautiful sister, whom, according to the custom of the country, they all used in common; and, to prevent interruption, had 15 staffs made all exactly alike, of which each having one, left it when with her at the door as a signal to the rest not to enter; that the poor girl, being tired with so much company, had another staff made, like the rest, to keep them all at a distance. And so he goes on with the story of her accusation and acquittal.

And Alexandro ab Alexandro, a good author on many accounts, speaking of the Nabathaoan Arabs and the Britains together, *Genialum Dierum*, L. 1, c. 24, applies this very story to the latter. The same Bardesanes also, in the above cited place,

says [Greek text], “in Britain many men have but one wife amongst them,” which has been doubtless first taken from what Caesar, *de Bello Gallico*, L. 5, said of them, “Uxores habent deni duodenique inter se communes, et maxime fratres cum fratribus, etc.,” [“Ten and even twelve have wives common to them, and particularly brothers among brothers, etc.”] the rise of which to him, who stayed but a very short time in the island, was probably no more than that he was told ten or twelve would live with their wives altogether in one family and in a very sociable manner. For, from his following words, “eorum habentur liberi a quibus primum virgines quaeque ducta sunt,” “the children were accounted theirs who had married the mother when a virgin,” it clearly follows in his own sense that they had regular marriages, and each woman her husband. And thus not very long before Caesar’s own time, and not far from Rome, lived that excellent but poor family of the Alii, of which 16 men with their wives lived in one mean house, as Plutarch tells us in the life of P. Amilius, who, though he was twice consul and twice triumphed — of which that for the conquest over Macedon, was the greatest Rome had ever known before— yet he gave one of his two daughters to one of that family to live in that manner with him. He gave him also on that triumph five pounds of silver, the first of that metal that had ever been in that house. Val Maximus also, L. 4, c. 4, relates the same.

But all this is little in comparison of what we have from Laonicus Chalcocondyles, a late Greek historian, who *Ferebus Turcius*, L. 2, p.m. 61, having mentioned the war between England and France in the reign of Henry VI and Charles VII, he undertakes to give some account of Britain. And, in his character of the English, says it is a custom all the island over that, when a person invites a friend to his house, the first part of the guest’s entertainment is that he should [Greek text], which his translator Clauserus renders thus: “ut primum cum amici uxore concumbat, ut deinde benigne hospitio excipiat.” [“As soon as the wife copulates with friends, then a friendly welcome is received.”] And that the men think it no dishonor to them to have their wives and daughters thus κνεαξ (*Clauserus*) *impraegnari*, and from hence other authors have given the same story, that is, that the English first prostituted their wives to their

invited guests, and thought it no discredit to themselves to have them and their daughters thus impregnated. How the Greek author himself intended this is not certain, but the mistake at first arose from the common practice of saluting, and the ambiguity of the word *κόω*, which signifies both to kiss (*osculator*) and to conceive or be with child (some of our English writers I think have noted this).

But to enumerate the several fictions of this kind that occur in diverse authors would be a vain as well as needless attempt. Strabo, L. 4, p.m. 139, relates some detestable things of the Irish in that way, but is so cautious as to tell his readers he desires not they should be believed, for he has no credible authors for them. But since the foregoing generally relate to Britain, we may further note an accountable story in Procopius, an author in good repute, who in his 4th Book, *de Bello Gothico*, p.m. 349, etc., per Hoeschel's Gr., gives a long narrative of a British maiden princess that led over an army of a hundred thousand men in 400 ships to the main to take satisfaction of her former suitor, Radiger, a relation of Theodebert, a king of the Franks (in Austrasia) in the time of Justinian, for having slighted her, and that she obliged him to marry her. After which, he proceeds to relate the manner of ferrying over at midnight the souls of the dead, or rather some invisible bodies, but very heavy, from the main to the island as swift as the wind, for which service these people that attended it were excused, he says, from paying taxes to their prince in Gaul. But what can be conceived too senseless or incredible for historians to relate, when Dubravius, Bishop of Olmetz, in his history of Bohemia, which L'Englet du Fresnoy says is accounted one of the best, very seriously tells for truth those wild stories that children read of Dr. Faustus. But he applies them to one Zish [or Zyto], conjuror to King Wenceslaus, as that he swallowed another of the same calling, clothes and all, excepting his dirty shoes which he spit out; that he turned the hands of the nobility at the king's table into horse's and ox hooves; fixed large deer horns on their heads; when looking out of a window turned bundles of straw into swine and sold them for ready money; with others of the like kind, from all which and innumerable others of the same stamp,

we may judge what dependance we can have on historians in many cases.

That the Athenians had a law for men marrying their half sisters by their mother is generally received for a truth chiefly on the credit of Philo Judaeus, who says this of them, p. 533, Edit. Turneb. Gr., etc., and in the same place that the Lacedamonians had another for marrying half sisters by the mother but not by the father. But the same writer, to show his skill in history, did not scruple to say in his *Life of Moses*, L.1, p. 412, that masters were sent for out of Greece on very high wages to instruct him, when it is well known that in that age Greece was wholly barbarous. It is true Cor. Nepos says the same of the Athenians as having such a law, but what pursuant to this he relates of Cimon and his sister Elpinice may probably be entirely disproved from an oration of Andocides, extant amongst the Greek rhetors published by St. Steph., and the improbability that there was such a law from the same oration, Aristophanes, Euripedes, etc.

Chapter 2:

Of the Exterior Senses

We have seen in the preceding chapter that Man in his formation was designed for Society, which it was thought proper in the first place to establish as a foundation, and thence to proceed to the consideration of his several faculties, so far as they can be discovered to have been in the intention of Nature (or, more properly speaking, of our Creator) in framing him, to inquire for what purposes they were given him, to what lengths they can reach, and generally how they are to be applied, in order to attain that measure of happiness in social life which appears to have been intended for us, and of which we may be capable here.

In considering Man in this view, though the care of our bodies is of very great importance to the regular exercise of our animal and rational faculties, the one having a most strict dependence on the other, yet this falling not within the design of these papers, wherein nothing but the mind, and what is immediately subservient to its operations, is to be considered, that other part must be wholly waived here, and the first subject to be inquired into will be the exterior senses, since solely from the ideas furnished by these we have the first materials for thought. From thence, we shall be led to consider the application and use of those ideas made by the intellect working on them; next, the affections and passions are to be considered; then, what foundation can be discovered in Nature for the distinction between moral good and evil; after which, we are to consider our power of choosing in the will; and lastly, from these collectively, we may infer and deduce our respective duties in life, as they will arise to view from these several foundations in Nature in our original frame.

And first, of our exterior senses. These, from all the knowledge we have of antiquity, have always been limited to the number of five. For as nothing has been meant by them but the means of conveying to us some notices of things without us, it has never yet appeared that we have, or rather it is certain we have not, any other means of receiving such notices than by

some of these ways, viz., of things distant and not touching us, by sight, from light to the eye; by hearing, from sound to the ear; or by smell, from effluvia to the nostrils; or of things touching us, from taste to the tongue and palate; or of other qualities by nerves diffused over the body [1], which several kinds of notices, conveyed by so many several organs fitted for that purpose, so far as they raise or convey ideas to the mind, are to be the subject of the present disquisition.

And as these ideas are the primary, or, as some say, the only, materials of all our knowledge, it may rationally be concluded that it must be of very great importance, and highly contribute to the right knowledge of our selves, to have just notions of these senses, of their abilities and extent, that from thence we may also form more just conceptions of the powers of our intellectual faculties which operate on those ideas. For hereby, we shall not only be taught in a good measure to see the extent and limits of these faculties, but also discover our ignorance, which is scarce of less moment to the just discharge of our duties to be acquainted with and convinced of, than it is to gain the knowledge of what is attainable by us by means of those aids that have been dispensed to us. Therefore, it may be more justifiable to be somewhat particular in considering these organs, on which our knowledge has so intimate a dependence.

Plato's *Timaeus*

In order to this, let us take the liberty to imagine, each for himself, that in the condition of a pure abstracted mind, he had been present at the first formation of Man, and was a spectator of the process of the work. But for the greater decency, and to avoid presumption, let us suppose the scene to have been that of Plato in his *Timaeus*, where he calls what he there delivers only εἰκότα μύθον, a probable story or fable. Nor can we account it any other, since undoubtedly the almighty fiat was sufficient, without any such gradual process, for the work. Yet as such an imagination best answers the present purpose, we may not improperly apply it here. Plato lays the scene thus:

The supreme Creator (says he), after all the other gods (whom he calls δαίμονες, and we may term angels) were

produced by Him into being, speaks to them to this effect. You divinities, who, as I am your parent, are with my other works eternal, are now to proceed, by virtue of the powers you have received from me, and in imitation of my work in your own production, by my established laws of Nature, to replenish the world with other animals, which, were they formed by myself, would also become immortal, but these now to be produced by you, must be mortal in themselves and only in their succession eternal. And for the formation of a more noble creature than the rest, which is to have a superior sense and knowledge of the deity, he promises to give them from his own store an immortal part, to be compounded with the mortal, which they are to frame out of the elements or matter previously existent in his creation.

Now let us suppose the Universe with the heavens, the luminaries, elements, and all the several kinds of matter, subjected to the great and primary laws of the whole, to have been fully formed and put into motion by the supreme Creator, and that from proper parts of these, the operators were to take their materials for the work they were to proceed on. Let us also suppose the ideas already existent on the plan of which the animals were to be formed. That, as the individuals were to be produced into life, enjoy it for a time only, then quit it, and in the whole course of it be in a flux condition, ever subject to a waste and therefore ever requiring fresh recruits, their bodies were to be so framed as to take in the proper supplies from the parts of the globe they were to inhabit, and convert it to their nourishment. They were also to be endowed with faculties for propagating and continuing their own species in a constant succession, for which purposes, and that they might enjoy themselves and the creation, they must be furnished with the powers of local motion and a sense of the objects surrounding them, and for this end all the parts of the composition must be adapted each to the other so as mutually to contribute to and answer every several purpose, as well as the general intention of the whole production.

Vessels and canals with their liquids therefore must have been first provided for preparing and ministering nutriment growth and strength to the whole body, and part of these liquids were gradually, by further digestions and percolations, to be so

refined and subtilized as to furnish a common *sensorium*, the seat of sense to the whole creature. For ministering to this, instruments of communication of a proportionately fine and exquisite texture were to be formed, on which all sense and motion were to depend as their primary and sole organs; and these are the nervous system, a system equally impossible for mankind fully to understand as it is sufficiently to admire their mechanism and composition.

But the great masterpiece of art we may easily conceive to have been the contrivance of means to give the work a sense, not only of things touching and therefore closely affecting it, but also of objects at a distance from it, of which for its safety, use, or delight it would be necessary it should have some notices. As we find *sight* is the principal of these means, it may be proper in the first place to consider it.

The medium of light

As mechanism, or the organization of matter, is here supposed to have been the only business of these operators, we may rationally conclude that they could not find means of communicating such notices without an intervening medium, and consequently they would consider such as they saw the state of the Creation, as then finished off, would furnish. And as they observed that vast body of fire, as we suppose the Sun to be, placed as in a center, for communicating heat and thereby motion (for we have reason to believe all heat consists in, or is produced by, motion) to all the several parts of its system, and that its rays, darted in right lines where no interposition of opaque bodies obstructed their direction, possessed all space, at least within that system, exciting at the same time in all the minuter particles of matter they struck on, which were susceptible of it, some further vibratory motion, and that these particles by these motions in some measure affected each other. From whence it may be evident, that in such a medium occupying all space, where there was no interposition, right lines might lie in a continued series or arrangement of such particles from every physical point to every other, and however the particles of any such line were affected by the body they touched

at one extremity, the same affection might be continued and communicated to the other. [2] Being therefore furnished with such a medium already provided for them, we may imagine the operators would consider this so proper for their purpose, that they would immediately conclude on rendering it so far subservient to their design as to form one sense, at least, that should be wholly dependent on it. On which view, they were to frame an organ susceptible of all impressions from those rays moving from any corporeal objects towards it, so as to have a perception of them excited, sufficient to give such notices as should be requisite for its own well-being and preservation.

How this organ of the eye was to be framed, may not in one respect be difficult to imagine to those who consider what may be performed by a single spectacle glass placed in a hole of a window shutter in a darkened room. For there the rays, striking on the glass from each point of every surface lying towards it of all the exterior objects, receive, by the force of attraction inherent in all body, a bent or small turn, by which they are refracted to so many points at the proper focal distance of the glass, and there united, paint on a sheet of white paper placed at that distance most exact images in the most lively colors with all their motions, but inverted, of all the exterior objects the eye itself could take in, or be sensible of, in the same situation. But on the other hand, by what curious mechanism in the nerves themselves this or any other sensation is performed, must probably remain a mystery inexplicable by the powers of human understanding throughout all ages. Descartes appears to be the first who attempted to account for this in his ingenious treatise *De Homine*, and in his discourse of the eye in his *Dioptrics*, where he takes it for granted that every nerve, though appearing single to our eye, is in itself truly a *fasciculus* or bundle of infinitely small filaments, which is now generally allowed to be truly the case. And it may be added that, for ought we know, each filament in every such bundle may have a distinct property, peculiar to itself, though of the same kind with the general intention of the whole. That is, the whole optic nerve being designed for the office of vision in general, every distinct kind of filament may be adapted for the perception of a different color, by its being from its different tension susceptible of a

different degree of tremor impressed on it, and the same likewise of the auditory nerves, of which more hereafter.

But what is obvious and more plainly intelligible in this admirable organ the eye, is that it consists of coats and different humours, all diaphanous and all most exquisitely contrived for the due performance of its office, the whole of a globular form; the outward coat, though perfectly pellucid, yet of a very strong substance of the nature of horn, whence it takes its usual name of *tunica cornea*. Yet at the same time it is thus formed for strength, it is made exquisitely sensible to the most gentle touch, that the greater care may be taken to prevent everything that might possibly endanger or annoy it. It is further protected by the strong bones of the head that stand prominent over it, and these moreover guarded on the outside of that prominence with a thick scone of hair, as it is within its own orb with the lid fenced also in its cil with another range of hairs, the more effectually to prevent its being affected with motes or dust falling on it, a very minute quantity of which giving it a very sensible uneasiness. The lid itself is so formed as, without any act or concurrence of the will, to close at the sudden approach of any object, as it is by its frequent nictation to moisten and lubricate the ball itself and to wash off any finer dust that might adhere to and offend it. The orb of the eye is also, in most animals, furnished with diverse muscles for turning it about without moving the head, and is further so framed in Man that, by the rays falling obliquely on the cornea of the one or the other eye, an approaching object may be discovered within the compass of at least of one half of the horizon around us.

The exterior part of the eye being thus framed, if we suppose all the humours within to be, as they truly are, perfectly transparent, we may the more easily conceive, from what hath been said of a spectacle glass placed in the hole of a window in a darkened room, what was to be further done to complete this admirable organ. The ball of the eye represents such a room, and to render it the more truly dark, it is formed all black on its insides. The cornea without was made of an equal thickness, as well as transparent, that it might neither give any manner of obstruction to the rays falling on it, nor because of its sides being exactly parallel within and without, give them any deflection; as

we see the glass before the face of a watch, though of a considerable convexity, gives no obstruction, nor in any manner deranges the visual rays in showing the hour. Within this cornea is placed the *uvea*, a fine muscular membrane with a colored circle up on it, called the *iris*, from which the whole eye, when distinguished in respect of color, takes its denomination, as blue, gray, hazel, or black, etc. This in the middle of it is perforated for the intromission of the rays from abroad, and the passage being no other than a hole, and therefore appearing black, is called the *pupilla* or sight of the eye. But as all the works of Nature appear contrived with the most consummate skill, the same can be nowhere more conspicuous than in the mechanism of this perforation of the uvea or its iris. For the whole is so framed that, without any sense of it in ourselves, in an obscure light, this passage enlarges and gains so much upon the iris, as but a small part of it is to be seen. On the contrary, in a strong light, the pupilla is contracted and the iris gaining upon it is so much enlarged that the perforation appears exceeding small, extending itself in a faint light to take in a larger quantity of rays, and contracting in a brighter to exclude what is more than sufficient for vision. Of which action in this curious membrane, though we have no sense or knowledge, as has been said, in ourselves, yet we have a perfect sense of the effects of it, as often as going out of clear day light into a darkened room, such as are sometimes made so for sick persons, we find ourselves in a manner blind, and continue so until the pupil can expand itself to take in a larger quantity of rays. And on the other hand, when going out of such a room into the clear day, we find our eyes no less oppressed by the overbearing of the light, until the same pupil has some time to contract itself and shut out its excess.

Opposite to this passage and a little within the ball, by a fine membrane called the *ciliar ligament*, is hung the *crystalline humour*, of a much denser consistence but perfectly diaphanous and convex on both sides, which in persons not yet decayed with age, most exquisitely performs, with some small assistance from the next humour behind it, the part of a glass lens, in refracting the several cones or pencils of rays to their foci in the *retina*, the name given that black coat which surrounds all the interior and back part of the eye ball, from its consisting of an exceeding fine

texture-like network by the extreme filaments of the optic nerve which terminates therein.

Between the cornea and the ciliar ligament, on both sides of the uvea, the *aqueous humour* is placed, which appears no other than a limpid water, and is thought to be of no other use than to fill up that space and to keep the coats moist and distended. But behind that ligament and the crystalline, the *vitreous humour*, of a somewhat denser consistence than the aqueous, and of a queenish color, possesses a much larger space, filling all the remaining cavity of the eye and serving to perfect the refraction of the rays, in more exactly directing their several pencils striking on the crystalline to their respective focal points in the retina. And thus as those rays come to the eye from every point of the object obverted to it, and are by refraction again collected into so many points in the retina, exactly in the same order and situation as they at first bore in the object from whence they were reflected (save that they must come inverted), the form of this object with all its coloring becomes most accurately delineated on the dark back side of the eye, and from thence a sense of it is communicated to the common sensorium of the brain, if in reality there be any such thing distinct from the organs themselves, on which the respective sensations are impressed.

But in this act of vision, there is not only the before mentioned admirable contrivance for enlarging or contracting the pupilla in proportion to the quantity of light, but, as it is an invariable law in optics established in Nature that the nearer the object lies to that body of matter which causes the refraction, at the greater distance from the same their focal points must fall, there is a no less wonderful provision made also in this point, and equally without our knowledge. For if the viewed object be remote, the crystalline humour, by which the refraction is made, approaches to the retina, but if it be near the eye, these two are drawn to a greater distance from each other, of which every one may be fully convinced by this easy experiment. Make in the glass of a window at a common reading distance some little marks of the size of common letters, in a right line from the eye with the horizon or some remote object. On viewing that object through the glass, those little marks will almost disappear, or will

appear so indistinct that they will scarce be observable. On the other hand, fix the sight only on these marks, and all distinction will be lost in the remoter object or the horizon, though in both cases the ball of the eye itself continues exactly in the same position. Yet in this experiment, if it be thoughtfully adverted to, there may be some inward change or motion felt within the ball, but wherein that motion consists anatomists have not fully agreed. Descartes, who, though he made it not his profession, considered the eye with great exactness, was of opinion that the motion is in the ciliar ligament before mentioned, which by its muscular frame, according to him, causes the crystalline which is suspended in it, to approach or recede to or from the retina. But it is the general opinion of many, that some of the six or seven muscles formed for moving the eyeball every way by variously compressing it, may lengthen or shorten its dimensions as there may be occasion.

Thus we have seen by what process the images of exterior objects become painted, and this in their proper colors, upon the retina, or the expansion of the optic nerve at the bottom of the eye; but in what the mechanism of this nerve and all others consists, is a mystery not yet, if ever, to be explained by Man. However, if we may indulge conjecture, in the following may perhaps be found an account not altogether improbable of the first steps discoverable in the business of our sensations, and particularly in vision, though sensation itself may be found inexplicable.

The causes and nature of colors held mankind long in uncertainty, of which that ingenious treatise of the great philosopher R. Boyle on the subject is an incontestable evidence, until his contemporary the late greater Sir I. Newton, by considering the experiments he made with triangular glass prisms, discovered that the real differences of all the primary colors lay in the rays of light themselves, and not at all in their modification, as had been long supposed; for that each several kind of them had an invariable property of exciting in us its peculiar respective colors, as they were respectively subject to different degrees of refrangibility in passing the glass, and this has now prevailed so universally that it is received for an established truth.

Of these colors, those rays that exhibit the red are the least refrangible; then follow in succession the orange, yellow, green, blue, indigo, and violet (as that author has distinguished them) in their several degrees. This last, namely the violet, being the most refrangible, as the red is the least; that is, in the refraction or bending all the rays out of their direct course by the attractive virtue of the glass, the red is the least deflected of any, and the violet the most. Now it appears highly reasonable to suppose that, as all refraction most probably is owing to the attractive powers inherent in body, to which the rays of light are subject (as is easily demonstrated) as well as any other, the different refrangibility of the rays of light may depend on their different velocities in their vibrations from the luminous bodies that emit them, the attracting body having undoubtedly a greater power over another moving more slowly than on one that is darted with a greater rapidity; and this difference in the velocity of the rays exhibiting different colors we have reason to believe is essentially existent in Nature. Red, which we suppose to be the most rapid, as it is the least refrangible, when strong of the kind, is the most offensive to a weak eye of all others, not to mention that it is the color of fire itself; the next to it in this respect is a strong orange; the yellow is more indifferent; green, the common livery of Nature, in proportion as it has less of the yellow and somewhat more of the blue in it, is refreshing; and of one degree of this less, that is an azure, the aether itself appears; and of a somewhat deeper kind, the ocean. Again, of all kinds of flame the blue is most certainly the weakest; that of pure high rectified spirits will little more than warm the hand when held in it; that of sulfur will by no means fire gunpowder, except it be in a match after the flame had laid hold on the card or wood that has been dipped into it. Flames in the exhausted receiver, as in many other cases, expire blue, and universally in all flame the blue is the weakest. Nor will any of that color, when viewed through the refracting prism, exhibit any other but itself, though at the same time the white or the red exhibit all the colors. And from this difference in the velocities and strength of the rays exhibiting different colors, we may make a conjecture not altogether improbable of the cause of that phenomenon commonly observed, and also mentioned in the Scripture, that a

red evening is a sign that the ensuing day will be fair, and on the contrary that a red morning portends rain. For as the weather in these cases very much depends on the falling of the dew, it being seldom known to rain any day in the night before which dew has plentifully fallen (though scarce any rules for the weather are beyond exception), therefore as these incline to fall in the evening, the exceeding fine vapors drawn up by the Sun in the day, of which they are composed, may retard or keep back the weaker beams, and suffer only the stronger, such as the red and orange and perhaps the yellow, to pass to our sight. But in the morning, if those vapors have not fallen in the night, the same reason holds in that case for the appearance of a red sky, and shows as they are not yet fallen, it may be expected they will in rain, when by the moist disposition of the air a sufficient quantity of them is collected and driven together to compose it.

This difference in the velocity and force of the rays of light being allowed, we are next to consider that all the changes, all the effects produced in the Universe, are entirely owing to motion, of which there are very many sorts productive of the greatest effects, whereas notwithstanding we are no otherwise sensible than by the effects produced by them. When a bell is struck, we have the sound, and though sometimes in a large one it is almost sufficient to deafen those who are near to it, yet we are not otherwise sensible that it is in the bell that produces the sound than that we have assurances from thence, strengthened with other reasons, that the whole of the particles of that great body, by the force of the blow it receives from the tongue or clapper, are put into a tremulous or a vibratory motion, of which from our sight notwithstanding we have not the least intimation. Yet a single touch of the hand, or other body, very speedily puts a stop to that tremor, and consequently to the sound itself that was produced by it; of which more when we come to consider the next sense, that of hearing, wherein some things will occur that may particularly conduce to the further illustration of this article.

But from what has been advanced, it is obvious to conceive how the different rays striking with different forces on the optic nerve may produce effects altogether as different on the organ of sensation formed to be receptive of the impressions of

light, as the different colors appear to that organ. For though, from our prejudices, we may at first judge it easier to conceive how the striking of various vibrating strings may produce sounds no less variously affecting the ear, yet on retiring into our own minds and closely considering the circumstances, abstracted from all these prejudices, we shall find and must be obliged to confess the matter in both cases carries so near a resemblance as to be very much the same. Which doctrine, as it is here delivered, is very plainly hinted in Sir I. Newton's *Optics*, the 13th Question, in which towards the end of that valuable work is express to the same purpose.

Newton's hypothesis rejected

Thus having seen how, by means of these different rays of light, we may be made sensible of the several different colors conveyed to the eye by them as they are inherent in the light itself, whether proceeding directly from the Sun, its great fountain, or from elementary or other fire, we should next in course consider the coloring of bodies, of which the last mentioned author in the same work has copiously treated. But as the doctrine advanced in that part in reality (though upon all occasions he most carefully avoided even the term hypothesis) differs from what is commonly taught in the Schools principally in this: that as they account all colors to be only so many different modifications of the same light, and the different colors in bodies to be only a quality in these bodies fitted to modify the light in a proper manner to affect the eye with such a particular color, which is saying nothing at all to the purpose, whereas Sir Isaac carries the matter so much further as to allege there are in all surfaces exceedingly thin laminae fitted to reflect only such rays, or a mixture of such rays of light alone, as shall produce such a determinate color as is inherent in themselves, and no other. But in accounting for light, both seem to agree in this, that as it is an emanation from the lucid body, it is infinitely reflected from every point to every point where it can pass in right lines without any obstacle to obstruct it.

And this hypothesis appearing to me, from the first time I considered it, to be attended with insuperable difficulties, as it

supposed those infinitely infinite reflections which must be instantaneously produced by striking up any kind of light, and that all its rays during the continuance of that light were no less infinitely crossing each other, I could not therefore but judge some such other hypothesis, as that of Descartes, preferable at least in this part, that it supposed the aetherial spaces with all the interstices of body, and among the rest the bottom of the eye, to be filled with these fine globules of his second element, and that light consisted in their being put by a proper impulse into a vibratory motion without any local one at all. Therefore, seeing that philosophy with its elements is justly enough exploded, I, from much plainer principles and such as we are better acquainted with, formed to myself another that appeared less liable to these weighty objections, the substance of which is expressed in the subjoined note, which the reader if he please may consider. [see note 2] But as to my own part, I confess I find every hypothesis that has hitherto been devised or probably can be devised for the solution of the phenomena of light, to be attended with such difficulties, that they may justly enough be excused who will pronounce of them generally that they are all far short of giving the mind any entire satisfaction. And although the celebrated author who has in this discourse, and in the note below, been diverse times mentioned, most carefully avoided using the term hypothesis, yet it is plain from the whole doctrine of his *Optics*, that the above mentioned which is assigned to him was truly his. For it seems impossible to explain it by any hypothesis whatsoever, without allowing all sorts which illuminate to be of the same kind, and those that have hitherto been examined, as that of the sunbeams, of the moon and stars, or of flame, are known now to be all susceptible of the several refractions that have been mentioned. Yet there is great reason to believe from other experiments which have been made, that the greater part of the noctilucas exhibit no such appearance, for I never could find any in the light from rotten wood, nor from the firefly or lampyris, which is of the same nature but brighter than the English glow worm. That from fish or flesh I have never had any opportunity of trying, and much less that from Bernoulli's phosphorus, which is said to be only mercury agitated *in vacuo*, or the light raised by F. Hawksbee's

experiment. Those who have such opportunities may make proper trials of them by the prism, and from these draw more certain conclusions on that point. But there are other appearances from light in matters familiar enough to us that it is extremely difficult, if at all possible, to account for, and particularly this:

Place two or three common spectacle glasses, say three, over one another, touching in their vertex. Set a lighted candle at any proper distance, as a foot or 18 inches, declining a little sideways from their axes. The eye in a proper station may observe twice as many images of the flame of the candle as there are glasses, by one reflection from each of their surfaces— from the first convex, only one single reflection; from its concave or the next surface, another [reflection], with one refraction through the first; from the 3rd surface, a reflection with two refractions; from the 4th one [reflection] with three [refractions]; from the 5th with four [refractions]; and from the 6th surface, the reflected image undergoes no less than five different refractions, and all the images are distinct and clear. Yet an eye placed below these glasses might through them all see the image of the same candle more distinct, as it would appear considerably enlarged. [i.e., the images seen from above and below do not interfere with each other, as might be expected if the images consisted of rays composed of particles of light emanating from the candle.-PV]

Now as all the perception we have of any object without us by means of the organ of sight is produced solely by those rays, and all the sensation they impress is only that of color, it is plain that all vision or sight is purely a perception of coloring. That this is so, will be readily owned by such as duly advert to it, and more especially if they consider the business of painting or picture drawing, in which noble art it is very well known a great master will, only by his colors on a smooth even canvas, so exactly represent the appearance of an object, that were we not previously acquainted with performances of the kind, we might at some small distance mistake the image for the real substance. Thus the famous Grecian artist Zeuxis above two thousand years since, deceived the birds that flew to his painted grapes as they would to the real fruit. Yet he was outdone by his competitor in glory Parrhasius, who imposed on Zeuxis himself by drawing the

figure of a napkin with such exquisite skill, that Zeuxis took it to be a real one laid on a picture to cover it, and therefore bid him take it off and show his work—by which mistake he left the prize of honor uncontroverted to Parrhasius, since the one had only deceived birds, but the other the painter Zeuxis. [3] By this art are objects thus lively represented, solely by ranging the colors as they appear to rise from the substance, raising the parts by stronger, depressing them by weaker or dying, lights, or sinking them in fainter or stronger shades. And indeed, while he believes himself drawing after the life, he is doing no more than imitating or copying after a picture drawn within himself on the bottom of his own eye, for that is his sole exemplar, and he has truly no other original. And this it is we call really seeing a thing, yet at the same time if we see the image of a body reflected from a looking glass, we say only we see the image.

Thus all our vision is nothing else than picture, and the great difference between it and the painter's art when exquisitely performed, is that the latter cannot give motion, but by sight the images move and change with the body. We may have the view in every light and on every side, and lifeless bodies may be turned inside out, broke, comminuted, dissected, racked, or tortured by the chemist's fire and numberless operations to discover what other appearances it will put on, yet in all the changes it can undergo, in all the transmutations that can be made of it, our sight, which is accounted our noblest and most useful sense, gives us no deeper knowledge than the surface still, and furnishes us with no more than picture.

Yet this very fully answers all the ends it was intended for. By its mediation, we with other animals can at some considerable distance discover what may concern us either to pursue or avoid [4], and in general we have a sense of the objects near, or about us, or within our ken, sufficient to operate on or influence the will to the choice of such action or behavior in relation to them, as is most agreeable to our respective natures. And how much further this sense can assist us may be considered hereafter.

The medium of air

This organ of vision for giving us a sense of objects without us being thus provided, because of the nature of the rays of light which must ever move in a straight line, no perception of other objects could be communicated than of those only, between which and the eye the rays might uninterruptedly pass. Therefore for notice of another kind, and for different purposes, some other organ was to be framed that might yield some sensation of bodies, substances, or beings that the first could not at all times equally discover, but more particularly to communicate notices of the more inward operations of the creatures. For this end, and to provide another organ, the operators might observe another kind of body diffused all round our globe that had no determinate direction, as the rays have in right lines, but was voluble, elastic, and so fluid as to be subject to the least motion of the bodies to which it was circumambient, and susceptible of infinite modes and varieties in that motion. This then was resolved on for the medium of another sensation, and the organ was accordingly to be framed that should be sensible to its impressions. Hence was formed the ear for hearing, which, though accounted the second in order and dignity after the sight, yet in the contrivance seems to show rather more than less astonishing art and skill, since its sensory must be framed of nerves of so fine a texture to be differently affected by the minutest difference in the motion of the medium, differences that human understanding, though sensible of the effects on the organ, can never possibly conceive how they can consist in such infinite varieties in that medium. How the air, if that be the sole medium (which is questionable), may be affected by thunder, the roaring of a cannon, or other great concussions, is easily conceivable, and their effects are sometimes visible even on glass windows, etc. But how the vibrations of the parts of metal imperceptible to the eye in bells, plates, etc.; the modulations of the pipes and the differences of the same pipe by compression, dilation, and stops above it, as in those of birds such as the nightingale, etc. that have no cheeks nor lips to alter the sound, yet utter a vast variety of notes; and more particularly the human voice, which in some cases can compass no less than three full octaves—how in all these there should be such a vast variety, not only in the trembling of the air or medium, but in the

different manner of the same degree of tremor or vibration, and that such an organ as the ear should by such a fabric be capable of exactly distinguishing them, must be wholly inconceivable, for that these varieties are infinite may appear from this.

In music, which is the art of sound, they take first one staff or system which consists of 7 definite notes, most of them whole and full tones, and the last of these with the first repeated gives the diapason or unison, the greatest concord, when the medium makes exactly two vibrations on the pulse of the highest, while but one is made by the lowest, so that every second vibration in the higher falls exactly in with each one of the lower. And the intermediate notes between these two extremes are all so proportioned that their vibrations shall coincide with those of the lower at some determinate number, as 2 with 3 (which is the next concord to 1:2), then 3 to 4, 4 to 5, etc. But though these are chose as distinct steps in music to frame the rules of their art by, yet between each of these steps or notes the rise or fall may have degrees as infinite as there are or may be lines between the measures of one and two exact inches; though instruments neither can nor ought to be made to take in these varieties, because harmony consists chiefly in the concords, but a human voice might gradually compass them were they of any use in melody. Again, those artists carry other octaves still in the same proportion higher or lower, until they take in the greatest extremes in height and depth to which instruments can be made to any good purpose. How numberless then must be the intermediate degrees of vibration or tremor of the medium between these ultimate extremes, to proceed no further. But it is affirmed that if a bit of paper be laid on a string set to any certain note, not only a string on another instrument set to the same note and brought near to the other being struck shall by the vibration of the medium communicate the like tremor to the quiescent string, but also that the same note played on a wind instrument will set the same string on motion, as the trembling of the paper will discover. Now though the vibrations of the medium must in their number or quickness be the same both from the wind instrument and the string, yet any ear will discover a very great difference in the kind of sound, for the same note from a harp, a lute, a spinet, a flagellet, a flute, etc.,

and even from instruments of the same kind, will be very differently heard and most easily distinguished. Hence again arises another vast variety from the different manner or modification of the same note or number of vibrations, and yet that simple organ the ear, by its little tympanum, which in a nightingale that is very sensible to the differences of notes, is capable of distinguishing them all.

Thus the matter appears to common observation. But if there be any reality in that ingenious thought of Crousaz, that the nerves in the *lamina spiralis* are all of such proportional length and tension as to be in perfect tune, as stringed instruments are set, and that every nerve is affected only by its correspondent note, this will open another large field for speculation. [5] Sir I. Newton found by observation that the refractions of the seven principal colors (white and black being excluded, as the first is a collection of all the colors, and the other a negation of them) were exactly in the same proportion as the lengths of the several divisions of a monochord to give the 7 notes in one system of music. [6] Then may it not be as probable that there is the like distinction in the plexus of the optic nerve, and that each of its filaments can be affected with one color only, for in the 13th and 23rd of his curious Questions at the end of his *Optics*, 8vo. edition, he supposes the sensation of color to be raised by a tremor of the nerve communicated to it by the percussion of the ray, and by it to the common sensorium. And from hence we might perhaps account why the fiery red color, which is the least refrangible and, as he imagines, gives the strongest vibration, is of all others the most disagreeable and sometimes even painful to the eye, and that the violet blue which is the most refrangible, and he supposes to have the faintest vibration, is on the other hand refreshing to the sight. But against such an hypothesis the question may be asked: Why, since all colors and their operations are from Nature, should one be more painful or offensive than another? Or is it because the sight of blood, though that is not the most offensive red, is unnatural and should be avoided? All this however of color is out of its place. Yet if there be any such a conformity in the affection of these sensitive nerves in the different organs, and so exact a proportion in measure between the lengths of the sounding strings that strike

the distinct tones and the refrangibility of colors, and could it be proved that the filaments of the optic nerve act upon the mind by the impression of an imparted tremor, it may afford some pleasure in contemplation to consider the uniformity observed in the operations of Nature. Nor is it any objection that the same color or sound must strike on more parts of the retina, or on all the tympanum. For in the first, the filaments of the optic nerve are most intimately interwoven, and every sort may lie in every part (in appearance) of that plexus; and in the ear or in both, as the tremulous motion given the medium by one string set to one musical note strikes on all the strings of the other instrument near it, yet puts only its proper correspondent in tune into a like vibration, so it may be the same in either or both these organs.

A more subtle medium

Of the hearing, air is generally accounted the medium, and the exhausted receiver in an air pump seems to strengthen the opinion, yet there may perhaps be another more subtle that cooperates with it. It is well known that other very gross mediums convey sound much better than the open air can, as the noise of great guns at 50 or 60 miles distance on the sea may be better perceived by laying the ear to the ground than in the open air on the top of a tower. And so a small rit or scratch of a pin or one's nail at one end of a piece of timber 70 or 80 foot long, may be as clearly perceived by the ear at the other end of it as if it were close to the place where the scratch was made. Again, that common experiment among children, of hanging a fire shovel by the middle of a piece of twine and thrusting the two ends of this twine laid over the ends of the forefinger of each hand into both the ears so that they may seem to be quite stopped by the fingers. If the metal be struck, it will excite a sound in the ears by the medium of the twine that will appear as loud as most great bells in England. The air receives its tremor by being moved or struck by, or by its own striking on, grosser bodies, and whatever motion in bodies can communicate this necessary vibration to the air or medium may undoubtedly become a medium to give a sensation to the organ.

The apparatus of the eye, though excellently contrived, is notwithstanding simple and so intelligible to us, that by one single lens in a darkened room or box we can produce the same effect to very great perfection. But the apparatus of the ear, after all the anatomical disquisitions made on it by the most curious, is not yet fully understood, the several parts, cavities, meatus, bones, membranes, etc. being so exceeding intricate and perplexing that their several distinct operations or uses cannot yet be clearly conceived. But the whole turns on this: there were mediums in Nature (as it is here said) before any such organs were framed. From thence were these organs most exquisitely contrived to render the existing mediums subservient to the designed end of giving the animals that were forming due notices of the objects without and about them. The excellence and stupendous art of the work consists in that admirable contrivance of the organ and its nerves by which the whole is effected. For though in the *camera obscura* we introduce the figures of the outward objects, and they appear there very distinctly painted on our paper, etc. placed in the focus of the lens, yet it is our own optic nerve alone that discovers this, and without it the rest would be nothing.

Most of the animals we know that live on Earth and have local motion are endowed with these two senses. That of sight has its use common to all; hearing appears not to be of much more use to some than to warn them of approaching dangers. Yet most brutes on occasion can utter some kind of sound which is understood by others of the same species, and is also known by some others, especially creatures of prey, but these sounds are most frequently used between the dams and their young, and sometimes between the sexes. The choristers of the air, as they have the advantage of the wind, so they have no less that of the voice and ear transcendently above all others, Man only excepted, and to our species it is of the highest use as it is the great medium of Society, a subject to be particularly considered in the next section.

Of the other three senses there is occasion to say but little, for, excepting the touch, their operations are confined within narrow limits and are of a grosser kind. The smell is accounted the most spiritual of the three because it is wrought on

by an invisible medium and by objects of some distance, but that can scarce be called a medium, since it is only the particular effluvia of those bodies that affect it, and effluvia, however subtle, as some certainly are so to a surprising degree, can be accounted no other than fine detached parts of the same body, unless we should imagine that some kinds of body can by contact tinge or affect the air or other medium in such a particular manner as to render them sensible to the olfactory nerve. But this is inconceivable to us, as it equally is that if a single grain of musk were carried open round the globe, but preserved from the injuries of weather, it would leave a perfume in the air for several inches round it all the way, and yet weigh a grain at its return as before, which if true proves a minuteness in the particles of body as far beyond our imagination one way, as immense spaces can be above it in another.

The taste and touch are both by immediate contact, for the objects bodily affect the nerves, the sensation of the one is solely in nerves lodged in the tongue and palate within the mouth for that purpose, and the other is diffused over almost all the exterior parts of the body, but excepting those parts that have a cuticle less than all the rest, it is generally most exquisite, or at least most useful, in the fingers' ends.

These are the five outward senses acknowledged in all ages to be limited to that number. It is therefore strange that an ingenious author, who it is hoped is still living and will live to oblige the world with many other useful pieces, should think fit to say, that though we have got the number five fixed for our external senses, yet seven or ten might as easily be defended, [7] and elsewhere that the division of them into that number is ridiculously imperfect, instancing for others that might come into the list, hunger, thirst, sickness, weariness, etc.; but this was undoubtedly owing to his dropping the word external in the idea, though he retained it in the expression. For by this term external senses nothing has been understood but a sensation raised in or upon our bodies by something from without us; but hunger, sickness, weariness, etc. are only indispositions of our frame within ourselves and no impressions from objects without our bodies, as all those of the senses perpetually are, for it makes no difference in the case that food is taken into the mouth before it

is tasted, it is no part of us until digested and turned into flesh, blood, or other humours. It is true that J. Locke, who was a judge in these cases scarcely to be appealed from, says he followed the common opinion of Man's having but five senses; though perhaps there may be justly counted more. [8] But he had in the same section said before that he thought it not possible for anyone to imagine any other qualities in bodies whereby they can be taken notice of, besides sounds, tastes, smells, visible and tangible qualities; that is, as he lays it down in that chapter, that we have no senses given us besides those that take notice of such qualities in bodies without us. And when any man can clearly discover he is furnished with more, he may then boldly advance his new doctrine, yet the credit of it will turn wholly on his own word as much as if landing in an island of people born blind and who had never heard of color (were there any such people), he should talk to them of vision and the effects of it. What J. Locke intended was doubtless that as there are vast differences in the tangible qualities, as hot, hard, soft, dry, moist, etc., all which are perceived by that one sense of feeling, the several operations or effects of those qualities exciting different sensations on the body, they might be so distinguished as to be called different senses. Yet the αἰσθητήριον, or the organ of sensation, is the same, as far as we can discover, and we justly use the word feeling for them all; but to reckon hunger, sickness, and such like amongst the external senses could never have entered his imagination.

Now it is evident that these senses were formed not for Man alone, but more or less for the whole animal kind, and there is not one of them in which there is not good reason to believe that some animals very far exceed Man. The lynx, the eagle, the hawk, with diverse other species, are believed to have vastly the advantage of us in that of sight. In quickness of hearing, many creatures exceed us, and more especially (as it is thought) those that are subject to be hunted and preyed on by the voracious kinds. In smell and taste our faculties are scarce to be named with those of most other animals. By these senses they know and pursue their food and exactly distinguish between the noxious and the salutary. Their tastes are fitted to the digestive powers of the stomachs and inner organs, and very rarely any of

them mistake in those points that are of the first importance to them; or when they do, or meet with external injuries, it is believed most of the wild ones know how and where immediately to apply for a remedy, if the ailment be of a curable kind. Nor has it yet been found that any others than such as are familiarized to Man, and by him put out of their natural course of living, are subject to distempers, excepting in some cases when extraordinary contagions infect the air and scatter destruction and mortality through whole regions, by which not only the tame brute, but sometimes the wilder kinds, have fallen in the common calamity.

Of the sense of touching or feeling we scarce know how to judge, but in some or other of the senses diverse animals so very far exceed us, that one would be almost tempted to imagine they had some other organs of sensation, or that if only the same, those they have were so differently formed as to be almost of another kind. Who can account for a dog's distinguishing one stone amongst numbers of others like it at the bottom of a river or water, which should impede all smelling, only from its having once been in his master's hand? Or a pig being brought to market in a bag, steering its course, if let loose, the nearest way for several miles back to the place from whence it came? Or for a horse in America, that having been brought a hundred or two of miles and passed diverse ferries over large rivers, will direct its course in feeding near the banks of the last river up that stream perhaps 50 or 60 miles until they can find a fording place, and having passed that, will do the same by the next, and so continue, until at length, after several months, they steer directly and come to their native place, of which many instances have been known? Or to which of these organs shall we impute the previous sense that creatures have of the future changes in the air and weather, of which so many instances are given us by Aratus, and by the more faithful and judicious Virgil?

Plenum vs. the vacuum, eg, magnetism

That we and other animals might have been endowed at the first formation of our species with diverse other external senses is scarcely to be doubted. Those rays which, from their

effect produced on our eyes, we call light, might not improbably, to an organ otherwise fitted, have imparted something else than color. But as those rays we see pervade what we account very solid bodies, as glass, crystal, etc., so we are assured there are others that with the like ease pass the most solid and opaque of all the bodies we are acquainted with. Play a small needle hung by a suitable thread about a lodestone, and as the hand holding the thread is moved from place to place, the needle will fly about toward or from the poles. Strain the thread, and trembling direct its point immediately to that pole which last impregnated it, and in every motion will show an incredible rapidity. If a large and solid piece of gold be interposed between the pole and needle, there will very little more difference appear in the agitation and direction of the needle than if there were nothing between besides the open air at the like distance. This needle is body of a most solid substance, and cannot be conceived moveable by anything else than body, for wind, air, vapors, and all things of the kind, though not visible to the eye, are no less bodily substances than either the steel or magnet. But this body that with so much force and rapidity works on the needle, and most manifestly in straight lines pervades the solid gold as freely as light does glass (for were the magnet enclosed in a box of gold it would do the same), I say is not perceptible by any of our senses, but is discovered by its effects alone.

Now may we not rationally suppose that the same power which framed our other organs, had it been thought suitable to our degree in the order of the creation, could have given us another peculiar one to receive sensations by the magnetic medium, which probably is as certainly and as universally diffused round all this globe as our air is? Further, Sir I. Newton closes the later editions of his admirable *Principia* with an intimation of a most subtle spirit, which he supposes may pervade and exist in the interior parts of grosser bodies, and universally contribute to the greatest effects in Nature. And shall we believe that the same Almighty Power which has so wonderfully framed us as we now are, could not also have given us an organ that would make us as sensible of that spirit (if any such there be) and its operations, as we are now of light by means of our eyes that give us vision? Of this, if our whole

system be considered, we cannot reasonably doubt. Nor does it appear either impossible or improbable but that there should orders of animal and even corporeal beings exist, to whom the most solid rocks are as transparent and permeable as the air is to us, the region of which is undoubtedly as full [9] of body as our Earth.

A plenum was the doctrine of Plato, Aristotle, and some other ancient philosophers, as it was of Descartes of late, and was constantly maintained until toward the end of the last age, but now the opinion of a vacuum prevails among us, which in the sense its great late author Sir I. Newton conceived it, may be [*crossed out*: is certainly] very just. But whoever narrowly considers his writings will find that, as he was sensible all the mundane spaces (and extramundane are inconceivable by us) are filled (in our sense of the word) with the rays of those innumerable great luminaries the fixed stars, the remotest of which may dart their continuous beams even to us, since the better our telescopes are the more they discover of them, which could not be unless those rays actually reached us, it is impossible he should conceive any of those spaces a mere vacuum. For as he supposes, Qu. 13, that body and light are convertible into one another, and since no body in the course of Nature can be annihilated, then after the change, light is as truly body as it was before. And what is that medium which he mentions in his 18th and the following Questions in the 8vo. edition of his *Optics*, and particularly in the 21st, distinguishing it from the rays of light, and supposes it to grow denser at greater distances? Is it not body? Thought not according to our vulgar notions, formed on our perceptions from these two senses, principally our sight and feeling. If we duly reflect on the order of the Universe, it will probably be found that the notion of a plenum, in the sense of the note below, renders the system of the Universe more regular, consistent, and beautiful, and therefore more rational and worthy of its Author, than any other. But to sum up the whole, perhaps that hint of the judicious Locke is not void of reason, where he says: "We see and perceive some of the motions and grosser operations of things here about us, but whence the streams come that keep all these curious machines in motion and repair, how conveyed and modified is beyond our

notice and apprehension. And the great parts and wheels as I may so say of this stupendous structure of the Universe may, for ought we know, have such a dependence and connection in their influences one upon another, that perhaps things in this our mansion, would put on quite another face, and cease to be what they are, if some one of the great bodies or stars incomprehensibly remote from us, should cease to be or move as it does." [10] Of which see more in the same section.

But to return. We have these five senses or conveyances of intelligence from things without us and no more, and we have them in common with all or most of all the other several species of the animal kind, several of which, as has been observed, exceed us in enjoying them to a much greater perfection, as diverse of them surpass us also in strength, agility, and swiftness. Nor have they the advantage of us only in those particulars mentioned in the close of the preceding section, as their natural clothing, and those sure and unerring guides, their instincts there discoursed of, but almost in every other respect relating to our bodies only. They and we equally require the continual support of aliment; we hunger and thirst for it; we faint, languish, and die when denied it; we digest and convert it into flesh, blood, and humours by the same kind of inward apparatus; we move our limbs and several parts by the same muscular motion, and as by the same mediums for our external senses. So by the same principles and laws of Nature all actions for the support of our bodies are performed, with this principal difference, that as their food, so all their motions and actions are more simple and more sure. We see therefore that Man, who as the Psalmist very justly says was made but little lower than the angels, is yet in his body much inferior to the brute. How widely then must they be conceived to err who make this the sole object of their care, and seek not to improve themselves in that by which it is evident they may or should vastly excel all the other visible parts of this Creation, that is, their mind and intellectual faculties, which we are in the next place to consider.

LOGAN'S NOTES

[1] It is therefore surprising how a late ingenious author should have ventured in a published treatise to assert this limitation of these exterior senses (for so he himself calls them) to five, to be ridiculously imperfect (*Essay on the Nature and Conduct of the Passions and Affections and Illustrations upon the Moral Sense*, 1728, by F. Hutcheson, note on p. 3 *et. alibi*), and to name with them those inward sensations of hunger, thirst, weariness, sickness; which are so far from being notices of things without us, that they are only the effects of some want or disorder in the interior parts of our bodies, and therefore can with no propriety be numbered with the others.

The electricity hypothesis

[2] What is here said or intended to be said of light as the medium of vision may appear to be somewhat obscurely expressed, the reasons for which shall be here given, and the matter somewhat further attempted.

The Ancients were generally content to consider light only as an emanation of lucid bodies or matter, which though it is next to saying nothing at all of it, yet it may perhaps prove nearly the whole of what we shall materially or with certainty know of its true cause. Aristocles' definition of it was trifling in calling it only *actus diaphani*. Descartes, who by his discoveries in dioptrics, geometry, algebra, etc., made himself the wonder of his age, and for a time was much followed, judged it necessary to suppose a very subtle medium distinct from the lucid body for explaining it. But the business of colors ever proved perplexing, as abundantly appears by that curious treatise on the subject by the excellent R. Boyle, until the more profound sagacity of the great Sir I. Newton discovered, from the different refrangibility of the Sun's rays, that the differences of the primary colors arose from the respective real intrinsic differences and not from any modifications, as had been supposed, of the rays of light incident on bodies. He also further discovered that the very minute parts of the surfaces of bodies, according to their different thinnesses, reflect different colors; as also that the same parts, while they reflect rays of one color, transmit those of another, with some other particulars. All which, as founded on experiments, are

largely treated of in his excellent book of *Optics*, and from hence one very considerable step is made into the knowledge of what the varieties of colors arise from. We have also learned by it that the improvement of telescopes, and other optical instruments that depend on refraction, is limited, and cannot be carried to the wished-for perfection. Yet though these are great discoveries in the subject of colors, that of light and vision will still be found wrapped in deep obscurity. For it happens to us in this case, as it generally does in our disquisitions into Nature, as to persons traveling over large continents, who, when they gain the top of one hill or eminence they had in prospect, discover again from thence only some further part of the vast spaces before them that still demand their toil. Yet with this difference—that such people may at some time gain their end, but in these searches we must never. “*Est quadam prodire tenus...*” [“It is always possible to reach a certain point...”], “*...si non datur ultra.*” “...if not to go beyond.” Horace] —however, and so we may go on.

To apply this, Sir I. Newton in that book as first published in 1704, considered light as the cause of vision and colors only in the sunbeams, or in other rays darted from flame, etc., agreeably to the common notion, which is that the rays of light darted instantaneously, or with an incomprehensible celerity, such as 150,000 miles in one second of time, are reflected from every physical point of matter it strikes on, in a sphere of rays where nothing else interposes, which are again reflected in a like sphere from every other point on which they impinge, and thus rays passing in right lines from every such point to every other. Nor is anything less than this to be supposed to account for vision in this hypothesis, which makes those rays the only medium of light, sight, and colors. But whether this be truly the case may be questionable for these reasons: [Or alternatively] But as often as I have considered this hypothesis, it seemed to be attended with very great difficulties, and these objections to it occurred:

1. The solar rays, or others from pure flame, convey not directly of themselves any color to the eye. Receive those rays on fine glass tinged in melting with any color, as red, blue, or green, or on the well-burnished surface of any metal or polished stone or jewel, and not only that first reflection, but the same

repeated from one such surface to another a hundred times over, will never exhibit to the eye on which it falls such a sense of the color as will be received from viewing it in common light. And if it be objected that the excess of the splendor so dazzles the sight that the color cannot be perceived, for solving this, view it through a smoked glass to take off that splendor, and it will still appear the same. Now if the color be in the Sun's rays themselves, why ought not they, especially when rendered inoffensive to the eye, more clearly and distinctly represent it, than it can by any other means be discovered? If it be said that the polish of the surface puts it in a condition to reflect the whole light and therefore all the colors together, from whence the appearance must necessarily be only white, let it be considered that in the tinged glass there is a strong and vivid color, break it in any manner across and the new surfaces of the fracture will have just the same effect, and therefore takes off the objection. We may add further, if the reflecting of all manner of rays prevents our seeing (in a proper sense) or distinguishing the reflecting object, how comes it that we can more exactly distinguish the parts of the whitest objects than of any other, since these are confessed to reflect all colors, but in the reflecting glass or metal, we from that reflection can discover nothing?

2. When a small candle is lighted up in a room, the whole space, and every object in it, on the parts obverted to the candle, are enlightened, and to an eye placed in any point of that space, where nothing interposes, they become visible. That the rays of light proceeding from that candle are nothing else than the particles of the tallow or wax with the wick accended and put in motion, is the received opinion. Now since those rays are allowed to flow in a constant succession, it is very easy to demonstrate that for filling the whole room, however large, with those rays, vastly less than one millionth part of one grain of the tallow or wax for one instant of that succession is required. By an instant here is meant the time in which a ray passes from the candle to the walls of the room, which supposing the distance about 50 feet, will, according to the above supposition of the celerity of light, be less than $1/15,000,000$ th part of one second. But further, when a ray strikes on any one point of the walls or other object, it must be supposed that from that point as a center

at least a hemisphere of rays is also immediately darted or diffused, for otherwise that point would not be visible from every other point in the room obverted to that wall, and the same must hold with every point. But what an infinite splitting and dividing of rays must be supposed in these cases. And further, all these rays must be infinitely crossing each other in every point of the whole space, and yet never interfere with nor disturb one another in their progress. And still further, though produced from so incomprehensibly small a quantity of the tallow or wax, they must be allowed to have all the primary colors in them that are assigned to those of the Sun, for in the glass prisms applied in such cases, the refracted colors appear in the one as well as in the other. Now whoever will own he can conceive all this possible in Nature, unless he can also so far strain his imagination as to conceive the means and manner of its possibility, must at the same time own that all the knowledge he can pretend to in the case is no more than belief or opinion about a matter he conceives not, and therefore in truth he knows nothing.

3. The several kinds of noctilucas, with the phenomena of light produced by F. Hawksbee's experiments and others in electrical bodies, seem beyond the reach of this hypotheses in any manner to account for them.

4. Diverse kinds of creatures as cats and rats can see where we cannot conceive any such thing as we call light can possibly reach them, which as there may diverse other objections naturally arise against the mentioned hypotheses, it may not therefore perhaps be unworthy the thoughts of curious enquirers into Nature, to consider whether this whole subject of light, colors, and vision may not be more rationally accounted for. Not that we are to expect we can ever attain to any certainty in the case, for it will be found clear to conviction that the first principles of Nature were designedly concealed from us. Yet as there is an avidity of knowledge implanted in the human mind, and these kinds of speculations are so far from being injurious that they rather improve and raise the thoughts to contemplations that may prove truly profitable to such as are capable of them, as well as entertaining, we may proceed to guess at least at some

more probable means of accounting for these effects that are of so much importance to us in life, which may be thus attempted.

That great genius Sir I. Newton, who appears to have penetrated farther into the secrets of Nature, as well as into mathematical science, than any man before him, though in that mentioned edition of his *Optics* he took no notice of any other medium for light than the solar rays or others from lucid bodies, and also in the 20th Question, added amongst others at the latter end of the book in D. Clarke's Latin edition (but the 28th in the later editions of it), seemed to contend against any other medium in the aetherial spaces. Yet in the 2nd edition of his admirable *Principia* in 1713, he adds a most remarkable paragraph in these words:

Adjicere jam liceret nonnulla de spiritu quodam subtilissimo corpora crassa pervadente, et in iisdem latente; cujus vi et actionibus particulae corporum ad minimas distantias se mutuo attrahunt, et contigua factae cohaerenti, et corpora electrica agunt ad distantias majores, tam repellendo quam attrahendo corpuscula vicina; et lux emittitur reflectitur, refringitur, inflectitur, et corpora calefacit; et sensatio omnis excitatur, et membra animalium ad voluntatem moventur, vibrationibus scilicet hujus spiritus per solida nervorum capillamenta ab externis sensuum organis ad cerebrum, et a cerebro in musculos propagatis, sed haec paucis exponi non possunt; neque adest sufficiens copia experimentorum, quibus leges actionum hujus Spiritus accurate determinari et monstrari debent.

Englished thus:

We might add here something further concerning a certain most subtle spirit which pervades and is latent in gross bodies, by the force and acting of which spirit the particles of bodies attract each other at the smallest distances; and when they touch closely adhere together; and electric bodies act at greater

distance as well in repelling as attracting bodies near them; and by which light is emitted, reflected, refracted and inflected, and bodies are heated and all sensation is excited, and the members of animals are moved at will, namely by the vibrations of this spirit propagated through the solid fibrils of the nerves to the brain and from the brain to the muscles. But these are things that cannot be explained in few words, nor am I furnished with sufficient experiments for exactly determining and demonstrating the laws by which this spirit acts.

Here it is plain he came not only to acknowledge another medium, but to ascribe to it the principal phenomena or operations in Nature that more intimately concern us. And though he had here only given these very short hints of it without leaving us any hopes of hearing further from him on the subject, yet after three years more, in his own 2nd edition of his *Optics* in 1716, he thought fit to add on the same, 8 new Questions from number 17 to 24 inclusive, wherein he more largely explains those heads of which in the former paragraph he had given but very short hints before. And could that wonderful man have lived and enjoyed the same strength of faculties he was blest with when, in the vigor of his age, he wrote his *Principles*, and have continued his observations on those subjects, he might very probably, with the advantages of further experience and reflection, have given the world new lights into them, and have rendered that theory much more plain and intelligible than he has left it.

But since we are now to have nothing further from that great hand, why may we not, for solving the difficulties attending the theory he appears at first to have embraced, proceed to consider the matter thusly.

An alternative to Newton

In all fluids, particularly in water, for with this we are best acquainted, we know all its particles bear every way one upon or against another. So if into a square closed vessel of any size filled with this liquid, a small pipe of less than an inch bore

be very tightly let in, and water be poured into it so as to communicate with that in the vessel below, but to stand perpendicularly in the pipe to any height, suppose 3 feet in this case, we know that every particle of water in the vessel will be pressed every way, as well upward and towards every side as downward, and even upward with a force equal to what it would be impelled with downward, if a weight pressed it equal to the weight of a body of water of the same surface with the inner one of the square vessel and of 3 feet in depth, or the height of the water contained in the small pipe. Which, though certainly true in fact, is one of the greatest paradoxes we know in Nature. And thus every particle pressing every way with the same force that they would if the vessel had been made all those three feet deeper, every side with the top and bottom equally press against the water, yet notwithstanding all this pressure, or even though it were vastly greater, the fluidity of the water, as far as we can judge, is no way lessened. Its parts as freely slide by each other, and it will receive any mixture of different tastes or colors as easily as before, or as it could in any situation, wherein it might be thought to lie under no pressure at all. Now as all the particles press each on the other, they must necessarily from every point press in right lines, this being the only natural direction of all pressure and motion; but as gravity is in this the cause of its pressure, besides some other attractions in the particles, they must in their motions receive diverse other determinations. This fluid, as it possesses so considerable a part of our globe, may be justly called a medium, as it certainly is in many cases, and it is in its nature adhesive, or which is much the same thing, attractive, as we see in what we call wetting, and in its small drops gathering up into a spherical form when it meets with nothing of its own nature to join with.

We are further sensible of another medium, our air, by which every part at least of the surface of this terraqueous globe is pressed on, and all its particles some way also mutually press on each other, but without any attraction, for it is now with reason believed to be rather by a *fuga*, or repulsion, than by elasticity only. And whatever the cause is of their resiliation, such is the gravity of the whole, as we find by the barometer that every square inch of surface with us is pressed by it with a

weight of about 240 lbs. troy, taken at a medium; yet notwithstanding this pressure, it is entirely pervious, gives but little resistance to motion in it, and crushes not by its gravity, as far as we can find, even the most tender of bodies that move in it. But what is here to be particularly considered in it is, that though it is subject to the most violent agitations, yet its finer parts at least are also at the same time subject to the most regular motions or vibrations, as is evident from the musical sounds produced by it, or with its concurrence, while the grosser body of it may be agitated by tempests. For that it is necessary to the production of sound, is known from experiments made in the exhausted receiver.

American “heresy”: electricity

We have now in these two fluids, which make up so considerable a part of our sphere, two mediums, the one attractive and the other repulsive, and that there is another which may be both attractive and repulsive, we have not only the authority of that great genius who has been quoted, but the more we look into Nature, the more reason we may have to be convinced of it.

Electricity was formerly regarded but as a trifling appearance in Nature, and therefore in the last curious age was very little considered; for that quality was supposed to be excited only by putting into motion the finer parts of the body it was found in, and yet the excellent R. Boyle had observed that these parts being once put in motion, excited also the same quality in any other body, as silver, iron, marble, etc. that was brought within the sphere of their action. (see Boyle’s works abridged, Vol 1, pa. 512) But now more lately by F. Hawksbee’s experiments in producing light, and particularly by the surprising phenomena arising from electricity in those of Step. Gray, we may see a field opened for speculations that, if duly pursued, may probably lead us into more just and extensive notions of our bodies and the world we live in, than have hitherto been generally thought of.

And if there be no heresy in mentioning it in the present age, why may we not venture to question the reasonableness of

asserting a vacuum as indispensably necessary to the continuance of motion? The argument indeed may hold in relation to all such bodies, the matter of light excepted, as our senses are formed to take cognizance of, but shall we from thence presume to judge of all the kinds of subtle matter that space may be filled with? Can we be sure that there is no electric or elastic medium that instead of obstructing or retarding motion, may be the very means of continuing it, or rather, have we not from the discoveries lately made, powerful reasons to believe it? Can we say an exhausted receiver is a vacuum because the air is drawn out of it, while at the same we see it filled with light, the matter of which in the true nature of things, and on a just estimate of them, though not according to our apprehensions, may possibly be a more essential substance than the earth or stones we tread on? But if a vacuum be not absolutely necessary, as that allotted by some to the etherial spaces cannot be, then undoubtedly to have all space in the Universe possessed by some kind of matter is much more consistent with the dignity, beauty, and order of the whole, than to imagine those vast voids which carry even a kind of horror in the thought.

But light being the only subject under consideration here, as that and electricity either do, or generally may be made, to accompany each other, let us proceed on that of light only, which, with its colors depending on it, may perhaps from the preceding be rendered more plainly intelligible in the following manner.

Light and heat are generally supposed concomitants, yet we find light is produced by bodies as destitute of heat as almost any we know. Quicksilver seems as cold as any metal, and dead fish and flesh have certainly very little heat in them, and yet these yield light, the first when freed from the clog of air, as in the barometer and Bernoulli's phosphorus, the others best with air, or scarcely without it; rotten wood, and the lucid matter of a living or dead glow worm, not at all without it; the phosphorus from urine, etc. with air, but better without it. There must therefore be a medium which can exhibit light distinct from the solar rays, and from elementary fire. And since, as has been observed, all or most electrical bodies may be rendered

luminous, why may we not conceive that subtle medium which has been mentioned to be the subject of both? And as light is to us only a sensation of all the colors united, why may we not consider it as that medium put by proper elastic impellents into its vibratory motion, such as: the solar rays, which from their resiliency we may suppose elastic; common flame, of which air is known to be a great ingredient; the friction of elastic bodies, or by more silent motions, imperceptible to us, yet effectual, as that of fermentation is in diverse liquids, of which in many cases we have no other sense than from the effects only? And if this be admitted, since the medium must be universally diffused, and may probably consist of particles of different magnitudes, and from thence be subject to different degrees of vibration, if we reflect on what has been observed before of the pressure of the particles of water, we shall be at no loss to conceive how, at the presence of any of those impellents that can put the medium into its vibrations, light appears instantaneously diffused all around, and affects the eye wherever placed, from all parts, without supposing any of those infinite reflections, crossings, and interferences that have before been mentioned. Thus the matter of light to us may universally be the same, though the impellents exciting its vibrations may be very different (and thus a cat's eyes, in which a light is sometimes seen, may have in them a matter capable of producing these vibrations sufficient for their use), and lights may appear different from the different forces of the impellent, as will be seen hereafter. But heat alone is not sufficient to produce light; it only attenuates and divides the parts, and if these are elastic, they may turn into smoke and then into flame, which is undoubtedly elastic to a very great degree, and therefore is a most proper impellent to excite the vibrations of the medium. The same effect is also produced by the elastic effluvia of glass and other electric bodies when agitated by brisk motion.

Then, for variety of colors, they may in the same manner be conceived, and all Sir I. Newton's discoveries be properly applied here, but with a much greater simplicity and uniformity. For while he concluded that all the different colors are in the different rays of the Sun, since light is produced by so many other different kinds of body or matter, how are we to suppose

that every kind of light, however produced, becomes possessed of all the same variety of colors or rays, or at least in proportion to its strength, that are seen in those of the Sun itself? Is it not therefore much more rational to conceive but one medium for all light, subject nevertheless to be put in motion by a variety of bodies or matter? And may not the different appearances of colors depend on the different magnitudes of the particles of the medium, and their different vibrations and forces thence arising? (as in Sir I. Newton's 13th Question at the latter end of his *Optics*, p. 870)

But to proceed to a more particular consideration of colors and vision, let us only suppose this medium (whether just the same with that of Sir Isaac Newton or not is of no importance here) to press in its degree, like the other two before mentioned, on all surfaces whatever, and let us suppose, as we justly may, that all matter is formed susceptible of some particular kind of vibrations not yet observed by us, as we find in those very solid bodies, bells, plates of metal, glass, etc., whose every particle undoubtedly vibrate when by being struck they produce sound, which were it not for that sound would probably have never been thought of. And as this is a parallel case, let us also take another furnished by the objects of the same sense of hearing, as thus:

The differences of sounds are acknowledged to depend on the different vibrations of the air or medium, and in musical strings the different vibrations depend on the different length, substance, and tension of the string. But when any particular note is sounded, whether (as it is said) by a pipe or string, any other string set exactly to the same note, placed near that which sounds, will, without being any otherwise touched, be, by the vibrations of the air or medium only striking on that string, put into the same vibrations and join in sounding the same note in unison with the first. Now as this is a matter well known and frequently mentioned, let us apply it to the present case and ask: Why may we not suppose, as has already been hinted, that the particles of matter in bodies, and especially in surfaces, are subject to peculiarly different vibrations according to their size and texture proper to minister to vision, as those in bells, etc. are to sound? That the particles of our medium are also subject to peculiar vibrations? That the whole medium being put in

motion, the particles of this and those of the surfaces whose vibrations correspond, as in the case of the musical strings in unison, act on each other, and that this action is from thence communicated to all the others of the medium of the same tenor, in proportion to the force of the impellent, whether it be the Sun, a candle, etc., and subject also to that common law in Nature that the force of action from a center decreases in a duplicate ratio of the distance? Thus, wherever the eye is placed within the sphere of that action, it must necessarily receive a cone or pyramid of rays of the same color or colors with its base, and no others. But that these vibrations may be communicated in right lines, we are not to imagine them of the same kind with those of strings or with those of a bell, glass, etc. before mentioned, but that each particle has its own vibration, perhaps from its center outwards, and also takes impressions from the impulse of those about it of its own kind on every side. And if this appear difficult to conceive, yet it is no more so than what we allow to be in the nature of all fluids, as was shown before in water; for it is an acknowledged principle in hydrostatics that in liquids, every particle must press in every direction. Nor is there anything in this so difficult to conceive as what Sir I. Newton supposes in Qu. 26, that the rays of light have different sides subject to different refractions (*Optics*, 8vo, pa.335), though he allows that those rays are made up of a series of particles.

As exceeding thin plates of diaphanous substances are observed to reflect the strongest or the primary colors, such as the thinnest plates of talc, exceeding thin glass, bubbles of soaped water, etc., Sir I. Newton by experiments on some of these, and on the thinnest plates of air between the surfaces of object glasses of large telescopes, attempted to discover what degree of tenuity or thinness is required to produce each several color. But even from those experiments we have reason to conclude the thing impracticable, since it is evident that very different thicknesses produce the same color. Some of those experiments will not readily succeed in every hand, but to be convinced of the incomprehensible fineness of the parts of light, as also of the extreme tenuity of the surfaces that reflect it, we shall scarce need a better opportunity than we may find in those

soaped bubbles, for, if attentively considered, they will furnish matter enough for a large variety of speculations in this way.

How the eye is affected in vision is spoke to above in the context, but the different sizes of the particles, or the different forces of their vibrations, may be collected from diverse observations. The least refrangible colors are undoubtedly the strongest, and the most refrangible the weakest. Place bits of silk, as ribbons of the same texture and size of different colors (as a friend of mine tried it on a different view), on the smooth surface of snow, leaving them for several hours in the clear sunshine. As white is produced from the reflection of all colors, the piece of that color, if nearly as white as the neighboring snow, will be found to have scarce sunk at all below the common surface, and every color will have sunk less than others of the same kind in proportion to its lightness, or its approaching nearer to white. But of full colors, the red will have sunk the least; a strong yellow a little, but not much more; next a green; then the blues; and the black undoubtedly the most of all. These experiments having been made to find what colors are most exceptive of heat, discover at the same time which of them most strongly repel the rays, or, which is the same thing, most strongly vibrate, and the differences we find are in the same proportion reciprocally with their refrangibility.

Again, as a live coal moved very swiftly appears like a line or stream of fire, or as children in their play call it, a ribbon, which is owning, as the same author has observed, to the continuance of the vibration in the optic nerve. If several bits of ribbon of full colors of their kind be fastened separately to the end of a stick and be very quickly moved, or rather, if they are fixed one below another on the side of a small wheel turned rapidly about, one may plainly discover a difference in the continuity of the circles they will appear to make, each of its own color, for the red will in this exceed the rest, and so the others in the above mentioned order, but this had best be tried in the Sun.

Further, if the fixed stars be viewed in a clear night through a glass prism by refraction, though they will all to the 3rd or 4th magnitude exhibit an oblong light, yet the brighter the star is, the more red will appear in it. Sirius, Lucida Lyrae, Rigel,

and such others of a white light will show a good red; Aldebaran, Antares, and Orion's eastern shoulder, being of a redder light to the eye, will show the other colors more faintly; but the less bright stars will scarce show any red at all. And all weak flames commonly appear bluish for want probably of a sufficient force to impel the rays or parts of a stronger vibration, as the expiring light of a candle in the exhausted receiver, and that of weak spirits. So sulfur, though its fire is accounted strong, yet its blue flame when pure and unmixed is so weak that it will not fire gunpowder, though diverse other flame will, nor when viewed through a prism does it exhibit any red at all. But the difference of the force of red rays from others may be clearly conceived by this, that on walking out or traveling when the ground is well covered with snow in the sunshine, or when the Sun's rays are received directly in our eyes, on shutting them, the idea of white is soon lost, but a strong red seems for some time to remain, because the rays or particles of that color made the strongest impression, and the vibrations they excited in the optic nerve continue the longest. Clouds or air appear red in a fair evening, and the appearance is commonly a sign of a fair ensuing day; for the fine vapors exhaled from the earth, beginning then to thicken in order to fall in dew in the night, may obstruct the passage of the weaker rays, so that the red mostly, and sometimes the yellow, appear. But the same in a morning portends rain, for it shows the vapors are not fallen, but by the greater contracted cold of the night are yet to fall, though they are not so much condensed as to form drops, but continuing to condense they become rain. For it is generally observed that it seldom rains the day after dew has fallen plentifully in the night, and rain after a red morning rarely follows before the latter part of the day, nor does rain so constantly ensue in this as fair weather in the other case, for the Sun may refine those vapors again, and prevent their condensing and falling.

But as there have been some hints given about the various appearances of different kinds of light viewed through the triangular glass prism, if the ingenious, who have proper opportunity of making those experiments on different subjects, would try such as are requisite, it is highly probable that much further discoveries may be yet made in this way. For it will be

found that all the kinds of light which make an impression on the sight, and even some which afford sufficient for the plain discovery of other near objects, very much differ. The light of rotten wood, from the trials I have made of it through the prism, appears unaltered and directly the same, as also does the light of the American firefly or the lampyris, and therefore it is probably the same with that of the glowworm. Whether the rays of light from fish or flesh and those from mercury agitated *in vacuo*, as in Bernoulli's phosphorus, or from bright diamonds, carbuncles, and other jewels, will be divided when viewed through the prism, I have never had the opportunity of trying; but that the phosphorus from urine should produce the same effect with fire itself, is highly reasonable, because it is really no other than fire.

But upon the whole of this discourse, it is plain from the difficulties that arise from every view we can take of the subject, that it far exceeds the reach of human capacity to comprehend it.

[3] Pliny the Elder, *Naturalis Historia*, L. 35, ch. 10.

[4] Through use and practice by figures appearing less in proportion to their remoteness, for a reason well known in optics, but chiefly by our being furnished with two organs of the same kind, as also by the interposition of other intermediate objects, from whence alone it is, and not from refraction, that the Sun and Moon appear to us so much larger at their rising and setting, though really further off from us than when more elevated [illeg.] ... of the distances of the bodies we behold.

[5] *Traité du Beau*, pa. 174: "La lame spirale—est composé de fibres extrêmement fines et toutes d'inegale longueur. —Il y a toute apparence que chaque fibre est destiné a recevoir un certain ton, a peu tirer de la meme maniere que dans les clavestins, etc." ["The spiral lamina is composed of extremely fine fibers and of unequal length— there is the complete appearance that each fiber is intended to receive a specific tone, pulled somewhat in the same manner as in harpsichords, etc."]

[6] *Optics*, 8vo. edition, p. 110, 111.

[7] Hutcheson, *Essay on the Passions*, Pref., p. 10 + ibid. note on p. 3 of the book.

[8] *Essay on Human Understanding*, Book II, Chapter II, §3 *ad finem*.

[9] By the word *full* here is not understood that there is not interstice void of matter, which would render it in Sir I. Newton's sense and words much denser than quicksilver or gold, but according to the common acceptance of the word, as we say a cask is full of ashes, feathers, or air. Thus suppose a box of a foot square with the same depth, had within it a hollow sphere of the 10th or 20th part of an inch in thickness that touched all the 6 sides of the box. Suppose this sphere to be again milled down and blown into other spheres of an inch diameter. There would then be 1728 such spheres. Suppose each of those reduced again to others of but the 100th or 1000th of an inch in diameter, and we should not then scruple to say the box was full, and very full. Yet if water were poured into it besides the cavities of each [illeg.] rule it would receive very near half as much or about [illeg.] solid contents of the box pour a few drops of the tincture of [illeg.] and it would tinge all this water and then all that quantity of [illeg.] filled by the particles of a blue color, throw into it a few drops of spirit of vitriol or nitre, and then it would again be filled with acid particles because the least drop would take of it. And this seems to be the only notion we can properly have of the word; but of a pure vacuum we can form no idea, and we have no positive notion of a real plenum.

[10] *Essay on Human Understanding*, Book IV, Chapter VI, §11.

Chapter 3:

Of the Intellect

Having thus considered the external senses of animals by which they are enabled to receive notices of things without them, and having, on that view, clearly seen that the internal sensations excited through them entirely depend on the formation and texture of the organ, in being with so exact and so astonishing a contrivance adapted to receive and be affected with proper impressions from the respective objects, we should next in course proceed to consider to what several purposes such notices and sensations appear to have been intended.

The use of them to brute animals, which, as has been already observed, have them not only in common with Man, but many of them in much greater perfection than they have been granted to our species, is very evident. For it appears that, in regard to themselves only, they were solely intended for enabling them to seek and find the food peculiarly adapted to their digestion for the nourishment of their bodies, for avoiding such things as threatened injury or danger to their being, and for continuing a succession of their species by generation, each in its proper way. For all which ends, we find they are respectively furnished with such powerful directive instincts, that is, their whole frame is so composed and constituted that, when not put out of their natural course by Man, they unerringly pursue them. Nor do they want any other powers or faculties than those peculiar instincts to lead them infallibly to the attainment of the whole that was originally intended for them in their formation.

But much otherwise we find it is, as has largely been shown before, with Man, who, even to provide the necessities of life for his support, security, and defense, is obliged, together with those natural propensities deeply and radically fixed in his constitution—which may, without any derogation to him, since they are all the work of the same great Author of his being, be as properly called instincts as any of those we apply the term to in other animals—but Man (I say) is obliged together with these to recur to that greater and nobler gift, his intellectual faculties or

the superior abilities of his mind, which ought here to be considered.

But the whole process of human understanding, its faculties, powers, and limits have been so judiciously and fully inquired into and stated by that excellent reasoner, the author of the *Essay* on that subject, that it is rendered in the writer's opinion in a great measure needless to enter into it again. Yet as his view in these papers was to lay down one entire scheme of his own thoughts as they arose on considering the subject, Man, in regard to the title of this piece, he cannot well avoid running over some general heads, though they have been much more largely treated before. And though he thought himself obliged to consider what others have said on the same subject as far as their writings fell in his way, yet he must here in some measure touch the same in his own manner, that the whole may appear of a piece, and when considered together may stand or fall by the sentence of abler judges according to its merit, for he neither seeks nor wishes for any other recommendation. When out of his hands it is the world's, and if it find any readers, they may approve or condemn it as they please. He shall think himself no further concerned in it, provided nothing be found inconsistent with the only end he proposed by it, the Good of mankind.

Man alone of all this animal creation being endowed with the powers of reason and understanding, in inquiring into the nature and use of these powers we may, from what was observed in the first chapter, undoubtedly conclude that, in relation to his body, they were in the first instance designed for supplying those wants for which, in all other creatures, Nature had otherwise made a certain provision; and it is evident that the bulk of mankind too rarely apply them any other way. Yet would they make use of them, even to this purpose, as regularly in all respects as the others are seen to pursue their instincts, it is certain the world would be vastly happier than now it is, and we should generally have much less cause to complain.

But however we were at first designed, it is now apparent that little but disorder prevails. Yet that it is still in our power to make it quite otherwise, and that the means for it, even in a natural way, are very much within our reach, it is the business of these papers not only to show, but, as far as the

writer's thoughts have carried him, to point out those means as their foundation is laid in Nature.

In order to which, he thinks it in some measure, though not so directly conducive, to consider our intellectual faculties; that learning, as far as we can, to know ourselves, we may be the more sensible of what is or is not in our power, so that we may neither fruitlessly labor for what is not, nor fail in the prosecution of what truly is, or may be made so.

Our intellect, or more generally, our mind, as was said before, was undoubtedly intended in the first and most immediate use of it to supply our bodily wants; but to imagine this could be the sole end of it would be most absurd. For then of all creatures known upon the Earth, Man would be the most miserable, since we see by much the greater numbers racked with constant cares, worn out with toils and fatigues, and laboring under perpetual anxieties either to compass present necessities, or to make provision for futurity in the way they have proposed to themselves as best in their own imagination. While the beasts in the field and fowls of the air, formed incapable of any such thoughts, and therefore conscious of no manner of care, have nothing more to do in life than to look out for and pick up that food their instincts direct them to, and Nature, without their labor, has duly provided for them, in and about the places they are produced in. The whole creation round us we see, as far as it is possible for us to comprehend, gives in every other part but Man most evident marks of infinite wisdom and goodness; and to conceive that Man alone should be distinguished for misery, and that faculty which raises him superior to all other creatures and enables him by the application of means that are in our power to become master of them all, and further gives him a sense of yet superior wisdom and power, should be given him for a curse, is no less than to give that faculty and all our common sense the lie, and is enough to debase us even beneath the lowest degree of it. It was clearly shown in the first chapter that Man was formed for Society, which, if not intended for his good, would be a contradiction to the wisdom and goodness that produced him, and that he was designed for a much greater degree of happiness in himself, it is hoped will be made appear in the sequel. In the mean time we

are to proceed to consider this faculty of the mind, so far as that happiness has any dependence on our knowledge, and probably somewhat further.

Faculties of the mind

The mind, though only one in itself, is commonly distinguished by its several kinds of operation into several faculties as those that follow. [1]

The *apprehension*, which is only its capacity to take and understand anything that is presented to it; and a quickness of apprehension is a readiness in conceiving any object of the understanding presented to us, either in making the ideas of a speaker or writer our own, or in inferring one thing from another in whatever manner presented.

The *imagination*, in the sense the author of *The Procedure* so very frequently mentions it, that is, passively, is no other than memory. It is called the place of images, but when they are no longer the object of sensation, they can have no place in us but in our memory. [2]

But the imagination taken actively, which is truly the sense of the word, as its derivation shows it to be the action of imagining, is very different, for this is the power of assembling images together, of ranging them and throwing them into some series, not truly according to the existence of things, unless by accident, but at the will of the disposer, and in a quickness of this consists what is called *wit*. From the quickness and strength of it also are the inventions of poets, whether in romances or verse; the descriptions of orators, historians, and other writers; etc. It is also from these images ranging in our brain when we sleep that dreams arise, for those that were raised the preceding day, or not long before, being the freshest, floating as it were uppermost and associating themselves with others of the same kind, and sometimes by accident, or we know not how, with others, make up compounded representations, as flying vapors join in clouds in different forms, and commonly the one has no more meaning in them than the other, but are truly according that common distrik [?]. Others indeed have found, or believed they have found, theirs to be of very great importance, of which such

strange instances have been given that it would be too presumptuous to lay down one hypothesis for them all, for no man can judge of another but from what is within himself. We may indeed suspect strongly, but ought not to decide.

Reasoning is in itself no other than comparing ideas one with another, and from thence inferring others, each step being made a medium agreeing in some principal part both with its antecedent and consequent. If they fully and adequately agree in that part for which they are applied, the last, as well as every preceding step, concludes in absolute demonstration and knowledge, provided each medium was justly taken. If the agreement in this process is not full and perfect it will end only in probability, which is of all the various degrees between absolute falsehood and absolute truth or knowledge.

Judgment is the power and action of discerning the reality of an agreement between these mediums or the want of it, and a rectitude in this is the greatest gift and highest perfection of human understanding. It is what perhaps no man can wholly acquire to himself, more than he can a vein for poetry, without some indulgent grant from Nature. Yet it is certain that whatever degree of it a person has from Nature, as we are not to suppose any who can be accounted rational wholly destitute of it, it may be vastly improved by a close attention and observation; and particularly geometrical demonstrations and algebra, if properly applied, and not so much studied for the knowledge of their conclusions as to observe and accustom the mind to that sort of gradation and process, will very much contribute to strengthening it, but a steady and close application of thought is the main.

As to the *affections* and *passions*, though all intended to be in subjection to the powers of the mind, instead of which to our great unhappiness we find they much oftener influence it than they are influenced by it; yet as they have not their rise, nor are seated in, the brain, the consideration of them belongs to another place; and the *will*, which truly depends on both, ought in course to follow them. But the due regulation of this, comprehending in it all the duties of life, the whole train of this discourse, ought to be leveled principally to that end, and accordingly it should have its place.

These before-mentioned seem to be the principal faculties of the mind. And as they are made use of for the attainment of knowledge, they have with all things coincident with them been so fully and justly treated by the excellent author of the *Essay* on the subject, that to say anything further on them to the same purpose would be an idle undertaking, and to vary from him on these heads on which principally he appears to have been exact, might be as dangerous as it has evidently proved to another author. Nor should even those short definitions or descriptions have been given as above, but that occurring in course and without search to the writer's mind, he thought it would be no great loss of time or paper to insert them.

Locke and Aristotle

In taking a view of our knowledge, it is necessary in the first place to observe that from the writings of Aristotle (a name that is now become almost a scandal to mention without passing some reflection on him, but it is hoped more justice is done him in a note at the end of this book), though he laid it not down himself in express terms, the Schools took up this position, “*nihil est in intellectu quod non prius feurit in sensu*,” that there is nothing in the understanding but what was first in the sense, or in plainer terms, which is the true meaning of it: we understand or know nothing but what is derived to us through our senses. And this seems to be taken for granted not only by J. Locke, so far that his whole process appears to be built on it, but, what is more strange, the author of *The Procedure* lays it without any restriction or limitation for the foundation of his discourse, the reason of which is plain, for that it serves the best to infer the necessity of that analogy he contends to prove. Nor is it to be controverted, but that it is truly through our senses and by the ideas received from them that the foundation of all our knowledge is derived.

But this being the case, it may consequentially be inferred that, since it has been shown in the preceding chapter on the senses that they convey to us no other notices than of certain qualities of objects that each sense respectively was formed and particularly adapted to receive by the impressions made on it,

and not at all of their real intrinsic nature in any other respect—as the sight only shows color, and by its lights and shades, as in painting, the figure of the objects that reflect it, with the further advantage of showing also their local motion, as either the whole thing or its discernable parts change place, whereas painting can exhibit them only in one instantaneous situation; and so the hearing receives notices solely by sound, the smell by effluvia discerns odors, and the other two are affected with other sensible qualities solely by contact—and as the formation of the organs for these respective purposes and no others clearly show, these notices were all that it was thought fit we should have of any object whatever, all which depending entirely on the peculiar frame and texture of our own organs, it is evident that these sensations in our bodies and the notices received from them are purely relative to us. For without an eye to receive the impression, and a faculty of discerning it as impressed on the organ, there would be truly no color in the world. Since it is now with good reason generally agreed by all who can judge of it, that color entirely depends on the disposition of the very minute exterior parts of body differently reflecting the rays of light, as has been fully shown before, and on the eye being particularly fitted not only to receive them on its optic nerve expanded in the retina, but also on that nerve being adapted to be differently affected by them, and to give notice of this to the mind, or the *sensus communis*. Therefore to imagine that other intellectual beings which have not or want not such organs, yet may know much more of Nature than we do, should have the like perceptions of the operations of that matter we call light or the rays of it, and consequently of color, would be most absurd and partial to ourselves. All our knowledge of body therefore, which, as we are circumstanced, is what principally affects us, may therefore be justly accounted only relative to ourselves, and to our frame and present situation here.

But as this knowledge, as has been said, is first derived from these our senses, and the abilities of our mind are exerted by reflecting on, comparing, and judging of the ideas they present to us, it seems consequential to infer from thence that all the knowledge we can attain should also be purely relative, and that we cannot possibly have any at all more real in itself than

those notices are of the real nature of things, from which only some certain qualities are conveyed to us by our sensations.

That this thought may appear shocking to many who so highly exalt the powers of reason, and make it as an efflux of the deity and a participation in some degree, as it were, of the divine nature, is not to be doubted. Yet the writer has often thought that he not only could make an advantageous use of it to himself, but, if duly considered, it might be rendered so to mankind in general, for from hence we should learn humility and caution; from hence we should be led to limit our inquiries and forbear carrying them into matters perfectly unfathomable by our very short line, and, which is more, by a line that in many cases must float instead of leading directly to the supposed bottom. We should hear no more of the infinity of space or of duration, proposed as subjects to be canvassed by our understanding, nor of some others equally incomprehensible. But what is the principal of all, we might by this reflection on our condition be reduced from such vain pursuits to consider, as Persius advises, “*Quem te Deus esse jussit, et humana qua parte locatus es in re.*” [“Learn the person God has commanded you to be, and in which part of human affairs you have been placed.” Persius, *Satira III.*] What truly is the nature of our being, the end of our formation, and our station here? What are our duties, and what the most proper and direct means for discharging them? However limited our knowledge is in other respects, it is full and clear here, which, being the principal subject of this discourse, is to be more fully considered in its proper place.

But as we find there is implanted in the mind of Man a strong bent and inclination for knowledge, it may be proper to proceed in considering it further as follows.

Though, from what was observed above, it may be made a question whether we can be said to have any real knowledge at all of the world and Nature, a thought that must undoubtedly depress our condition exceeding low, since from it may be argued that, if this knowledge be peculiar to our species only, it may amount to little more than something of the same kind with the natural instincts by which other animals are directed; but that they have vastly the advantage of us, since theirs are sure unerring guides to them in all things necessary to their being,

while we are perpetually running astray from our duty, and but with difficulty and uncertainty attain any good end that it can be supposed we were designed for. Yet notwithstanding, this kind of argumentation is truly consequential and rational, while we confine ourselves to consider all our knowledge as originally depending on the ideas we receive from our external senses, a truth that cannot be contradicted. These following thoughts nevertheless may serve not only to enlarge to our conception of the franchises of the human mind, and to extend the limits of our understanding, but to show that, in things that truly concern us, our knowledge may in degree be as real as that of other intellectual beings. And that it is not so in other cases, is rather a favor and kind indulgence to us than otherwise, since from hence we may more clearly discover what pursuits were intended for us, and what attainments, by being wrapped up in obscurity, are denied us, and that accordingly we should employ our study on such chiefly as may truly render us happy. For though we can never arrive at the knowledge of the true nature and the primary principles that constitute the essence of the objects around us, yet by proper application we may certainly learn so much of them as to render them useful to us in the manner they were designed for us. And as it is plain from the unsuccessfulness of our inquiries that nothing further was intended for us, so we ought to conclude that in endeavoring for discoveries beyond this, we are acting counter to the good pleasure and direction of that sovereign power which formed us.

Creative power of the mind transcends the senses

But for fixing our belief of the reality of our knowledge, as the writer is, in these leaves, only giving the course of his own thoughts to be submitted to more discerning judgment, he thinks fit here to offer his reasonings with himself on the subject, which, though they may probably appear somewhat odd at first, yet they may perhaps be found not altogether unworthy of further consideration, or if they prove so, may be rejected.

Our knowledge, it is true, has no other materials at first to work on than the simple ideas of the sensible objects without us. But the powers of the mind are plainly found by experience to expand themselves afterwards to so vast an extent, in forming within itself such infinite numbers of ideas and so very different from those first sensations, that it has appeared to the writer as if it were furnished with a capacity in itself, by a little practicing on those simple ones, to evolve other powers that were at first only virtually latent within it. For which (as comparisons, when they can be justly made, very much illustrate a subject) he has sometimes formed this to himself, to which he owns is wide enough, but the nature of the subject cannot possibly from exterior things admit of any truly adequate.

And it is thus: Let us consider one of those species of insects (so called) that undergo diverse transformations, as, for instance, the silkworm. This at first is contained in a very small egg, from which with a little warmth breaks out into a small worm, that, if it found no proper food, would in a short time expire; but meeting with green leaves it grows up into a bulk, and in the time of its growth it puts on different figures, thrusts out more rings and new organs, and when fully replenished works out the greater part of its substance in the manner mentioned in the first chapter. After which, this animal that at first appeared a contemptible little maggot, and then a circled worm disagreeable to the sight, at its next appearance comes out furnished with wings, of which not the least stamina were before observable to the eye; and a wild sort of the same species in the woods that work very much in the same manner, become most beautiful very large butterflies of a considerable duration. So tadpoles quite change their figure, and so diverse other productions in Nature put on new forms, and exert new powers, of which at first there was not the least appearance to be discovered. Why then may we not imagine it may be in the same manner with the mind? And that from its first simple food, the ideas it receives from the senses, it may have a further power to work up those into others vastly differing?

But we need not ask why we may not, for we see in fact it truly is so. The mind, by its native powers, after the perception of its simple ideas, reflects on them, compares one with another,

and, as occasion offers, with others that appear to have any relation to either. And observing some effect produced by some exterior cause, it infers the like or something of the like kind may again be produced by others, and still going on in this process. Though we reflect not at the time on the manner of this internal operation, more than we do how our organs of speech form the words we utter, we strike out conclusions so far transcending in degree those first materials we begin with, that they might seem almost of as different a species as vegetables are from some of the animal kind. And thus we have opened to us and are enabled to enter into, as it were, a new kind of world of ideas, as of virtues, vices, modes, habits, relations, obligation, duties, merit, with diverse others that cannot be directly produced by any species of simple idea of the senses.

Thus, should I actually see a person doing a grateful or compassionate action to another, I receive from my sight no other idea than those of the figure and motions of the persons, but that wherein the gratitude or compassion of the action consists is an idea of a kind altogether different. For suppose the action itself consisted in one person giving another a purse of money: the very same representation might arise and be impressed on the sight from a robber in that manner giving his partner a share of his ill-got plunder, but on my knowledge of this, the same impressions on my organ would now produce the detestable idea of villainy, that in the other case gave me the amicable one of those excellent virtues. These observations and what has been offered may sufficiently convey the writer's sense on the subject, and he thinks it not proper to dwell on them longer here.

But now to come to the reality of our knowledge. Though our perception of objects by color, sound, smell, taste, and feeling discover not to us their true essence, but only bring us such notices of them as at our formation it was seen proper we should have of them, yet we may, by the ideas they furnish us with, be as sure of their existence as we can be of our own by thinking, or, which is the ground work for this, by our being sensible of those ideas. And that we may be still the more sure, we find that, of all such outward objects as have an existence of any permanency and are within our reach, we may have a double

sensation, as of their figure, magnitude, number, motion, or rest, both by the sight and touch. It is further well worth observation how our nerves for these senses are so diffused and ranged in their regular and natural situation to convey their notices to us with due certainty, that if they are put out of it, they will have a very different or contrary effect. Thus if the middle finger be laid over the foremost, and a pea, a small button, or such like, be rolled under the ends of both thus placed, that single pea will appear to the touch to be two, and at the distance of the breadth of both fingers or thereabouts. So if the ball of one eye be passed by the finger from without, a little out of its proper situation or direction, yet not so as to hinder the sight, the object we then look at will appear double. But Nature, when left to act according to its established order, will never deceive us by our senses in any point where it truly concerns us to know otherwise, nor is it fit we should suspect it. For when we observe the conduct of men, and how some excel in suiting means to obtain an end designed by Nature to be truly advantageous, we conceive an idea of wisdom, and from other occasions, as acts of beneficence, etc. we form one equally clear of goodness. But when we look abroad into the wide field of Nature, we there observe means suited to their ends and causes to their effects in so just a manner, and with so much wisdom and goodness, that it strikes us with admiration, begets a reverential regard, and, on considering ourselves with the rest, leads us into a full persuasion that there must be one cause of all, equally wise, good, and great. We find also that truth is the sole object that our reason and understanding pant after, and nothing is more detestable to them than falsehood. It is therefore a rebellion against our own reason and common sense to imagine it possible we should have been formed by such a power to be only deceived, and in all our ideas imposed on. It is our perfection in our human state to pursue and keep up to the intention and order of Nature, and he forfeits his title to humanity who leaves her prescriptions. Most vain is it then to fancy all may be spirit, and that there is no such thing as body in the Universe. Nothing is more just than the old observation in this line [Greek text], "Who's born a man should think as becomes a man." Or as

Sophocles (*Ajax*, v. 769, etc.) more fully expresses it to this purpose with somewhat addition:

The Prophet thus; The rash presumptuous mind
Who, while by Heav'n to human state confined,
Would leap his pale and break the defined bounds,
With pointed vengeance injured Heav'n confounds:
Or to delusive whims the man* betrays,
Condemned to rove in Error's endless maze.
[*in al. ms. L, *the fool*.]

But it may be further justly observed that, while we are really acting according to Nature, and firmly believe, with all the rest of mankind, that things to us are truly as we suppose them here, yet considering what has been advanced, that our senses convey no ideas of things but such only as our bodily organs are fitted to receive, and therefore all the knowledge we can derive from them is only such as is purely relative to ourselves in our condition, but this may have no agreement at all with that of other intellectual beings who neither have nor want any such organs for their knowledge. Nor may it be inconsistent with divine goodness to give us a set of notions peculiar to ourselves only, which we call knowledge; for provided these are sufficient to lead us to the happiness intended for us, it will be equally useful to us as if we had the same kind of intelligence with the highest order of angels. And this indeed is an observation and objection that carries no small weight with it.

But this point also, it is conceived, may be cleared up thus. Though it is very true, our first original ideas are no other than such as have been mentioned, yet, as was observed before, the objects themselves from which we have our sensations do certainly exist. For, to take an instance, though fire may affect other beings in no such manner as it does us with heat and light, yet that it destroys the consistence of diverse other kinds of bodies is certain. For if a pile of wood be set on fire, though neither we nor any other creature endowed with such senses as ours has any knowledge of it at the time, we find by the effects remaining that it certainly performs thus. So we find heavy bodies gravitate to the Earth, without any relation to our

sensations; that solid parts remain fixed in their place unless moved by force; that water and other liquids, on the contrary, on the least declivity or descent, will flow downwards. We are assured there is a Sun, whose rays not only affect us, but give life and motion to everything animated on our globe, and by them all vegetation is carried on. We know this Earth is immense in comparison of one of us; that besides the Sun, there are other luminous bodies, which as they at the same time appear in the same situation in relation to others beyond them, on whatever part of this Earth, vast as it is, they are observed, we are from thence assured their distance is vastly great, and so must be their magnitudes. We further discover also that under those others they gradually move, some faster, some slower, but all nearly one way, and by repeated observations we are able to fix their periods or times of their revolutions. Nor have they any motion whatever discoverable by their appearances to us, but we can calculate them and tell their situation in respect to each other and the Sun, without any regard at all to us; and not only what it now is, but what it has been for some thousands of years past. And this knowledge, in the material parts of it, as to their motions and place, though from different hypotheses, has for many ages past been very much the same. Now as these motions appear to have no more relation to this Earth and us its inhabitants than they may have one to the other, and it cannot be conceived that any other intellectual beings can know those motions and revolutions otherwise than as they are real and true, that is, as we do, so in these points at least their knowledge must be the same.

Further also, we know the comparative quality of lines, figures, bodies, or numbers, so far as they are within the reach of a finite comprehension. We are capable of knowing the properties of figures, as triangles, squares, etc.; circles, and of a vast number of other curves, with the properties of their lines, as diameters, sines, tangents, asymptotes, etc.; and their mutual relations, in the whole, when finite, or in their parts, with infinite theorems and propositions, either already discovered in geometry and arithmetic, or that may be discovered, all which are so entirely abstracted and are so far from depending on our sensations that they depend not even on matter itself. For were

this globe with us, and all upon it, to be annihilated, they would forever exist the same in whatever mind could conceive them; or, so far as truth can be said to exist without a knowing mind, they would be eternally true, though conceived by no mind at all. And therefore it is impossible, for us at least, to imagine that any other intellectual being can conceive them to be otherwise in these cases than as we find them, and if our minds are so framed as to conceive it impossible, this is a law to us, and must determine and conclude us. Therefore, by whatever powers those other beings may comprehend them, intuitively or otherwise, since the same truths must be equally the objects of their knowledge as of ours, so both must essentially be the same. For to suppose they can know them to be essentially otherwise, would be directly to destroy their truth and all demonstration.

And yet further: We have very great reason to believe that our abstract ideas of the relations of things, such as power, wisdom, goodness, duties, and the several virtues, vices, etc., though diverse of them may originally have a very great dependence on our sensations or affections, yet are in themselves as real as any other knowledge whatever; for every idea considered as it is in the mind must necessarily be real, otherwise it could not exist. And as we could not have any ideas of figures or numbers without the assistance of our outward senses, which first discover them in the concrete, yet in the operations of geometry and arithmetic we entirely abstract them from all matter, and this, too, very early in life. For when a child of 6 or 7 years old is asked how much 3 and 4 make, or how much is 3 times 4, he considers the numbers only in his mind, without applying them to things that are to be numbered. So in the same manner, though all virtues depend on some action or conduct,* (* some virtues are said to consist in the negation of vice, as Horace says, "*Virtus est vitium fugere et sapientia prima stultitia carnisse.*" ["To flee vice is the beginning of virtue, and to have got rid of folly is the beginning of wisdom."] Yet even these may be called action or conduct.) which action as really exists as the actor, and the idea of it as really as either, it may be consequently as truly be abstracted in the idea of the mind from the agent as number can be from the things numbered, and be accordingly estimated and compared with the other ideas that

have a relation to it. Algebra is, of all the sciences that were ever known, by much the most abstracted, for in this it transcends even all the purest kinds of the mathematics; and though it is generally now employed in geometry and arithmetic as affording the largest fields for it, whose limits, as to our knowledge of them, it has vastly extended, yet it may be properly applied to all subjects whatsoever that admit of more and less, or of comparison, and whose values may by any means be estimated. It is founded on the simplest and plainest principles, for when the subject and its parts are understood, it considers their relations and proportions, and from thence forms an equation which, from the first, is perpetually observed to the last determination. And all its operations in the process turn on this self-evident axiom: that if to or from equal things, we add or take the same thing or equals, the sum or remainder will be equal. But a great part of the skill lies in substituting equivalents, either known before or found by some other equation. Now that this very science, with which no other can contend for certainty, or at least cannot in that point exceed it, may not only be applied to figures and numbers, as it most generally is, and to consider powers, forces, motion, etc., as it frequently is, but also very justly to moral actions, can never be doubted by any who duly consider both them and that science or art. There is one universal standing equation throughout the Universe eternally subsisting, which is *justice*. And under this, labor is to be equated by pay; public merit by public honor and gratitude; private by private; homage by protection; crime with punishment; etc. That the great merit of all services are like the relations before mentioned, to be particularly considered in the component parts or the inducement: for when a service is done where the contrary was intended, that service either becomes nothing or negative;* (* these are terms well known to algebraists.) if done by accident, the *homologeum comparationis* is very small; if done through real and sincere benevolence, its value (in the same proportion as the weight of diamonds increases the value of their luster and water) is augmented in a duplicate ratio. In the same manner are crimes to be considered, and thus generally all the conduct of mankind in civil life may be estimated and equated, and morality be as fully and clearly demonstrated as those sciences called the

mathematics. It was therefore a most unjustifiable attempt in the author of *The Procedure*, etc. to set mathematical and moral certainty at so great a distance, as he has labored for many pages in ranging his charges on them, which must have been owing either to the strength of his prejudices in favor of his darling subject, Analogy, that led him to sacrifice any other truths to it, or to his want of more acquaintance with mathematical sciences, to which, while he so freely ridicules abstraction, he shows himself very much a stranger. Since all the pure mathematics are pure abstraction and no other as this, $ax-xx=yy$, $ax=yy$, etc., if he can read it, most clearly shows. And this is a point of very great importance to us, it may be worthwhile to consider it a little further thus.

All mathematic demonstration proceeds in this manner: First all the terms belonging to the subject are fixed by clear definitions of them, so that all persons whatever who consider them may have exactly the same conceptions and ideas of them with him that demonstrates. Then, after demanding it to be allowed that a straight line may be drawn between two points, that a circle on a center may be swept, and the like, there are certain self-evident truths laid down, such as when proposed to the mind, it immediately sees the ideas so fully agree that without any difficulty or reserve it acknowledges their truth, such as these: That if two or more things be each equal to one other thing, then they are also equal between themselves; hence if to or from things equal between themselves, we add or take away the same or equal things, the sums or remainders will be equal, and such like; also that the whole is greater than any part of it, but equal to all its parts; with other such like truths that prove themselves to the understanding by such plain common sense such as all men agree in, and as there can be no principles more clear to prove them by, therefore they admit of no other demonstration than their own inherent evidence. And it is the business of a mathematician that all his propositions be reduced, though often by a chain of very many links, to turn at last on one of these self-evident axioms, upon which it becomes demonstration. But the clearness and certainty for which this method has obtained so much reputation consists in this, that the ideas these subjects furnish are generally more clear and

determinate than most others. But of whatever things we can conceive as clear and distinct ideas in our minds, as of a line, a figure, or number, the truth of the agreement or disagreement of those things in their ideas may be as clearly and fully demonstrated as any proposition in geometry, for in all reasoning on mathematical, moral, or any other subjects, the process and conduct of the mind is just the same. And yet, upon the whole, this difference may be observed, that in the mathematical, the ideas of the terms, being perfectly defined, are distinct and clear, but the process itself frequently becomes very perplexed and intricate; when, on the other hand, on moral subjects it is short, plain, and easy, but the ideas themselves, for want of that care which is used in the other in rightly defining, prove often obscure and uncertain. But why may not we conceive as clear and distinct an idea of a *kind action*, as of a circle? Our eye itself, when we view a thing that appears round to it, cannot discover to us whether it be truly a circle or not; but our idea of a circle, as of a figure whose circumference is everywhere equally distant from its center, is perfectly clear. So we have, on the other hand, as clear an idea of action and of benevolence, as we have of figure and roundness, and compounding these we cannot but have as clear an idea of a kind action as we have of a perfect circle. But, it may be said, perhaps the action that we observed had very little benevolence in it, but much more of the selfish, against which there lies with just the same force another perhaps, that what appeared to us to be a circle might on its own plain surface be quite another thing, such as a long ellipsis, and gain the appearance of circular only from its oblique situation; as all ellipses, however oblong, if viewed from the point where the vertex of the right cone would lie, which would by its section give them, must appear to the eye to be perfect circles. And in the same manner, all the circles in a sialenous cone will appear ellipses, and in these and other such like observations the whole art of perspective lies, which is ever observed in all true picture. It may also be further observed here, that though all true mathematical demonstration is most certain (and so most undoubtedly is all other), yet notwithstanding the very great pre-eminence allowed to it, which as things have hitherto generally stood it justly deserves, it proves not always so satisfactory to the

mind as those who know nothing or but very little of the matter have imagined. One of the self-evident axioms before mentioned is that the whole is greater than any of its parts, and undoubtedly nothing can be more clear or certain. Yet those geometrical demonstrations that turn at last on this axiom generally terminate in what they call a *reductio ad absurdum*, that is, that on supposing the thing to be any otherwise than as it is proposed, an absurdity will ensue, which kind of demonstration, being only negative, seldom ever proves so satisfactory to the mind, but that it could wish for a better. Therefore no mathematician will now use it, if an affirmative one can possibly be struck out, yet very many of the demonstrations we have from the ancients turn wholly upon this. But further, some things have passed for demonstrations which are not clear to this day, and others have passed for such on very able mathematicians that have at length been proved false. Very few, if any, have been yet able fully to comprehend what that prodigy of skill, Archimedes, has left in his treatise of spirals; the very ingenious Bullialdus freely owned he could not. Jos Scaliger so far deceived not only himself but many other mathematicians with his *tetragonisma*, or squaring the circle, that it required the strength of so great a genius as Vieta to discover the mistake, as Hobbes's pretences to the same required that of a Wallis. And it is therefore a very great wrong to our understanding, and no less than an abuse on mankind, to set moral certainty [3] at such a distance, or indeed at any at all, from geometrical. Nor would any man perhaps, who himself understands mathematical demonstration, attempt it, but much less appear so extremely positive in it.

Those who are sufficiently masters of it will easily see that all the parade made in so many pages in *The Procedure* to show how far moral certainty is short of mathematical, as that this last compels, but the other (moral) must have the concurrence of the will, etc., consequently how much less certain the being of a God is, than the mentioned property of a triangle, is only a vain and empty flourish most unworthy of an ingenuous mind or any other well-wisher to the good of human kind. For it may be truly affirmed that, to make all those truths which that author will have founded only on moral certainty depend on the

concurrence of the will, would open a flood gate of such pernicious errors into both society and religion, as would prove much more fatal to them than all those he endeavors in his book to erase.

It may not therefore be found a needless digression to have removed such disastrous mistakes, since by it the certainty of our knowledge is asserted.

LOGAN'S NOTES

[1] But prior to them all it must be observed that in all animals endowed at least with more senses than that of feeling only, there is what is properly called a *sensus communis*, by which notice is taken of the impressions on the senses or of sensation; and though brutes have this as well as Man, yet in Man it is not to be supposed as any thing essentially distinct from the mind. For to make a low and but an imperfect comparison, as instruments are made furnished only with a graduated limb for taking altitudes, and others may be made with a like limb, but with so much other furniture that all the problems in sphaerics may be solved by it, so this *sensus communis*, though common to all other brutes, may also be in the human mind as united with the organic body, for this can want none of the faculties of the brain that they are possessed of, though our exterior senses often fall short of them.

[2] Yet it has been distinguished by the Ancients for the place of ideas received by the senses under the name φαντασία, as a part of the memory only, and in the same sense Aristotle frequently used it. Brutes also have this kind of memory in some degree by which their sensations impressed by the *sensus communis* is retained, and they sometimes prove remarkably durable.

[3] That what in common discourse we call moral certainty, as when one depends on the veracity [...] persons or his own memory and such like, is quite another thing that what is meant here by the Doctor [...] as we can have from mathematical, since the process is the same and the ideas of the one may be as determinate as the other. Nay, it may be further advanced that, although as has before been granted, we owe all

our primary original ideas to our external senses only, which are at first as the food of the mind whereby it is enabled to exert its further operations, yet its abstracted and compounded ideas seem to be more directly its province, and to exercise itself in and upon these to be more immediately the end for which our reason and intellectual faculties were given us, as may probably appear more clear hereafter. And now it may be proper to take some short view of the several kinds or species of our knowledge, that we may be the better able to judge what subjects appear to be fitted for our intellect, and what, as was said before, by being wrapped in obscurity and placed beyond the reach of all our searches, have been denied us.

LOGAN'S FRAGMENTS

Logan's disclaimer on the first draft of Chapter 3

This is the very first draught, and having afterwards considered the subject much farther, as appears in several papers left with it, now at random, which I intended to digest, but was prevented by my being called, on Gov. Gordon's death, to the presidency of the Council; which was immediately followed by that most perplexing affair with Gov. Ogle of Maryland, who used his utmost endeavors, and too often succeeded, in seizing and confining our people from time to time in a nasty prison. I was therefore obliged to lay all these thoughts aside, and I now entirely condemn this as altogether insufficient.

A Newtonian "proves" the attraction of matter and the vacuum

J. Keill, author of the *Introduction to True Philosophy* in the Philosophical Transactions No. fully proves this attraction, if you will allow him two things: 1) that the smallest particles of matter gravitate to or attract each other in a ratio

vastly exceeding that of the real gravitation that we are acquainted with, as in a triplicate or quadruplicate ratio instead of a duplicate, which, it is known, is the ratio in the other. And since it is most certain that what he demands is either true or false, and it is impossible to know which it is, nor will it cost us anything to grant him either, we may as well allow the one as the other. The other to be granted him is the infinite divisibility of matter, which, if allowed him, he in a very clear mathematical way, that is, by dint of pure demonstration by a Lemma and a Theorem, proves he can imagine it a pellicle of matter so thin that it shall bear a less proportion to the thickness of leaf gold (the thinnest substance we know that will stick together and is but one 238,000th part of an inch) by much more than a million of millions of millions of times than this thickness of leaf gold itself bears to the distance of Saturn from us, allowing the Sun's distance to be 20,000 of the Earth's semi-diameters. And this is truly the amount of his first mathematical theorem. But in the 2nd he as firmly demonstrates that allowing when we see a solid inch of gold, there is but the hundred thousandth part of that space filled with solid matter and that the other 99,999 parts are all pores and vacuum, that then the vacuum in the gold and in a solid inch of air will to a trifle be nearly the same. Now these truths we see thus demonstrated not only in print but in Latin, too, and in a mathematical demonstrative way. And what would we have more? And thus philosophy is mathematically demonstrated, a blessing reserved solely for these latter ages.

From thence, he goes on by theorem after theorem to show in what cohesion, fluidity, elasticity, electricity, etc. consist. And though the gentleman is now removed, there are others, doubtless, who, from the same principles, can clearly solve all the doubts that can be started....

Moral sense distinct from the body, e.g., the drunken state

That the soul cannot, or at least does not, otherwise act than by the organs of the body, which therefore, as they truly are its instruments, very properly bear that name, is evident from

this: that if a person of a sober life in the main of his conduct, happens unexpectedly to be overtaken with liquor and finds his feet or his tongue falter, he will plainly discover to others as well as find in himself a sense of shame, which so far would show the mind in itself is somewhat entirely distinct from all those parts that the spirits of the liquor can affect. Yet if obliged by any means to proceed in drinking, that sense with all his senses will be entirely overcome, and there will be nothing more of the man to be found or seen than his outward body more senseless and stupid for the time than a brute. And even this observation of a sense of shame on the first disability holds not in all, for some there are who, notwithstanding their detestation when sober of those disorders and very firm resolutions taken up against them, yet when betrayed by company to drink, on the first glass of excess beyond what their constitution will justly bear, lose all their condition and go on without the least check of compunction. Nor is it then otherwise with them than with a stone supported aloft which, as soon as ever it tips over from its rest, irrecoverably falls to the ground or the next stop. In the same manner, the drinking companion has, after the critical glass, no more power to command himself than this insensible stone, and of such there are many deplorable instances to be found in the world.

Ideas of the mind like words of a language

Though it is absolutely impossible to conceive how these ideas are renewed, yet the matter may perhaps be rendered somewhat more intelligible by considering the nature of speech, than which nothing appears more simple, and yet we shall find it in some measure to resemble our thinking. All the words of any language in a common way are learned, and in a full one they are vastly numerous. They are readily pronounced by the several organs being differently applied to modulate the common air, without the speakers knowing or thinking what means he uses for the purpose. For how many millions have entered into and left the world at a full age without ever observing that they closed their lips in pronouncing a word with a b, p or m in it; or the different strokes of the tongue on the teeth and palate in

uttering the t and d; and the like in such others. But further, when the words are once learned, they naturally follow the intention of the speaker with not much, if any, more thought how to find the words, than he takes about applying his organs to pronounce them. Now why may we not imagine that something like this obtains in the affair of ideas? We learn in childhood first one word, then another, and proceed until we attain gradually vast numbers of them, which ever after we have learned we have ready for use. Much in the same manner in infancy the mind begins to receive ideas by the organs of the senses, and when once received these organs retain their facility to produce them again at pleasure. Words are repeated by the faculty of the organs expressive of the ideas or inward motions, and these ideas are generally directed by the mind. Words nowhere exist but while they are uttering, for their signatures in books or writing are marks of words only; and so ideas nowhere exist but while they are in actual presentation to the mind.

The several kinds of truth

All knowledge is truth, for if not truth it is error and falsehood and therefore not knowledge. Yet one may have a true knowledge of falsehood, for he who knows all the passages in Homer, Virgil's *Aeneid*, or Heliodorus, may have a true knowledge of what they wrote, but none perhaps of any one fact, because what those authors related is fiction. And so we may know many things that have been wrote of Nature, and yet have no real knowledge of the things themselves.

Though there have been laborious inquiries into truth, as to give a distinct and full account of it as used in the abstract would be found difficult enough, yet notwithstanding it is used in various senses. When we hear the word *true* pronounced, we have generally as clear an idea of it as of most others. For when we say such a sentence or saying is true, it is a true story, an account is true, a glass or a picture is true, a true watch, the true cause, true English, a true man; most of which would be explained in different words, yet they are all very easily understood. But by these we see that though all knowledge is truth, the terms are by no means convertible. For we cannot, or

but rarely can, say that truth is knowledge, more than we can say a glass, a picture, a watch knows; and so of the rest, for we even call not a man true from his knowledge, but from his fidelity or veracity, or both.

But all knowledge consists in the agreement of our ideas with their objects or one with another, and this agreement is the truth of knowledge. For the better comprehending of which as it may relate to the subject of the discourse, it may not be improper to make some attempt towards distinguishing knowledge under the character of truth into several heads, as below. In which the writer does not at all pretend to exactness, being sensible that to give a just and accurate scheme is both beyond his abilities, and would claim more application than his present view requires in it. This here proposed being sufficient, as he conceives, to give us some light at least what kind of truths and knowledge are best suited to our condition, and consequently which are the most proper for our study and application. And if these hints may be of any use, it is not to be doubted but others will make them their own, rectify and improve them, and carry them much further.

It is conceived then that truth may be distinguished (though done very imperfectly here) in some such manner as this, viz., into:

Transcendental truth, when the intellectual ideas agree perfectly with the true nature of things, as in their essence, their causes, dependencies, and relations, which belongs not at all to Man, and more of this hereafter.

Physical truth, when the ideas of the mind are truly the representations that the senses, proper to receive and transmit them, are fitted for or capable of receiving from the objects; under which are included not only those ideas that have been actually received from the object itself, for these must always be true if received under no disadvantage, but those we form of such outward objects by any means whatsoever, with the judgment we make of them, etc.

Metaphysical truth, which consists wholly in our abstracted and universal ideas and their mutual relations and agreement, that is, in such ideas as either have no external material prototype or, if they may have such, are wholly abstracted from them. Thus all action, passion, modes, virtues,

vices, and the whole subject of morality, pure mathematics—in short, all our ideas that are not directly formed by external objects.

Technical truth, when true rules are given either for practice or judgment, as in grammar, logic, rhetoric, poetry (so far as they depend on rules or art), arithmetic, geometry; and all arts liberal or mechanic, either for practice or judgment.

Practical truth, when actions agree with ideas or with rules.

To these may be added *exegetic*, or perhaps rather *mnemonic truth*, or the true knowledge of what others have said or wrote; and on this depends all history, a great part of philology, the whole skill of quoting authorities.

And lastly, *enunciative truth*.

The progress of Physics will transcend “attraction”

Before we leave this subject, it may be convenient to take a cursory view of the knowledge generally professed and what height it is arrived to. And though what is called Physics, or the knowledge of Nature, justly enough has the last place in a philosophical course in the Schools, yet it may be proper here to give it the first.

The Ancients, though they appear not to have been any way behind us in the knowledge of life, and what concerned them, and this makes their works on such subjects so highly esteemed to this day, yet in that of Nature it is agreed on all hands they were extremely deficient

How far any of the Eastern nations carried their inquiries of this kind is not known to us, but it is highly probable the notion of the 4 elements—fire, air, water, and earth—came to the Greeks from the Egyptians; Pythagoras, who resided long among them, being the first we know of (if the writer mistake not) that established it. Yet notwithstanding his disciples Ocellus and Timaeus in their small pieces are full of it, and Emmedocles by his fragment appears also to have entertained it, he in some sense or other made number the great principle on which all depended.

And though these were generally acknowledged to be the materials of which things were compounded, yet besides this distinction there were several different opinions of a prior principle, which some made one of these alone, as some picked on water, others fire, others the air; Pythagoras himself, number; others, love and strife; Plato, from the Pythagoreans, eternal ideas; Leucippus, Democritas, and Epicurus, atoms; but most of them, save the last, allowed a divine mind. Aristotle, by much the greatest genius for philosophy of all the writers of antiquity whose works we have remaining, observing the endless varieties and differences of opinions, to stop all further inquiry into what none of them could know, viz., the original of the world, made it eternal; and as compendiously for principles picked only on matter and form, which was plain to every capacity, and his philosophy obtaining these with the 4 elements; 4 qualities of hot, cold, dry, and moist; and the 4 humours of the body, all which were the doctrine also of the great physician Hippocrates.

There were scarce any from their time for near two thousand years that looked any further. But then the chemists from Paracelsus brought also in their principles of salt, sulphur, and mercury. But Descartes about a hundred years since, with his vortices and 3 elements, made a large step towards driving all those off the stage; and then also into medicine came the distinctive alkali and acid. And now attraction and a *fuga* with us takes place of them all, and we are now to conclude we have got the very truth in possession. But as each opinion prevailed by showing the errors or insufficiency of what obtained before, what the fortune of the present may prove, time alone only must disclose, as all those past notions with their principles proved of no other use than to amuse, and to set up a set of sounds to be predicated (as it is called) one of another in systems composed from them; which, however, brought honor, and sometimes wealth, to those dignified on their [...] with titles.

If, on the other hand, we look into the progress of real useful knowledge in Nature or in the use of things, we shall find the Ancients, excepting later inventions not then known, and most of these seem to have been casual, the Ancients incomparably outdid us, as in pyramids, with such prodigious massy stones at the loft; obelisks; architecture; statuary;

aqueducts; amphitheaters, etc.; their preeminence in which is to be seen, and is acknowledged at this day. It is also as freely confessed that in poetry and oratory, Homer, the oldest of all poets we have (unless some exceptions can be made from the Scripture), and Virgil, Demosthenes, and Cicero have never yet been equaled; though in the first, if any have a right to put in a claim, our Milton has undoubtedly the best pretence to it. In medicine also the ancients seem to have [...]

The moral instinct in Man, e.g., shame

Shame to be well considered; it is of vast importance.

Nothing sets the instinct in Man in a stronger light. A man is found false; how is he struck with confusion. Whence can this arise, but from a consciousness within himself that he ought to be faithful and true. A man is found ignorant, but he is not ashamed of being so of a theorem in Euclid or Archimedes if he never professed the skill, nor were known to apply himself so long that in a common way he might have attained it. If ashamed, it is of his having acted against truth in pretending to know what he did not, or by his weakness fell short of the [...] he was desirous to bear in point of knowledge or abilities. So in all cases we are ashamed of our being found defective in what we desired might be believed of us, and the suddenness of the shock, the flushing of the blood into the cheeks, which we neither can send thither nor detain by our wills, only clearly show this is owing to our frame, that we have transgressed against the laws of Nature, which in this as readily exerts itself as surely as by a shriek, a shrinking, or any other disorder from a wound or blow. But these appearances of shame are not seen when our own [...] thoughts accuse us not, etc.

The freest thinker would highly resent being accused or suspected of acting dishonorably, betraying a trust, denying the depositum of a dead friend. Why? Because it renders him vile in the opinion of all. Whence this honor and this unanimous consent of all, but from a principle? He is not angry at an undesigned or accidental hurt, but will generously bear it without resentment; but the least charge, imputation, or suspicion of baseness he thinks is not to be forgiven.

Why do people willingly suffer pain and death for an idea?

That Man in the best of his reasoning is generally weak, that he is so far led by prejudices in most cases, that even in his strongest assurances, points of belief, and convictions he may be suspected of being misled, is a truth that none who well considers the history of Man can reasonably doubt of, and from hence it is exceeding difficult and hazardous to pronounce that any opinion whatsoever is absolutely right. Yet a solid inquirer into truth should not be wholly discouraged from examining how far appearing certainties will reach, and, when a notion is traced to its utmost extent, where and in what it will terminate, whether it is capable to the last to support itself, or whether that also, like thousands of others, will not, like the first heads of most rivers, be lost only in quagmires and bogs.

Of the kind that will best bear an inquiry and strict examination seems to be that strong persuasion in the minds of many that has led them to suffer not only death, but the cruelest tortures, for adhering to opinions different from those about them, of which there have been innumerable instances in many ages.

That some have expired in flames merely through a spirit of vainglory is not to be doubted. Such probably was the Indian philosopher Calanus in Quintus Curtius, Peregrinus in Lucian, Empedocles, and perhaps an..... [left blank by JL] Many through a belief that it was their duty, as those wives who would contend who should enter the funeral flames with their deceased husbands, and be consumed alive with their dead bodies. For the conduct of these people, it is not difficult to account from this certain truth, that several of our passions are strong enough to counterbalance and outweigh the terror of death and pain, and to the same cause may undoubtedly be referred the forwardness of many of the first Christians, who so eagerly sought martyrdom as to court and even force it. For they were evidently so fully possessed with the notion of its being meritorious, that this thought alone gained an entire dominion

over all their faculties, and left no room for reasoning, judgment, or any consideration.

But there is another kind of this resolution to submit patiently and with resignation to these cruelties that appears to require further and closer consideration.

We find that many of those who suffered in this manner were awakened to a full sense of the pain they were threatened with and would gladly have avoided it, and they have so far conformed with the measures taken to prevail with them to renounce their former opinions as to abjure them, as Jerome of Prague at the Council of Constance, Archbishop Cranmer, and many others. Yet they were haunted with terrors in their consciences afterward, and could find no peace or rest until they again retracted what they had last done, and, when condemned, appeared to enjoy a perfect tranquility [and] went out of the world by such painful exits with joy, and the utmost inward satisfaction.

Now the point to be inquired into is, since as human creatures we have no powers whatsoever but what we have from Nature, what is it that can give this inward peace and this resolution upon it to submit to what Nature has, for the preservation of the species, clothed to our apprehensions with the utmost terrors? Whence comes that serenity and tranquility, that inward joy and satisfaction, that has often been known to attend such resolutions? For whoever will justly consider the passions when they are strong enough to work up the mind to any resolution, it will be found, if I mistake not, that they act with an impetuosity in bringing the mind to some determinate point which is thereupon positively fixed on, and it is never afterward allowed to hesitate or doubt, but every thought is formed and directed to the same view without suffering others of a different kind to interpose, lest they should divert it from what is already fixed and firmly established. But such a disposition of the mind, though fully capable of carrying the person to execute what has been determined, seems altogether inconsistent with that serenity and that joy that have been mentioned.

That anything arising from mere human nature is able to effect this, it would be difficult to prove. How the passions work we have seen, and whether the soul, which we know is most

closely united with the body, and is generally compassionate with it, has something in itself so distinct from the body as to be capable of producing this serenity in itself, over all the disorders and ruffles that must naturally arise from the terrors of pain and a dissolution, is much to be questioned. It would therefore recur that such persons meet with some supernatural assistance sufficient in such affecting cases to support them, and effectually to quell and compose all the emotions of Nature.

But if we thoroughly examine facts, we shall find that this assistance arises not from any such illumination or instructive principle as informs and directs the mind, because it is evident that many persons have appeared favored with such assistance, and been enabled cheerfully to suffer for points either entirely, or at least very, different and sometimes contradictory in their own nature. To bring instances of this is needless, for there has scarce been any profession persecuted to death, whose principles led or pretended to lead to a reformation or greater purity or truth, but has furnished examples of this, even amongst pagans as well as Christians. From whence it is plain, that a strong persuasion in the mind that what is professed is right is the only general point to be centered in, and that such a persuasion will hold in all cases whatsoever if the object appear to have piety or virtue in it.

But whether it will hold in other cases is not at all plain. Instances of persons willing to suffer for what they conceived to be certain truths in any science have never yet, I believe, been given. To this it will be answered, that probably no instances of any kind can be given of persons voluntarily choosing to submit to death rather than to renounce their opinions, but of such only as believed a future state, and that their well-being in that depended on their conduct in this life, which it must be owned will hold in most of the instances that have ever yet been known in the world. And yet I think not in all, for I believe Vaninus, who was, for his professed atheism, burnt at Toulouse, might be an exception.

A polemic against “the author of *The Procedure, etc.*”

Those who have considered the brain and the faculties exercised in it, have distinguished the latter into these five: the *apprehension*, *imagination*, *memory*, *judgment* (or *reason*), and the *will*. The apprehension is the first notice that is taken of an idea, whether simple or compound. And people are said to be quick or dull of apprehension as they more easily, or with greater difficulty, receive ideas or notions, and seems to depend on the texture of the brain and exercise.

Of the imagination, much less has been said by authors. Malebranche in his *Recherche* spends one of his 6 books on it. On the contrary, Locke has not one word of it as a faculty or place of the brain. But a more modern author of vast self-sufficiency [Peter Browne], who magisterially pronounces on his subject and condemns almost every other writer, whether living or dead, who has touched on the same and agrees not with him, which scarce anyone does in his narrow limited scheme— the author I mean of *The Procedure, Extent, and Limits of Human Understanding*— makes the imagination the storehouse of ideas from sensation, which he says it receives from the senses without any act or concurrence of the intellect. See *Procedure*, p. 55 & 155, but p. 390 he delivers himself more clearly thus:

When those impressions, which we are by God and Nature disposed to receive from outward objects, are imperceptibly conveyed through the organs of sensation to the imagination, to be there repositied and stored up as the first groundwork and gross unwrought materials of all knowledge, whether of things material or immaterial, then it is that they obtain the name of ideas.... It is called the imagination from the images of external objects lodged in it, in the same confused and disorderly manner they are transmitted from the senses.... This is a faculty in Man as well as brutes purely passive, and differs from memory in that it is, more distinctly speaking, the storehouse or repository. But memory regards rather the furniture or vast variety of ideas themselves lodged there for the use of the pure intellect, and it is not a distinct faculty from the

intellect, as the imagination really is, but an ability in it to revive again and bring into view any ideas or notions wherewith the imagination has been once impregnated....

Other writers have generally termed the memory this repository and storehouse of ideas. But Doctors differ, and how far this great one has proved himself qualified to criticize and censure that most finished piece that ever was wrote on the subject of the understanding— though in some other points not directly relating to it, he [Locke] made some unhappy slips. For here the Doctor [Browne] asserts the impressions or ideas are imperceptibly conveyed to the imagination, and in p. 155 and elsewhere, he supposes them previously brought thither without any notice of the intellect, which is no other than the human mind. When, on the contrary, it is notorious that no idea can be brought into and lodged in the brain without some degree of attention more or less in the mind, since thousands of objects may fall under the direct view of the eye, and as many sounds reach the open ear, without conveying any particular idea whatever. Thus a person, having his thoughts fully possessed of some important business, may walk in a crowd from the Exchange of London to Westminster, and though many thousands of objects come into his sight and a vast variety of sounds strike his ear, yet, unless he gives them some attention, he may not carry off so much as one single idea from them all, save that of a crowd; that is, he may not be able to recollect any one particular object that he saw or sound that he heard in his whole walk, though with a proper attention he might have mentioned hundreds. And thus unhappily does that author mistake in the very first step of the mind toward knowledge.

Mind “is in itself an active power lodged in us”: another draft beginning of Chapter 3

Of the Intellect

Thus we have seen how we attain a sense of objects without us, and what is truly the nature of the ideas we receive of

them, that is, such only as each of those respective organs is formed to impress on the nerves that convey the sensation. And as these wholly depend on the frame and texture of the organ and its nerves, all our ideas thus received must be entirely relative to us, or to the animal furnished with that organ. For were this differently constituted, the idea would be different, and these ideas, such as they be, are the sole foundation of all our knowledge.

The eye gives the idea of color, and the diversity of color by its lights and shades gives that of shape or form; the ear does the same of sound, and so to the rest, because they were so framed. But each of these senses is purely passive: the eye, if its object be red, cannot represent it blue. According to the strength, fineness, and accuracy of its texture, the eye of one person may give the impression much more strong and lively than that of another, but it can do no more.

Now the use of these ideas is for the mind to work on, which, in one sense, is as merely passive as the senses, for it cannot make to itself any one original idea whatever. But though it may probably forever remain impossible for us to determine what the mind or soul is, taking each of these terms in the same sense here, yet we may be well-assured that it is in itself an active power lodged in us, capable first of an impression from those ideas (Qu.: whether the ideas and the mind are not in one sense the same?), and enabled to range and compare those ideas thus impressed on it. And as each of the organs of sense was framed directly and immediately to convey ideas agreeable to its texture, so we are to conceive these powers of the mind implanted in us no less directly and immediately to work on those ideas. And as parts are suited to parts throughout our bodies and through the whole universe of things, so these ideas in their nature, and these powers, were undoubtedly formed suitable to each other. And thus far we may trace the powers of the mind, and, though we know no more of them, we may in some measure conceive what they consist in.

But this we ought always to carry carefully along with us, that as colors are relative only to the eye and sounds to the ear, etc., and the notices of them to us depend wholly on the organ, so the operations of the mind may be as peculiar to itself.

When we behold a blue or a green color fairly before us, we have the utmost evidence we can be capable of receiving that we see that color blue or green, yet this still depends on the frame of the eye. And so, when the mind sees a thing whole, and then considers it divided into two or three or more parts, it concludes, with the utmost certainty that it is possibly capable of receiving or attaining, that the whole was equal to all these parts taken together, it is formed and constituted that it shall acquiesce in this. And this with all such propositions, or rather primary conceptions, of the understanding, in which it immediately and fully acquiesces, are what we call truth, but for no other reason, if we thoroughly examine it, but that we find such conclusions perfectly and universally agreeable to the understandings of all the rational part of mankind. And of such truths all real knowledge consists, for all real knowledge is truth, and nothing is such but what may be reduced to some of the clear and common notions.

A third draft beginning of Chapter 3: a new theory of ideas

Of the Intellect, but imperfect

[The intellect] is the power by which we are to comprehend all other things and to attain to knowledge, but it can never comprehend itself. The use of it is all that was intended for us. Yet we are capable of knowing many useful things concerning it

Many have considered it, [e.g.] Locke in a regular system beginning with the simplest ideas and proceeding, etc.

The seat of it now confessed by all to be in the brain, and the part of us, above all others, that has been found the most difficult to account for. Cicero in an assembly began his discourse on it by assuring his auditors he knew nothing of the matter.

As it is the seat of our reason, anatomists have labored to find the difference between the human brain and that of other animals, but in vain. They find the same texture of parts and

nearly the same situation, the same number of pairs of nerves that give all sense and motion, and the same position and process, and think it a melancholy consideration that the difference is so small that it is not to be discovered.

But from hence we are only to consider that if the human soul has no other materials to work on than brutes are furnished with, the more excellent it must be in its own nature.

The first principles of our knowledge are allowed to be the ideas we receive from our external senses. These appear to be the foundation of all thought, and without them it is pretty plain we could not think at all. The nature of these and their conveyance have been considered in the foregoing chapter, but how they are further made use of is the subject of inquiry.

It has been a received notion through all ages and still continues, that these ideas, being once received into the brain, are laid up as in a store house. It is supposed there are impressions made from the senses on the brain as on wax from a seal, and retained there. The collection of these is called the *imagination* as the seat of images, and those who have gained most of these are the most knowing. Authors who treat of the subject have generally agreed in this, and much is said of the imagination as a faculty and its powers. The *memory* is another faculty by which these images are raised up for use, and writers speak of these as of things certainly existent in us. Great pains have been taken to find the distinct seat of each in the brain, and they will have the imagination to be lodged in the fore part, but the memory in the hinder parts, of the head, which, by the way, is somewhat absurd, for the seat of the ideas only ought to have been inquired into, since the memory can never find them but where they are.

He who will look into the anatomy of the brain, as it appears either from dissection or description, will not wonder that those inquiries should be entirely at a loss.

To suppose these ideas or images were left impressed on the brain or in the mind was undoubtedly very natural, since, after we have seen an object, we can afterward at a very distant time call up the idea of it, and in sleep we often seem to see such objects as plainly as if they were actually present with and before us. It might therefore well be supposed the idea or form

remained and was actually existent in us, otherwise how would it be possible it should be again presented to us?

Descartes hit on a very rational thought, in appearance, by supposing that all the nerves ministering to the senses terminated in the pineal gland situate pretty near the center or middle of the brain, and that the soul residing in that gland there received all the notices brought to it from without by the several senses. But those who were more skillful, or took more pains in dissections, soon showed that great man's mistake, by proving from inspection that those nerves did not in any manner center or terminate there as he imagined.

To suppose that the ideas of things conveyed by the nerves into the brain were there received into the soul or mind and so made its own, would be a most agreeable solution of the point, and what all men who think seriously of the subject would or ought to wish to be true. But the contrary appears certain, for as those ideas are mechanically or organically conveyed at first by these slender corporeal substances, the nerves, assisted by the animal spirits, so it is plain they still continue to depend on the same. This appears from the disorders arising from strong liquors, fevers, etc. which could not have the effect they are certainly known to have on the mind, did not its operations depend on those parts that could be affected by such means, that is, on the nerves and spirits. So in the decay of old age.

It is certain therefore that those ideas or images depend on the brain, and, if at all existent, they must be found there.

But whoever will look into the anatomy of that part of us, either on dissection or from description, will not admire that the most diligent searchers have never yet been able to succeed in their inquiries. There is not any one part of the brain so formed or so distinguished from the rest as to give the least room to imagine such impressions can be made and preserved there, to answer the several uses to which, in thinking and reasoning, our ideas are continually applied.

Nor is it to be expected we shall ever be capable of solving all the difficulties that will continually occur in these speculations. Yet possibly a rational thought may be proposed which will entirely remove all these hitherto insurmountable

difficulties about the seat or repository of ideas, and the following is offered.

The powers of the mind

It is entirely agreed that the nerves are so framed as by their being struck by their proper medium or object at one extreme, they communicate the notice of it at the other, as has been abundantly shown in the preceding chapter. But by what wonderful texture, fabric, and process this is performed is, and probably will forever be, concealed from us. Yet we know it is so, and probably it will forever be in vain to inquire further. Now, to solve all the mentioned difficulties, we need no more than to suppose what is perfectly rational, that these nerves are not only so formed as to represent the ideas from the objects, which is a point universally agreed in, but that when once put into that disposition or conformation (for instance, when the optic nerves represent or give the idea of a tree or horse, etc.) the same nerves can at any time after recover the very same disposition, and represent the same again *de novo*. And that all memory, all the difference of capacities, quickness of thought, etc. depends entirely in the constitution of these nerves, their firmness, agility, volubility, etc.. as we see the feats of activity performed by tumblers, rope dancers, etc. depend on the make of their limbs, sinews, and agility with exercise, which is also equally necessary for the improvement of the mind as it is for the activity of the body.

That these nerves should be endowed with this further surprising quality or faculty, as it is new, so it may at first perhaps appear incredible. But let us only reflect a little, and we shall not find it more so than everything else relating to our understanding, or even to our frame, and one might almost say than everything we observe in Nature. We look upon things as strange in a reverse proportion to our acquaintance with them. Nothing is more familiar to us than fire, water, light, sight, and such like, and yet it is hard to say, upon carrying our inquiries to a full length, which of these afford most matter for our wonder. Nature everywhere and in every step we can take in advancing into her secrets, has always at a proper distance her curtain

drawn, that gives a full stop to our view. What is necessary and of use lies open enough to us, and if it would have been for our real advantage to have known more, it is probable we should have been furnished with faculties for it. There is no real use in our knowing more of our intellectual powers than we really do or may. And what is here offered is chiefly intended to show by what more rational means those fatiguing inquiries that have puzzled the learned, or the candidates in that kind of knowledge, in all ages, may be entirely superseded, and more just notions substituted which may, on a better foundation, be more satisfactory to every sober ingenious inquirer.

To conceive thus of the powers of the mind gives us more clear notions of ourselves, as it is hoped may appear in the following.

By this account, it may be thought the real existence of ideas in the brain is to be utterly discarded. And thus far it is so, that by it they are not allowed at any time to exist but when they are actually present before the mind, and whoever will seriously reflect on it will find it extremely absurd to suppose there can be any ideas or images of things actually existent in the head, and that the mind should at the same time be insensible of them, as if they were clothes laid up in a wardrobe, or books in a library. It is inconsistent with reason to imagine it possible, for the very being of an idea consists in a representation to the mind, and we may as well suppose that the images of things are laid up behind a looking-glass when the objects themselves are removed from before it, or, more properly, that any images at all exist otherwise than in its actual presentation.

It will be objected perhaps that in the act of remembrance or recollection, we plainly search for and labor to recover a lost or missing idea. But this probably is no other than as if one had once learned to wink with one eye only, and through disuse could not readily fall into the practice of it, but was forced to be at some pains to retrieve it. So the nerves may not for some time be able to throw themselves into the same disposition they once had done, and therefore they spend some time in recovering it. But more will occur to be said on these heads when the powers of the mind are to be spoke to.

Locke is partly superseded,
but not entirely overthrown

As it is on all hands confessed that our knowledge consists in ideas, this total oversetting of their separate existence may be thought at the same time to overturn also the whole system of the process of our understanding as excellently laid down by that just reasoner on these heads, J. Locke, in his most valuable *Essay* and his posthumous piece on the subject. But it is much otherwise. The Ptolemaic system of astronomy exhibited the doctrine of the sphere from triangles imagined in the heavens in a regular and plain manner, easily comprehensible by the understanding, and well adapted to the solution of every problem proposed in it. Though the theory is now with good reason rejected, and the Copernican has succeeded it, which, in reality, though it removes those triangles from the heavens to the Earth, proceeds notwithstanding in the very same manner from the very same data to solve the same triangles without any difference in the process. So, whether our ideas separately exist, as has been supposed, or do not exist, the reasoning on them is just the same. The ideas are alike present in both cases when they are applied or made use of, and this is all that is requisite in the subject before us.

To consider that process of the understanding is not the intention of this discourse. It cannot perhaps be better done than it is in that noble work, and to that the inquirers who would satisfy themselves on the subject may justly be referred.

Of the imagination and memory there needs very little more to be said, since their powers, as has been observed, consist solely in the strength and readiness or agility, if we may so speak, of the nerves that first present their respective ideas. But now another subject presents itself, which may employ the strongest heads in any manner to account for, and that is the mind itself, our understanding and ratiocinative powers, by which we are distinguished from those other beings in the Creation which are furnished with the very same apparatus in their brains that we are.

Chapter 4:

Of the Affections or Passions

Of all the considerations we can enter into relating to our human state, there is not one of greater importance to us, or that requires our more serious attention, than that of our affections and passions. For as the weight is to a clock, or the main-spring is to a watch, so these will be found the true springs of our actions, and therefore on the regulation and adjustment of their motions principally depends all our happiness in life.

They have been treated by many and variously. Amongst the Ancients, the Stoics above all others talked mightily of them, but with the greatest absurdity. They defined them to be false opinions or wrong judgment of the mind, and declared open war against them all as irrational, brutish, and contrary to Nature, [1] placing their wise-man entirely out of their reach, so that he might, in their account, be as happy [2] when frying in Phalaris's bull, as if he were fanning with zephyrs on a bed of roses. That their view in this doctrine, however unnatural, was extremely good, must be acknowledged, and it often had a happy effect, for of this sect were many of the best and most virtuous characters that have been transmitted to us from antiquity, as the Catos, Brutus, Antonine, Thraseus, with many others. Yet at the same time, their great ignorance of human nature appears by it, since a man without passions or affections is only a creature of the brain, and we may as well imagine a man acting without any senses, for both the one and the other are constituent parts or powers of our frame, and absolutely necessary to our being human creatures.

The only word used by the Greeks for them was *πάθος*, or *πάθημα*, which Cicero interprets *morbus*, a disease (for *passio*, which would be the proper Latin of it, was not in his age admitted into the language). But thinking this too harsh, he generally uses *perturbatio* for it [3] as if they were no other than disorders or disturbances of the mind, and sometimes, though rarely in a philosophical sense, he uses the words *affectio* and *affectus*, from whence our English word *affection*. Plato, and

after him Aristotle, assigning to the soul three distinct faculties, besides the vital or animal, viz. the νοητική, ἐπιθυμητική, and θυμική, [4] which are rendered the intellective, the concupiscible and the irascible; and those who followed them have ascribed all the affections and passions to the two last, which strange distinction has been constantly kept up in the Schools, and until very lately in most treatises on the subject. To the first of these two, the concupiscible, they assigned love, hatred, desire, aversion, joy, and grief; to the last, hope, despair, fear, courage, and anger; which are the eleven that have generally made up their account [5]. But how defective this is when, among others, pride and shame are left out, those who consider how pernicious the one, and how useful the other, is in life, will easily be convinced. The Stoics, who, as has been said, made the greatest noise about them, reckoned only four as principals, viz., joy, grief, hope, and fear, [6] in which they were followed by most of the Fathers and ancient Christian writers. Descartes, introducing into the world new systems of his own which prevailed for a time, greatly contributed to bring the whole Peripatetic philosophy into discredit, and he wrote himself on the passions much more justly and accurately than any who had gone before him. His definition [7] of them is that they are perceptions, or senses, or commotions of the soul, especially relative to itself, which are produced, continued, and strengthened by some motion of the spirits. But he denied [8] that their seat is in the heart, to which probably he was led that he might the better support his darling notion, whereon his whole system of the human fabric turned, that the soul has its seat in the pineal gland of the brain, where placed, as in a throne, it exercises its dominion over the whole body, a notion that from anatomical observations was in a little time exploded. Of the passions, he makes admiration the first, in which he has been followed by diverse others, and though he numbers up and describes about forty, he makes only five of them principal, viz., love, hatred, joy, grief, and desire. Du Hamel, who has been reputed the best systematic writer of philosophy, follows Descartes and assigns them generally to the sensitive appetite, [9] which he makes nearly the same with the imagination, [10] and even Dr. Willis reckons the appetites amongst the faculties of the brain. And

thus all those the writer has seen who have treated of them, place them in the soul, in the brain, in the judgment, or in the imagination, etc. And though Descartes and his followers, with a good appearance of reason, ascribe all their emotions to the spirits and blood, yet the writer cannot be persuaded they have set the subject in its just light, but is of opinion such a system of them may be shown to be founded in Nature, as that a just and due consideration of them in this view may not only, on the one hand, show us the goodness of their first intention in being planted in us, but, on the other, greatly contribute to render their conduct more familiar and easy by enabling us to direct them to their proper objects, and more effectually to restrain them within the just limits intended for them in our formation.

Brain and heart

And in the first place, it will be found of the greatest importance to know their true seat and the manner of their operation. In order to which, and to examine whether they can in any proper sense be said to be lodged in the brain, we must again consider the operations of this and what passes there. In the preceding parts, it evidently appeared that some of the passions displayed themselves in infants as early as any other notices whatever, unless their fixing their eyes on light may be excepted. It appeared also that no ideas were brought into the brain but through some of the external senses, and that the reception of ideas, ranging, dividing, compounding, comparing them, and inferring, recollecting, judging, and such like operations upon them, are the whole business of the mind and intellect in the brain; but the passions are vastly different from ideas, therefore their seat cannot be in, nor can they belong to, the brain.

Knowledge, which before was shown to be truth, is in the same person and in all persons forever the same, the difference consisting only in the degree; so if one person knows a truth, it is impossible that any other who knows it can know it otherwise in its essence, though one may know vastly more of it and more circumstantially than another. So if I know that the square of 4 is 16, or that the diagonal of a square is incommensurable to its side, no man can possibly know these to

be otherwise than I do, and my knowledge, while I have it, is constantly the same, and thus all persons, if they have but a moderate share of sense or capacity, may be taught the same thing exactly alike—but it is vastly different with the passions. For if a person be obliged to go into places where there may be danger from a wild beast, for instance, he may be taught and truly know by what means he may defend himself or avoid the danger, yet notwithstanding all the provision he can make and all the knowledge he can compass, if naturally subject to the passion of fear, it may all avail him nothing. And on the other hand, if naturally courageous, he may be so roused as to perform even more than he at first conceived or imagined. New ideas may be easily introduced, and the mind may easily be instructed, but to plant courage in the place of fear where natural, on a sudden, without something adventitious and more than common, is impracticable, and if ever to be effected, time and practice, until a kind of habit can be introduced, is generally necessary. And yet there have been some known in armies so subject to fear that, though they could reason very clearly, though they were sensible they must be broken, disgraced, and ruined if they did not surmount it, and though in their judgment they would prefer the death they feared to this disgrace, yet for want of courage to hazard what they themselves considered as the lesser evil, they have been obliged to submit to the latter and greater. So some have continued passionately to love a mistress, though they found her to be false, their judgment at all times declared against their passion. Some again who have, on all other occasions, been known to be good speakers, have been unable to bring out a sentence to the object of their love, as others have been reduced to the same incapacity through awe or terror. And hence the great advantage is known, and accordingly valued, of what they call a presence of mind, when the person blessed with it, preserving his reason unshaken and undisturbed by any passion, is capable of acting, under every circumstance and in the midst of dangers, with the same equal serenity and clearness of thought as if he were calmly running over his duty in his solitary walks or closet.

Now as the action of the mind in the brain, as employed solely on its own ideas, is in itself calm, quiet, and regular, and

the effects of every passion ever show themselves in some impulse or motion, it is from hence sufficiently evident that our ideas, which in truth are no other than our knowledge, and these passions, are in their nature wholly different and entirely distinct, though it is no less certain that they are each so constituted as very strongly to affect each other, of which more hereafter. But they cannot both have the same seat, and as that of the intellect is in the brain, the passions therefore must necessarily have another, and to find it is not difficult. The Ancients were so sensible of the affections and operations of the heart that they made it the seat of wisdom, of thought, and understanding. In the Scriptures, very many expressions occur to this purpose, and the notion was common to all the Eastern nations. Amongst the Greeks *φρενώ*, or in the plural *φρενες*, signifies the mind, or understanding, yet not only Homer [11] used this for the region of the heart, but even Aristotle [12] himself, and hence *μεταφρενον* is that part of the back about or near the heart. So *πραπιδες*, often used by the poets for the mind, is properly the midriff. In the same manner in Latin, *cordatus* signifies wise or prudent, and *procordia*, the region about the heart, was often used for sense or understanding, as in that of Virgil, “*frigidus obstiterit circum praecordia sanguis.*” (*Georgics*). [“prevents cold blood about my heart.”] And though they mistook who assigned thoughts to the heart, [13] yet in other respects they certainly judged well in allowing it so great a power and command, and so large an interest in the whole of human conduct. For as it is the fountain of life, not only furnishes the blood and spirits, but is the first spring of all motion in the bodily machine, and sets and keeps the whole at work, so it will also be found the principal spring of all action, moral as well as animal or natural, and a theater in which the grand concerns of life are principally transacted.

That it is the seat and spring of the passions, none can doubt who have observed in what manner they themselves have, on any extraordinary motions of them, been affected. It may be pained with grief, flutter with joy, and be raised as if set on wing. It will seem to boil with anger, be ready to burst with resentment, kindle with affection, and the phrases in common speech sufficiently show how it is often found to be affected, as a heavy

heart, a light heart, to break one's heart, a heart ready to burst, leaping for joy, with many others. Farther also, whoever will observe may find that if, on the rising of a passion, the reason be employed to allay the ferment, as this prevails, they will sensibly feel the other to sink downwards and die away, like a morning mist before the prevailing Sun.

But it is not these passions only that are seated in the heart, for it will be found that the more durable inclinations and dispositions, and those from which men generally take their moral characters—as when we say one man is good, merciful, generous, grateful, another haughty, cruel, revengeful, with all the other denominations taken from the virtues or vices as they turn on disposition—have also their situation principally there.

Accordingly, from this distinction of place and situation, it must be that some persons of strong natural parts, or that excel in the intellectual faculties, are notwithstanding swayed by vicious and most corrupt inclinations, such as ungrateful, revengeful, treacherous, etc.; and on the other hand, some of the greatest probity, faithful, sincere, and of great courage, are sometimes found exceeding weak in understanding. And in general, though good sense often proves no bad security for honesty, because the disadvantages of the contrary are so flagrant, yet that the abilities of the head and rectitude of the heart are vastly different, and in some subjects so remote that they can scarce ever be brought to meet, has been known by the experience of all ages.

But how the several distinct passions are directed to work in the heart, or how the dispositions subsist there, is no more to be accounted for by us, than the operations of the soul in the brain. These are points that must ever be concealed from us and remain wrapped up in impenetrable obscurity. Nor would it perhaps be of any great advantage to us, as we are at present situate, to be let into the secret, if at all capable of it, which may be doubted. Curiosity has led and enabled us to know a good deal of the outsides of parts (for our utmost searches into the most interior deserve no other name), and what we know, if properly applied, may prove sufficient for all our purposes. That the heart is a muscle fitted by three ranges of transverse spiral fibers for contraction and dilatation, to take in the blood at its

right side, drive it into the lungs to be aired there, receive it again at the left, and from thence by stronger motions and vessels to propel it into all the parts of body, is known from the first rudiments of anatomy. As it also is that in these operations it differs nothing, and in its make and texture very little, save in the variety to be mentioned, from the same organ in the several brute animals about us, and thus far we are sure it is exactly suited for those plain and manifest operations. But further, as it has within it proper cavities for containing the blood, one on each side called the *ventricles*, with two other higher and smaller called its *auricles*, on opening a heart of an ox, sheep, or other such creature, we shall find the sides of all these cavities, but more especially the auricles, lined with a wonderful texture of round vermicular fibers of very different sizes, with a great diversity of windings, cavities, sinews, etc. And in these varieties, human hearts are said very much to exceed all others. Anatomists inquire no farther into the use of these than to suppose them serviceable in forwarding the circulation, but it may be reasonably enough supposed that the muscular texture of the bulk of the heart might be abundantly sufficient for this. And as a person looking into the inside of a very complicated piece of clock work, though he understood nothing of the design, would be apt to believe such a diversity of wheels, springs, and parts must be designed for some thing more than one simple motion, so whoever attentively views these interior structures of columns, fibers, papillae, sinews, etc., all differing as much in the different subjects of the same species as either their or our faces do from one another, they might with a good appearance of reason suspect there was something further intended by them.

But however that be, this is certain, that this organ is fitted to be the seat and subject of our affections and passions. And as these are real motions, but according to the principle first laid down— nothing in Nature can move or act otherwise than by, and agreeably to, the powers it is in its original intention invested with— all these motions, that is, all our passions, must be original powers from Nature planted in the heart. Nor ought we to search any further for the cause of their production, though to inquire into their end, the measures for conducting and directing them, is a matter of the highest importance.

And that they are truly such originals will be evident to any who, with but a moderate degree of attention, will consider them. For as we can bend our fingers inwards to the palm, but not at all outwards to the back of our hand, and our legs backward, but not at all forward before the knee, for this plain reason, that these parts are so formed that they will freely admit the one motion but by no means the other, so it is no less plain that though we find our hearts are susceptible of love, hatred, fear, or anger, yet we cannot by our utmost endeavors, should we use them, love, hate, fear, or be angry by any act of volition, more than we can sneeze, hiccup, or perform any other of the natural involuntary acts at pleasure. And yet less can we love an object that appears hateful to us, hate what appears lovely, fear what is desirable, or be angry at what pleases us. Every object therefore, according to its nature, or at least its appearance to us, has its respective and correspondent passion in our breasts, which by Nature's direction rises at it without any act of our will or reason, as the eye winks when anything suddenly approaching it, or as to a hungry person the saliva rises to water the mouth at the sight of agreeable victuals. To inquire therefore any further into their origin, to dispute, as some have done, whether they belong to the sensitive or the intellectual appetite, with much more of such jargon, or whether they are opinions and wrong judgment, or are seated in the imagination, etc., is not only an unhappy loss of time, but it tends to perplex the understanding, render the things themselves still more unintelligible, and, what is of worse consequence, puts us out of the plain and ready path that Nature seems to have traced out to us for their direction and regulation.

“J. Locke appears to have made a slip”

Nor are those much more excusable, who (like some celebrated historians, that are for reducing all the facts they relate to some certain views and formed counsels, of which the writers were generally ignorant) are in the same manner for treating these passions as if they were all at our immediate command, and merely subservient to our pursuits of pleasure and declining of pain, on which hand even the very ingenious J.

Locke appears to have made a slip. For, having in his *Essay*, Bo.2, ch. 20, §3, justly enough observed, that pleasure and pain, and that which causes them, good and evil, are the hinges on which our passions turn, he unhappily proceeds to make them turn on the reflections only that we make on the good or evil, pleasure or pain, that objects will produce. For thus he says in §5, Hatred or love to beings capable of happiness or misery, is often the uneasiness or delight which we find in ourselves arising from a consideration of their very being or happiness. Thus the being and welfare of a man's children or friend producing constant delight in him, he is said constantly to love them. In which words we see the nature of things inverted, and the effect assigned for the cause. For would any man living, if he were in his senses, on being asked why he loved his children, give for an answer that it was because he delighted in seeing them do well? It is probable indeed that he might think the querent unworthy of any answer at all. But if he gave any, and a serious one, it must be to this effect, that he loved them because they were his children, it was natural for him and he could not avoid it, for in such cases, as we saw before in the first chapter, Nature has made a sure provision, without leaving it to the work of reflection or consideration. Nor can anything be more absurd than to imagine that any of the passions (properly speaking) turn on reflection. It is sometimes indeed a matter of deep reflection and consideration to know whether an object is good or not, but this inquiry has no immediate regard to the affection. For the moment, the very instant, that it appears good in the imagination, whether it is declared so by the judgment after a long process, or appears directly so by an immediate impression of an external sense, the affection as instantaneously rises to it, as will be more fully and clearly seen in the sequel where this is to be more particularly considered.

But to proceed in order, we are further to observe that, seeing all notices of things without us are brought by the external senses solely to the brain, and all thought, all the powers of the intellect, imagination, and memory are exercised only there, it is evident that the heart cannot form any thought, nor can any affection or passion be excited in it, without proper notices communicated from elsewhere. But how such communications,

and so instantaneous as those are known to be between the head and heart, can possibly be performed, is a point of much the same difficulty with accounting for the other internal operations in either of these regions. Whether the soul that exercises all the powers of thinking in the organ of the brain, by the fine fibers, filaments, or glands of which it is composed, with the juices and spirits that are harbored there, may not also, by an immediate presence, act upon or be acted on by the heart, is a question that probably may never be solved by human understanding. Yet since from the inquisitive diligence of anatomists, we know that all sense and motion in the body lies in, or is performed by means of, those curious cords and filaments, the nerves, which all arise from the brain itself, or from the spinal marrow, which though of a firmer texture, is but a prolongation of the same. We may by these trace a communication, which though in appearance it fall much short of such an apparatus as might perhaps be expected for so important a transaction, yet as Nature we find in other cases produces vast effects by what may appear to us but very slight and inadequate instruments or causes, perhaps what is now to be mentioned may really be sufficient. And there is one particular in it which may merit our most serious consideration, for which reason it is hoped the length of it will the more easily be excused.

Anatomists in treating of the brain have reckoned up ten pairs of nerves which all rise within it, and of these but one pair, called the 8th or otherwise the *par vagum*, descend into and are dispersed by their branches through the trunk of the body. Of these ten pair, according to Dr. Willis's distinction (which nevertheless seems precarious and doubtful), such as have their rise in the *cerebrum* or body of the brain are destined for spontaneous motion, that is, the motions performed by them are at the command of our will; and those that rise behind in the *cerebellum* are for involuntary motions, not subject to our direction, as the beating of the heart, the peristaltic motion of the guts, with many others, of which kind are most, if not all, of those that are performed by means of that eighth pair. Besides those ten, there is another large pair of greater extent than the 8th, called the *intercostals*. There are moreover thirty other pair called the *vertebral*, or spinal, proceeding from the spinal

marrow, which as was noted above, is but a prolongation of the matter of the brain, one pair issuing near each *vertebrae* or joint, 7 of them from those of the neck, 12 at the roots of the ribs from the back, five from the loins, and 5 or 6 more from the *os sacrum* below. But of the nerves in general, and especially of these intercostals, it may be proper here to discourse more particularly.

Though anatomists have been at vast pains to discover the nerves in their respective origins, and to trace their processes in all the parts through which they range, and also to examine their consistence and whether they have any cavities, which it is now generally agreed they have not, but are only composed of a great number of filaments, like a hank of thread enclosed in an outward case, yet they seem not to have considered their nature and uses otherwise than in general that they are the only instrumental processes on which all sense and motion depend. The Ancients (as Galen) made some distinction in them, assigning part of them for sensation, and others for motion. But as they have always been found difficult to trace, their knowledge of them was very imperfect, for they reckoned in the whole only seven pair of those rising in the brain.

But as in viewing and contemplating the works of Nature, every discovery we make in them does but open a new field, and gives us a fresh sense of still more latent wonders beyond our ken or reach, and since we know so very little of these curious instruments in our bodies on which notwithstanding so very much depends, we may venture in speculation to consider at least what may be probable, in order to strengthen our judgment in conclusions of real importance.

We may observe then, that although the nerves have generally been considered no otherwise than has been mentioned, when viewed at their extremities with microscopes, they appear branched like a tree with infinitely fine ramifications. [14] Yet as trees, notwithstanding they generally agree in being so branched, vastly differ in their natures, as some bring apples, others nuts, others cones, etc., so undoubtedly must the nerves be equally, or rather much more, different in kind. For it must be absurd to imagine that nerves formed to receive the impression of sound can essentially in their texture and

nature be the same with those formed for sight, smell, etc. And if they were not thus different, why should there be so many distinct pairs, all from different origins, more than of the blood-vessels, which we see all spring from the same root, the great aorta at the heart? Or why again that great variety of intertextures of the branches of one pair with those of diverse others? For the answer which may be made, that it is for the more ready communication of the several parts, is not at all sufficient, because Nature always working by the simplest methods, this in appearance might have been effectually answered by giving them all one root and placing the general sensory there, as Descartes contrived for his pineal gland in the machine of a man of his own composing.

But further, not only each conjugation or pair of nerves may in the whole differ in their nature from each other, but so also may the several filaments of the same pair amongst themselves. Otherwise, why do we find those branches, the which serve for several different purposes, as the 5th pair which minister to all the several parts of the face and to the palate, tongue, etc., so much larger at their origin than others, and composed of so very many filaments, each of which has its own root at its first rise? Nor does it appear improbable but that, differently from the case in trees, even the minutest ramuscle or fibril distinguished at the extremities by a microscope has its own proper root, and runs distinct in its whole process from the one end to the other.

Now laying down this as highly probable that not only the several pairs, but also the several filaments in the same pair, may greatly differ in their nature, and this for a certainty, that as we may sensibly feel we think only in the brain, and therefore that the soul, mind, or intellect resides solely there, we may conclude that these nerves, by the vast varieties in their constitution, are peculiarly adapted to execute its commands in that situation in every office that by our original frame was intended should be subject to our will. For that the will should not in all cases have command over the mechanism of the body was absolutely necessary, otherwise the work of nutrition, with all the several requisite instincts that for the preservation of our being we were formed to obey, could not be executed. Nor was

it fit the motion of the heart, with many others, should be subject to our direction, for in that case life itself might soon be at end, or at best our whole economy be subjected to the utmost disorders. And therefore it was much more wisely ordered, both for the continuation of our being, and for our well-being in life, that our will should have no part in these operations. Upon all which we may proceed as follows:

Of the ten pair of nerves that rise in the brain, only the 8th, or par vagum, are distributed into the body, and there minister to all the involuntary organic motions, as the pulsation of the heart, etc. The great intercostals also, which might properly be accounted an eleventh pair, are not only diffused through all the trunk, but in Man are of a much greater extent than the other. For as the most accurate anatomists have observed, they communicate with most or all the other principal nerves, either at their rise or in their branches, and are by much the most considerable in the whole human body.

These nerves also Dr. Willis has supposed to serve for involuntary motion no less than the 8th pair before mentioned, but that they may serve as well for the spontaneous as the other, it is hoped will be rendered at least very probable by what is offered in the note below, which such readers as can please themselves with inquiries or speculations of this kind are desired to be referred. [15]

Now taking for granted what is there remarked, that it is inconceivable why Nature, which never does any thing in vain, should have caused two such pairs from different origins to run down, as these do, a great way side by side, if they were not intended for different purposes, we are next to observe that, though the structure of our bodies in every the minutest part of it affords just matter of admiration, yet there appears not one particular in the whole that may more deservedly claim our strictest attention, which is this: that although in Man, and brutes of the more perfect kind, the vessels and principal inward parts, such as the brain, heart, entrails (the cud in such as have it excepted) are in their texture, disposition, and order very much the same—for they have exactly the same blood vessels, number of nerves, etc., and as was observed before, even the human brain, the seat of our reason, is found to differ very little from

theirs in constitution or parts, save in their *rete mirabile*, which we have not—yet, as have been noted, there is not only in the heart a greater difference, but in the communication between the head and heart a much more remarkable one, if Willis's cutts and accounts are to be depended on. For as Bp Cumberland from that author formerly observed, [16] there is in Man a notable plexus in the intercostal nerves from whence diverse branches are sent down to the heart, communicating also with the diaphragm, none of which are to be found in brutes, from whence he deduces some considerable arguments to the advantage of our species. But he fell much short of carrying the observation so far as, it is presumed from the foregoing note, it will naturally bear. For the communication between these two principal regions, the head and heart, being both in men and brutes carried on by those two pairs, the 8th and the intercostals, in brutes it is chiefly, if not wholly, by the first of these, or the 8th, which are supposed to serve only for involuntary motion, and therefore in them there was no occasion for that plexus. But in Man it is principally by the intercostals, to which a nobler use has been assigned. And the reason of this remarkable difference is very plain: for those creatures being incapable of reflection, and consequently void of all the powers of reasoning, they wanted no other intercourse between those parts than by that single pair, which serve only to involuntary motion. And thus they can have no manner of command over their passions (for some passions, such as anger, fear, love they have in some measure as well as we), when on the contrary in Man, in whom, from what has already been observed, a proper provision for involuntary motion in the pulsation and circulation, independent of the will, was absolutely necessary, as also in some measure in exciting the passions, there is for these ends a considerable communication by branches from the 8th pair, though much less than in brutes. But by the intercostals, which are here supposed to be more subjected to the will and the influences of reason, the communication is much greater, and by these it is principally carried on. And this distinction on the part of brutes furnishes a no slender argument to confirm what was advanced in this discourse before, that they are capable neither of reason nor reflection, though some great authors have declared themselves

of a contrary opinion [17]. As on the part of Man it also shows, or at least with a good appearance of reason points out to us, on what conditions our passions are planted in us, that is, that they shall rise involuntarily, as by sure experience we find they do, and yet that they should be subjected to some command, and may by proper measures be subdued. Thus in such as are subject to the passion of anger and hasty resentment, it may be observed, if they are otherwise persons of conduct, though on a provocation, however they may guard themselves, it will on a sudden seize their heart, yet they are often able to stifle the outward appearances of it. And though some such are too often found to harbor and indulge the resentment, yet by the same means by which they checked those appearances lest they should expose and injure themselves, that is, by a resolution formed on due reflections and a calm use of their reason, they might undoubtedly subdue that also, and banishing at least all the uneasy effects of it, act in it as well afterwards solely by the rules of virtue or humanity, as they did at its first rise by those of prudence in regard only to their interest or reputation. And as from experience this is known to be true in the mentioned case, we may on due observation find it so in all others. That it is so ordered in effect is indubitable, and whether the organic apparatus for it here pointed at carries not also with it a large probability of truth, must be referred to the judgment of others. Of the use and application of this doctrine more is to be said hereafter.

Laughter

But before we leave this part, another observation from Willis, which Cumberland also takes notice of, is not to be omitted, viz., that with the same plexus in the intercostals, the diaphragmatic nerve, or that serving the midriff, very remarkably communicates, of which in brutes there appears not the least trace. And the reason evidently is, that laughing being peculiar to our species alone, from whence, in contradistinction from all other creatures, Man has been defined by some to be animal risibile, that it should be excited by an impulse from the brain with the concurrence of the heart, this communication is ordered

between that great conveyance of intelligence, the intercostals, and the nerve by which alone the midriff receives that heaving motion whereby laughter is produced. So also for smiling, and the greater motions of the face in laughter, those muscles that give them are in a good measure actuated by nerves from the fifth pair, with which the same intercostals are by all allowed particularly to communicate.

Thus from the ordination that evidently shows itself in the disposition only of these small strings, the nerves, we may clearly see how the phenomena of our fabric are in a great measure to be accounted for. And from this provision for laughter, peculiar (as has been said) to us alone, another argument of weight may be deduced to be added to those in the first chapter, for proving that Man originally in his frame and composition was designed entirely for Society. For the sole end of laughing must have been for conversation, to render it more agreeable on occasions of mirth, since in solitude it would not only be useless, but might be accounted madness.

But now to return to the heart, which was determined before to be the only seat of the passions, and these have been declared to be original powers (*sui generis*) implanted in it at its formation. And some notice also has been taken of its interior texture as fitted for peculiar motions and operations, besides the mere contraction and dilatation for the work of circulation, for which the muscular fibers of its body may well be deemed sufficient. We are now further to observe that since the pure and simple passions, such as love, hatred, joy, grief, etc., are greatly distinguishable in their kinds, so also, we may justly conceive, must the motions be that produce them. Nor can anyone doubt of this who considers that we see not one motion, even the minutest, in our whole frame, for which some adequate provision is not peculiarly made. Small, one would think, needed the provision to be for moving the ball of the eye only, and yet no less than six distinct muscles are found fitted for this purpose; and as the make and uses of the muscles in the more exterior parts are pretty easily discovered, their number in the more complete myologies is astonishing, besides which it is allowed there are numbers of others in some of the inward parts, the knowledge of which no human skill or industry has hitherto been

able to compass. And among these may well be ranked those vast varieties of parts that are seen in the inside of the heart's cavities, for though those called the columns appear so fitted as to be applied to the use of the valves in opening or closing them, yet all the rest as well as they are visibly of a muscular texture, that is, they are suited for motion. It may therefore be considered whether it is not highly probable that these are appointed for producing those several motions and modifications in the heart on which the passions respectively depend. To prove this by real experiment may perhaps forever be found impossible, because in death such motions subsist not, and in life it is impracticable on an organ that admits of no outward tampering. But if there be only a probability admitted in the notion, as to the writer there appears a great one, it may very much contribute to fix us in the persuasion that the passions being organic, after what has been observed on the intercostal nerves, they must consequently be so much the more in our power. But to close those observations, this is to be laid down for a first principle here, that the several affections of the heart, in the cases of love and hatred, joy and grief, fear, hope, anger, desire, and such like, that appear on the first view to be the more simple sensations of the heart, as they may not improperly be termed, are original powers or faculties in it, and may in their own nature be as distinct in their respective productions and operations as any other of the muscular motions of the senses themselves, or as the sensations of hunger, weariness, etc. in the other parts of the body.

It was also observed before that the heart, being incapable of receiving any ideas and consequently of all thought, the powers of this being lodged in and wholly confined to the brain, it can therefore receive no impressions or be otherwise affected, in regard to its passions, than from the head alone, for bodily disorders in the blood or humours are here wholly out of the question. And though we have been able to find no other passages for an intercourse between the head and heart that are known to convey sense than by those small ones of the nerves, by and along with which, the common opinion is, the animal spirits pass within their enclosure, yet certain it is that the communication between these parts, the head and heart, is

amazingly quick and close, and in many cases more powerful in the effects than any thing that occurs in our whole frame besides. But if any should further doubt whether this may not be performed by the blood being affected by the spirits in the brain, and conveying by its wider passages this affection or motion to the heart; or whether the soul itself, as was once hinted before, may communicate directly with the heart, and there exert an immediate operation; or whatever also may be imagined in the case, to find any just solution to such questions is most certainly placed beyond the reach of human power, and they must be left among the inscrutables of Nature. But to that of the blood this may justly be objected, that by the arteries, which are its noblest passages, there can be no communication from the head downwards to the heart, because the many strong interposing valves that all stand the contrary way forbid it; and by the more exterior veins it is no way probable, because the blood descending in them, before it is dismissed from the brain, has, for the supply of those parts, been exhausted of its purer spirits. Therefore considering the whole organically, for to that of the soul itself nothing can be said, there appears good reason to conclude, as has hitherto been supposed, that the nerves, which we are very sure impart, or are the first immediate instrument of, all sense and motion to the body, in this case also principally furnish, and are the means of, communication. But how or in what manner they operate, or how one single pair only, as the intercostals, or two at the most, if the par vagum should be taken in, should serve to convey such varieties of intelligences to excite the different passions, or how the animal spirits (admitting their reality), unless we should suppose, what we cannot, that they themselves are the thought, can effect it more than the other, is equally inconceivable. Yet if, in the way of speculation only, we should imagine what will not probably be found to carry anything disagreeable in it, that, as in the 2nd chapter on the senses, it was hinted from Crousaz that possibly the *lamina spiralis* of the ear, which seems to bid the fairest for being the principal part of that organ for hearing, may have the filaments of its nerves so strung and set in tune as that each only may be moved and affected by its correspondent note of sound, and from the sense of such and such particular nerves being affected the

different natures of the several sounds might in the sensation be distinguished; and from thence a like notion was started, that possibly the several filaments of the retina of the eye might in the same manner be so framed, that each respectively should be sensible to, and receive impressions from, such rays of light only as were suited to them by the different degrees of refrangibility, proper to the colors exhibited by them to the sight; so also in this case, the smaller filaments of the intercostals, like the keys of a spinett or organ, fitted to strike the respective strings in the one, or open pipes in the other, may in like manner be prepared to strike the parts of the heart and excite the respective passion or affection. For the powers of Nature, in working the greatest effects by what may to us appear the slenderest means (as in some fermentations for instance), are wholly incomprehensible, and in some cases the small fiber of a nerve, which if searched for would scarce be found perceptible to the sight, by being wrongly affected will produce pains inexpressible.

But to leave uncertain speculations and return to what we are sure of, the close or rather instantaneous communication between the heart and brain, whoever will be at the pains to examine what passes within themselves may easily perceive that scarce a thought ever rises in the mind but as suddenly an intermixture of some affection from the heart is found, like the bass in concerts of music, co-operating with it. And happy were it for us in many cases if this comparison were truly just, but to our misfortune it falls greatly short; for often, too often, the affection or passion bears the command and becomes the principal director, as may in the following be more effectually set in view and considered in its proper place.

But not only the suddenness, but in many instances the extreme violence, of the effects of this communication is astonishing. Frights, whether from real or imaginary causes, by sight or hearing, or even by the touch, have given such rude shocks and agitations to the heart as have greatly endangered, and sometimes destroyed, life itself; but swooning away in such cases, especially with the softer sex, is well known to be common. Nor have the surprises from fear or grief proved more fatal than even the sudden transports of joy, with which several have been known irrecoverably to expire: as Chilo of

Lacedaemon on his son being victor at the Olympic games; Sophocles the poet; Dionissios and diverse others mentioned by Pliny [18] and Val Maximus [19]; our great mathematician Oughtred on his hearing the convention in 1660 had voted the King's return. And hence is the necessity of the caution in not letting a condemned person at the place of execution, who expected no pardon or reprieve, too suddenly know of mercy indulged to him in that way, for without such a proper care, some have been known in danger of as sure a death by the extended grace as they expected before from the hands of the executioner.

That these effects are not in proportion to the quantity, or even as the force, of the motion of the heart or blood seems to be plain from this: that no emotions there appear more soft, smooth, and easy than those of joy, nor any more afflicting or grievous than those of sorrow, and yet we hear of more (for there have been many instances) who have expired by sudden transports of the first, than by such attacks of the latter. Again, nothing throws the whole frame into so great disorder as furious anger. In some, the blood will seem to boil, the face redden, the breast, neck, and eyes will swell, and the whole body seem to be convulsed, yet none perhaps were ever known to die by the transport. Which must convince us that the effect depends not, as has been said, on the quantity, but on the nature of the commotion, and this must further depend on the manner of the agitation of the heart and its parts that produce it.

But as those instances abundantly show the force of notices from the brain to the heart in exciting its passions, so the heart has no less power and influence over the other, and so general is the communication that scarce can any new object strike the sense, or new combination of ideas rise in the imagination and possess the mind, but immediately the heart is some way also affected with it. There will be some liking or dislike, some pleasure or uneasiness, before the understanding or judgment can be at all employed to weigh or consider it. And so naturally do we fall into this without thinking of it that it may be observed, when a person becomes a spectator of two others contending who are both equally strangers to him, and whom perhaps he had never seen before, yet some affection will unaccountably arise and incline him, though wholly disinterested

in the event, to favor with his wishes the one more than the other. And even from very trifles or what has no solid foundation in Nature have such currents of the affections been raised, like large rivers that frequently rise from almost imperceptible drains in marshy places, that have engaged vast numbers in faction and parties most pernicious in their consequences; as in those of the Prasini and Veneti [20] of old among the Romans, by means of which faction, Constantinople, in the reign of Justinian, had almost been ruined, to mention nothing more modern. Nor will it be found in almost any case, but some affection from the heart intermixes, and (as has been said) cooperates with thought in the brain; or if in any case, it must be in theorems and pure abstracted truths, or inquires into truths in the result of which we have no interest engaged. And yet thought and affection or passion, however complicated, as they have a different rise, so they are truly distinct in themselves, and reason, which is our supreme, and, as the Stoics called it, the ἡγεμονική or imperial faculty, if it exerts the authority that in our formation it was intended it should be invested with for governing our thoughts, may with no great difficulty not only distinguish that part the affection is acting in the case, but by correcting its officiousness, reducing its exorbitance, and directing and conducting it in its proper channel, may fully regulate it and render it justly subservient to the end for which it was placed in our composition.

And from the observation of this prevalence of the passions over the understanding was rhetoric probably first reduced to an art, and cultivated by study and with application, that not only the subject should be clearly explained, and arguments be ranked and accounted in their greatest strength to convince the understanding, which ought to be the utmost view of it, but also by an elegant choice of words delightful in their sound and composition, ranged in measured periods, and attended with graceful action and a just cadency of the voice to move the heart and touch the proper strings for exciting the passion wanted in the case, to influence the judgment or prevail over the powers of reason. Thus Julius Caesar, after he had, by invading the liberties of his country, raised himself to the imperial dignity, ascending the Tribunal with a fixed resolution

to condemn Ligarius who had distinguished himself in opposing him, but admitting Cicero to speak through a mere curiosity of hearing his old friend once more declaim, was so shaken by the torrent of his eloquence that he changed color, shuddered on some moving points the orator well knew how to touch, dropped the papers he was holding in his hand, and at the close, instead of pronouncing the fatal sentence, generously absolved him. Nor will any admire at this who now read that oration, which is still extant, if, with the beauties of the discourse, they consider the additional advantages of that orator's voice, elocution, and action, with which it must have been delivered.

On this head may be added that not only oratory, which carried reason and sense with it, but even sound alone without words in musical composition, may have astonishing effects on the heart and its passions. That it will calm and allay them was understood as long-since as the days of Saul and David; and that it will raise them to rage and fury has been equally confessed. The effects of Timotheus's martial notes on Alexander the Great, whose spirits were so gradually roused that at length, starting up, he seized his sword, are frequently instanced. But a story of the like kind told by the old Danish historian [21] of their King Eric the 2nd, who, by his musician on a designed trial of skill, that author says, was wrought up to such a transport of rage, that he killed four of those about him before his guards rushing in could seize him, is (if true) astonishing.

LOGAN'S NOTES

[1] [Greek text] Diogenes Laertius; [Greek text], Plutarch, *De Virtute Morali*, p. 449.

[2] See Plutarch in his abstract, *Stoicos absurdiora poetis dicere* [*The Stoics speak more paradoxically than the poets*], but this is there strangely applied to the Epicureans, though the true doctrine of the Stoics only.

[3] "...perturbationes animi, formidines, libidines, iracundiae? Haec enim fere eius sunt modi quae Graeci πάθη appellant, ego poteram morbos, et id verbum esset e verbo, sed in consuetudinem nostram non caderet." ["... disturbances of soul, to fears, lusts, resentments? For these, too, are of the class

which the Greeks call *pathe*, I might term them diseases, rendering one word by another; but it would be in accordance with our idiom.” Andrew P. Peabody, trans.] *Tusculanae Quaestionis*, Lib.3, proge intuiti. [“On Grief”]; “... Hoc propemodum verbo Graeci omnem animi perturbationem appellant; vocant enim παθος, id est morbum, quiumque est motus in animo urbidus.”

[“Morbus, which has as limited a meaning as our word 'sickness,' is commonly used only of bodily disease, yet, like 'sickness,' is metaphorically applied to diseases of the mind or soul.” Peabody, trans.] Idem. Ibid.

[4] Plato gives this Division, Lib 4, *de Republica*, 436 and 439, and Aristotle, who often has it, quotes it as Plato's, *De Virtutibus et Vitiis Libellus* [*On Virtues and Vices*].

[5] Plato has said but little of the passions; Aristotle, a good deal, but he fixed no determinate number for them; T. Aquinas, the best of the School divines, about the year 1280 treating very largely of them in his *Summa Theologica*, part 2 from Qu. 22 to Qu. 48 in above 130 Articles proceeds according to this division, and has been generally followed by all the Peripatetics.

[6] Boethius, though a great Peripatetic, expresses this, *de Consolatione Philosophiae* [*The Consolation of Philosophy*], L.1, Metr.

[7] in these Adonics, [Latin text], *de Passionis* [*Les passions de l'âme*], Article 27.

[8] Ibid., Article 33.

[9] “Animae... motus omnis uti et bonum vel malum sensibile ad appetitum sentientem, quique nobis cum belluis communis est, omnino pertinet.” [du Hamel] *Ethica*, tract 3, disp. 2, qu.3, art 1.

[10] “Neque illud necesse est ut longa oratione demonstramus appetitum sentientem esse facultatem non re, sed cogitatione tantum, a sensu et imaginatione distinctam.” [du Hamel] Ibid. Thus we are told here that the sensitive appetite is in reality just the same with sense and imagination, consequently both the senses and imagination must have appetites, but this is true of neither. Appetites are given us solely to supply what is wanting or requisite for our support and well-being, or for

continuing the species; and as they are respectively stronger in proportion as they are necessary, so the organs appointed, in the first instance, to minister these supplies, are also attended with the greater pleasure; but the appetite lies not in the sense. None will say the eye or ear have any appetite, for that the eye is not satisfied with seeing nor the ear with hearing is but a figurative expression, and just opposite to that other, The full soul loathes the honeycomb: for in the first, the soul or mind is intended, and in the last, the stomach, and yet it is true that each of the senses is very capable of a gratification. To apply this, we cannot subsist without food to recruit the continual waste of our spirits, juices, etc. When this is wanted, the vessels of the stomach being emptied, strongly crave it, and in proportion to this want, the palate is gratefully affected by a proper supply. When these wants and desires are fully satiated and the appetite is cloyed, the pleasure of the palate is vanished, and yet the honey (were that the case) loses not its sweetness, nor the palate its faculty of distinguishing sweet from bitter. To ascribe appetite to the imagination is yet more absurd, for notwithstanding it furnishes the image of what is desired, as of fresh grapes or cherries in Winter, and also brings up the memory of the agreeable relish and pleasure that used to attend the eating of them, yet this is all, for the appetite lies elsewhere, and the vitiated humours of the parts it resides in greatly contribute to heighten the imagined pleasure.

[11] *Odyssey* 9. [Greek text]

[12] [Greek text] (i.e. Diaphragma) Aristotle, *De Partibus Animalium*, L3, C10.

[13] The Stoics made the heart the seat of the understanding, as Lipsius shows at large by many quotations. *De Physiologie Stoicorum*, L.3, C.18. Amongst whom, he also quotes the great Hippocrates himself for the same opinion, from his short tract *de Corde*, for this expression [Greek text], “mens enim hominis in ventriculo sinistro sita est imperat,” [“the left ventricle being the more immediate seat of the soul, and the true center whence the body is ruled.”]; but if this piece is truly that author’s, which his editor Faesius suspects, it is true he contradicts what he says in it in another place, as in this passage in his tract *de Morbo Sacro* [*The Sacred Disease*], etc. But as

he in other places is plainly of a different sentiment, as *de Morbo Sacro juxta finem* [Greek text], he might here by γνώμη, the word he uses, mean rather the purpose or will than understanding. Epicurus agreed in the same with the Stoics, as Lucretius, L.3, v.140 [*De Rerum Natura*]: [Latin text: “That counsel which we call the mind and that cleaves seated in the midmost breast.” William Ellery Leonard, trans.]

[14] see Fig. 3 in Tab. XVIII of Blancard’s *Anatomy* taken from [left blank by JL.]

The intercostal nerves

[15] It does not appear by the published treatises of anatomy, that this important pair of nerves were otherwise taken notice of or described than as the interior branch of the par vagum, until the famous Dr. Willis made his curious and laborious inquiries into the brain and nerves therein, in his tract *de Cerebro* [*Cerebri anatome*], first published in 1664. And yet it evidently appears they were known a hundred years before to Eustachius to be a distinct pair, and to have nearly the same origin and course as Willis has described them, as we now see them in that author’s excellent 18th Plate, which, with 46 others (47 in the whole), lay engraved and finished for working off, unknown or concealed about 160 years, that is, from about the year 1552 to 1713, when Lancisi, physician to Pope Clement XI, learning from Eustachius’s other writings that he had caused such plates to be engraved, by his own great diligence and his master’s authority, happily discovered and published them at Rome the following year, with some but very imperfect explanations of his own. But these being altogether unknown, Dr. Willis was the first who discovered and published to the world that these nerves were a pair entirely distinct from the 8th, though of a large communication with them, and he derives their origin by one small branch (Eustachius makes it double) from the 6th, and two others from the 5th pair, in which he is followed both by Vieussens and Ridley, who have since Willis taken pains on the same subject. But the celebrated anatomist Jacob Benignus Winslow, a professor at Paris, in his excellent *Anatomy* translated and published in England 1733, Section VI

N.358, will not allow they rise from those two pairs, but asserts that what has been accounted their first head or origin is no other than a branch from themselves, detached upwards, and divided into more filaments to join those other two pair. But while he denies them that head and calls it only a pretended origin, he assigns them no other, unless when, in the cited place, he makes that ascending branch to rise from the basis of the cranium, he intends also that the whole trunk does the same. Eustachius also seems plainly to give them a very considerable head at the cerebellum, in that larger white oval spot on the left side (which is larger and rounder on the right) just below the smaller round white specks, that Lancisi observes to be given for the rise of the 10th pair on the outside of the bend of the 8th; and the neck of this head of the intercostal falls in with its upper branches just at the rise of the first cervical, about the beginning of the first great ganglion, but on the right side this is covered by the shade and by the nerve of the 10th, which 10th is on that right side also very plainly exhibited, though neither Lancisi nor G. Douglas, the translator of Winslow, have observed it. For the first says, p.46, *decimum par in orbu suo utrinque recisum apparet*, but it is not so, and the other takes no notice of the tenth at all, and though its neck is covered by the bodies of the 8th and 9th, yet it is very plainly shown, and brought down even to the 3rd cervical, which sends off the first branch for the diaphragmatic. But great allowances are to be made in those small draughts for the slips and oversights of engravers; what is here observed is from the Dutch edition of Eustachius 1722, which may probably be much inferior to the Roman printed from the author's original plates, as the English cut in the translation of Winslow is vastly worse in those parts than the Dutch.

But whichever of these gives the first rise of the intercostals, that is, whether the 5th and 6th pairs or the basis of the cranium, the latter of which is by much the most probable—for why should the most considerable pair of the body have only a mutuatitious original?—let us consider why it should be accounted subservient to involuntary motion only, and not to the spontaneous. What reasons later observers may have found to be of Dr. Willis's opinion, that the nerves proceeding from the cerebrum serve for spontaneous and those from the cerebellum

for the other motions, the writer cannot judge; but he confesses he sees none. For all the ten pairs (unless the two first may be excepted) appear to rise from the *medulla oblongata*, and when the Doctor argues that the intercostals, because (according to him) they spring from the 5th and 6th pairs, must therefore minister to the involuntary, he seems inconsistent with himself, for he allows that the 5th, as they serve to the whole face, both the maxillae or upper and under jaws, the lips, muscles of the tongue, etc., or several of their branches at least, must be appointed for the voluntary, and as the 6th go only to the *abductor oculorum*, why should its motions be accounted involuntary only? But the 9th and 10th pairs, as they rise still much farther back from the cerebrum under the cerebellum, if the office of the first of these is only to serve that voluble organ the tongue, and of the other to command some of the motions of the neck and the muscles of the head, these can by no means be esteemed involuntary; and therefore his distinction seems to have very little if any foundation. But if these intercostals, as we may gather from Eustachius and Winslow, rise yet farther back and lower in the basis of the cranium below both those pairs, the 9th and 10th, they would seem from thence to be appointed only for the voluntary, yet that cannot generally be the case. But before we inquire further, let us hear what Winslow says of them. Having as above denied them the origin generally assigned to them, after he has said r.361 that he believes the name of sympathetici majores or maximi (as he had before called the portiodura of the 7th, sympathetici minores and the 8th pair sympathetici medii) would be more proper for them than intercostals, because of their frequent communications with almost all the principal nerves of the body. He goes on R 362 etc. to describe their situation on the lateral parts of the whole twenty-four vertebrae, and then adds, through this large extent, they appear like two ropes (cordes doubtless in the French) divided and in a manner intersected at different distances by a great number of ganglions of the medula spinalis ----- that these ganglions* (of the intercostals) differ more or less from each other in size, color, and consistence, and may be looked upon as so many origins or germina dispersed through this great pair of nerves, and consequently as so many LITTLE

BRAINS. –and –N366 The first cervical ganglion is the most considerable in size, but not in consistence, representing a soft oblong tumor of the figure of an olive, and situated longitudinally before the roots of the apophyses+ of the three first vertebra, immediately behind the pharynx.++ (* a ganglion in a nerve is an oval tumor or branch in it. + the knobs that stand out in the neck-bone. ++ the top of the gullet or passage from the mouth to the stomach.)

It is farther observable also that Vieussens makes those ganglions increase in size at greater distances from the head, as if it were to balance by the quantity of their enclosed medulla their greater remoteness from the brain. Here we see they abound in these ganglions, and the first great one, situate very near the brain itself, somewhat resembles it in its softer consistence; they also communicate with all the other principal nerves of the body, and particularly with most of those from the vertebrae, forming new ganglions at every joint of communication, and these still increasing in size according to their distance, in which respects, as well as others, they greatly differ from all the rest. Again, since every one, on considering the general disposition of the nerves, may clearly see that for the involuntary motions below the head, that other great pair, the 8th, which are allowed to serve to those purposes, might alone, to the view of reason, be abundantly sufficient. Therefore, as Nature (as is observed above) is never found to do anything in vain, but ever uses the most simple and direct methods for executing all its intentions, we may conclude that these intercostals were designed for some other different purposes. Upon which, from the foregoing considerations, these few queries may be proposed to be weighed by the more skillful who have applied their thoughts to such subjects, as, 1) whether the 8th Pair alone may not be thought in Man, as we have good reason to conclude they do in brutes, to communicate all the pure mechanical involuntary motion to all the parts they are extended to? 2) But as in Man, they appear not to be carried to so great an extent as in brutes, for in them the 8th pair are the principal, but in us the intercostals, whether these latter (the intercostals) receive not from the others, (the 8th pair) at their frequent communications, but especially at their great one at their two first largest ganglions, a competent number of

filaments to be conveyed in their trunks and branches to the remoter parts, to which the 8th themselves do not visibly reach? For we have no reason to believe that any filament of nerves ever coalesce. 3rdly) Whether the spiral marrow, in which none will imagine any thought can reside, and yet all or most of the voluntary motions of the body and limbs are performed by its nerves, is any other than a store of nervous matter provided for furnishing out the stronger nerves by which all the labor of the body and limbs are performed, so fitted as, on the one hand, to be enabled by constant supplies from the medulla to execute the commands given them, and, on the other, so disposed as to be directed by a nobler intelligence in the execution? 4) And lastly, whether the intercostals are not the conduit, or channels of this intelligence? These indeed are questions, which it is not to be expected it will ever be fully in the power of Man to answer, yet a due consideration of them may be of good service in relation to the important subject of this chapter. Much more might be added here on the nerves, but this is a note only, which probably may by some be thought too long already.

[16] *De Jure Naturae*, Ch. 2, § 2.

Contrary to Locke

[17] Locke, *Essay*, Book 2, Ch.11, §11 says, It is as evident to him that some brutes in certain instances reason, as that they have sense; but it is only (he adds) in particular ideas. Yet the contrary opinion, if duly considered, will be found by much the more reasonable. Pardies the Jesuit wrote a piece, *de la Connaissance des betes*, printed in some editions with his mathematical tracts, under a pretence of opposing Descartes' notion that brutes are mere machines. But he has stated the whole in so clear a light, that whoever reads and rightly considers him, will be at no loss to discover that ingenious, we must not say ingenuous, author's own opinion, or on which side of the question the truth may lie.

[18] [Pliny the Elder], *Naturalis Historia*, L.7,c.53

[19] Lib.9. c.12 [Valerius Maximus]

[20] These are mentioned here to give a remote instance, that no way now concerns us, of the madness of mankind in

engaging in factions on misunderstood notions, that not only endangers, but sometimes wreck, the public peace. The Prasini and Veneti are not only the names of two colors, green and blue (besides which there were at times two others, russet and white), worn by the charioteers and racers in the Circus of Rome, and from their example, in other cities, which nevertheless so divided the affections of the people, that persons of different inclinations in respect to them could scarce meet for conversation. See Martial, Lib. 10, ep. 48, *De Prasino Conviva Meus, etc.*; Pliny, *Epistle* L.9.6; and Juvenal, *Satyr 11*, v.195, tells us the Romans were as much affected with success of the parties, as with their vast losses in their war with Hannibal. But near 500 years after, in Justinian's time, by means of these same senseless disputes, the city was fired, the famous Church Sophia with many other public buildings destroyed, many thousands lost their lives, and the Empire was endangered, See Procopius, Lib.1, *de Bello Persico*, but Hokkel Greek edition whence this is taken is imperfect in the place, but according to Fabricius it is restored in that of the Louvre.

[21] Saxo Grammaticus, *Danish History* [*Gesta Danorum*], Lib.12, p.m.209

Ch. 4, Section II

The inclination in the heart to good, is love

Having thus seen that the affections and passions are original powers, faculties, or principles fixed in us by Nature; that their seat is truly in the heart; that this is affected from the brain by some competent means for exciting these affections, which is here supposed probably to be by the communication of the intercostal nerves; and that they again as immediately affect and influence the thought, we should next in course consider the use and ends for which these faculties were given and planted in us.

And in this inquiry we may find that, as truth is the sole object of the understanding, as has been shown in the preceding chapter, so *good* is the proper object of the heart; and as the aversion of the one is falsehood, so evil is of the other. Nor is it any objection that our affections often pursue what is truly in itself evil, more than that the understanding often acquiesces in and takes up with error instead of truth.

When any object strikes or is raised to the view of the mind under the appearance of good, the affection immediately rises to it; and when its course is directed wrong, the deception is from the mind, opinion, or imagination. The heart itself never mistakes in its own first motions, but the error rises above, though frequently, on the other hand, the affection when raised greatly influences and sways the understanding, and by its preoccupation, gives the judgment afterwards a bias to determine wrong. This everyone may, on due examination, find to be the common process within themselves. And it is evident that all the mistakes committed in these cases arise from a neglect in the mind, in not duly examining the true nature of the subject, and not exerting the authority that it was intended (as has been said) in our original frame it should be invested with over the affection, when too busy or active either in embracing or

rejecting it, until the judgment could deliberately decide and pronounce upon its nature and fitness.

The propensity or inclination in the heart to good, when exerted into act and applied to any object under that appearance, is what we call *love*, which therefore is the first and principal of all the affections or passions, because it is the immediate and direct application to that grand object, whether real or apparent (which it cannot by its own powers distinguish), that the heart was formed to pursue and embrace. And consequently, it must as naturally be averse to and avoid what bears the contrary appearance, which motion is therefore called *aversion* or *hatred*. Nor is this any other than one branch of the great law that obtains through the whole course of Nature, which unites all the several parts by their respective fitnesses first given them, one for the other, and thereby combines all into one grand whole. The Ancients appear to have been sensible of this, who in their pagan divinity made love the first, and by much the most ancient, of all their gods [1]. Nor were all their philosophers ignorant of it; for there is reason to suppose that those two, Empedocles and Heraclitus [2], meant nothing else in their declaring that love and hatred, or peace and war, were the grand principles by which all things in Nature were composed and subsisted, as we now see that in our modern philosophy, for the solution of the phenomena of body, the same, under the names of attraction and repulsion, are applied.

But before we proceed further, it will be proper here to consider what that is in the nature of things to which we apply the term good.

Though nothing is more common than the word, nor more obvious than the idea of it under some appearance, yet mankind have so greatly differed in setting its just and determinate signification, that the subject becomes nice, and the disquisition not very easy. The writer however will here venture to deliver his own sentiments on it, as far as reason appears to dictate them, and must submit them to the judgment of others, and what follows, it is hoped, will be found not ill-grounded.

Happiness

Good then (in relation to us) is that which gives or procures us pleasure, immediate or mediate, consistent with the end of our formation, which, in respect to us, is our own happiness.

Pleasure is a sensation of the suitableness of an object to the sense, appetite, affection, faculty, or power in us, fitted in our formation to be moved or affected by it.

And *happiness* is only the continuation of pleasure.

Pleasure is here distinguished into immediate and mediate. The first is a direct gratification; the other, what will or may procure a subsequent enjoyment of it. But the definition here given, if duly considered, will carry our view to a great extent. Man is a compound of diverse faculties, particularly of those named in the definition, and as all these have severally their gratifications, the compound being but one, the whole with the differences of the several parts must be considered together. None will say the gratification of any one or two senses of the body is to be put into competition with the health and ease of the whole. Nor, it may be supposed, would any one in his senses hesitate in determining whether he would choose to lose his sense of smelling or taste, or perhaps both, rather than his sight or hearing. And he must be already out of his wits who would not rather choose to lose a limb or two, or one or two of those senses, or life itself, rather than his understanding, so as to live distracted. From whence it is evident we make a distinction in the worth of the parts, allowing the one a superiority above the other, and, accordingly, pleasures are to be estimated agreeably to the dignity of the faculty affected by them, and consequently so must the good that is efficient of the pleasure.

Now good and evil being frequently divided into natural and moral, what is meant by *natural good*, are those things that either immediately give pleasure in gratifying the senses, appetites, or some of the passions (and too often the inordinate), or may be the means of procuring gratifications to these or even to those of a superior kind, which means are such as health, wealth, power, honor, or esteem, including all those that are called the goods of fortune, which, being wholly out of us and very little in our power, may either be given us or taken away from us by the will of others. But *natural evil* is generally

limited to pain or uneasiness arising from want of health, necessities, liberty, etc.

Moral good depends on the exercise of those called the moral virtues, which are either the objects of the purer and uncorrupt affections, or the operations of these towards their proper objects, conformably to the dictates of reason, and tending not only to our own happiness, but to the good order and well-being of our whole species (of which, as it is proposed for the principal end and view of this discourse, more is to be said hereafter). *Moral evil* is directly the contrary of the good, and therefore needs no other explanation. But to proceed.

All our appetites, sensations, affections, and passions have manifestly been given us for ends directly tending to our support, pleasure, or happiness. And first, as to our bodily appetites and gratifications of our senses, we may observe that, because we are so constituted that we cannot long subsist without meat and drink, the procuring and furnishing of which was designed should be part of our employment in life, therefore the appetites of hunger and thirst are made exceeding strong, and when the whole body by the exhaustion of its spirits becomes sensible of the want of those supplies, the uneasiness becomes unsupportable. Yet even this uneasiness, we see, was not left to be the only inducement to us to the practice of eating, but, as a further solicitation regularly to answer such cravings, the organs of taste were so formed that a greater pleasure should attend it than any other of its neighboring senses. In the same manner, the continuation of the species being of the greatest importance in the established course of Nature, because many reflections might damp or retard our care in that article, there is the strongest provision made by most powerful inclinations, and these also are attended with gratifications proportionable. But then, on the other hand, our smell being of no such great use to us, as it is to many other creatures, the pleasure it yields is almost a matter of indifference; and yet because some things might by their effluvia prove noxious to our health, therefore, that we might with the more care avoid these, is this sense capable of giving us a great uneasiness, and considerably greater than its pleasure. Again, our sight and hearing are of the utmost importance to us in life, and so necessary in all transactions, that

there could be no manner of occasion to give the organs themselves any sensations of pleasure as a solicitation to us to use them. For though some colors and some sounds are more agreeable to the eye and ear than some others, yet the sensation of any color or sound affects the organ itself with but very little pleasure. Beauty and harmony indeed, that are conveyed through these to the mind or imagination, are capable of giving exquisite pleasure, but the sense of these lies not, like the pleasure of the taste and smell, in the organs themselves, but more interiorly, of which more is to be said upon another subject.

Thus it is with the appetites and external senses, which we see are all so constituted and ordained, that they shall affect us with a greater or less degree of pleasure in proportion as their use is of greater and more immediate or less importance to our own well-being, and the continuation of a succession of others in our places. Let us now, in the same manner, consider the end and uses of our several passions and affections.

Love: “the principle which animates us to seek our perfection”

Love was declared before to be the inclination of the heart to good, with which it seeks to unite. Aquinas well enough defined it in these two words, *complacentia boni*, the complacency of good, or the pleasing sensation we have of good. But if good be the only proper object of the heart, and love, the nexus or tie between them—since good through the whole creation is no other than what tends to the perfection of it, in the whole and in every part—then love in its operation is, as was hinted above, the same law in the animal and sensitive with that which in the corporeal keeps the whole together united into one Universe.

We then very clearly see the great use of it, as it is the principle which animates us to seek our perfection; but it has various appearances, and accordingly is distinguished. In seeking the good of our own individual, it is *self-love*, which is no other originally than the direction of the affection towards

those things that Nature has formed suitable to our well-being, or what we imagine such. It displays itself in the next degree most strongly between the sexes, in procal and conjugal affection, and in the product of this, parental, which were largely spoke to in the first chapter. It diffuses itself also in a general *benevolence* towards our species or mankind, and, more contractedly, it powerfully exerts itself in *friendship*, which when well-placed yields some of the most solid comforts in life. Some have distinguished another branch, as they would make it, by dividing the objects that please into *bona* and *pulchra*, good, and what we have no word in English fully to express, the common rendering of it is fair or beautiful. And to the good they apply love; to the other in inanimate beings, complacency; but the definition of good, before given, takes off all occasion for any such distinction. [3]

As love is the first, principal, and sovereign of the passions, so all the rest of them are related to, or in some measure depend on, it. For the contrary of good is evil, but all contraries must be *ejusdem generis*, of the same genus or kind, and are strictly relatives. Good and evil are the objects of all the passions; therefore, as love is the universal one for good, this with its opposite serve to explain all the rest.

To speak of the use of *hatred* is unnecessary, for as naturally as we seek good, we must avoid its contrary, the same views directing us in both.

As the gratification of the appetites and senses were shown above to be attended with pleasure, so the affection of love, obtaining and joining with its object, is in the same manner attended with one peculiar to the heart, called *joy*. But if it either fail of this union, or otherwise an evil, the proper object of hatred, happen to it, it produces the contrary, *uneasiness* or *grief*. And these two are the immediate fruit or product of the two first passions or their objects, good and evil, and their end or use most evidently is, by the pleasure arising from the one and the uneasiness from the other, to excite us to the pursuit of our good in all things, and to decline the evil. From these two—which, properly considered, are no less sensations than affections, but have the greatest force on the heart, as they are variously intermixed with the first two, love and hatred—all the others,

with some variation of circumstances, seem in a great measure to be compounded.

When the mind has the view of a good judged suitable for us, but placed at some distance without our immediate reach, and has reason to believe it will be obtained, the motion of the heart, as influenced by these reasons, is distinguished from love by the name of *hope*, and the prospect of obtaining the good, by anticipation, intermixes some of the pleasure expected from the reality; but if all those reasons entirely fail, it is then *despair* which affects the heart with grief proportionate to the intenseness of the first affection. If the mind is under great doubts whether the good will be obtained, or is inclined rather to believe the contrary, or if it has an opinion that an evil will happen, grief or uneasiness intermixes with the thoughts, and the opinion either way produces the uneasy emotion in the heart we call *fear*, which is truly a passion of vast consequence, and is sometimes known to have very great effects upon the whole body, not only in stopping or retarding the motion of the blood, but it unstrings or slackens the nerves, and sometimes even the sphincters; whereas hope has very little effect on the blood, spirits, or nerves, and is no other way a passion than as it seems to be a disposition of the heart to anticipate a pleasure annexed to some good in the imagination. But the use both of hope and fear is very great; for the first animates us to pursue a good, though distant, gives courage to encounter and undergo difficulties, and in misery it proves often a tolerable succedaneum in the place of good itself, which it is known sometimes for no small space pretty comfortably to supply. It is the poor and distressed man's surest friend, when all others fail, and helps to bear up the heart when everything else but this alone would sink it. The story of its being left in Pandora's box, is on diverse accounts worth noting. [4] The use of fear is to excite our vigilance and caution, to prevent dangers, avert evil, and to render us more careful and circumspect in the choice of means for more surely attaining the good proposed, and avoiding its contrary.

Desire (*cupiditas*) is reckoned one of the principal passions, yet it is, in the common sense of the word with us, no other than the operation of the will directed to an object not immediately in our power. But the object in itself is much of the

same nature with that of love; it is something agreeable which we conceive will be attended with pleasure in the enjoyment, and therefore it is love put into a stronger motion in order to obtain the object. Thus it very much depends on the mind for the direction from the will, on which a proper passion rises in the heart to incite all our faculties to exert themselves in using proper means for obtaining the proposed good. From whence its use is so manifest, that nothing need be added to explain it.

Compassion is benevolence with some intermixture of grief or uneasiness, which that affection gives us for the unhappiness of others, the excellent end and use of which is, that we should naturally be inclined to relieve the distresses of each other. And on this affection it has been justly observed that, though we have no name for the pleasure we sometimes take in seeing the prosperity or success of another, for that *congratulation* is little more than a term of ceremony, yet the term compassion is most common and the thing itself is universally agreed to be the real duty of all who partake of human nature, from which consideration the word *humanity* is in the same sense applied to it. It may further also to the same purpose be observed, that we have the terms *sympathizing* with those in affliction and *condoling* with the sorrowful, but no words correspondent to these in the opposite sense, or in cases of joy; for in these, congratulation is also deficient. And the reason for this is plain: persons in prosperity want not the notice of their friends, but those in distress greatly need their countenance or assistance.

Pride, a passion of vast influence on life, though wholly neglected by the writers on ethics, is a branch of self-love, by which we put a value on ourselves. It seems, in the first intention, as was observed in the first chapter, designed for an excellent end, by putting us on improving ourselves and attaining such qualifications as may recommend us to the esteem of others. On this foundation in Nature it is truly what we call *honor*, a noble principle and the great guard of reputation, which, even in those who have scarce any other, proves often a happy preservative against vice and all that can appear or be thought base, mean, or dishonest, and in this case it is ever tempered in benevolence. *Ambition* is a more aspiring branch of it, courting

a higher rank in the esteem of men, and therefore sometimes incites to actions truly useful, and that conduce to a general or public good. These seem to be the pure and genuine effects of it according to its first institution, and in this view it is one of the most excellent ingredients or qualities in the whole human composition. But the more valuable it is, the more solicitous care it requires to preserve it pure, for, according to the common observation, that the best things corrupted prove the worst, so when this, by being more contracted into self, collects a further force from thence and appears and is known under the name of *pride*, it becomes highly pernicious. This generally knows no bounds, and if of the soaring or ambitious kind, expatiates without limits. It is like a stream flowing down into a plain without channel or banks, and according to its own quantity overflows more or less; if moderate, and it has not yet deviated much from honor, it may refresh, but if large and impetuous, it inundates and destroys. Accordingly, it is one of the most dangerous passions, and the more so because, however visible to others, it can, no more than the eye does, discover itself. But in regard to this, its first and grand effect is to vitiate the optics, substituting in the place of true and simple vision a kind of prospect-glass; one end of which, constantly turned inwards to self, magnifies and draws it nearer, and the other, directed to the rest of mankind, lessens and sets them at a further distance. Therefore, as the persons never consider themselves otherwise than in this view, they truly think themselves as big as this represents them. But it has this further quality from optics, that it ever transplaces itself, and sees its own image in others; for the proud think any or everybody proud but themselves, and thus probably all who read this, however in for it, may think themselves perfectly clear. For this very reason therefore, there is not one of our passions or affections that requires so strict an eye, so close an attention and examination, for nothing is more destructive to Society. It strikes up jealousies, kindles animosities, destroys friendship, saps the foundation of virtue, and, with *resentment*, is the bane, the grand disturber of the peace of the Universe.

Vanity is from the same root, but of a more light and superficial kind. It affects chiefly the applause and praise of

others, for obtaining of which it has not seldom put many on useful and laudable actions, and though sometimes troublesome to others, yet it is seldom so injurious to any as to the persons possessed with it, by subjecting them sometimes to ridicule.

Idols of blood, family, title

There is another branch from the same root, commendable in itself when kept strictly within bounds and directed only to its proper end, our own improvement, which in this view is *emulation*, and is that best sort of what Hesiod calls *contention*, which he says was given from Heaven to men for a blessing because it rouses them to industry and every honest exercise; and thus far it may sometimes be truly useful. But when one person rivaling another falls short in abilities or success, what was before a laudable inclination may degenerate into the most vile and detestable of all the passions, *envy*. Nor does envy generally rise from emulation only, but is more commonly the spurious brood of pride, in whose retinue it is very frequently found. And then it rises in the lowest and most abject minds, directly from the most vicious kind of self-love naturally aiming at its own good, yet is so far from employing self in proper means to attain it, that with a squint and distorted view, it ever fixes its eye on the good possessed by others, which it also thinks wrong-placed, and therefore hates the possessor for it. To minds thus infected, real merit in a person placed near them is the most grievous and afflicting eye-sore, whence they are first led to hate, and then, for their own ease and consolation, learn to despise it; and rummaging their own stores, pitch on some real or imaginary quality or advantage for their idol (as blood, title, family, or perhaps a mere phantom) to which they think all regard ought to be paid, superiorly to everything besides. But to draw characters is not the business of this discourse. It is enough to say that envy and malice (which is to be mentioned in the next) are the monsters of the passions, corruptions and flaws in Nature, and much the same in the mind as cancerous humours in the body.

As the heart naturally affects good and is averse to evil, the appearance of this latter in the actions, speech, or behavior of

others, as it carries the face of injury or wrong, begets an uneasiness, and raises the passion we call *anger*, which, allowing for the differences of natural disposition, generally rises in degree proportionable to the affection or regard we bear to the object affected by the injury. And the end of its being placed in us evidently appears to have been for the discouraging of wrong in any case, by giving the offender cause to expect retaliation, revenge, or punishment. It is also useful for maintaining authority in families, in civil government, and in all cases where good order is to be preserved and supported, and all wrong and injury prevented; but this passion is extremely apt to exorbitate and greatly to exceed the bounds within which, to render it truly useful, it ought to be carefully restrained. For sometimes it breaks out into transports, which, unless some acts of violence are committed in the heat, often prove more injurious to the person seized with the passion than to its object; but too often, under a more calm and silent appearance, or sometimes otherwise, it settles on the mind in a fixed and permanent *resentment*, incompatible with the social inclinations and pernicious to the peace of mankind. A yet further degree of this, as distinguished by names, is *malice*, the wickedness of which is shown in the very derivation of the word, as it comes from evil.

[5] But this ought for the most part to be distinguished from anger, for the one is a not-ungenerous passion in many cases useful and not unbecoming a man; the other, though it may be turned to an object by some occasional resentment, yet in itself it is the foulness of a vicious disposition of heart, which, when capable of this, is rarely so of any thing truly good, great, or generous whatever. The right use of anger, and what appears most agreeable to the original intention of it, seems to be this: that it should never rise higher than the real provocation, nor continue longer than to make a suitable impression on the offender, to deter him from the like for the time to come; or to obtain reparation for the loss or damage, if any be sustained by the wrong; or to inflict such punishment as for the good of Society has been judged necessary in such cases. But in private ones, it should always be remembered that *clemency* is planted in us, with no less care than anger, and the one ought ever to be roused and exerted to temper the other. To clemency, the tribute

of praise, honor, and esteem is accounted due; but to anger, none was ever paid, except in some very few particular cases, where in justice to others it may become a duty.

The same consideration ought also to be rigorously applied to that natural inclination many find in themselves to *revenge*, with this further reflection upon it, that, as the poet [6] has justly observed, such a disposition argues a meanness and narrowness of soul, and that the weakest part of our species is the most subject to it, but generous spirits are above and despise it. We have thus seen the use of this passion, anger, but we ought ever to remember that it is one of those that require the tightest reins and strictest discipline with the closest scrutiny and examination. For too few there are who are so well acquainted with their own hearts as to be sure there are no clots of resentment lurking there that infect their reason, or at best that influence their inclinations and bias their judgment in points they would be very loath to own

Natural conscience: pain and uneasiness of the guilty

Nature, having provided us with this warm passion to display itself on wrong done by others, it has been no less careful to furnish us with another, no less active, to rise at wrong or any slips or mistakes committed by ourselves, of which it is very strange so few writers on these subjects have taken any notice. Nature has distinguished this into two kinds, as our actions are either known to others, or as they may perhaps be known only to ourselves. In the first case, when we are guilty of wrong-doing, have made a slip, committed an indecency, or run into an inconsistency that we think may lessen us in the esteem or opinion of others, the passion of *shame* arises upon it and fills us with a confusion, which it is plain is a natural passion of the heart, from the wonderful provision Nature has made in investing (as anatomists inform us) great numbers of small branches from the 5th pair of nerves, which, by the intercostals, as has been shown, communicate directly with the heart, round the small veins in the face; that by their being straightened by

these nerves, the blood may be stopped in them, and display the affected person's concern in blushes. Which, though often considered as a weakness in the person, from their imagining or suspecting that to be an error or fault, which is not, yet, in regard to the particular provision thus made for it, ought not to be discountenanced, but considered as a proof of Nature acting in them in its pure simplicity, which we find, by worse introduced habits, is too often unhappily suppressed. The same appearances in the face that arise on this sense of wrong in ourselves, are also displayed, and often in a greater degree, on that relating to others, viz., anger, which in its better symptoms flushes the blood into the face; but when, on the contrary, it leaves it, and paleness ensues on resentment, it is generally believed to be of a more mischievous kind.

As shame arises at our own errors when we think others are sensible of them, from the same root, this inward sense of our guilt, whether known to others or not, displays itself with vastly greater force in what is called *natural conscience*, which probably may never hitherto have been ranked among the passions. Yet if we will do justice to the subject, we must allow that whatever in us effects the heart, in the sense it is here considered, will as properly come into the number as any other that can be named. Now all must own that when conscience accuses, anguish is felt in the heart as sensibly as any other of its emotions. Some, perhaps, may apply this only to grief rising in the same manner on the reflection of guilt, as it does in other cases; but on a due scrutiny into our own breasts, and on examining what passes there, we shall find that the operations of this now mentioned are as distinct from the other passions hitherto described as they are generally one from the other. For the checks of conscience sometimes rise on the first thought before an action is entered on; sometimes again more strongly in the time of it; or, if neither of these happen, then after it is committed, when the impetus or hurry of the mind, raised by the prevailing passion that led to it, is stilled, and time is given for cooler reflection. If reason cannot justify it, then are the powers of conscience felt to exert themselves with full vigor. On a sense of guilt impressed by the influences of this with the strongest signatures on the mind, paleness seizes the face, and horror and

confusion the whole frame. Or, if the face be concealed, and the offender gets out of reach of both discovery and danger, the horrid spectre of his guilt still stalks before him, haunts his walks, and pursues him with terrors. The Ancients excellently represented this by their imagined Furies, in frightful shapes, with torches and scourges of snakes, attendants upon guilt, and they appeared fonder of no tragedies than those wherein was shown—"Scelerum furiis agitatus Orestes," [7] an unhappy prince said to be pursued by those Furies for killing his mother who had murdered his father. [8] And the poet [9] above quoted, in strong and lively expressions, describes those horrors with this just remark, that a guilty conscience night and day charging a criminal is a torture far surpassing what the most cruel, either on Earth or in Hell, could invent. The pangs of this are not only unsupportable, but the affliction inconsolable, until the mind can, on repentance, be some way satisfied, or frame some hope that the crime is expiated. And hence doubtless arose among those Gentiles the practice of expiatory oblations, to appease the powers they, from their own inward terrors, supposed offended. Some indeed there are, who, having from their very infancy been trained up and hardened in vice, or, if they had a happier education, finding those checks in their opinion impertinently troublesome, to rid themselves of their importunacy and the better to accommodate themselves to some prevailing modes, have from example learned to think or call it a greatness of soul to brave over all the restraints of virtue. And accordingly, as far as they can, they suppress and stifle the unease monitor, as a man may, if he please, by means only of some habits, very much weaken or destroy the use of any of his limbs or senses. Yet notwithstanding all endeavors, rare is the instance where any one has led a vicious life and gone on in a course of crimes, that ever durst venture on a solitary retirement to enjoy himself alone without some provision for a constant succession of means to divert self-examination. Or, if they attempt it, those are they who, from their own feeling experience (but preposterously), lay it down for a principle that pain or uneasiness is the spring of all our actions, of whom more is to be said a few pages forward.

The effects of a disturbed conscience here mentioned have in all ages been acknowledged. And though it may be too

true that there are some so hardened as to be sensible to no remorse, as some are born blind, others deaf, etc., and others afterwards become so, yet all generous and ingenuous minds, however innocent their lives have been, since we are all subject to some lapses, must own they have been sensible of an uneasiness in themselves on a consciousness of mistakes, though no other person living knew them. They must also own that this uneasiness is of a kind different from fear, because fear has always a view to some future evil, but this will rise when there is not the least thought of any of those terrors that some would assign for the only cause of it. Also, though grief is a natural effect of it, yet it will be found to differ essentially from the other in this: that common grief has some exterior cause, as the loss of something dear to us, or some evil befallen us, but this is in itself an original cause, being an interior operation in the heart produced by a reflection on the idea of wrong in the mind, as naturally as love, fear, anger, or shame, etc. are produced by the ideas proper to excite them. Grief also, by being indulged for a time, is sometimes known to become even pleasant, but the lashes of conscience never. Therefore, whoever considers what has before been observed, that there is not the least motion performed in our whole frame without an adequate apparatus for it of nerves, muscles, etc.; that the interior texture of the heart, from its wonderful varieties of parts, may naturally and justly be conceived intended for as large a variety of uses; that the passions before mentioned, love, joy, fear, anger, shame, etc., are several operations of the heart distinct in themselves, and displayed as variously as their causes are different; whoever, I say, impartially and seriously considers all this, cannot but see and acknowledge there must be as adequate provision made by Nature for this operation of natural conscience, as for any other of the passions or affections whatever. It does not always indeed, like some of the rest, exert itself and work most strongly at first, but is sometimes lulled for a time, as Aeschylus most judiciously and with an excellent thought first represented his Furies asleep in the theater, until roused by the murdered person's ghost. And happy are those, who, agreeably to the tenor of the same fable in the following part, can at length be rescued from the scourges by a kind interposing hand from

Heaven. Yet when the crime is atrocious, however it may be made up, as in a glass vessel once broken, however so firmly cemented, the flaw still remains visible, not only in the sight of men, if known, which when,

No Penance can absolve a guilty Fame;

Nor Tears that wash out Sin, can wash out Shame. [10]

but even in the mind itself; as James the 4th of Scotland, for having been in arms against his father, wore an iron chain about his body, to which he added a link yearly after until his death, with many more examples that history affords of a voluntary penance. This is the force of conscience working in the heart of man, where the Author of Nature has placed it as the greatest guard and security for a social and regular life. Here in its adytum, its sacred apartment, the tribunal of conscience is erected for taking cognizance of all our actions, which, far above the reach of all bias or corruption, it impartially judges as they stand before it stated in the mind, and approves or condemns irreversibly and without appeal. Here is the “sancti recessus mentis,” the holy recess of the soul, in Persius [11]; this is the seat of Horace's Particle of Divinity [12]; of the god with which Cato, according to Lucan, was filled [13]; of the Genius of Socrates [14] that ever diverted him from wrong; of the god within us [15] that Pythagoras commanded his disciples, and they one another amongst themselves, not to thwart or disturb. It is the sovereign seat of that solid wisdom, the great rule and conductor of life, that the wise of all antiquity and of all ages have acknowledged, the place of reception or residence of whatever is allowed to Man to communicate with what is supernatural and transcends simple humanity, and herein all persuasions in matters of religion universally agree. Nor can any dissent who acknowledge any principles at all, and that there are such things as *final causes* in Nature.

As good is the object of love operating in the heart, but love, by its own force, often fixes on a good for the sake of its concomitant pleasure of an inferior kind, wrongly preferred to others of a superior dignity that reason would prescribe, the object of conscience is right and wrong in human actions, as reason dictates or determines. It might here be expected that, according to the method hitherto observed, these terms should be

defined or explained; but as they properly depend on *moral good*, a subject of too much compass for this place, and that is to be treated of in the next chapter, we need only observe here that perhaps there are no terms in Nature of which people more universally think themselves capable of judging, than of what is right or wrong in moral actions. There is therefore nothing further requisite in this case than simply to apply those notions, as every particular person's reason enables him to judge, for this alone is the object of conscience; because, of itself, as placed in the heart, it cannot naturally teach or show anything new, but the mind must first be furnished with ideas for the conscience to operate on, for it can frame none. Yet, as love and the several appetites rise immediately to the proper objects presented in the imagination that they were respectively fitted to embrace, and from the conformity of these to their own nature give them a new addition of force, but cannot be brought to affect anything that is not con-natural with them, so conscience, the supreme arbiter of all, watching over every other operation, every motion and action of the other passions, joins with the best, and ever most closely unites with love, when raised to the highest and most perfect object the mind is capable of conceiving. Thus fixing and most firmly adhering to what bears this appearance, whether actually conformable to the truth of things or not, so long as this appearance holds, it is not by any force to be separated or disunited from it. Hence it is that people, when they are firmly persuaded of what they believe to be a truth of the highest importance, become willing to undergo the greatest persecutions for it, sacrifice life itself, and choose to lose it even by the most cruel tortures, rather than forego the opinion that has appeared to them to be established on such a foundation. But when this has no other sanction than the party's own persuasion or belief, though their suffering is a sure proof of the firmness of their persuasion, it is none at all of the truth of their opinion; because it has frequently been known that different persons have at the same time been willing to seal their respective opinions with their blood, as it is called, though directly opposite and contradictory to each other, and this proof of the firmness of persuasion in persons of character who have set the example, has frequently proved most powerful argument in influencing others

to imitate the same. But though sufferings and example may greatly confirm the authority of truth in people's minds, yet they can add nothing to the real essence of truth, nor ever make that such which is not so in its own nature.

If any should imagine that these observations, which arise in course from the nature of the subject, may be interpreted to the disadvantage of virtue, piety, or true religion, the fault will lie on the interpreter and not on the writer, who is as sincerely a friend to these as any man living, and is firmly of opinion that, as their only solid foundation is truth, they never can be injured by any genuine production of it whatever. The subject of this discourse is Man, considered from what may now be observed in him, as he is truly and essentially finished off by Nature, with a view to the several ends for which it may be evidently discovered his several organs, faculties, and powers were originally adapted, and from thence to deduce our obligations to apply them to these, and to no other. For in this lies the perfection of every subordinate being, that it should truly answer the end of its being brought into existence; but this in relation to us is never in a natural way to be so effectually discovered as by the knowledge of ourselves, so far as it is possible for us to attain it. And in order to this, it is hoped, on what has been advanced in the preceding discourse, we may from the first chapter safely draw this general conclusion: that Man in his whole composition was formed for Society. And next from the others, that our exterior senses were ordered solely to give us notices of things without us just so far as they may be of use to us, and not to teach us their essential and specific natures; that the powers of our intellect are ordained to enable us first to apply the ideas those senses furnish for supplying our outward wants, and then to discover all necessary truths that have relation to our well-being and happiness in life, but that these reach no farther than the bare contemplation of truth, to distinguish one thing from another, without any other operation; that to enable us to obtain and enjoy the good necessary to our well-being, diverse appetites and affections are implanted in us suited to the nature of the objects, the union with which is attended with pleasure, and that from hence spring all our inclinations, and consequently all action; but that these affections or passions are extremely apt to

exorbitate, run counter and on a wrong scent from a mistaken choice, therefore judgment or reason is constantly to watch over them; that although it was necessary these should rise involuntarily, yet it is so ordered in our frame, in a manner different from all other animals, that our reason should have a command over them, and be able, by the particular provisions made in us for that end, to regulate and keep them under discipline; and lastly, the more effectually to attain this, there are particular affections placed in the heart to animate and invigorate our reason, such as honor, shame, and, above all others, *natural conscience*, from all which it is evident that the supreme Author of Nature has so constituted us originally as that there not only is, but we may clearly discover there is, a very ample provision made throughout our whole composition for our happiness here, and to render life truly a blessing. But as a great deal is said by authors on the *will*, and *moral good* has not yet been distinctly spoke to, it is necessary particularly to consider these two important heads, and from thence what has here been briefly summed up will be greatly illustrated. After which, it may be proper to consider the general causes of the vast deviation of mankind in all ages from their duty and their own real happiness, as also the most obvious means of reducing them not only to a just sense, but the practice of it, a subject that all must acknowledge to be of incomparably the greatest importance of all others whatsoever.

But before we leave this subject, it will be proper to observe there are several other names or things ranged by some in the list of the passions or affections, that have not been mentioned amongst the preceding. Particularly Descartes, who is allowed to have wrote more accurately on them than any before him, and most other writers since on the same subject have followed him in it, has placed *admiration* at the head of the passions as the first, giving this reason for it, that it is necessary and, accordingly, is intended for fixing our attention. Yet notwithstanding his opinion, the writer has ventured to omit it, for another very good reason, which is that he cannot discover how it can properly come within the character of a passion. The term *admiring* is used in a double sense in our language, as in the Latin from whence it is taken, and also in some others, as

signifying not only to wonder, but also to esteem, greatly to like, or to be pleased with. The first is the most proper, but when this is duly considered, it will be found only an effect upon the mind or intellect from something new or unexpected that puzzles or perplexes it, and is generally owing to our ignorance of the cause. One wonders at the feats of a juggler, the machinery of an opera, etc. because he knows not the arts of the first in concealing his methods of conveying his balls and of drawing off the spectators eyes while he imposes on their sight, nor in the other, the contrivance of the wires, by which the machines are played, nor the artful disposition of the colorings, lights, and shades, and when these become known, the wonder is over. But this concerns the understanding only, and Descartes himself acknowledges [16] admiration causes no change either in the heart or blood, and consequently, according to the doctrine here laid down, it is no passion, but to be excluded from their list. There are also other terms applied to the higher degrees of this, as surprise, astonishment, amazement, horror, etc., but in these the thing itself, besides its novelty, frequently carries something in its own nature with it that strikes or raises some of the genuine original passions or affections of the heart; and then both the head and heart, as in other cases, are affected, the wonder lies only in the first, as above explained. And on our imagining that what we say surprises or amazes is of a nature either immediately or by its consequences to affect our ease, safety, interest, etc., it will of course produce the correspondent passion or affection, as fear, grief, anger, etc., in which the wonder bears no part at all.

Admiration in the sense of esteem, liking, or approbation, is wholly of a different kind, being no other than an affection in the heart, some degree of love rising to what the judgment pronounces, or the imagination represents, good or valuable. *Contempt*, which some also number amongst the passions, is the direct opposite to this, for aversion, or some degree of hatred, accompanies the contrary appearance. The Latins use for the first the word susplicere, which is properly to look upwards upon a thing, as despicere is to look downwards on, or to condemn, it. Objects of the first kind are, by the tenor

of the language, supposed to be placed above, and the other below us. [17]

But there are other qualities reckoned by some amongst the affections, which may appear more justly to claim a place with them, such as benevolence, generosity, avarice, gratitude, compassion, cruelty, and the like, but all these may be more properly ranged amongst the virtues or vices, of which more also in the following.

Inward disposition of the soul

On these and the like, this general consideration further occurs, which is of the vastest importance to us, and accordingly cannot but very deeply affect us. That is, that while the thoughts of the brain are of a transient and fleeting nature, formed, as was observed before, by the different ranging of ideas, but the affections are more permanent, some more and some less so, as joy and grief may be very soon raised or laid, but some others, as love and hatred, proceed more gradually, there is yet another root more deep and more difficult to be accounted for, the general inward disposition of the soul or mind, in which there are found rather greater differences than even in the make, stature, beauty, or strength of the body, and not less than in the capacity or natural abilities of the head or understanding. For some are known to be radically and by nature sordidly covetous; others profusely generous; some think they can scarce ever balance a favor received; to others it is a pain to think of one, and they hate the man that has obliged them; some are on all occasions compassionate and what we call tender-hearted; others are not only hard as the flint, but even delight in cruelty; and so in other cases. These remarkable differences in people's natural dispositions and capacities, with others equally observable in their fortunes, putting men in all ages upon inquiring into the cause, led the Ancients very early to impute them to the different aspects and configurations of the stars, but principally of the planets, because of the varieties they observed in their motions, and it is not improbable but that the notion may be well-founded in Nature. But excepting that they showed some judgment in assigning to the two planets nearest on each side of us, Venus

and Mars, the powers of influencing love and war, which two, we see, are the grand prevailing passions in all the species of animals on this globe, their whole pretended science of astrology was made up of such ridiculous and inconsistent absurdities, that it is astonishing to think how it was possible that persons of such excellent understandings, as some who professed it were in other respects, nay, that whole nations, should suffer themselves to be so bewildered and misled. It may, I say, be thought highly probable that the celestial bodies have a very great influence on the productions of the Earth. But since we may be assured of this, that no man yet has ever discovered rules by which they could, with any appearance of certainty, or even of consistency with reason, be judged of [18], nor is there the least probability that any ever will be known, or, if they could, might it be of any advantage to us, it becomes us to lay the thought entirely aside and to apply ourselves to what we know is, or may be, truly in our power for rendering our lives easier and happier in our respective stations.

For what depends not on ourselves, there is a strong presumption in favor of such as are descended from virtuous and worthy parents and progenitors. That “*Fortes creantur fortibus et bonis: est in juvenis, est in equis patrum virtus, etc.*” [19] is a received and not ill-founded notion, yet it is far from generally holding true, and more may be owing to instruction and example, in setting the minds of youth right in their education, than blood. Notwithstanding both which, it is well known for a melancholy truth that sometimes the most worthy, the most virtuous, and careful parents, have been cursed with the most vicious children, of which that best of men, the Emperor Marcus Antoninus, and his son and successor one of the worst, were as flagrant an instance as perhaps was ever known.

To be well-descended is a great advantage, and to be well-endowed by Nature is a vastly greater. But however these prove, this is certain [20], that there is no person so unhappy in either of these, who, if he has but a moderate share of common sense, and is capable of forming a resolution, may not by proper endeavors greatly correct and supply the failures of Nature, which are scarcely ever absolute defects, but rather some imperfections or perversions. Were a person born without eyes,

it is most certain he must ever remain blind, yet many we know have been born blind, who, notwithstanding, have by proper measures been brought to see; and to have the lost sight restored is yet less uncommon. It is the same in the case of virtue and vice. The seeds of the first are as generally implanted in us as eyes are given to our species and other animals, and the defects of the mind, though of vastly greater importance, are, by application and diligence, much more easily cured than those of the body. Every man has it in his power to experience this in himself, and to find how much more readily he may master a passion, than he can remove a cough or cure an ailing tooth or finger.

That this is in our power, and that it was intended and so ordered in our formation that our passions should be subject to our reason, was the design of this chapter to show. In some, it is very true, they are much stronger than in others, yet still we are so framed that they may be subdued, and if the conquest should prove difficult, it is still the more glorious. It is a prize that cannot be purchased too dear, nor too earnestly contended for. Our happiness depends on it; it is the highest we can attain.

Fortior est qui se, quam qui fortissima vincit

Monia, rec virtus altius ire potest.

Our selves to conquer yields the noblest prize,

Nor to a loftier pitch can virtue rise.

LOGAN'S NOTES

[1] Hesiod, in his *Theogonia*, or genealogy of the gods, makes Chaos the first of all things, next to this the Earth and Tartarus, and Love co-eval with these. Ver.120. Parmenides, also an old philosopher and poet whose works are lost, is quoted to the same purpose by Plato in his *Symposium* in this verse [Greek text: "First among the gods she invented Love." Walter Hamilton, trans., *The Symposium*. Middlesex: Penguin Books, 1951, page 42.] The ancient and heavenly Venus and Love are there also distinguished from the common.

[2] These two names have been taken notice of by authors, for two odd particulars related of them. That of the first comes to be the better known from these lines of Horace—"Deus

immortalis haberi dum cupit Empedocles, ardentem frigidus Aetnam insiluit,” as if that sage, to be reputed a god, had thrown himself into Aetna's flames—and Desprez, though one of the three best commentators in *Usum Delphini*, on his name in Horace, *1 Epistle* 12, is so weak as to give into it, but it can be no other than a mere fiction. The other is said to have been always weeping for the follies of Man, as Democritus is said always to have laughed at them, and they are both mentioned in these two respects by Juvenal in his excellent 10th *Satyr*. That Democritus ridiculed the vain anxious cares of mankind and was called *the laugher*, and that Heraclitus scarce ever laughed, but was always grave, and lamented the wickedness of his countryman the Ephesians, whom he in vain attempted to reform, are both true, but it appears from his extant letters in Laertius that his constant weeping is only another fiction, and Juvenal, in his “mirandum est unde ille oculis suffecerit humor,” [“the wonder is how the other sage's eyes were supplied with all that water...” *Satyr X*] carried it too far.

[3] It should be further observed, that whatever the mind approves is called good here, and the application of the heart to it, of whatever kind it be, as an action or event, etc., when raised to it as a good, is here accounted love, and this should be duly remembered, otherwise some things here delivered here will be scarce intelligible.

[4] It is very observable that in all antiquity, the notion that human nature was lapsed from a happier state to a more degenerate universally prevailed, and Ramsay in his *Travels of Cyrus* has prosecuted this subject to good effect. Amongst the Greeks, who derived most of their theology from the Egyptians, they had this story: that Prometheus and Epimetheus were two brothers of divine extraction. Prometheus, undertaking to form men of clay, stole heavenly fire from the Sun to animate them. Jupiter being angry at this called a council of the other deities, in which it was resolved that a most beautiful woman should be formed, and each of the gods should bestow some one gift on her. Accordingly she was furnished with all the alluring and deceiving arts that could be thought of, from whence she had the name Pandora, or all-gifted. She had also a fine box into which was crowded all the diseases and miseries that have ever

attended Man, but to those, hope was added. With this present she was sent to Prometheus, who rejected her, but his brother Epimetheus embraced her and it, and opening the box, the whole swarm of diseases that afflict mankind broke out. Affrighted at which he clapped to the lid, but too late, for all were escaped into the wide air, and only hope remained in the bottom.

[5] *Malum.*

[6] Juvenal, *Satyr 13*, V.189: "... Quippe minuti semper et infirmi est animi exiguique voluptas ultio. Continuo sic collige, quod vindicta nemo magis gaudet quam femina...."

Revenge which still we find

The weakest frailty of a feeble mind.

Degenerous passion and for man too base,

It seats its empire in the female race;

There rages, and to make its blows secure,

Puts flattery on until the aim be sure.

[7] Virgil, 3 *Aeneid*.

[8] Of the tragedies of Aeschylus, the oldest tragic poet, we have seven remaining, three of which relate the story of Agamemnon, the General of the Greeks in the Trojan War, who on his return home after ten years absence was murdered by his wife Clytemnestra and her paramour. Their son Orestes, who was sent abroad young, returning when of age, killed his mother, for which he was haunted by the Furies, as in Aeschylus's *Cloephore* and his *Eumenides*, or the Furies, in which they were brought on the stage in such frightful shapes, that it is said some women spectators miscarried on the sight. We have one also of Sophocles and two of Euripides on the same subject, but it was forbid to represent the Furies themselves anymore.

[9] Juvenal *Satyr 13*, v. 192: "... Cur tamen hos tu evasisse putes, quos diri conscia facti mens habet attonitos et surdo verberare caedit occultum quatiente animo tortore flagellum? Poena autem vehemens ac multo saevior illis quas et Caedicius gravis invenit et Rhadamanthus, nocte dieque suum gestare in pectore testem."

["But why should you suppose that a man escapes punishment whose mind is even kept in terror by the consciousness of an evil deed which lashes him with unheard blows, his own soul ever shaking over him the unseen whip of

torture? It is a grievous punishment, more cruel far than any devised by the stern Caedicius or by Rhadamanthus, to carry in our breast by night and by day one's own accusing witness." G.G. Ramsay, transl.]

[10] [Matthew] Prior in *Henry and Emma*.

[11] Persius, 2 *Satyr*, v.71: "Quin damus id superis, ... compostum ius fasque animo santosque recessus mentis, et incoctum generoso pectus honesto." ["Why don't we offer the gods... justice and right blended with the spirit, a mind pure to its inmost depths, a heart steeped in nobility and honor."]

[12] Horace, 2 *Satyr* 2, v.79: "affigit humo divinae particulam auras." ["fixes to the ground this particle of divine breath."]

[13] Lucan, L.9, v.564: "Ille (Cato) deo plenus tacitaquem mente gerebat, effudit dignas adytis e pectore voces, 'Quid quaeri, Labiene, jubes? an liber in armis....,' with the rest of that admirable speech. ["... of godlike thoughts borne in his quiet breast, this answer uttered, worthy of the shrines (Cato), 'What, Labienus, dost thou bid me ask? Whether in arms or freedom....'"]

[14] The Genius or God of Socrates is spoke of by many authors. Plutarch wrote a book under that title which we have, and Apuleius another, *de Deo Socratis*. What this was could never be known, if Socrates himself, who was certainly a very good man, was truly sincere in the point. It appears from his own account of it in Plato's *Theages*, to have been some extraordinary sense within him that checked and forbid when any new thing arose in his own mind, or was proposed to him by others, that would not have a good issue, but never incited him to undertake or do anything. Yet if it be well considered, it might probably be no other than the result of his excellent judgment, tempered by the great probity of his heart, which, in a mind perfectly composed, may appear to carry something of divinity with it; yet there are some particulars told of those hints given him that appear extraordinary, and not to be accounted for.

[15] "Μή διασπᾶν τὸν ἐν ἑαυτοῖς θεόν." ["not to tear away the god within them."] Iamblichus, *de Vita Pythagorica*, Cap. 33, n. 240.

[16] *Passiones Animae*, Article 71.

[17] Yet admiration may be, and often is, taken in both these senses complicated. We may stand or be rapt in admiration of the works of the Creation, of the contrivance of an orrery, of the solution of a problem, of any beauty, etc., but this is no other than contemplation with a complacency, which will be more fully considered and spoke to in the next chapter.

[18] To judge of the foundation of the rules in astrology, take this short account of them. It was observed the Moon made 12 revolutions up to the Sun, while the Sun made one about us (but she [the Moon] truly goes more than 13 times round us in a year), hence they divided the heavens into 12 equal parts, and, imagining the fixed stars in those parts formed into the shapes of diverse animals, they called them *signs*. Finding 7 planets, they assigned to them the dominion over those signs. They found, as they lived on the north side of the equinoctial, that the Sun was hottest when in that sign they called the Lion, that is in our month of July, though it is just the contrary on the other side of the line, and therefore they assigned Leo to the Sun for his sign; to Lady Luna as his consort, they assigned the next at his left hand, Cancer or the Crab; to Mercury as next, they assigned the next two signs on each side, Drago before and Gemini behind; to Venus, the next two on each side, Libra and Taurus; to Mars, the two next before and behind, Scorpio and Aries; to Jupiter, the next in course each way, Sagittary and Pisces; and to old Saturn, the other two, Capricorn and Aquarius, which both fell in together. Now on this whimsical distribution, grounded on no better a foundation than that the Sun's rays in our northern hemisphere are found hottest in July, the main principles of their whole science turns. Their 12 houses, which is another kind of division, is altogether as whimsical; their notions of trines and sextiles being favorable, but quartiles unfriendly, aspects, is altogether as ridiculous; their directions and profections, by which they pretend to judge of and foretell the whole course of a person's life, are mere imagination. And yet to this senseless study, though no better grounded than the common fortune book invented for cheating or amusing young folks, children, and fools, have many very great men entirely devoted themselves. And about the time of the Reformation, though Picus of Mirandola had some little time before wrote earnestly and

judiciously against it, it was exceeding high in reputation, or at least in vogue and practice. Even Melancthon himself, by much the best, as well as the most learned, man then concerned in that cause, was as deeply as any engaged in the study.

[19] “The brave spring from the brave and good, the colt and heifer exert the courage of their sires, etc.” Horace, *Odes*, L. IV, 4.

[20] Horace's lines are worth quoting on this head, *Epistles*, L.I, 1:

Fervet avaritia miseroque cupidine pectus?:
Sunt verba et voces quibus hunc lenire dolorem
Possis et magnam morbi deponere partem.
Laudis amore tumes? sunt certa piacula, quae te
Ter pure lecto poterunt recreare libello.
Invidus, iracundus, iners, vinosus, amator:
Nemo adeo ferus est, ut non mitescere possit,
Si modo culturae patientem commodet aurem.
Virtus est vitium fugere, et sapientia prima
Stultitia caruisse....

Doth creeping avarice thy mind engage,
or doth it boil with fiery lust or rage?
Why there are rules and precepts that can ease
Thy pain and cure great part of thy disease.
Or art thou vain? Books yield a certain spell
To stop thy tumor; You shall cease to swell
When you have read them thrice and studied well.
The rash, the lazy lover, none so wild
But may be tame, and may be wisely mild,
If they consult true wisdom's rules with care
And lend to good advice a patient ear.
‘Tis virtue Sir, to be but free from vice,
and the first step toward being truly wise.

Chapter 5:

Of Moral Good or Virtue

Having in the two last preceding chapters considered the intellect and affections, our next important subject ought to be the *will*, on which alone the regulation of our whole conduct in life [depends]. But because this may be more fully and effectually spoke to when *moral good* or *virtue* has also been considered, it will therefore be proper in the next place to proceed to this.

The distinction between natural and moral good has already been mentioned, and there are few who do not imagine they have a notion clear enough of what is meant by it, as it bears the name of virtue. But by what principle we are obliged or led to the practice of it, or whether naturally by any, or otherwise than by the authority of laws or religion, has been greatly contested, nor does the point appear to this day to be fully agreed,

The Ancients almost universally agreed that Man was formed by Nature for Society, and therefore that he is obliged to observe and practice whatever tends to the good of the community of which he is a member. This alone is a very good and comprehensive rule, and it was in all ages generally acquiesced in as sufficient, until Hobbes of Malmesbury, as has been already observed, in the reign of Charles the First, moved by the distractions of his country and to oppose the wild notions that then prevailed, that he might (as he thought) the more effectually demonstrate the necessity of civil government and of a due submission to its powers, unhappily stumbled on that most detestable notion of his own, that the state of Nature in respect to Man was a state of war; that consequently all men are naturally enemies to each other; that only fear brought them into Society, and to form communities. Which notion, wild as it is, got such astonishing footing after the Restoration, that diverse of the more judicious who considered the destructive consequence of a doctrine subversive of all the sacred and endearing ties that should engage men in social life, and that minister all the

comforts of it, strenuously opposed the hypothesis and its author, and both then and since that time many pieces have been wrote to expose the pernicious opinion, and to establish our obligation on a more rational foundation.

To enumerate the several English tracts then published against that author, were it in the writer's power, would be but to little purpose. Those chiefly of our own country that have fallen under his notice and appear to carry weight with them, are such as these that follow.

Robert Sharrock of Oxford, afterward Doctor of Laws, published in the year 1660 a valuable piece in Latin of the duties of Man [1] according to the law of Nature, and seems to be the first who attempted to supply the great defect, complained of by Lord Verulam, that due care had not been taken to establish the *fons juris* on some certain principle for a foundation of morality, from which all obligation was to be deduced. And his was this: That the end of every worthy and virtuous action is to remove uneasiness and enjoy a serene tranquility, which are (he says) what the Ancients understood by pleasure. [2] a notion which, at first view, may to some perhaps appear below the dignity of Man, yet his doctrine built on it is most solid, and the book well deserves to be better known and more read.

Bishop Cumberland, about a dozen years after, published, also in Latin, his learned treatise *de jure Naturae, Of the Law of Nature*, which is to prove this principle: That the greatest benevolence of every rational agent towards all, forms the happiest state of every and of all the benevolent, as far as is in their power, and is necessarily requisite to the happiest state which they can attain; and therefore the common good is the supreme law. [3] This he has labored from all topics to establish, and there are many excellent thoughts in the book, but the Bishop appears to have been too full of thought to digest or display it regularly, and therefore he is apt sooner to tire his reader than effectually to instruct him, or furnish him with any series of solid argument. James Tyrrell, who was also a turbid writer, endeavored to state the doctrine of that book more clearly in an English piece published in 1692, but it does not appear that there has been much notice taken of it.

About the same time with Cumberland, Pufendorf [4] published his excellent work of the law of Nature and nations, in which, as Grotius in his prolegomena *de Jure belli ac pacis* had done before him, he shows that Man, by the law of Nature, was formed for Society, and that this law flowed from the will of God, and this with right reason they both lay for the foundation of their superstructure. But Grotius proceeds more on the authority of example, Pufendorf on that of the opinion of authors; but whatever difference there is, as they are both excellent, it may be owing only to the difference of their subject. John Selden also, who was contemporary with Grotius, wrote a learned piece of the law of Nature and nations, but it is *juxta disciplinam Hebraeorum*, and therefore mostly limited to the Jewish nation, yet in Lib.1, c. 8 he treats of the law of Nature to very good purpose; but both he and Grotius wrote before Hobbes.

In Queen Anne's reign, the deservedly celebrated Dr. Samuel Clarke, in his introduction to the *Evidences of Natural and Revealed Religion*, delivered in his sermons preached on Boyle's foundation, lays down this for his fundamental proposition: "That there are necessary and eternal different relations that different things bear one to another, and a consequent fitness and unfitness of the application of different things or different relations one to another, by which the will of God determines itself to act what is agreeable to justice, goodness and truth, for the welfare of the whole Universe; and these ought to determine all rational beings to act by the same rules, for the good of the public, in their respective stations, and they lay on them an obligation so to do." And this as here expressed is that grand principle of *reason*, on which, without regard to any thing else in our nature, some later writers are for building the whole system of our natural and moral duties.

The moral sense: Shaftesbury, Hutcheson

A few years after, in the same reign, the polite author of the *Characteristics*, in his inquiry concerning virtue, as also in his *Moralists*, advances a scheme that, in his beautiful dress of it, appears new, which is, in substance, that the whole of all things

making one universal system, all the parts of which are relative one to another, nothing is good in it but what is some way useful to that system, nor ill that is useful, and the same obtains in the parts which compose lesser systems included in the whole. That mankind making one of these, his merit consists in his disposition to promote the good of that system of which he is a part, and consequently of the whole. And for this end it is so ordered that, as his outward senses can discern the beautiful, the harmonious, etc., and their contraries in outward objects, so his mind has also its eye and ear capable of distinguishing the fair and foul, the harmonious and dissonant, and the right and wrong, in behaviors, actions, and affections; and that he is endowed by Nature with propensities to approve the one and condemn the other, and with a genial benevolence towards his whole species. That this sense, he conceives, is as natural to us as natural affection, and therefore he calls it the *moral sense*, from whence the form is come into use with others.

The modest and learned William Wollaston, in his excellent system of *Religion of Nature*, which he pretends only to delineate, observes thus: “That the acts of men being distinguished into good, evil, and indifferent, for ascertaining the difference between these, there has been a long and laborious inquiry after some general idea or some rule by comparing the aforesaid acts, with which it might appear to which kind they respectively belong, and though men had not yet agreed upon any one, yet one certainly there must be,” and he proposes the following, which (he says) “has always seemed to him not only evidently true, but withal so obvious and plain—and the application of it so easy, that if things are but fairly permitted to speak for themselves their own natural language, they will, with a moderate attention, be found themselves to proclaim their own rectitude or obliquity.” And premising that no acts can be denominated morally good or evil but those of intelligent and free agents, his rule may be thus briefly stated: that truth being the conformity of those words and signs by which things are expressed to the things themselves, things may be denied to be what they are by deeds, as well as by express words; that no act, whether word or deed, that denies anything to be as it is, can be right; omissions also to act according to the truth of things are

wrong; [5] hence, the great obligation on Man is to conform his actions to the truth of things.

Not long after this, Francis Hutcheson published his *Inquiry into the Original of our Ideas of Beauty and Virtue* in two parts, the first of which is a fine performance on the plan given by Crousaz in his *Traité du Beau*, Amsterdam, 1715: Chap.3.1,2, where he founds beauty on variety with uniformity, in the other on moral good and evil; and in a 2nd treatise, his *Essay on the Nature and Conduct of the Passions*, he takes up the Earl of Shaftesbury (author of the *Characteristics*) his moral sense, which he prosecutes in both pieces to very great advantage, but without mentioning either of his authors. The meaning of this moral sense and the substance of the whole doctrine of it, may be taken compendiously from his illustrations in his 2nd volume, p. 211, in these words: “That we have not only self-love, but benevolent affections also towards others, in various degrees, making us desire their happiness as an ultimate end, without any view to private happiness. That we have a moral sense, or determination of our mind, to approve every kind affection, either in ourselves or others, and all publicly useful actions which we imagine do flow from such affection, without our having a view to our private happiness, in our approbation of these actions.”

This doctrine of the moral sense was not long after opposed by a clergyman [John Balguy, 1686-1748], as the title of his little piece indicates him, called *The Foundation of Moral Goodness, or a further inquiry into the original of our idea of virtue*, parts 1st and 2nd, wherein (part 1, p. 10) he says: “If we impartially consult our ideas,” he is persuaded, “we shall find moral goodness no more depends originally on affections and dispositions, than it does on laws, and that there is something in actions absolutely good, antecedent to both,” which in the sequel he shows is the reason of things. And having made his objections for the subversion of that opinion of virtue being founded on the affections, and of the moral sense, he proceeds to establish his own, on the foot of the principle of reason as advanced by Dr. Clarke.

As F. Hutcheson’s pieces are extremely well done in that way, so this last author treats him and the subject with candor

and decency, which is more than can be said of the before-noted author of *The Procedure, Extent and Limits of Human Understanding*, [Peter Browne, c.1665-1735] who treats the term moral sense with ridicule, and with the same freedom he does everything else that has the ill-fortune to be disliked by him.

These several opinions being thus stated, they may be distinguished into three several heads. The first has for its original principles hatred and fear, and utterly destroying all notions of moral good as subsisting on the basis of Nature, founds Society only on compact and law; but this, as it is now generally exploded, must forever by all men of sense and probity be held in detestation.

The 2nd owns a fundamental principle for it in Nature, by making one universal law obtain through the whole, which evidently manifests itself in the established order of the Creation; and that human reason, acting conformably to this, directs us to act up to the same order and make it the rule of all our actions. This therefore turns wholly on reason.

The 3rd asserts a natural bent in the soul of Man to good, from implanted affections and inclinations, that lead him to benevolence and a concern for the public good, for which end a moral sense is given. And these two last are the foundation of all the several schemes, except Hobbism, that have (as far as the writer knows) been offered to the world.

And though they have of late been so far distinguished as to become the subject of some little controversy, yet by former writers, as the Ancients, Grotius, Pufendorf, and all those who asserted Man formed for Society, they were complicated and both taken together. Cumberland draws strong arguments from both, but seems best pleased with those furnished from the moral sense; and if we take Sharrock's principle in its just and genuine sense, that also will be found mostly to turn on the same. Nor do those who distinguish themselves as assertors of either of these particularly, absolutely deny the other, for to deny reason, or the use of it, in directing the natural affections, would be too ridiculously absurd for any man to attempt it. And the late champion for the cause of reason in derogation of the affections by no means rejects them, for Part 1, pa.7, he says thus: "That the Author of Nature has placed in our minds benevolent

affections towards others, cannot be denied without contradicting experience and falsifying our own perceptions. Whoever carefully reflects on what passes within his own breast, may soon be convinced of this truth, and even feel the evidences of it, etc.," and he allows them to be "auxiliaries seconding reason, etc."; also pa.12, he owns their "great use in prompting us to what is good, and stimulating us to our duty." But then, pa.30, he says that, though he grants "the reality of such affections, and the usefulness of them in respect to human nature," yet he "can by no means look on them as essential to virtue, nor can think that an instinct has a place in its constitution," and adds that "to speak properly, reason was not given us to regulate natural affection, but natural affection was given to reinforce reason, and make it more prevalent."

These quotations in the author's own words fully show his notion of the whole, and the writer of these sheets would never think himself concerned to examine any particular person's or author's sentiments if they were only his, or were entertained but by some few. But the book seems to be not only deservedly esteemed, as it is well-wrote and a very handsome performance in that way, but it is further highly probable that this notion of the foundation of virtue is greatly approved and applauded by all such as think there can be no greater service done to Man, than to exalt his dignity and his distinguishing characteristic, reason, to the highest, to make it co-essential with, or at least an efflux of, the eternal reason, the rule and law of the Omnipotent; and, as virtue is by all allowed to consist in a conformity with reason, the practice of it, if founded on so heavenly a principle, must be proportionably ennobled, and Man consequently acting by its rules becomes by much the more exalted being.

Hence it must be that the mentioned author conceived "the mistakes he thinks the author of the *Inquiry into the Original of our Ideas of Beauty and Virtue* has committed, (in founding virtue on the moral sense) are of the utmost consequence, and that they lie at the foundation of morality." He urges also, pa.19: "That it deserves to be considered how much virtue is depreciated and dishonored by so ignoble an original."

Amongst his reasons for asserting a nobler for it, and for his being dissatisfied with that author's scheme, he (pa8) gives this: "That virtue appears in it to be of an arbitrary and positive nature, as entirely depending upon instincts that might originally have been otherwise, or even contrary to what they now are, and may at any time be altered or inverted, if the Creator pleases." But he says, pa.23: "It is no more in the power of the deity, to make rational beings approve of ingratitude, perfidiousness, etc., than it is in power to make them conclude that a part is greater than the whole." Also pa. 33 to the same purpose, that "things when once brought into existence, and constituted in such or such a manner, those agreement or disagreements, wherein truth consists, flow necessarily from their respective constitutions, and by consequence neither depend on the perceptions of intelligent beings, nor on the will of the Creator himself." Which last may in one sense be very true, but if the Creator's will is always co-operating in his Providence, such language might much better be spared.

These quotations, though not taken in sequence, yet it is presumed their ingenious author will acknowledge that as here stated they express his genuine sense, without injury to his meaning. And if his sentiments are in some measure opposed in the following, he may be assured it proceeds not from any spirit of contradiction, but is the result of those plain deductions that, as the writer conceives, flow naturally from the principle first laid down and the method in which it is considered, without the least bias or propensity to any previous notions or opinions whatever.

But in relation to the last quotations, he must crave leave here to express his astonishment at the liberty so often taken by authors in expressing what they conceive an impossibility, by declaring it is not in the power even of God, [6] which must be owing to this superlative exalted notion of reason. For if it be of the same essence with that which is a law on the Creator himself, then, consequently, who can have a better right than those who are sharers with him in the same principle to judge and determine what may or may not be within the limits of his power? But whencesoever it arises, the writer owns it has ever been shocking to him, and appears highly presumptuous. To

swear by a name is an acknowledgment of the greatness of the power or of the excellency of what is signified by it, and yet such reverence is allowed due to the sacred name, that to use it in that way in conversation is now accounted ill manners, and therefore by the polite is even for that reason avoided. Nor in France would such a liberty taken with their King, whose health they must not drink, be tolerated. How much more then ought such weak, depending creatures as we are, who know not the real principles of so much as any one single motion in our bodies, to be cautious?

That reason is a great and noble gift of heaven granted to Man for the discovery of truth in things corresponding with our condition here; that it enables us to observe congruities or fitnesses, not only of such things and their parts as are immediately subjected to the cognizance of our external senses, but also more internally, of the ideas of actions, of behavior, and of conduct in life; that it is capable of judging of its own ideas and operations, of our affections, passions, and appetites; that it can often discover and trace up effects to their causes, discern and contemplate the beauty, regularity, and order that shine out in all the parts of the Creation that have relation to us and our faculties, and equally doubtless in the whole; and from this view, point out how we ought proportionably to regulate our own inward conduct and that of all our actions; and further that, by its means, we are conscious of all this, can reflect on what passes within us, call up our past ideas, collate and form judgments on them, and thus from the proper attending powers planted also in our constitution, enjoy refined pleasures from knowledge and contemplation, exceeding all others that we are susceptible of from our formation.

That reason, I say, is capable of all this, and was granted for these and such ends, is what we ever ought to be persuaded of, and most gratefully acknowledge the divine goodness in bestowing on us so noble a faculty. But while all this is acknowledged, we ought at the same time to be modest enough to carry its claim no higher than its own proper and genuine right can raise it. We ought not, in a natural sense, like what is said of the giants of old, attempt to seek heaven with it, lest we fall too much under the moral of that pagan fable, or depend on waxen

wings, or be found too nearly imitating what Bergerac tells of himself, that he mounted to the Sun on light casks carried up by smoke from elementary fire. For even the author of the *Foundation, etc.* himself, who appears as deeply as any in the party for exalting reason, gives us no other than this definition of it, which is a very just one, that it is a faculty enabling us to perceive, either immediately or mediately, the agreement or disagreement of ideas, whether natural or moral; and our own ideas, he must mean undoubtedly. But if these ideas and their rise, as truly represented in the preceding two chapters, be duly considered, and how this faculty is liable to be disordered by distempers or strong liquors inflaming the blood, [7] we may sadly be convinced how little reason we have to magnify it to divinity. The great Selden who, in his 6th, 7th, and 8th chapters of the first book of his work before mentioned, has excellently treated of it, was probably the first who distinguished it into two kinds under the same name. And considering it under the first, as it is generally denoted by the name of understanding, or the ratiocinative faculty, which is the proper subject of Locke's *Essay*, that is the pure and simple "faculty itself, undirected by any superior authority or engrafted principle pointed out to us our duty," he observes [8]:

[T]hat to admit reason in this sense as a criterion to judge by, we shall not find it so steady and certain a rule for distinguishing between good and evil, as that it will always discover to us what is best and most eligible. Nor, were it ever so certain and steadily the same, could our obligations, or the knowledge of what is permitted, be derived from thence as their cause or the authority on which they are established. For as to the uncertainty under which the free use of simple reason has in these cases ever labored, to say nothing of the herd of mankind, who are very little practiced in the careful use of it, there is no man who has had the advantage of literature, but knows how various the opinions, how vastly wide and how a warm the disputes were concerning good and evil, proposed as ends for action amongst the great professors of right

reason, the philosophers, nor was there ever any authority found sufficient to decide upon the question. The differing sects were various and manifold, and so large a swarm there was of different notions and opinions, which every inquirer, proceeding on his own strength and lights, professed he built on the most exact and solid dictates of reason, that philosophy split into no less than 278 several sects that in some respects would more or less be different one from the other, as was noted by Varro, the most learned of all the Romans.

This excellent author therefore in this next chapter, wholly rejecting this reason for a foundation of the *jus naturae*, or right as founded in Nature, goes on to consider it [9] “as derived from, or established by, the command, authority and indication of the parent of Nature, the Supreme Being,” and proceeds to show, “that as well very great philosophers, as Christian Fathers, and also civilians or lawyers, have expressly taught his doctrine, that God as the parent of Nature and Supreme Ruler of the Universe, has planted in the mind of man, pointed out and commanded some certain things, distinctly characterized under the terms of good and honest or honorable, to be observed, and other things in the like manner to be distinguished under the name of evil or dishonest, and from these collectively is the *jus naturale* or the law of Nature composed.”

That the author of *The Foundation, etc.*, and all those who write in his sense on that side, must be forced to explain themselves as meaning this kind of reason, is not in the least to be doubted, more than it is that their intention is perfectly good, and that to promote the cause of virtue is truly and honestly their aim, equally with that of those who write on the side of the affections. But that by these words of the great cited author, the moral sense is truly intended, must be plain to every man who understands the subject; and which of these are in the right, or whether either or absolutely so, is a point that requires, and must by all be allowed highly to deserve, a thorough disquisition. Nor is it to be doubted but those who consider the importance of the question, which is no less in itself than to discover the true

foundation of our duties as laid in Nature, will be good-natured enough to take kindly any rational attempt modestly offered towards a solution.

It was in a great measure with a view to this, that the writer first took it into his thoughts to range and commit to paper the notions he had entertained long before. And in the following inquiry into this point particularly, as he owns he writes in some part for his own entertainment, if, where the road appears pleasant, he sometimes expatiates beyond what the subject may seem directly to require, he hopes he shall be indulged in sometimes venting his crowding thoughts, and be excused; and he acknowledges it is proper he should make this motion for more parts of the present tract than one. What has already been observed in the preceding chapters, if duly adverted to, will render what now comes under consideration much more familiar and easy. In the last, all that passes within us, and can come directly under our notice, was ranged under these four: our appetites and their sensations; sensations from our eternal senses; our affections and passions; and our intellectual faculties comprehending all those that are lodged in the brain. But we must, in this search, more particularly inquire into the springs of Nature, of pleasure and desire, not so much physically as historically, that is, not into the organization of our parts by means of which they are produced, but what in respect to them is truly fact, which all persons of a moderate share of understanding, without any further skill, have an equal and right sufficient abilities to discover and know, if they will but be at the pains to reflect on what passes within themselves.

Art, beauty, and the moral sense

It has been shown, and every one is sensible from experience, that the pleasure arising from the gratification of our appetites is lodged in the same parts with the appetite itself, and that, when the cravings of Nature are moderately and regularly satisfied, whether they proceeded from want or repletion, a sense of pleasure is, from the refreshment, diffused over the whole frame. It has also been observed that, in these, there is further at least one of our external senses at the same time gratified, as the

taste, and perhaps the smell, in satisfying hunger, as the taste may also be in that of thirst, and in so in others. It has also been noted that, in the gratifications of these three of our senses, the touch, taste, and smell, the pleasure is perceived in the organs themselves, and all these are directly subservient to the body only. Nor is it necessary to repeat here what has already been so largely dwelt on, that these, and all other kinds of pleasures, depend entirely on the formation of the organs, in being so suited to the objects, that when they meet, their fitness and agreement, where there is sense, produces the delightful sensation. To which may be added that, even where there is no sense that we know of, we may observe a just resemblance of the same, as in the different faces vegetables put on when the parched Earth is refreshed by kindly showers of rain, Nature, in the surface of the Earth and its productions, then seeming to smile and put on a countenance of gladness; so that all Nature appears to subsist in these fitnesses of things as they are formed, one to suit the other. But with us, it is so ordered that these agreements should be attended with sensations of delight, so that care has been taken, not only for our subsisting, but also, from the same means, there is a provision made for our pleasure, to render life, in all the offices subservient to it, happy, or at least comfortable here.

In the other two senses, sight and hearing, it is so ordered that, not only the organs themselves should be affected with some pleasure, but their nerves also should be sensible of a greater within the brain.

The eye is in itself refreshed and delighted with some colors (as was observed before in the chapter on the senses) more than with others, but we are sensible of a much greater pleasure from the beauty of objects, that we believe subsist in the things themselves, without relation to our passions or appetites: as in landscapes, gardens, ranges of trees, the forms as well as the mixture of colors in flowers, a well-shaped animal, graceful action and motion, regular buildings, and especially in the just assortment of parts in any complete pieces of workmanship that give advantage and luster one to the other. But though there are none who have the use of sight, but can discover and distinguish beauty in objects, or see what is agreeable in them to their own taste, yet very few there are, if any, who can absolutely

determine wherein what pleases truly consists; and yet less, what is chiefly considered there, wherein, and in what part of us, that pleasure is particularly lodged. Nor is anything further pretended to here in this point than rational guesses, if even these can be happily made. That beauty itself has been referred by two authors to variety with uniformity as its foundation, has already been mentioned, and that it very much depends on proportion (that which gives the true uniformity in this case) has been a general opinion. In diverse instances, this has been discovered to a great degree. The remains of some of the work of the ancient statuaries and architects, however now mutilated, though these of statuary, when perfect, probably fell greatly short of those of a Phidias or Praxiteles, are, in the opinion of the ablest judges, incontestable proofs how greatly they were masters of the laws of proportion in those ages. And in later times, or about the end of the 15th Century, the famous Michael Angelo, who excelled not only in painting and statuary, but also in architecture, gave a most convincing instance of the same, when, having built the magnificent palace of Farnese, he also erected in Rome a small convenient house for himself with very little embellishment, and yet cast all its parts into such exact proportion, that the prospect proved rather more entertaining to the eye of skillful beholders, though they could not point out the particulars wherein it lay, than any other of the most celebrated modern works in that city, though it greatly abounds with them. But the artist himself who had formed the plan, having thoroughly studied the laws of proportion, which his several employments required of him, well-knew wherein that beauty consisted. Yet all this amount to no more than what at the same time it clearly proves, that we are so framed as to be affected with pleasure from beauty; and that it is ordered we should be so from the nature of the thing itself suiting the sense or faculty that takes cognizance of it, and not from any knowledge of the cause. For without this sensation purposely given us, it is certain we could find no pleasure in it, and therefore have no occasion to study or enquire for the causes of what was not. But we find there is truly a beauty in things that gives us pleasure, and therefore search for the cause, and if our skill or knowledge of this gives us also a pleasure, that this

pleasure is of quite another kind, for it differs not from that which we should find in the demonstration of a theorem.

But to go somewhat further into the subject, we find variety is in general a very great fund for pleasure; and since we can be sensible of none (as has been repeatedly, but can scarce be too often, observed) without a provision made for it by Nature, the design in giving us a sense of pleasure from variety seems to lie open enough to be easily comprehended. The more infinitely various the work of the Creation are, the more stupendous appears the power of their Author, and still the more conspicuously is his goodness extended to us, in so ordering our composition that this variety should also contribute to our pleasures in all things where there were not more important ties to restrict us. Hence variety becomes delightful to us by constitution, and accordingly is one of the principal component parts of beauty, as well as in other enjoyments where those restrictions obtain not, that were for nobler ends ordained, as is mentioned in the first chapter.

Again, for the other component of beauty, i.e., uniformity, we find Nature has a most particular regard to this in all things. As its productions were to be vastly numerous, had they been all alike, there could have been no variety, yet this was not to be wholly vague, or, as it were, accidental. To reduce this variety under certain laws, proportion was to be observed. Truth, the only object the understanding can acquiesce in, consists in sameness or equality of things or their relation, or, which is the same thing to us, of their ideas. So proportion consists in sameness or equality of ratios, as in these proportionals: 4, 6, 9. The ratio of 4 to 6, and of 6 to 9, is exactly the same, viz., sesquialter, and thus some rule of proportion obtains not only in beauty, but in all parts of the Universe. But further, as the Universe is one great whole consisting of infinite varieties of parts, all suited and relative to each other, though our limited sight can discover or comprehend but very few of these relations, so Nature delights in reducing things to unity; and that the beauty of all things we are capable of considering consists principally in this, is plain in most, if not all, the instances that can be given, not only in the beauty of the objects of sight, but equally in those of the understanding. In

matters of pure speculation, as in mathematical theorems and the like, the more of them we can reduce under one general proposition, and the more of such propositions under one general rule or axiom, the greater is the pleasure arising from their contemplation. So poets, whose fruitful imaginations take in the greatest compass of ideas, or at least more fancifully range them, and who, from an impulse of Nature, are the happiest in hitting what strikes the affections and thereby pleases, whether they write in verse or prose, are always the most admired in dramatic representations, when not only unity of time and place is observed, but when the whole action meets and centers in the catastrophe; and so in epic performances that turn in a longer tract of time, the latter is expected, and that no episodes be brought in but what have some direct relation to the principal action, that the unity of it may not be broken. And these are the great rules that Nature, in such works of the brain, to render them truly pleasing, has prescribed by her προφήτης, or the utterer of her oracles, Aristotle, to which all critics who deserved the title have in all ages vailed and universally agreed in them as incontestable. Thus that parent power, whose great law in all her master's works as well as [Greek term], is union, has implanted not only in our affections a tendency to the same, but also the like in our minds, and imprinted her signature of unity on beauty, without which it cannot pass as truly her's, or natural; and thus it is conceived, the reasons why both variety and uniformity become necessary to the composition of beauty, may in some measure be deduced from their foundation in Nature.

But in order to inquire where the pleasure is lodged that arises from vision, we may observe that the first new-born infants are seen to take notice of is light. Immediately, they fix their eyes, if they can, on that from whence it comes, as a window, the fire, or a candle, if present, and if this last be moved, their eye still follows it. Nor have we reason to doubt but they find a pleasure in beholding it, for if not disposed to sleep, and they want not the nurse's supplies, they will cry on being left in the dark and be quieted by a candle being brought, and more easily if kept in motion before them. Whether they think at that time of what strikes their sight, every one will be apt to conclude in their own way, nor shall anything here be offered

to interpose; but if thought consist in ranging or reflecting on ideas, since they can have received so very few of these, their thoughts must be confined within very narrow limits, and then their pleasure may perhaps solely consist in the organ and its nerves being affected by the suitableness of the object. Next to this, their sight appears pleased chiefly with glaring or glittering and shining colors; then with things in motion, and especially with small resemblances of themselves or human faces, as puppets and babies or little likenesses of creatures they have seen, for large figures seeming way pleasing to them. And other kinds of beauty which, besides the coloring that still remains agreeable, may arise from proportion, gradually gain on them as they take in a greater store of ideas, and their understanding becomes more enlarged.

Beauty is universal

But it may be proper to observe here that there are some who, affecting a singularity in denying all sentiments of Nature in relation to virtue or moral good, likewise assert that there is no positive or real beauty in things, but the whole depends on fancy or humor. For that there are whole nations who prefer black faces, flat noses, thick lips, others affect black teeth, the Chinese small eyes, some again prefer plump bodies, others slender, and thus running on through particulars, they would from thence infer that Nature has given no real characteristics by which beauty can be defined; but this objection is of no other force than to show the prevalency of custom in some cases over Nature, which has been allowed by all men. For if we inquire a little deeper, we shall find it thus: that Negroes should prefer their own color and acquiesce in their own common shapes is natural, for so monkeys, baboons, and all other creatures by instinct prefer their own species to all others. That they should, as they do, esteem a shining black, which with them is the color of a beautiful face, since their whole kind is upon the black, is just, and we do the same in distinguishing blacks of any kind, for a full and especially a shining one is ever preferred to the pale; and yet not only their children, but themselves at all ages, prefer light and gay colors in other things, for their eyes are made as ours,

and therefore find a greater pleasure in them. That they esteem flat noses and blubber lips above others is not true, though, as has been said, they acquiesce in them, for, when they can choose for beauty, they make nearly the same judgments that we do. But as Nature has made a sure provision for recommending the sexes to each other, and few of them have opportunities of much choice, they the more easily take up with what falls to their share; and where the variety of colors is wanting to strike the eye, the difference of a feature in the face is of little weight in that commerce. The preference of black teeth, where it obtains, can never be owing to any preference given to the color, but to an esteem for the art and skill by which they are rendered so, strengthened by prevailing custom begun from some odd humor and admired for the ingenuity, as they might account it, or from a singular humor to distinguish themselves from brutes, as it is said they themselves allege. So among the savage nations, some value themselves on the great varieties of figures sunk by pricking and introducing a black color under their tawny skin, which those of greater and more manly spirits notwithstanding so far despise as to apply no more of it than may just serve for a distinguishing mark, and a compliance with the custom of their country. Whether the Chinese prefer little eyes is to be doubted; for some writers have told us they drink nothing cold, and others that they drink nothing warm, and so in other things much of what is told of them, as well as of other remote people, is to be suspected. Their figures brought to us with small and down-looking eyes are designed for grotesque; but if their eyes are generally little, they act prudently in not slighting them. As to plump or spare bodies, the latter regards only the beauty of shape; the other, when preferred, depends on custom, founded on another view than pleasing the eye only, though leanness, and a body not sufficiently covered, can never be agreeable.

But upon the whole, we see to our shame what force there is in fashion, which is complied with by persons of sense to avoid singularity, at the same time that they condemn it. But even the greatest fashion mongers, if put seriously on declaring their judgment, will never hesitate in giving one greatly the preference to another, though not then prevailing. Therefore, no arguments drawn from custom can be of any weight, since all are

convinced that very many of them, though followed because they are the fashion, are in themselves unnatural, and thus all such objections entirely vanish, as every other of the like kind inevitably must, when their true foundation is more narrowly inquired into. Were any of those people who have been quoted to give their judgment of the beauty of a flower, of a tree, a bird, a horse or other animal, of ranges of trees, or of anything where there was no particular customs or prejudices to warp them, can we imagine they would differ much, if anything, from us in opinion about them? The surest method of judging of genuine impressions and dictates of Nature, in such things as depend only on natural sentiment and inclinations and not on the exercise of reason, which notwithstanding is as much a natural faculty as the others, is to observe the first appearances of them as they break out in children. And then, from what has been said concerning that state, we may conclude that the eye is so framed as first, without any thought, to be delighted with light, and then with gay and lively colors, which continues through all the stages of life, and this distinguishing sense seems to reach no further than the ball itself. As to the other things that please their sight, as motions or little resemblances, these appear not to have any direct relation to beauty, yet children soon discover a difference between the handsome and ugly in most objects they view (as we in more advanced years suppose that difference to arise from the principles before mentioned, variety with uniformity, or proportion), and all this without any reasoning at all, and the same we do through our whole lives; for beauty (as has been said) was first observed to exist before its causes could be inquired into. Therefore, though we may perhaps have been sagacious enough to discover in what it may consist, and though proportion is an object of the understanding, yet it is evident beauty consists not in this discovery, for those who never heard of it are equally affected with beauty and can as clearly distinguish it. Nor in the sensation is there understanding in any measure employed in it. It is true that persons of fine wit and parts can much more exquisitely discern and distinguish between the beauties of objects, but this is owing to the more exquisite fineness of their nerves and temperament of their brain, as we see they show the like nicety in most or all their other pleasures.

From whence it is that such frequently become what we call men of pleasure, because their gratifications being more strong and lively, they find the more powerful solicitations within themselves to pursue them; and hence, unless their reason is yet more strong, they frequently are more prone, and hurry on, to vice. As for the connoisseurs, who can be sometimes rapt into admiration at the beauty of one piece more than of another, this is an accessory pleasure derived from the understanding. And it is the art, the perfection of the skill they admire, which, as was noted before, entirely intellectual, is altogether different from the sensation we have of beauty.

We have therefore reason to conclude that this sensation is lodged wholly in the nerves of the eye, the distinction of colors and their agreeableness in the retina within the ball, and the sense of other beauties further within the brain, as perhaps in the *thalami optici*, which approach, if they are not within, what we may suppose the seat of our intellectual faculties. But it is plain that this sensation, simply considered, depends not at all on our reason or judgment, though its ideas become a proper subject for them to work on, for the sense itself first discovers and shows us the beautiful in an object before the understanding begins to consider it.

It is further to be observed that this pleasure of the sight is very frequently accompanied with others, of which it is the moving, though not the principal, cause. As not only when one views the beauty of a wife or mistress, a fine horse, building, garden, etc. of their own, or sees a piece of fine work done by a person they love, in which cases, and such like, the pleasure springs from another source in the affections; but also, the contemplation or view of beauty in objects that have no particular relation to us, will in many instances diffuse a joy very sensibly perceived in the heart from that contemplation only. This, everyone who is capable of being pleased with beautiful objects must, on diverse occasions, have experienced in themselves. Beauty, therefore, is not only capable of raising a sensation of pleasure in the sense or organ and its appendages, but it extends itself much further by exciting the passion of joy or gladness, which in a greater or less degree is an inseparable concomitant of every other pleasure not disapproved by reason

or the judgment, nor attended with any other passion, as fear, to damp or stifle it. And as the sense alone first shows and distinguishes the beautiful without the aid of the understanding, so, without its direction, the pleasure affects the heart, and the whole sensation is, by the organic formation of the parts in our constitution, from the hand of Nature.

But before we leave this subject, it may perhaps require an apology that no distinguishing notice has been taken of the most celebrated kind of beauty, and to which the word is most frequently applied: that of faces, especially in the sex in which the old and grave Sophocles observed that love takes up his residence. [10] But this, in what truly constitutes beauty, viz. color and proportion, differs not in its nature from the same in other subjects of it. For the pre-eminence given it is owing to the passion it was designed by Nature to excite in us, which springs from another root, and therefore, in this inquiry, there could be no occasion for any such distinction.

Music also universal

The next sense, hearing, though the most difficult of them all to explain, yet in the view we are here to consider it will, from what has been said of the sight, be found the more easy. Of the organ itself and our perception of sounds by it, sufficient has been said in the 2nd chapter, but the pleasure of which we have a sensation by it, being our present subject, this particularly claims our attention. That the organ of the ear itself distinguishes between sounds, that some simple ones are much more agreeable to it than others, and that the differences in these more strongly affect it than colors do the eye, will be acknowledged by all, as it also will by most, that melody and harmony more nearly touch the soul than beauty, by striking the eye only, is found in a general way to affect us, where another affection is not excited by it and co-operates with it. In the sense of harmony or music, all mankind, all nations, however barbarous, agree, though according to the different genius and dispositions of the people. Some affect the more light and airy in quicker time and measure, others the more solemn and grave, and others again a more temperate mixture. Now that this has a

real foundation in Nature (that is, that the ear is so formed by Nature as to be sensible of a pleasure arising from grateful compositions of sounds), the greatest skeptic that ever lived never could deny, though diverse have declared against the use of music as enervating the soul, and inciting to looseness of manners and voluptuousness [11], but this is only the abuse of it, for Nature never ordained anything in vain. Lucretius supposes what is not improbable, that the first practice of it took its rise from imitation of the choristers of the air, [12] in which the most rigid must allow that pure Nature operates alone. For as they appear to have been intentionally framed to divert themselves and us with their pretty innocent modulations, they want no other instructor, and some of them are further provided with what is called a musical ear; for they will not only attentively listen to musical tunes, but imitate and practice them, and are observed to be delighted and rejoice in them. And were the story true, that is so beautifully told in verse by Strada [13] in imitation of Claudian's poetry, of a nightingale on a tree on the banks of Tiber, contending with a musician who sat under it, until, after many alternative contests, each vying and disdaining to be outdone, the little charming songster strained so hard at last, that it dropped down dead on the instrument. Were this true, I say, and the poet's word to be taken for it, who says he was a witness of this trial of skill, it would indeed be astonishing. But that the human ear is naturally formed to be delighted with tuneful sounds or melody, is as certain as that any other of our senses can be gratefully affected with the proper objects to which they are peculiarly adapted, as the palate with tastes, or the smell with fragrant odors. Mankind therefore having from the first been sensible of this pleasure, and consequently desirous to heighten and improve it, could not fail of observing what kinds of sounds and what succession of them most agreeably affected the ear, from whence instruments with strings and pipes and tunes came into use. Nor had they any other rule than observation alone, without seeing, or, as far as we know, inquiring any further into the causes of this agreeableness, more than they did into those of tastes, smells, and such like, which in all probability must ever remain inscrutable. But Pythagoras, who appears to have been the first great improver of music (at least amongst the Greeks),

by adding to the former two tetrachords of seven strings, an eighth to complete an octave, from an accidental observation of the sounds of hammers of different weights on an anvil, found means from thence to subject the sounds both of strings and pipes to mensuration, and thereby discovered that all the concords which Nature has made agreeable to the ear bear certain proportions expressible by numbers to each other [14]. And it is a proper combination of these only that renders music delightful, for, if good, it must wholly consist of them, save that sometimes short discords are intermixed like foils to set off a following longer concord and render it more pleasing; and even in the combining these little discords with the concords, proportion must be observed as well as in the other.

But it is further particularly to be observed on this that, though every agreeable sound simply considered appears to us to delight the organ itself, and the mind is affected by sounds in sequence ranged in such proportion as the ear, with its nerves conveying the notice of the sensation to the brain, is formed to be most pleased with, yet the greatest natural pleasure arising from it is felt in the affections of the heart, raised there by its communication with the brain. But it may not perhaps be out of the way to consider the pleasure arising from music more particularly. A person who has what is called “a good ear,” inclined to entertain himself with hearing music played and resolving to examine it, may perhaps (if it be instrumental) attend only to the tenor or treble, for in these must what we may properly enough call the body of the music principally be found. And then he considers the consonance of the notes, their sequence, the measure, the parts, members, stops, and returns of the tune in due time, all which, if they justly answer his ear and judgment, he approves of them; but if it is also accompanied with a bass, he may consider the justness of this also, not only in itself, but more especially as it falls in just consonance and harmony with the higher parts of the melody. Again, if there be a concert, and in parts, he has still a much larger field, and it must certainly require great practice and skill to judge with nicety of all these compounded together. Judging, however, as he can of the whole, if he finds the performance just, he is delighted with it, but the pleasure he receives by such an

examination, so far as it consists in the goodness or exactness of the performance, is owing wholly to his understanding and judgment as it has relation to the art only. He may further, if interested in the reputation of the performers or undertakers, or in the satisfaction of the hearers, conceive from thence also a very great pleasure, yet both these mentioned pleasures are equally from a foundation altogether different from that of the music itself. On the other hand, a person altogether unskilled in the art attentively listens to it, and though he knows neither rule, principle, nor reason for it, he is highly delighted with it, he finds his heart dilated with pleasure. He may be rendered either more gay or grave as the music is more airy or solemn, and which way soever he is affected, he finds an exquisite pleasure in the whole. Nor, perhaps, does the skillful person in the art that has been mentioned find his heart less sensibly touched than he, but, custom having rendered it more familiar, he is less moved with it, and his attention to the art and skill in some measure stifles those tender emotions which Nature, if solely attended to, would not fail to produce. Here we see the difference of the kinds of pleasure raised by the same entertainment or performance: the unskillful person without any manner of knowledge is greatly delighted, and this will readily be acknowledged to be owing entirely to Nature itself; the other is delighted not only with this, but also with the truth and exactness of the performance. Yet notwithstanding all his own or the players' art, it is solely Nature that furnished all the pleasure that either feel, for the whole art consists in nothing more than in carefully observing and practicing what is found from experience to be most agreeable to Nature, and it is truly in this, and in nothing else whatever, that the perfection of every art consists. So far as art copies after and pursues Nature, though perhaps more compoundedly, yet still it is found agreeable [15]; so far as it deviates from it, it becomes shocking, and we can use no worse term to disparage anything than to say it is *unnatural*, an expression sufficient to condemn and sink the most exquisite work or performance in all other respects besides. What renders music truly agreeable is proportion; that is, a variety of lesser parts following each other in proportion, but all strictly limited to exact and equal measure in time, a failure in which infallibly destroys the regularity and

justness of the whole. Nor yet could all this give any pleasure were not the organs, nerves, and spirits so framed by Nature as to be affected by these, and the heart also so constituted as to have the sensation of pleasure by its proper affection there excited. They are suited each to the other, and these sensations depend not on any act of volition of our own, but entirely on the texture of our parts and our original frame.

The intellectual pleasures

Thus having so far considered the pleasures that rise from the gratifications of our appetites and from our exterior senses, those also that spring from the affections would offer themselves next in course; but these have been so fully considered in the preceding chapter, where is shown that they are themselves little else than pleasure or uneasiness variously modified, that there can be no occasion to enter further on the consideration of them here. The next subject therefore are our *intellectual pleasures*, which are generally allowed to be the purest, most perfect, and consequently the most worthy of a rational being of all others.

The faculties and powers of the intellect have already been considered in the chapter on that head, and as it there appeared that the whole operations of the brain, the seat of the understanding, consist in the perception, ranging, combining, and comparing of ideas received originally by the exterior senses, it seems inconceivable how these operations, or the faculties exercising them, or the ideas, can in themselves be susceptible of either pleasure or pain; otherwise than, as of the motions of our other parts, some are easy and some irksome to us, and therefore become tiresome.

It is very true notwithstanding that most of our happiness depends on our ideas, and they are in a great measure the direct means, if not the primary cause, of it; but the pleasures themselves that we enjoy do not consist in them, however they may be occasioned by them. If a bell be struck, we hear the sound, or if an instrument is played on, we hear the tune and are affected with it; but none who have read and considered the preceding 2nd chapter will suppose these sounds are in the bell

or the strings themselves, though they are the next immediate cause of the motions and vibrations of the air by which the sensation of these sounds is excited in us. In the same manner, our ideas may excite the true springs of pleasure, but considered in themselves they cannot be properly said to give it.

It may be alleged on this head, that we find by experience the renewing or raising the ideas of any past pleasure also renews the pleasure—as it infallibly will, we know, if not attended with some other disagreeable reflection—and this may moreover be called, and not very improperly according to our manner of speaking, the ideas of the pleasure itself renewed.

Yet if we strictly examine this, we may find that memory being no other than an ability in the brain to renew the ideas formerly impressed on it, those ideas, when renewed, do but at the same time excite the same or like sensation of the pleasure that we had conceived before on that renewed occasion. So, if a person calls to mind some tender obliging expressions or behavior of a beloved object that gave him a pleasure founded on the affection he bears that person, he may not only find the same pleasure renewed, but perhaps, by some other superadded reflections, further heightened. Yet as his affection was at first the cause of that agreeable sensation, so it still continues to be the same; the same idea renewed in his mind excites the same emotion in his breast, and thence arises his pleasure.

To imagine that ideas or memory can subsist in any part of us besides the brain is absurd, since we know that all the nerves, on which alone all sensation depends, rise from, and directly communicate with, the brain; but there are cases wherein the communication is so very quick and close, that it may be difficult to find how any of the ideas on which thought is employed can be concerned. As when the stomach has been greatly offended and disordered by some wholesome, but nauseous, pill or potion, if any taste or smell strike either of the senses that distinguish them of the same kind with that which gave the offence, the like nausea is instantaneously renewed, nor will it be in the power of thought either to prevent it or totally remove it. So if one has undergone some very painful operation on any limb or part, upon the least apprehension that the same is to be repeated, the flesh of that part will sometimes, according to

the common expression, seem to creep. Which instances show that we are not to expect, in the sensations of pleasure or pain, a gradual process of thought from ideas; the communication with the parts is instantaneous, and so are the motions and affections of the heart with thought in the brain. These motions uninterruptedly, in these cases, accompany and keep pace with the operations of the other, though, as was observed in the preceding chapter, the understanding or reason may gradually, but never instantaneously, prevail over and sway those motions.

It was observed before that truth is the object of the understanding, and that it can never acquiesce in falsehood under that appearance. When it is employed either in the contemplation or search after truth, its operations, proceeding smoothly and regularly on the spirits or active parts of the brain, preserve and are strengthened in their tone, and it is evident we are so constituted in our frame that, while the spirits are thus employed, the heart should with them be also in the same manner affected, and a calm, equable flow be produced there, the same with the affection of joy in its most still and equable motion. And hence seems to spring the sense of those intellectual pleasures that are enjoyed in the pure contemplation of truth alone, abstracted from all other considerations that can influence the affections.

If any should think it needless to refer any part of this to the heart as interested in these pleasures, they are desired to examine themselves, and sedately and attentively consider where it is in such cases they feel themselves affected. For with a little attention, we may feel the operation of thinking in the head, and of the affections in the heart, as certainly as we do that we smell with our nostrils, and this is seriously recommended to all who are desirous to be satisfied in these points in themselves. For as it is impossible for the writer to know how it is in fact with any other person than himself, further than by inquiry to be informed how they also find it, and from this experience of his own, confirmed by others, to digest the whole into what appears to him a regular scheme, he will therefore never pretend to contradict any who assert the contrary of themselves, more than he would dispute their palates. But as we see Nature is generally very uniform in the productions of the same species, and the

writer, on a close examination of himself, has found it thus with him, and from thence thinks he has seen one regular uniform administration of our interior operations in relation to the subjects he treats of, he offers these observations of his own to the consideration of others who, he is inclined to believe, may with the like attention discover the same. From whence they may perhaps have the satisfaction to know something more of what had always truly passed in themselves, though they had never before observed it. And it is desired this may in the same manner be applied to all the other parts of this discourse, where our inward operations, or those of the mind or affections, are treated of, of which every one with a competent share of understanding may be equally conscious with the writer. But now to return to our subject.

As truth is the proper object of the understanding, so all knowledge is truth, as was sufficiently shown in the 3rd chapter, and therefore it is needless to insist on it further here, for it is of no importance to our present subject to take notice of the distinctions there made between the real and imaginary.

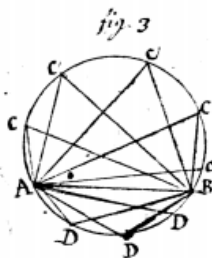
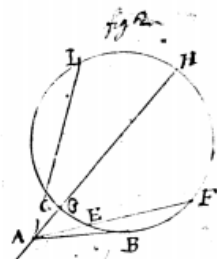
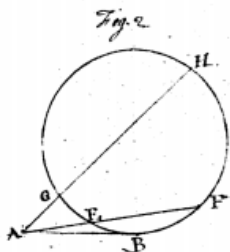
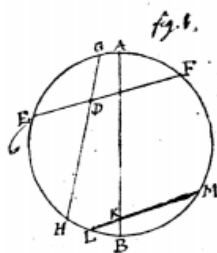
Of knowledge in reference to the subject, there are very many kinds, but the principal which yield intellectual pleasures (besides divine, which is no part of the subject before us) seem to be these three: mathematical, physical, and moral. At least they may suffice for the end proposed to be treated of here.

Mathematical is first named because it is the clearest and most evident, for pure mathematics consist chiefly of theorems which are propositions either demonstrated or demonstrable, and therefore, when demonstrated, their truth cannot be disputed. The contemplation of this alone renders them truly delightful; and not only so great is their utility in common life, but their advantage in habituating the mind to consequential reasoning is of such importance, that it is astonishing so few should make themselves acquainted with them. The Ancients judged of them much better. In Athens, the free-born youth were as constantly trained up to these four, reading with writing, geometry, music, and their bodily exercises, as our children are now but only to the first of them, for they will know that as the last of these was necessary to their health, so were the others to the improvement and enlargement of their minds. And it is certain that a regular

course of geometry and algebra properly taught or studied, would vastly more contribute to these ends than any system of logic commonly taught in the Schools. And as these sciences are known very strongly to affect the mind, and to contain a vast fund of pleasure in them, to such as have had the inclination and an opportunity to make themselves acquainted with them, to omit the consideration of them would be a defect in this discourse, but it is scarcely practicable to speak properly to this without descending less or more into, and taking some instances from, the subject. Yet in attempting it, such readers as have kept themselves wholly strangers to all things of the kind, may perhaps think they are neither obliged, nor ought it to be expected they should, without some previous instruction, understand anything of the matter. But let such have so much patience as to read on, and they may to their own satisfaction discover their past mistake, for nothing can be more plain— no, not the art of numbering— than the first principles of geometry. What is here offered is in itself extremely familiar, and no more than may be barely sufficient to show from what foundation, and in what manner, the pleasure these speculations yield arises. It is therefore not doubted but that what is here presented may find acceptance even with the most inexperienced in this way.

Geometry

And for our instances, we shall take the simplest of all the figures in Nature, which is the circle contained within one uniform line, every part of which is equally distant from one point in its middle called its center. It is the easiest formed of all others, because it may be drawn with anything that has two points, as a fork, a forked or any bending stick, etc., by fixing one of the points or ends, and carrying the other round it, whereas a straight line requires a ruler or stretched thread to draw it by. Yet simple as it appears, its properties are wonderful, some of which are these. It is impossible to draw any two straight lines crossing each other within it, but that the product of



the two parts of each line, multiplied one into the other, shall be equal to that of the two parts of the other line, multiplied in the same manner. As in the figure before us, the diameter of which, that is AB, a line passing through its center C, we will suppose to stand for 12 inches. Then let the whole line GDH be 11, its part HD = 8, and DG = 3; $8 \times 3 = 24$, that is 8 multiplied by 3 is equal to 24. Again let the line EDF crossing the line GDH in the point D be = 10, the part DE = 6, the other part of it DF will be = 4; then $6 \times 4 = 8 \times 3 = 24$. Again of the 2 lines AKB and LKM crossing each other at K, let AK be = 11, KB = 1; $11 \times 1 = 11$. Of the line LKM let the part LK be = 2, the part KM will be =

$5\frac{1}{2}$, and $2 \times 5\frac{1}{2} = 11 \times 1 = 11$. And the same holds in circles and in all lines that can possibly be thus drawn in them.

Another property is that if from a point, as A, without the circle, lines be drawn through it to its remotest part, and the whole of each of these lines, as AH or AF, be multiplied into the part lying without it, as AG in the one, and AE in the other, their respective products will be exactly equal to each other, and each to the square of the tangent line AB that but just touches the circumference. Thus if the whole line AH be = 12, and AG = 3; $12 \times 3 = 36$. If AF be = 9, AE will infallibly be = 4, and as infallibly the line AB will be = 6; but $12 \times 3 = 9 \times 4 = 6 \times 6 = 36$. And it is the same in all circles and in all such cases whatever.

Another property is that if from any two points, as A and B, in the circumference, two straight lines be drawn meeting and making an angle in any other part of the circumference, every of these angles on the same side will be equal each to the other. So also those on the other side will be mutually equal, and each of those on the one side will be the complement to 180 degrees to each of those on the other. So in fig. 3, all the angles at C are equal each to the other; so likewise are those at D; and any one of those at C with any other of those at D being added together will make exactly 180 degrees, or two full squares or right angles.

Now these are some of the properties (for there are diverse others) of this most simple figure the circle, which, as here explained, it is hoped may be obvious to any capacity however unacquainted with these studies. That they are entertaining in the bare speculation of them only, it is supposed will be easily acknowledged, but when their truth comes to be demonstrated, and it appears that the same one demonstration is applicable to all the infinite varieties in the same proposition, the mind discovers a beauty in that uniformity that can scarce be equaled by any other human abstracted speculation. Yet these arising from the circle only are but narrow and limited; the further we advance, the larger the fields constantly open.

For, to go one step further, a cone is a most plain regular body. It has a circle for its base, and it ascends all round it in straight lines terminating in a point at top, called its vertex. Cut this down by a plane through this vertex to the base, and the

outlines of the section will be a plane triangle, the simplest of all right lined figures; cut it anywhere parallel to the base, and the section will be a circle, the simplest of all curves. But cut it by any section different from these, and it makes some other curves which, from what has been observed of the body itself, may be conceived blended of a right line and circular curves, since the circles parallel to the base continually lessen, but in a simple arithmetical progression in their diameter to the top. If the section enters at one side of the cone and is continued to the opposite side, it gives an ellipsis, which is only a circle regularly stretched or drawn out to a greater length than breadth; if the section be carried parallel to the opposite side and therefore cuts the base only, it is called a parabola; if it cuts the base any other way than by this parallelism, it is called an hyperbola, and in this case, if two like cones are set opposite to each other meeting in the vertex of each, this last section will cut both cones.

On the properties of these three sections many volumes have been wrote. We have now 7 books extant of 8 wrote on them by Apollonius near 2000 years since, the last also is supplied by Dr. Harley, and numerous are the later writers on the same subject, which nevertheless is allowed to be not yet exhausted, several useful discoveries of other properties having of late years been made in them. Now the consideration of their axes, their different diameters with the respective ordinates to each, their foci, their tangents, subtangents, asymptotes of the hyperbola (that is, lines continually approaching but, though they were infinitely continued, can never meet), the great conformity of the different sections agreeing in the manner, yet essentially differing in their distinguishing characteristics, with the demonstrations of all these properties, and all to be met with in the sections of a body of so simple a composition as a straight line and circles, afford an inexhaustible fund of entertainment, the whole of which perpetually turns on the simplicity and uniformity of the principles, extended notwithstanding to an infinite variety, but always reducible to the same. There are also other curves attended with their peculiar properties, but nothing needs to be added to point out the true foundation of these pleasures: the mind everywhere meets with truth and everywhere with beauty founded on its surest principles. And these being

objects to which the understanding is suited, as our palates are to tastes, our eyes and ears to exterior beauty and harmony in sound, they become, like all other natural pleasures affecting the parts they are adapted to, the good of the mind, and consequently the heart, with its proper affections, rises to them, and a joy is diffused, as in other gratifications.

Of the last subject (mathematics) some readers may think too much has been said, as others again may rather think it too little, since no more than two branches have been spoke to, and the subject is vastly more extensive. What is called mixed mathematics or the practical parts of them (for what has been mentioned consists chiefly in speculation or contemplation, the proper exercise of the mind in intellectual pleasures) are generally accounted in a common way the most entertaining, as practical geometry, astronomy, dialling, surveying, hydrostatics, and the application of natural powers to mathematical principles in what is called mechanics, which is doubtless of the most extensive use to mankind. On all of which some useful and entertaining remarks might be made, but as they lie too much out of the way of our principal subject, this one on the most useful of them, as it greatly confirms what has been observed on the general, may be added here. That is, that though many books have been wrote on that most useful head, mechanics, or the moving of bodies, and the natural powers of engines applied for these purposes, as the lever, the stilliard, the pulley, the windlass, the wheel, the screw, and the wedge, yet so uniform is Nature, that this one constant principle explains them all, which is the well-known one, that the moment, that is the velocity of the moving force multiplied into the quantity of the force, is always equal (allowing for the friction or resistance of the parts of the engine) to the velocity of the body moved multiplied into its resistance or weight; but the application of this is not so common. It is very commonly known that a force or weight of 10 lbs applied to the end of a lever at 10 foot distance from its rest will, with the smallest addition, move a weight of 100 lbs at but one foot distance from the same rest; and so in the stilliard. But by the same rule we may exactly compute the force of a screw, which one would think exceeding difficult, for if the hand with the force of 10 lbs turns a winch of 21 inches in length, in

going once round it moves about 11 foot, or 132 inches. Now if the thread of the screw from outside to outside be half an inch, the force of the hand to press the body by the screw (allowing as before) is 2×132 , or 264 times increased, and therefore the whole force of the screw thus moved is equal to 2640 lbs. So in ships' tackles for hoisting of heavy bodies, the proportion that the length of rope passing through the sailors hands bears to the length of the way the body is moved (abating for the friction of the sheaves), is the measure of the increase of the force or purchase (as they call it) of that engine, and this depends entirely on the number of pulleys or blocks next the weight, but not at all on those fixed above, for they gain nothing.

Thus almost in all cases, we may find certain simple uniform laws in Nature extended to a great variety of modes of operation, the discovery of which greatly affects the mind and furnishes to it a constant and delightful entertainment.

Language and literature

But there are intellectual pleasures arising from other very different causes, as ingenious conversation, fine performances of art, strong arguments on a subject well ranged and enforced, history, oratory, poetry, with many others. Those from conversation and discourse turn in part on our affection or esteem for the company, in part on the subject, and the rest on the behavior and management of the parties. What we call *wit* generally depends on assembling ideas foreign in themselves, yet made to suit in some odd circumstance, and the more odd the more affecting; but though commonly accounted the finest seasoning to conversation, is of very little real use, save that sometimes a point is gained by it on such as are not to be prevailed on by solid reason. It often proves injurious to the possessor; the esteem paid to it, as abstracted from sound sense and solid judgment, is owing solely to a false admiration. Yet when it accompanies these other (as it seldom does, for such persons often reject it, though in their power) it helps to brighten and recommend them by a glaring polish. True and solid wit, which is quite another thing, is highly valuable; this is not only admitted into but makes up a very great part of the ornaments of

the most solid pieces. This shines (to give one instance) in the other writings of the author of the whole duty of Man [Robert Sharrock], for in that work he intended the utmost plainness, and in almost every page of these there is more essential wit, more beautiful similes (covertly it is true, but naturally and with the utmost propriety applied) than appear of any kind in several pages even of the celebrated author of *Hudibras*, though his performance is commonly thought to abound in wit equally at least with any extant in our language.

Arguments please by their propriety and strength, history by the subject and language, but on these heads we may observe thus in general.

What we call propriety, as the suitableness of one thing to another as founded in Nature, is everywhere desired and everywhere pleases. The signification of words was at first undoubtedly arbitrary, but by custom every term we are acquainted with raises its own idea in our minds. If that idea exactly suits the idea the speaker or writer who uses the same term would raise in us, our judgment pronounces the language proper. Or, if by transferring the natural and common sense of the word to heighten and enforce the sense, as “to fly to one’s aid,” “to swim in pleasures,” “to burn in rage,” “to thunder out menaces,” the metaphor renders the expression yet more agreeable, because it strengthens and enlivens the idea without any impropriety.

Again, as has been largely observed before, Nature delights in proportion, making it her constant rule, for on this alone depends music and whatever pleases the ear (exclusive of the agreeableness of the sound itself, as of a string or a voice to the texture of the organ). It is requisite therefore, for rendering language truly pleasing, that not only the words themselves should be proper in their signification, but that they should be composed of letters and syllables succeeding each other in the most easy flowing manner without offending the ear; or that these words also shall by the same rules succeed each other, yet so as not to weaken, but rather add a force to the sense; and lastly that the parts (the *χόλα*) and the periods should answer in proportion. Here the foundation of what pleases in language, whether prose or verse, appears to be laid in Nature, and on these

principles of it. Nature, in persons of a genius for it, prompts to the actual observation of them without study, or so much as spending a thought about them.

But language and composition, though delightful when truly good, avail but little in contributing to pleasure unless the subject and the conduct of it do the same. Subjects please in proportion as they touch the more tender affections, or are judged great and noble from the foundation in Nature that will be considered below. For though fine language, with a natural cadence, generally pleases both in prose and verse, it will not of itself go far with good judges. He must have had a vicious and low taste who could be pleased with those lines of Nero Torva Mimallonus, “implerunt cornua bombis,” and the rest of them in Persius, for they are only a rumble of words. But it is the thought must principally give the pleasure, which often affects more and touches nearer when simply and natively expressed, than in the most ornate language. We have very often the same thought both in Homer and Virgil, particularly in these lines of Homer:

[Greek text: “You are not to blame, I hold the gods to blame for bringing on this war against the Akhaians, to our sorrow.” Robert Fitzgerald, trans., *The Iliad, Book Three* (Garden City, NY: Anchor Books, 1975), 73.]

And in these of Virgil:

Non tibi Tyndaridae facies invisa Lacaenae,
Culpatusve Paris, diuum inclementia, diuum,
Has evertit opes sternitque a culmine Trojam.

[“You do not hate the face of the Spartan daughter of Tyndareus, nor is Paris to blame: the ruthlessness of the gods, of the gods, brought down this power, and toppled Troy from its height.” A.S. Kline, trans.]

The first are spoke by Priam to Helen on her blaming herself for being the cause of the war, from which he acquits her, imputing it to the unkindness of the gods; the other spoke by Venus to Aeneas gives the very same thought, but in much loftier and more beautiful language, for it can scarce be

exceeded. And yet on a little reflection, Homer's simplicity is rather the more affecting of the two (at least it appears so to the writer), but the thought itself may deeply affect any man who reflects on the several dispensations and changes in the course of affairs in this world.

Language will please in proportion to its beauty if the idea raised by it, however simple, be in its own nature agreeable, as what can be more simple than that of a husbandman bringing a rill down a cliff to water his ground, and what more beautiful than this description of it in Virgil:

Ecce supercilio clivosi tramitis undam
Elicit: Illa cadens raucum per levia murmur
Saxa ciet, scatebrisque arentia temperat Arva.
[The wary ploughman on the mountain's brow
Undams his watery stores; huge torrents flow,
And, rattling down the rocks, large moisture yield,
Tempering the thirsty fever of the field. (Dryden)]

The same also may be said of Addison's describing a muddied stream clearing itself in these lines:

So the pure limpid stream when foul with stains,
From rushing torrents and descending rains,
Works it self clear, and as it runs refines,
Till by degrees the floating mirror shines,
Reflects each flower that on its border grows,
And a new heaven in its fair bosom shows.

But if, besides that the idea or thought is natural, any of the softer affections are touched or raised, the pleasure is vastly enhanced by it.

The story of Aristaus recovering his lost stock of bees in the *4th Georgic* has little moving in itself, and yet it is highly esteemed for that affecting instance of conjugal love.

Orpheus's descending with his music to the infernal shades for his Eurydice, and his disappointment again by the force of his passion after he had obtained her; for were it not for the tender emotions of this affection, it would not be in the

power of all the author's fine poetry, his beautiful "ignoscenda quidem, scirent si ignoscere manes," ["one to be forgiven, if the spirits knew how to forgive," A.S. Kline, trans.] his "te, dulcis conjux," ["you, sweet wife," Ibid.] etc., with all the rest, so effectually to move us. So the episode of Nisus and Euryalus in the 9th *Aeneid* greatly moves us, by the strong friendship there described, and is vastly heightened by that one line, "Me, me, adsum qui feci, in me convertite ferrum," ["I did it-- I: your steel... is meant for me;" Allen Mandelbaum, trans., *The Aeneid of Virgil*. New York: Bantam Books, 1971, p. 86], on a parallel to which a remark of Cicero, in what follows in this, may deserve to be noted. On the other hand, the passion of love is not perhaps better described by any author whatever than in the 4th *Aeneid*; yet that amour being in all its parts irregular, for it begins vilely with "Speluncam Dido dux et Trojanus eandem devenient," ["Dido and the Trojan chieftain have reached the same cave," Ibid., p. 86] upon which, "summoque ulularunt vertice Nymphae," ["... and from the highest hilltops shout the nymphs." Ibid.] the whole of it is rather shocking than truly delightful. But again, scarce anything can be more moving than his most artful as well as natural close of the 6th book with the death of young Marcellus, for a reader could almost shed tears with Octavia, and no wonder such a mother so highly rewarded the poet as with above 75 pound sterling for each line, for Nature is there touched to the deepest. So in Catullus, the most beautiful part is his *Carmen Nuptiale*, with the responses of the young men and maids, and those pretty similes from the flower and the vine, for the subject is love and marriage; yet Ariadne's complaint on the perfidy and ingratitude of Theseus, who, after she had saved his life, left her exposed on a desolate island, given in that author's next poem but one, as it raises the highest commiseration, is yet much more affecting. Thus we clearly find that the most sensible delight we receive, even from those intellectual pleasures that have been mentioned, turns much more on the affections and a conformity with the principles carefully implanted in us by Nature in our original composition, than on any other art or attainment whatsoever. Hence also it is that we are furnished with another vast and inexhaustible fund for intellectual pleasure, the contemplation of the works of

Nature, for these, next to an immediate provision for our bodily wants and the discharge of our relative duties, appear to have been directly intended for the entertainment of our minds, that from this contemplation we might raise our thoughts to that of their great Author, and for our employment in improving them, both to our use and pleasure.

The field here is infinite, the variety incomprehensible, and yet we shall find the ends always centering in one, or directly tending to unity. It is true we cannot see into the primary elements of which the objects before us are composed, nor the interior springs by which they operate, for we are not furnished with organs fitted for that purpose. But though this was never intended for us, and consequently is placed beyond our reach, yet we see, and it was manifestly designed we should see, enough in the several parts of the creation round us to afford us matter for endless contemplation of the wisdom, power, and goodness of the supreme Director of the whole, and this with a pleasure that never pales, and unlimited as the scenes that yield it. To enter into particulars would require a volume, as diverse very valuable ones have been wrote on the subject, and we have several of them, as Ray, Derham, Newenty, etc. in English. But books, though instructive and entertaining, are not wanted: here Nature furnishes the best in her own works, which lie in themselves so open to view and so obvious to every capacity, that no director can be wanted to give their spectators a sense of the beauty and order that reign through the whole. The Universe displays this, not only in the disposition, the motions, and revolutions of the greater bodies, but in every the minutest part. Nor need we have any other lesson given us for our instruction herein than to be put upon considering the process of vegetation, from the seed as it appears when viewed in our hand and is put in the ground, whence in a small time it rises, exerting itself into the air, then throws out leaves, blossoms, flowers with a large increase of the same seed or fruit again. Or on considering the progress of a bird from her first preparing to build her a nest, then laying eggs, hatching them into life, feeding her young in their helpless state and training them up, until they can equally with herself provide for themselves. Or if we further consider the infinite apparatus in the frame and texture both of vegetables

and animals for the digestion of their several juices, their nutrition, etc., and the no less infinite instincts implanted in the vast variety of species of the latter, all cooperating respectively and unerringly attaining the purposes intended by them, we cannot fail of being rapt into admiration of the infinite power, wisdom, and goodness of the supreme Author, Director, and Conductor of the whole. The subject itself is endless, but these short hints may here suffice for our present purpose, observing only on the whole that, as all we are in ourselves is from the same power, so nothing is better suited to the frame of our minds than these contemplations.

The true foundation of virtue

And now, having in the preceding disquisition into the nature and funds of our intellectual pleasures laid the ground work on which we are to build our following superstructure, we may next proceed more nearly to consider the subject itself, and try whether we may not, with some certainty, discover in the same funds the true foundation of virtue. That as all nations throughout all ages have pretty well agreed in the most material practical rules of morality, which some have not without reason ventured to assert to be as demonstrable as geometry, the foundation itself in Nature whereon the whole system depends may be rendered equally clear, and consequently all further disputes on the subject being discussed be fully and effectually determined.

In treating of any subject, it is frequently of use to consider the names or terms by which it has been commonly expressed; but this, as it happens to be of less importance in this case than in some others, we refer to the note below [16] and shall proceed to consider the notions that those of the Ancients, of whose inquiries we now have any remaining memorials, and who professedly considered or treated of the subject, entertained of it.

And first, to consider the definitions left us by their philosophers, we shall find that, though their notions of it, when taken in their proper sense, were generally just enough, yet they themselves appear to have been at some loss how to speak to it

with sufficient clearness. Aristotle, by much the most accurate of all the ancient Greeks, and who without comparison wrote the best upon ethics or morality as a system, first says: in general, that the virtue of every thing is that which renders the thing wherein it is, and also the work or effect produced by it, good [17] (or perfect). And then more particularly defines virtue to be, An elective habit or disposition consisting in a medium (between the extremes of vices) in relation to us, defined or determined by reason according to the judgment of a prudent man [18], and so in other places he leaves the absolute determination to the sentiments of the judicious and virtuous. Hence the Schools have unhappily insisted chiefly on that definition, and we have much the same in that line of Horace, “virtus est medium vitiorum et utrinque reductum.” [“virtue is the middle between two vices, and is equally removed from either extreme.”] Plato had defined it more imperfectly, as the best disposition or habit of a mortal in itself commendable, and the habit by which the person or thing possessed of it is declared Good. [19] Cicero, [20] in diverse places of his excellent writings, is large upon it, sometimes defining it according to the Stoics in a larger sense to be a living up to Nature, but more frequently makes it the perfection of reason. The Stoics [21], if their doctrine be closely considered, had a more exalted notion of it; they made their *summum bonum* or happiness to consist in virtue, and this in living up to Nature, which some of them expressly declared to be the same as to follow God, and in this the Platonists [22] agreed with them. But the author of *The Foundation of Moral Good, etc.* gives a definition of it much preferable to all the others, i.e., the conformity of our moral actions with the reason of things, that is, in Wollaston’s language, with the truths of things, and both are the same. How this is, we are now to inquire, and in order to it, we cannot begin better than, with the Earl of Shaftesbury, to consider (as has already been mentioned) the whole Universe as one system composed of infinite other lesser subordinate systems, and these again of others, as our solar system has its several orbs, each of which is another system of itself. And whatever there may be in the rest, in this of ours we know there are many others, each made up of individuals, and every of these of different parts,

each of which may be perfect in itself considered as a part, as a perfect eye, hand, etc., but its use has reference to the whole of which it is immediately a part, that to its greater, that again to another, and so on to the whole.

But that we may further extend this notion, we may observe as follows. The Sun, the center of our solar system, though so immensely distant from us, not less, as it is now agreed, than 20 thousand semi-diameters of our Earth, or about 80 millions of our miles, by his rays illuminates our orb, as he does several others more remote from him, and cherishes, nourishes, and invigorates all productions; for on his rays principally, if not solely, does all life and motion on these globes within his system entirely depend. And further, so is our sight ordered, that it very clearly discovers numbers of other luminous bodies at so immensely a greater distance from us than our Sun, that the space between this Earth and him, compared with that of the nearest of those bodies, is but as a point to our apprehension, for so our instruments represent it.

Again, we see infinite others that are with good reason judged to be no less infinitely distant beyond these than these are from the Sun. And further, by the help of glasses, other infinite numbers are discovered still infinitely increasing in distance, so that even imagination can scarce set a limit to the discoveries that might be made by our sight with the help of glasses, were it possible to improve them to perfection; but the nature of light and the materials to be used with our limited forces will not allow this.

Now it would be absolutely impossible for the sight to make any of these discoveries, did not those luminous bodies actually transmit their rays of light to us on this globe, and consequently they must do the same into spheres in the same manner infinitely distant all around them. But there light is questionless of the same nature materially with that of our Sun, and that this is *body* we are well assured from the effects it produces when contracted into a focus, by destroying or changing the constitution of all other bodies whatsoever.

All those several luminous bodies therefore, however infinite in number or infinitely distant, materially communicate with this globe, and we may not only guess, but find it highly

probable, that all and every of them contribute to the support and carrying on the work of each other, and consequently that they all make one compaginated machine, or one universal whole. They must all therefore be exactly proportioned and fitted each to the other's operation, for otherwise they must prove destructive one to another and produce the utmost confusion.

This shows the order that must reign in immensity, but as we draw nearer home, the same is gradually more eminently displayed. The planets in our system have their projectile forces so suited to their gravities or attraction, as to perform their motions very nearly in circles, which they do with such constancy, that all the eclipses of the luminaries that were ever known to have happened, or that may hereafter happen, can be calculated to an hour with nearly the same certainty as those of this present year. But when we descend lower to consider the nearer process of Nature on this globe, it breaks upon us with a full light and luster. In vegetation and animals, the admirable adapting of liquids and their canals to each other, with the secerning glands fitted for producing such an infinite variety of flowers, fruits, seeds, etc. in the first, and instinct and operations in the latter (as has before been more largely spoke to), and all with such an uninterrupted constancy, such unerring certainty, that not any one species of either vegetable or animals, as has been noted before, was ever known truly to exist on this globe, but the same may be found on it at this day. Again, if we further consider the primary and radical means by which natural effects are produced, we shall find the first particles are so exceedingly small and fine that they escape all our senses, and are so inconceivably small that the great Doctor Barrow [23] doubted not to give it his opinion, that a particle of light is as much less in proportion than a small grain of sand as that grain is less than the whole world, and yet the force of exceeding small parts, as in fermentation, is so great as to produce all the wonderful effects in Nature. And thus, from the most stupendous immensity to the minutest particles that can be conceived, and even to such as we cannot with all our faculties by any means conceive at all, order, proportion, fitness, and congruity in the relations of things universally reign. And this order, these fitnesses and relations are eternal, or at least as the constitution of things in this

Universe agree to the ideas (supposing such) in the mind of the Creator, who in his wisdom produced them.

That this whole is perfect must necessarily be allowed, and consequently that the parts in their kind are the same. The perfection of a thing consists in its answering its end, and what enables each thing to answer its end, is its *good*. Every thing has a peculiar good relative to it, which is no more than the application of such things as are suited to it for that purpose in its formation. The good of a vegetable is heat and moisture duly supplied; that of an animal, warmth and sustenance or food, with what else is adapted to give it sensations suited to its nature and frame.

As all things in Nature thus have their mutual relations, as an action is directed suitably to the nature of the things it operates upon, or tends to advance the good of that thing, so far it is natural.

Nature of itself cannot alter any of its laws or change its course, but a mind possessed of the powers of freewill may variously determine the actions within its own sphere; yet it cannot alter one law of Nature, it cannot support a vegetable without heat and moisture, nor an animal without suitable food. So far as it promotes the good of a thing, which good is previously founded in Nature, in relation to that thing it is a good action, and from thence takes its character; but if it is not done from a determination of the mind by its freewill directed to that good, it is not good in the actor, nor otherwise than accidentally.

Man in a state of Nature

As we are now from this last step come to consider Man invested not only with the powers of reason, but those of freewill, let us on this head begin again with him. And conceiving him placed, clear of all prepossessions and prejudices, in the beautiful scenes of the Creation, as before rather hinted at than described, let us imagine with ourselves in what strain, or to what purpose, the course of his thoughts might most probably be directed. In the first place, we may reasonably suppose he would consider himself and his wants or his own appetites, which would naturally, and without any act of

reflection, lead him to supply those wants and to furnish himself with everything that he found necessary for his support, or that might contribute to his preservation or the bettering of his condition. But in this case, on consulting with his reason, he would soon find, from the dictates of that confirmed by his experience, that he must not overindulge those appetites. For instead of proving beneficial to him, the practice would not only throw him into bodily disorders, but distemper and weaken his sovereign part, his reason, which he would find it would be of the utmost importance to him to make his sole rule and guide in the whole conduct of his life. And by the exercise of this, on observing the beautiful order displayed in all the parts of the Creation subjected to his view, the mutual subordination of all those parts to each other, and the harmony that reigns and is conspicuous in the whole, he would from thence be the more strongly led to reduce all his affections, passions, and inward emotions to the like equability and harmony within himself, conformably, as near as might be, to that exterior order he observed in the several parts of the Creation without him. Whereupon, from the tenor of all his experience in this and such other parts of his conduct, he would infallibly find that such a sway over his appetites and affections, with a moderate enjoyment of the goods of life proportioned to his natural wants, would yield him the calmest serenity and most solid peace of mind, and consequently the truest happiness, the only end for which he could, by a power of infinite wisdom and goodness, be produced into being. But as in the natural course of things, it seldom or never happens to any man to have all his affairs flow in a smooth and constant tenor, and to steer clear of all uneasiness or adversity, either in his health or business, he would, from the same dictates of his reason, see the necessity of arming himself with steady resolutions, on the one hand, to bear with courage and patience such afflictions as were unavoidable, and on the other, in case of opposition or difficulties, to yield to none which he might possibly find means to surmount. And from these and such like observations in relation to things without him, on proposing to himself any end that he judged necessary or proper for him to attain, or on the view of any inconveniency that he ought to avoid, he would concert and

contrive the most rational and direct means in his power for gaining the one and escaping the other. And thus all these, and other such like cases relating to himself we may easily conceive, he might, from the dictates of his reason, proceed and act for his own sake, by which conduct he would, in a great measure, fulfill whatever is required by three of those the Ancients called the *cardinal virtues*, namely *temperance*, *fortitude*, and *prudence*, to which last named they generally allowed the precedence, though it comes otherwise in course of a regular treating of the subject.

But to proceed. When this same person further considered his station in life, that he was but one individual of his species, and convinced by his wants that (as has been abundantly proved in another chapter) he was formed for Society (for he will readily perceive he cannot with any comfort subsist without it), from the same exercise of his reason he will clearly see that every other individual of his species has just the same appetites, the same right to have them gratified, and the same title to happiness with himself. Therefore, as he will want their assistance on many occasions and exigencies in life, he will see it incumbent on him to be equally assistant to them, having no other rational means to engage their aid. Hence, he will be clearly convinced of an equality in the rights of Nature between himself and every other person he is concerned with, and from thence cannot fail of seeing with equal clearness that he ought, in all cases, to do by others, as he would desire they should do by him. To which, though this alone is a rule sufficiently extensive to ground all the mutual or relative duties of life on, if he superadded the preceding observations on the mutual dependencies of all things in Nature on each other according to their respective and reciprocal congruities, by which the good of everything consists in being supplied with what by Nature is formed to suit it, he would find it his reasonable duty to conform all his actions, and the whole tenor of his conduct, to those established laws of Nature, which he would find he was induced to set before himself as a most regular plan for his imitation; and would consider every contravention of them as an act of rebellion against that Sovereign Power, of which Nature is the handmaid, and a violation of those laws by which himself subsisted and enjoyed whatsoever was dear and valuable to him

in his own estimation. And herein consists *justice*, the other of the four cardinal virtues, deservedly termed by Cicero [24] the mistress and queen of all the rest, and was well observed by Aristotle [25] to comprehend all the others in it, calling it the most perfect virtue as consisting in the exercise of the most perfect, for it is no other than the rendering to every power, person, and thing what properly belongs to it, very nearly to which sense it is defined in the civil law [26]; or, according to what has been laid down, it is in a more abstracted sense the observing of the relative fitnesses in the nature of things, and applying each to the other. [27] But it is most justly said to comprise all the other virtues in it, for it not only engages us to pay divine worship to our God the Sovereign Lord of the Universe; to honor and obey our prince, parents, and the civil magistrate; to render to every other person what is due to them in their respective stations or relations, whether conjugal, filial, fraternal, or other relatives, friends, creditors, masters, servants, or neighbors; exacting universally the discharge of every duty to all the other parts of the Creation without us. But as every man also owes a justice to himself in regard to his health, safety, reputation of his whole character in life, this virtue may properly enough be said to be no less comprehensive than it has been rendered in the citation.

But in what has been said of the relative fitnesses in the nature of things, it is not to be imagined that only the physical congruities of things, which, in the strictest sense, constitute natural good, are to be here considered. For we are to remember that, though the ideas conveyed from natural objects (as was shown in the 2nd chapter) through our exterior organs of sense to the mind are indeed the liveliest and strongest, yet the intellect, in its further processes on them, other than in cases for our immediate use, or purely external, soon finds itself a loss; and that its operations on moral ideas and abstracted speculations (as in chap.3rd) are more distinct and clear. For of moral relations and actions in which moral fitnesses consist, the mind can form ideas perfectly clear and just, as between an owner and the thing owned, a promise and the performance of it, a benefactor and gratitude, a laborer and his hire, protection and fealty, and such others as in the aforesaid chapter. Between all which the mind

as clearly perceives the relation or fitness, as between a vegetable and moisture, or an animal and food, and much more clearly than in the greater part of the solutions offered as the physical causes of the phenomena of Nature.

The several species of virtues

But before we quit this inquiry into the nature of virtue as founded upon reason, the reader, it is hoped, will not think his time misspent in taking at least a summary view of those dispositions of the mind which have been, by authors, considered as virtues, or the several species of virtue in general. What those called the cardinal virtues are we have already seen, but must here add of *prudence* that, as it is wholly intellectual, or an ability of the mind, our director and guide in the exercise of all the other virtues, as well in regard to ourselves as others, the faculty or powers of it seem to be the immediate gift of Nature or Heaven, as much as strength or beauty is to the body. But it is greatly improvable by carefully observing consequences and effects ensuing from their antecedent causes, and from a tract of experience, forming its processes in electing and determining its measures for compassing an apparent good or avoiding such an evil under this general head, there are no others to be ranged as subordinate. Knowledge, understanding, and such like, it is true, are named by some, but by no means properly; for, as all virtue relates immediately to our manners and conduct in life, these fall not at all under that category. *Temperance* the next, which jointly with *fortitude* directs our conduct in relation to ourselves, may be distinguished into several subordinate species: as first *sobriety*, prescribing reasonable limits in our eating and drinking; *chastity*, forbidding not only all lasciviousness, but preserving also the thoughts unpolluted with impure imaginations; *lenity*, as opposed to wrath, or excess of anger; *clemency*, in opposition to cruelty and all inhumanity; *modesty*, as opposed to an overconfidence, or self-sufficiency and every indecent freedom; *humility*, the contrary of pride, ambition, arrogance, contemptuousness, and an assuming temper; *charity*, as well in interpreting the actions and conduct of others in the

most favorable sense, as relieving their wants and assisting them in their distresses:

Under fortitude may be ranked these: *patience*, the bearing of unavoidable evils with temper and resignation; *magnanimity* or *courage*, a contempt of danger where duty calls, and a greatness of soul raised above and disdaining every mean and sordid thought or action. *Resolution* and *intrepidity* take the denomination of virtues only from the cause they are engaged in; and *constancy* or *perseverance*, in continuing what by choice or chance one is engaged in, is much of the same kind, though it is more generally attended with praise than blame.

Under justice, which has, on account of its comprehensiveness, been sufficiently spoke to, there needs not to be named any other than *piety* and *gratitude*; the first of which, besides its common acceptation in our language signifying the duty, as has been said, that we owe to the Supreme Being, is, especially in the Latin tongue from whence the word itself is derived, no less frequently understood to mean the regard we owe or demonstrate to our parents, our country, or very near relations, as also that of a woman to her husband. And the latter term of gratitude to benefactors is so indispensably required in all engagements in civil life, that from a saying derived from the Ancients, “*si ingratum dixeris, omnia dixeris*,” [“if you pronounce a man ungrateful, you say all that can be said against him.”] a failure of this kind is reputed the blackest that can be laid to any man’s charge. Besides these, there are two others that must not be omitted, the one termed from our Latin writers *liberality*, but may more properly in an English sense be called *generosity*, a quality highly recommending those who are possessed of it; it is accounted a medium between avarice and prodigality, though leaning rather to the dispensing side, as frugality does to the retentive. The other is *civility* or good manners, a necessary qualification in life, and that borrows from several others of the above named virtues. It turns very much on that decorum which is so highly recommended by Cicero in his *Offices*, and is not ill-defined by an ingenious French author in his own language to be “*l’art de contraindre soi meme, pour ne contraindre pas autres*,” the laying a restraint on ourselves, that we may lay none upon others. It does not now appear that the

Ancients had any proper term for this, or that they much considered it. Aristotle names among the virtues *ευραπεία*, for one which is generally interpreted *urbanity*, and Bishop Cumberland in his *Treatise of the Laws of Nature*, Ch 8, Section 6, recommends it under that name as a virtue necessary to common conversation. But the Apostle Paul, Eph. 5.4, condemns the term in the Greek, undoubtedly in another sense than the philosopher recommended it, for it is in the old vulgate interpreted *scurrilitas*, and the two preceding words (filthiness or obscenity, and foolish talking) clearly show the Apostle took it in a very bad sense, though the utmost that it can be strained to in a just one, is facetiousness. There is another term which, though much the same with justice, is used with us in a more diffusive sense, that is *probity* or *honesty*, which takes in veracity with justice and a general rectitude of the heart, but these sub-distinctions being not very material, we need not at this time dwell on them any further. Yet there remains another of very high importance in life, namely *friendship*, which, though Aristotle does not venture absolutely to pronounce a virtue, yet he bestows on it two whole books of his ten on *Ethics*, dividing it into three kinds as proceeding from so many roots; the first arising from the prospect of profit or advantage or barely from a view to pleasure, he judges unworthy of commendation, but the third he founds on virtue itself, declaring none but the virtuous capable of it, nor that they are so any longer than they continue such. And it is certain that those who have the happiness to be blest with a virtuous disposition themselves, account a true friend, when they can find any, such the greatest treasure they can enjoy on Earth. True friendship doubles our joys, divides or alleviates our cares and misfortunes. Pythagoras's School exceeded all others in this, producing some of the noblest examples of it that were ever given in story, one of which we shall have occasion to mention a few pages forward. Cicero has treated of it excellently well in his *Lalius*, which is accounted one of the finest pieces in his extant works.

Thus the true foundation of virtue being inquired into and established upon the principles of reason, some readers may imagine there has been enough, if not too much, said on the subject, and it is confessed there would have been too much in

some parts of this chapter, were the whole to end here. But for our great happiness, there remains yet another part of the vastest importance to us, to which we are next to proceed, and by it, it will more evidently appear on what view much of the preceding apparatus, the use of which has not yet been seen, was put together.

The moral sense

In the foregoing, it is presumed it has been fully proved that to act virtuously is to act agreeably with reason or the nature of things, in the several relations we and they bear to each other. But were the whole left here, virtue would consist in the study of these relations, and he who had gained the highest attainment in that knowledge might have the best title to the character of a virtuous man, as he is allowed to be the best mathematician who is the deepest skilled in the properties of all manner of figures, their several relations, and the methods of investigating them, and thus virtue would become a system of knowledge in the brain—but it is most certainly a very different thing. A person may make himself master of all the systems of tactics or military discipline that are extant in a language he understands, and yet be very far from being qualified for the office of a general. He must, besides such knowledge, be possessed of true courage, great intrepidity, a presence of mind on all occasions, caution, foresight, and a ready invention for expedients; and if duly furnished with these by the advantages of his genius, he may, with but very little reading or other instruction, and with no great military experience (which it is said was the case of the Duke of Marlborough), become a consummate general. So in the case of virtue, though the knowledge of our duties is a very advantageous step, there are other requisites, without which virtue is not to be attained. Therefore, as the knowledge of Man, even in the highest acquisitions, is confined within very narrow limits, and the just exercise of reason, as in a preceding quotation from the great Selden, is in the power but of a few, and yet happiness or well-being is the grand concern of every individual, so gracious and indulgent has our Creator been to us in our

formation that he has largely furnished those requisites, and implanted them in our frame and constitution.

To make this evident, and to apply the several preceding parts to the subject, it has been largely shown that our several appetites, having been given us for our necessary support and for continuing our being here, to the several respective ways of answering their cravings there is superadded a further concomitant pleasure, and this generally proportioned to the importance of the demand and necessity of the gratification. These demands and gratifications are all founded in the nature of things, agreeably to their general constitution. Reason from experience would clearly show us that our strength and spirits, daily wasting of themselves, and more by labor or exercise, they require constant supplies of proper food, without which life itself must soon be at an end; nor could it subsist without the alternate successions of rest; that without means used for propagating our species, our whole race must, in the compass of an age, be wholly extinguished from off the face of the Earth; that our newborn infants, without the most tender care of the parents, would perish in some few hours after they come into light. Reason, I say, would clearly show all this, and all these supplies and means are founded in the nature of things. But is it left to our reason to determine whether they shall be applied? Far otherwise, we see, for there are not only the most powerful appetites and instincts implanted in us that compel us to answer and indulge these with their proper gratifications, but, as has been largely shown before, there is a further concomitant pleasure added: besides the ease found in removing the craving of hunger and thirst, the taste may also be exquisitely delighted; besides relaxing the body and spirits with rest, sleep when wanted has, in yielding to it, a pleasing and captivating softness not be exceeded; and so in all the rest which have been so fully spoke to before that they need not be repeated here. And as in these instances whereon the grand concerns of life have their dependence, that is, the preservation and continuation of the species, it was of absolute necessity to make the demands of Nature very strong and forcible, so these, being secured by impulses that were indispensably to be complied with and such as are common to us with brutes. In these superior faculties

likewise, wherein Man was to be distinguished from other animals, we have seen in the preceding that a proportionable provision has also been made, as far as by leaving him master of free-will was consistent with the design of making him an accountable creature, that is, a proper object of rewards and punishments. For, to make no further mention of the pleasures arising from the gratifications of our appetites, and of those which may be reputed our grosser senses, we have seen before in this chapter that the mind is affected with a very sensible pleasure in beholding a beautiful object; that this beauty, considered abstractly from the coloring, consists in the proportion of its parts; that proportion being entirely the object of reason, as it compares these parts with each other. Yet, without the least comparison of this kind, or any kind of operation of our reasoning faculty, the human mind is so formed that not only the more capable judges, but even those who never had the least idea of proportion, are nevertheless very sensibly affected. That the same holds much more evidently in the case of harmony or music, with which, though it has been before demonstrated to depend entirely as well as beauty on proportion, the ear, or the mind by the mediation of the ear, is naturally framed to be so affected, yet the most ignorant without thought, or any manner of reflection, are apt to be transported with it. We have further seen, not only in the speculative sciences, the pleasure the mind conceives in the beauty of propositions as founded in variety centering in uniformity, but also in the compositions of the ingenious, that in proportion to their proceeding on the plan of Nature, that is with a simplicity joined with propriety, and, as they move the affections or any of the more tender passions, they are found to be so much the more affecting, and consequently the more esteemed and valued.

Now, as in the preceding anatomizing of all those several mental pleasures, it has been clearly proved that order and proportion, which are discoverable by the sole use of our reason, are the true basis on which those pleasures are respectively founded, in the same manner that our several natural appetites are gratified by the several fitnesses of the things applied to them, though in these we are incapable of discovering wherein these fitnesses consist. Yet the pleasure of which we are

sensible in the enjoyment, depends not at all on our knowledge of their cause as discovered by our reason. And as it has been demonstrated that virtue, in all the branches of it, depends on reason, that is, on the mutual fitnesses of things, we have now only to inquire whether in this case of virtue alone, which has been in all ages and in all actions agreed, in some respect or other, to be the only true foundation of human happiness (for Epicurus himself, though so grossly misrepresented, asserted this) [28], I say whether in this case alone, the great Author of our being has so little befriended the principal of all his works on this Earth as to leave him entirely destitute of every other guide but that which, as the poet describes it:

Dim as the borrowed beams of moon and stars
To lonely weary wand'ring travelers
Is reason to the soul.... (Dryden, *Religio Laici*.)

And which, though it is so magnified by some, and very deservedly, it is confessed, when exercised in its purity and full strength, yet if we duly consider not only the preceding quotation from Selden, but what may be obvious to the observation of every person who has had any opportunity of remarking the general conduct of human life, we must be forced to acknowledge there are very few proofs to be found of any great influence that reason has upon the general mass of mankind. For, as it is most justly defined by the author of *The Foundation of Moral Goodness*, (pa.30) to be a faculty enabling us to perceive either immediately or mediately the agreement or disagreement of ideas, this definition alone is sufficient to convince us that, though the desire of happiness is common to all, yet this faculty is the portion but of a few, and of even those few not until they are of an advanced age and arrive at the years of discretion. That not only those of the lower rank, who are notwithstanding known to make up the greater part of the bulk of our species, are very little practiced in the use of it, but great numbers of such as make a figure and assume to themselves a character are often found to reason very little, or scarce otherwise than on the most obvious things, and even on those from custom only, in which notwithstanding they frequently err.

Nor perhaps, if it were possible to take a survey and examine the whole of our species, would one single person among many hundreds be found who could carry on a consequential chain of reasoning, sufficient from thence to deduce their several, or even some few, of their duties, and infer their obligations to perform them. Hard, then, would be the case of such, if the measure of their probity or goodness should be taken from their capacity and power of reasoning only. Some, indeed, might probably be content that all were to depend on their teachers. But however weak men's heads are, their appetites and passions seldom fail of being sufficiently strong, and miserable would be their condition if they had no other monitor near them than their glimmering spark of reason, or their memory, perhaps equally weak, to bind them to the discharge of their respective duties. But further, as was hinted before, if virtue consisted in the powers of reasoning, or those of the brain only, the most knowing or the most ingenious must ever be found the most virtuous, the contrary of which we, by melancholy experience, find to be true, such as these proving too often extremely vicious, while many others who know but very little have frequently been found more staunchly honest and more to be confided in for their truth, integrity, and fidelity.

These considerations must therefore convince us that it is impossible that a being, by whose wisdom and goodness we were ourselves produced into these beautiful scenes everywhere furnished with materials, if we could have the prudence to make a proper use of them, for our ease and delight, should, instead of giving us proper instincts, as he has to all the other species of animals for their sure and unerring guides, leave us possessed of freewill and no ability to govern or direct it but the operations of reason alone, the powers of which are so partially dealt, that to the bulk, or much greater number, of our species, it is of but little use at all. But that he has given us a further natural guide (besides the helps from religion) will clearly appear from the following.

Reason, as has been just now observed, is only a faculty enabling us to compare our ideas, and to observe their agreement or disagreement. This faculty is wholly lodged in the brain, but is no principle of action in itself. For the case is just the same

with it in this respect as with the lungs below it, which, though they perform the office of bellows to fan the blood distributed through them in passing from, and back again to, the heart, without which important operation, life would continue but a very few minutes, yet they have not the least power of motion in themselves, being furnished with not so much as one muscle, but are wrought, as other bellows are with the hand or other engines, by the muscles of the thorax and abdomen, which raise and compress the breast to receive and expel the air by alternate motions. In the same manner, reason alone, without the intervention of some of our affections or passions, the only springs of action in all human creatures, would be motionless, and its determinations of very little more use than the images of outward objects that are printed on the inside of the open eye of a person newly or very lately dead—for these are drawn on the retina of such an eye no less after death than before it.

Now, as these affections are various and have each of them a determinate species of objects, turning generally on these two opposites, good and evil, under different modifications, and rising to join with and embrace the ideas of the one kind the instant they are presented in the brain, and declining and avoiding the other, as has been largely shown in the preceding chapter of the affections and passions; and as it has been further shown in this, that beauty which in outward objects pleases the eye, and harmonious sounds that delight the ear, are both founded on order and proportion, and yet our minds at the same time are so formed that, without the least knowledge of that order and proportion, the most ignorant are affected with pleasure by the senses of sight and hearing as well as the judicious, though these not seldom frame artificial rules to themselves that sometimes, instead of improving very much, abate those pleasures; and as we have further seen that virtue itself also depends on the proportion or reason of things, that is, on the due observation of their several mutual relations to each other, or which is the same thing, the correlative duties of life; so it has pleased the great Author of our being to give us such an inward sense of the beauty of that proportion and those mutual relations, that there is immediately on the view excited a sensation of pleasure, without laying us under any necessity of

inquiry wherein that beauty consists. It is in the union of the affection with the idea which rises to it, embraces it, and thereby diffuses a pleasure over the whole soul. This is the great rule the Author of Nature has prescribed in his whole works, and is equally planted in the soul of Man, and probably in all intelligent beings, as we find the laws of attraction or repulsion are in all bodies that we are acquainted with in the outward Creation. And as no man was ever yet able to give more than very remote guesses at the causes of this attraction, so an attempt to account for this interior disposition of the heart or affections would perhaps be equally in vain. The outward eye, or the mind from its sensation, discovers a beauty and is delighted with it in outward objects; the ear yet more so with harmony; and the mind no less plainly discovers and is sensible to the beauty of virtuous actions; and all are equally founded on the reason of things, on order and proportion. It would be tedious to cite the testimonies of the Ancients to this effect in their lofty commendations of virtue, sometimes under its own name, and sometimes under that of *honestum*, or the other τὸ καλόν of the Greeks. Cicero, in those excellent philosophical tracts, *De finibus*, the *Tusculan Questions*, and his *Offices*, not to omit his *Cato Major* and *Lalius*, all which tracts may not justly be termed divine, is exceeding full of them, of which I shall give very few [29] below, with some others also from a late, very polite author of our own, who, if I do not mistake, brought the term moral sense first into use in our language.

Virtue more powerful than tyranny: the Pythagoreans

But referring the reader to these quotations, as it is now full time to draw this discourse towards its close, I shall only further mention from story some few passages to show that even the greatest tyrants or the most wicked of men, though their irregular pursuits altogether unqualified them to be witnesses in themselves of this pleasure, have, on the appearance of sublime and transcendent virtue in others, been charmed with the prospect, and obliged to own its superior excellency. Dionysius,

the last and cruellest tyrant of the name in Sicily, condemned one [30] Phintias, a Pythagorean, for an imaginary crime, to death. Phintias, knowing himself innocent, submitted, but desired he might have only the remainder of that day to settle his affairs and family, and he would give a friend as surety for his return in the evening. The tyrant and his courtiers thought him out of his senses for imagining any man would pledge his own life for another's, but his friend Damon freely offered himself and remained until evening the subject of their banter, and Phintias then returning, they both became no less the objects of their admiration. Dionysius hereupon gave the condemned person his life, earnestly beseeching them both that he might be admitted a third in their friendship—but in vain.

Polyanus, a valuable Greek author who lived under the two Antonines, gives us such another story of Dionysius the Elder, the other's father, who, having proposed a league of friendship to those of Metapontum in Italy, was opposed in it by one Euephenus, a philosopher of the Pythagorean sect. Provoked at this, the tyrant found means to get him into his hands and condemned him to death, but he prayed the sentence should be so long respited as to allow him time to see his sister disposed of in marriage, and he would give him a friend in pledge for his life. And accordingly he gave him one Eucritus, who was detained close prisoner during six months, the term of the other's license, at the expiration of which Euephenus, to the great surprise of the tyrant and his courtiers, returned and discharged his surety. In admiration of which, the condemned had not only his life given him, but Dionysius pressed them both to continue with him, promising them very great favors; but they declined it and prayed him to allow them to return to their own country. He granted it, and by it recommended himself much to the good opinion of the Italians.

But as the testimonies of such wicked men carries with it the most convincing proofs of the force of that interior beauty of virtue, in obliging their more brutal dispositions to do homage, and such illustrious examples, so, on the other hand, where it reigns in a mind devoted to it, the contemplation of such shining instances becomes a perpetual feast to the soul, as it is delighted with what it finds congenial to its own nature, and enjoys itself

in every virtuous action of another as it were its own. It is therefore greatly to be lamented that, though the world has long subsisted as to furnish us with some knowledge of its history as well profane as sacred (as they are distinguished) for near 3000 years, there are so very few instances to be found in it of such an improved virtue as the School of that great man Pythagoras generally afforded in all his disciples. Whose modesty, leading him to decline the name of wise that had been given before to those who were esteemed to excel in knowledge, he was the first that took upon himself that more restricted title of *philosopher*, or a lover of wisdom, and was capable in a strange country in Italy then called *Magna Graecia*, now mostly constituting the Kingdom of Naples, to raise up a number of heroic spirits who carried not only their mutual friendship, but all the other virtues, to a height unknown before in the world, and that, proving even then too sublime and strong for the wickedness of the age, occasioned their own destruction. Of this same great promoter of heroic virtue I believe it may be justly said, that probably there is not a name in history that has been more grossly misrepresented. Other philosophers talked, wrote, and disputed, while neither he nor his disciples did any of these; but they lived and practiced virtue in its perfection. By this, grounded on a strict observance of their duty to Heaven, they routed tyrants and tyranny wherever they came, and asserted universally the liberty of mankind. They introduced order into families, a regular and mild discipline into government founded on a most salutary law, impressed the strongest regard of all the social duties of life, and cultivated and improved their mutual friendship to that degree, that they accounted no sacrifice too great to be offered or actually made in proof of the sincerity of their profession, of which the preceding passages are most lively demonstrations. And this order of men with these institutions are sufficient to convince us what a powerful ascendant virtue may be attended with, when proper methods are applied to excite its full force in subduing all opposition, and giving it its natural prevalence over the mind of Man. Cicero has further most justly observed this in the following passage [31]:

Can we forget (says he) how forcibly we are moved, as often as we hear or read of any great act in which the spirit of a pious affection, of friendship, or of a greatness of soul is displayed; and not only we who are born educated and trained up to honorable pursuits, but how do the theaters ring with shouts of applause from the common people who have had no advantages of education, when the scene between Pylades and Orestes is presented, wherein Orestes particularly being condemned to die, but it was not known which of the two was the man, he freely offering himself, his friend Pylades interposed, affirming and insisting on it that he was the true Orestes, and therefore in justice the sentence ought to be executed on him alone. On the other hand Orestes, as he truly was the man, as strenuously insisted on it to prevent his friend's affection from carrying him wrongfully to suffer in his stead; but I say how great is the admiration of the people as often as this action is represented before them, though the whole might be but a fiction. Yet Nature in the case we see displays its force.

It is true in real facts, or such relations as are conceived to have been fact, the mind is much more strongly affected than by fiction and invention only. As who cannot but admire and conceive a sensible pleasure in contemplating the virtue of the Patriarch Joseph, not only for his chastity and constancy, but for his generous behavior to those very brethren who had so treacherously betrayed and sold him into Egypt? Or who can sufficiently admire the great but youthful Alexander for his justice and generosity in regard to Darius's Queen and his beautiful daughters? Or the young Scipio for his like usage of a most beautiful young bride he had taken captive in Spain, and sending after his victory for her new married husband and parents, honorably delivered her to them with a speech as it is yet extant in Livy, Lib. 26, c. 50? Who can forbear admiring the strength of affection and resolution in Codrus, the last King of Athens; Menaecus, the last of the Cadmaean race in Thebes;

and the two Decii father and son, both consuls of Rome, in voluntarily and knowingly sacrificing their lives for the safety of their country? The same we do by the justice of Aristides; the magnanimity of Socrates in disdaining to hearken to his friends advice to fly when they would have put it in his power, and his cheerfully taking his last fatal potion; the constancy and bravery of Fabricius; and amongst the rest of the adventures of Gustavus Erickson, the founder of the present royal race of Sweden, with numberless other examples of true heroism, of which we have the relations as of real matters of fact. And these and such others abundantly prove that, as has been already observed, there is implanted in the human soul a just sense of the interior beauty of actions by which it is affected, no less than by the beauty of exterior objects that strike the outward senses, and that the affections have their respective springs and keys which, when properly touched, are exerted, and the whole soul is affected by them.

The poets well know this who, being gifted by Nature with a kind of enthusiasm, study the heart and affections with care, and first exciting in themselves the passions they would raise in others, and then reforming by judgment the excesses of their transports on the plan of Nature, when they are so happy to succeed in forming a character to the life, whether wholly a fiction of their own or a general one from story, are found able to sway the passions of their auditory or their reader at pleasure, by raising, heightening, composing, and laying them, as a skillful musician manages sounds by his instrument, or as these sounds are sometimes followed by motions of the body.

In those performances when fidelity and constancy are in a lively manner represented in distress, the heart sympathizes and is pained. On the other hand if these, or toils undergone for public liberty or for the common good, or any other virtuous attempts, are crowned with success, the heart no less interests itself, congratulates it, and is dilated with joy. If falsehood, treachery, ingratitude, or any qualities of that clan accompanied with power, the heart swells with indignation; but if these are degraded, exposed, and punished, it recovers itself and exults again. And yet at what, or for what? For actions that perhaps passed more than a thousand years ago, or as probably that never

passed at all and that never anywhere had a being, but were creatures of a lively imagination, that is, of a poet's brain. But the less foundation there is of fact for them, the more clearly they prove the reality of these affections, as that there arises a joy at the idea of a virtuous action or of merit meeting with a just reward, and that resentment and indignation as duly attends the contrary. And this is so far from depending on reason or reflection, that it is observable in fictions of this sort, if the performance be truly natural and just in its kind, the author is never thought of. The mind is entirely engaged with the passions of the heart for the persons, as if in life, before us. Who has time to think of Guarini, when Mirtillo's character of fidelity, or Corisca's for treachery, in the *Pastor Fido* is in view? And this is no ill criterion to judge by of the justness of a piece, for if the reader has time to think of the author, it is because his work and characters, whether in epic, dramatic, or any other kind of poetry, are not sufficiently engaging. And the same also may in some measure hold in what is accounted true history, though there is but too little of the kind to be depended on.

The political leader

Now as it is plain from these observations that it is our affections, and not our reason, that excites our pleasure and engages our approbation, it may not be improper to enter somewhat deeper on this head. It appeared in the 2nd and 3rd preceding chapters that the first of these received only, and represented to the other, the ideas impressed on them by objects without us, which being received in the brain, the seat of the mind or intellect, this ranged, digested, and compared them, and on their agreement or disagreement judged and pronounced of their truth or falsehood, of their rectitude or the want of it, but had no further power in itself than by a communication in a manner instantaneous to impart its notices to the heart, whose affections and passions have been largely treated of in the next preceding chapter. And this last part as thus stated, the writer conceived to be a most advantageous doctrine to mankind, for undoubtedly to suppose the regions or seats of our reason and passions absolutely distinct in themselves, the command of the

one may be the more freely exercised by the other, on which view principally, besides that it appeared just and well founded in Nature, it was first entered on and espoused by him. Which notion, notwithstanding the opposition it meets with from some, he believes he has very strong and substantial reasons for continuing in the same opinion, but at present will only desire those of a contrary sentiment carefully, and with attention, to observe, upon any sudden occasion, what they find pass within themselves upon this head, and only alleging the general authority of the Ancients, shall proceed to instance one who has been mentioned before with advantage, who, through the course of all ages since he lived until the last, ever had justice done to his character, and from proper judges in no age will fail of it. That is Aristotle, who in his excellent books *de Anima*, or *Of the Soul*, speaks thus [32]:

But it is not the reasoning faculty or what is called the intellect which incites to motion. For the contemplative power considers not a thing as it is to be acted or omitted, nor directs in what is to be avoided or pursued, for motion always attends the act of avoiding or pursuing. But in contemplating any thing of this kind, it neither directs the one or the other. It frequently discovers what is in its nature formidable and on the contrary what is pleasant, yet in these cases it does not direct, but the heart is moved. [33]

Thus this author, whose character for just thinking on every subject he applied himself to, save natural philosophy (for that was not an age of experiments), has never been exceeded, as has been largely observed in the 3rd chapter. And here in the plainest terms he exempts our reasoning faculty from every other charge but that which has been mentioned, of operating on the ideas that have been conveyed to the brain by the exterior senses, and refers to the heart for the springs of motion as the seat of the affections and passions, to exert them on the appearance of any thing terrible and what is to be avoided, and the same of others.

And for an instance in the case, let us consider the politician, who, of all others we may imagine, makes the most

use of his reason in projecting his ends and the surest means of attaining them, takes a careful view of his plan, and considers the consequences of every pace he is to make. But in this, we are to consider by what interior springs in himself he proceeds to action. We are first to suppose him engaged in his station, for the service of his prince or his country, and if he is an honest man, for both, to which he is induced by the powerful influences of some affections, as by a love and consequently a zeal for these (not forgetting at the same time a due regard to his own honor and reputation), or by his ambition and love of power, or a desire to better his fortune, or possibly all these together. And his heart, being fully possessed of these several affections, gives him the bent and resolution to move all the engines he can possibly work to compass his proposed ends. But his reason only contemplates views and compares without the least advance to action, of which, without some of these that have been pointed out as the springs of motion, it is altogether as incapable as our lungs are, as was observed before, without being wrought by other muscles that make no part of them. In the same manner it is in the case of virtue. Reason without the affections, and particularly those named in the first chapter proving that man was formally in his creation designed for his Society—such as love to our own likeness and thence benevolence to the rest of our species, compassion to the distressed, gratitude to our benefactors, and such others—can effect nothing without these and the others before enumerated, shown before to be all founded on the reason and mutual relations of things in the general system of the Universe. We might as rationally expect a pilot should carry a ship or galley to her port without the aid of wind or oars, or a chariot by the skill of its driver bring the passengers in it to their stage without horses or other creatures proper for the draught, as that reason alone, without the aid of our affections, should conduct us through our stages here. For the same as the wind and oars are to a ship or galley, or the draught or horses to a chariot to bring it to its stage, are the affections, not only to virtue, but to our whole conduct in life. And on the other hand, what the pilot is to the ship, or the driver to the chariot, in some measure, but not in all respects or universally, is reason to the soul. For many have been known so

happily formed by Nature in their composition, and their virtue has so far excelled in a native probity, modesty, and the whole chorus almost of the other virtues, that they may without much danger be trusted to their own funds in themselves without further institution or direction, as is manifest among the common people in those countries where they have lived long without mixture, or any considerable resort of strangers, and therefore a native simplicity has very much obtained. For it is in this, in some measure, as with our organs of voice in speaking: we learn by the ear to pronounce articulate sounds as we hear them uttered by others, without adverting in the least by what motions in the organs that articulation is performed, though they are as just in themselves and as much according to the rules of mechanism, as virtue is to those of reason. But in the one case, the gift or capacity of speech is granted to Man by which he is enabled to articulate his voice, though not at all conscious at the time how it is effected, and in the other he is endowed with affections or a moral sense that naturally (at least where Nature is not much depraved) lead him to the discharge of his duty in the common offices of life, without any chain of consequential reasoning upon it, or so much as a necessity of knowing the cause, further than that he feels within himself a silent monitor leading him to that discharge, and sharply checking him for every omission. But on the other hand, though these silent admonitions of what is called natural conscience are ever to be regarded and held in high estimation, and though reason itself is no active principle, yet as it is given us as our sovereign director, we are obliged, at the same time we are acted or incited by our affections, to take care that this have the absolute command and control over them, and that they never run any lengths or further than reason and judgment approves their motions. For it is but too well-known from experience in many cases, that when they have the reins given them, they are apt to run counter and engage in confusion.

Thus then we find, that both those who contend for virtue being founded on reason, and those on the other hand who would ascribe it to the moral sense, are so far in the right, as each assert their own part, but at the same time are so far short of the truth, as they would either exclude or advance anything in

derogation of the other. Virtue in the abstract, as has been demonstrated, is truly founded on the pre-existent reason of things; but human virtue, or the practice of it, turns on the affections, and the sway or bent given by the implanted moral sense to the soul. All those we term social virtues are founded in the affections and constitute the moral sense; those affections implanted in our species at our formation are founded on the fitnesses on the mutual relations, that is, on the reason of things agreeably to and consistent with the grand system of the Universe; and that power or faculty in us we call reason, or the power of comparing ideas, ever acting agreeably to the laws of that system, is the watch or guard over those affections. Reason cannot act of itself without these, and would or might run wild of themselves if destitute of the checks and conduct of the other. Each separately from the other would be deficient and therefore each contribute their mutual assistance to the other “... Alterius Sic... Altera poscit opem, res et conjurat amice.” [“Thus one thing demands the aid of the other, and both unite in friendly cooperation.” (Horace)] And from hence, to close this discourse, we may easily form a proper definition of human virtue in general, that it is a conformity of our affections to the reason of things as founded in the general system of the Universe.

Answer to Locke

But now, we should be unjust to this subject if we should take no notice of a very great authority that may seem, in some measure, to militate against the preceding doctrine. John Locke, in his valuable *Essay on Human Understanding*, Book 1, after he had in the 2nd chapter with great force demolished the common notion of innate ideas, proceeds in chapter 3 to combat also innate *principles*, which—as he observed himself in chapter 4, §1 of the same book, “Since if the ideas which made up those truths were not, it was impossible that the propositions made out of them should be innate, or our knowledge of them be born with us”—was altogether unnecessary, and therefore might have well been spared. Yet he has given us a chapter of 12 pages on it in his folio edition. And as there is a vast difference between the exactness he everywhere discovers in treating of his proper

subject, the *understanding*, and what he shows when considering *morality*, he has been extremely unhappy on this point in this chapter also. Though, in the main, he expressly confirms the truth of the preceding doctrine, as where he says Ch.3. §3: “Nature, I confess, has put into man a desire of happiness, and an aversion to misery; these indeed are innate practical principles, which (as practical principles ought) continue constantly to operate and influence all our actions, without ceasing. These may be observed in all persons and all ages, steady and universal; but these are inclinations in the appetite to good, not impressions of truth on the understanding. I deny not that there are natural tendencies imprinted on the minds of men, and that, from the very first instances of sense and perception, there are some things that are grateful, and others unwelcome to them; some things they incline to, and others that they fly.” And again a little below: “As we (perceive) those others on the will and appetite, which never cease to be the constant springs and motives of all our actions, to which we perpetually feel them strongly impelling us.” Here the author uses the word appetite instead of the affections, but it is clear he must in some cases mean the same. Yet that in some of his expressions he overshoots himself is unquestionably evident, for, notwithstanding in the beginning of the preceding quotation he confessed that Nature has put into man a desire of happiness and an aversion to misery, and that these indeed are innate practical principles which continue constantly to operate and influence all our actions without ceasing, and called them inclinations of the appetite to good, he says, §13: “Principles of actions indeed there are lodged in men’s appetites, but these are so far from being innate moral principles, that if they were left to their full swing, they would carry men to the overturning all morality.” Now brutes, it is confessed, are not the subjects of morality, but are wholly insensible of all its rules and laws. Yet notwithstanding they are governed by nothing among themselves but their natural instincts, which is the same in them that this author calls appetites in Man, we find every distinct species of them live with each other on very good terms:

From spotted skins the leopard does refrain,

No weaker lion's by a stronger slain;
Nor from his larger tusks the forest boar
Commission takes his brother swine to gore.
Tyger with tyger, bear with bear you'll find
In leagues offensive and defensive joined.
(Englished by N Tate.)

... parcit

Cognatis maculis similis fera; quando leoni
Fortior eripuit vitam leo? quo nemore unquam
Expiravit aper majoris dentibus apri?
Indica tigris agit rabida cum tigride pacem
Perpetuam: saevis inter se convenit ursis.
(Juvenal, *Satyr 15*.)

And, saving that in the commerce between the sexes a more free scope is granted by the Sovereign of Nature to the softer, for very good reasons assigned for it in the preceding first chapter, in the grand concerns of the whole animal race those instincts or appetites are very much the same, and in what we differ from them one might reasonably hope (to argue *ad hominem*) that universal desire of happiness which (as the author confesses) Nature has put into man, might go a good way to secure him from that fatal overturning. For he had said before in §6 of the same Chapter 3: "God having, by an inseparable connection, joined virtue and public happiness together, and made the practice whereof necessary to the preservation of Society, a visibly beneficial to all with whom the virtuous man has to do, it is no wonder that every man should not only allow, but recommend and magnify, those rules to others, from whose observance of them he is sure to reap advantage to himself." From hence also one might further argue, that if the desire of happiness is an innate principle in all men, and God has made an inseparable connection between virtue and happiness, by this medium of happiness this syllogism may be obviously deduced:

The desire of happiness is innate in all men.

God has made an inseparable connection between virtue and happiness.

Therefore the desire of virtue is innate in all men.

And therefore if virtue be a practical principle, a desire to practice it is also innate. But it may be alleged that the author, by what he declares of God Almighty, intended his positive law to the Jews, or that which their Doctors affirm was communicated to the antediluvian world, on which Selden has wrote. But that he designed it otherwise, he himself has put beyond dispute by these words at the close of §13: "I think (says he) they equally forsake the truth who, running into the contrary extremes, either affirm an innate law, or deny that there is a law knowable by the light of Nature, i.e., without the help of positive revelation." And Book II, Chapter 28, §8 this is further explained in these words: "The divine law, whereby I mean that law which God hath set to the actions of men, whether promulgated to them by the light of Nature, or by divine revelation." These abundantly show that this excellent author, though he with good reason denies that there are any practical principles of knowledge innate in the mind, was far from the opinion that we bring not into the world with us certain strong propensities which, in his own words, never cease to be the constant springs and motives of all our actions, to which we perpetually feel them strongly impelling us.

But this is not the design of taking notice of him in this place. It is his unhappily asserting in diverse places in the same chapter, notwithstanding the truths he delivered as observed in the preceding, after an enumeration of diverse horrid practices and customs in several parts of the world collected from the accounts of travelers, he from the whole in §10 infers this particular conclusion: "That there is scarce that principle of morality to be named, or rule of virtue to be thought on (those only excepted which are absolutely necessary to hold society together, which commonly too are neglected betwixt distinct societies), which is not somewhere or other slighted and condemned by the general fashion of whole societies of men"; and then in §12 positively denies that this precept, Parents preserve and cherish your children, is innate. For, "that it is not a principle which influences all men's actions is what he has proved (he says) by the examples before cited, the sum of which examples is this: that the ancient Greeks and Romans exposed their infants to perish or be destroyed by wild beasts; that the

Mengrelians, who are Christians, bury their children alive; that in the Caribbes they used to geld their children to fatten them to eat, and the like of some people formerly in Peru. After which it must be confessed all his other acknowledgments, as that the desire of happiness is an innate practical principle to Man, that it influences the will and appetite which never cease to be the constant springs and motives of all our actions, are by this assertion overturned and destroyed.

For Nature has carefully implanted in the whole animal race of brute creatures certain instincts absolutely necessary for the continuance of their respective species, and particularly these four: *conjunctionis appetites*; a strong affection (στοργή) for their young when brought forth, which holds universally in the females, and so far that diverse of the most fearful kinds of them will then venture even their own lives in defense of their young; a craving appetite for their food and support; and an avoiding of hurt or danger to themselves, that by their natural fear from thence they might prevent their dissolution. All which are so strongly impressed on mankind as well as on brutes, that death, the last of them, is commonly called the King of Terrors. Now if it be allowed that a desire of happiness and an aversion to misery are innate principles in man, none will pretend to deny that these principles is in no case more powerfully displayed than in those four particulars before mentioned. And that the last of them is so far depended on, that those who are condemned to the galleys are safely trusted with their own lives, which they, together with their chains in the most wretched and comfortless manner, though they can't but have sufficient opportunities from the element they are frequently confined to, to put an absolute period to them and their misery together, and this by one of the easiest deaths, as drowning is said to be, that is known in Nature—yet this very seldom happens. When, on the contrary, how great have been numbers of those on the land who, as the poet [34] expresses it, “*sibi lethum insontes peperere manu, lucemique perosi projicere animas?*”, have, by putting violent hands to themselves, to get rid of life? And diverse by resolutely starving themselves have ended their days, as Zeno and Cleanthes particularly, the two first masters of the Stoic School, though it is commonly said hunger will break through stone walls, and that

self-preservation is Nature's eldest law. Yet by this single act, two of the strongest laws of Nature are violated together. Are we therefore to conclude the appetite for food or the horror of death, the last of punishments inflicted by law for the most heinous crimes, are not principles innate in Man?

In the same manner, no instinct whatever is more remarkable in brutes than the care and tenderness of the females universally for their young, and, in the winged and wild kinds that generally pair together, it is not much less in the males also. But it has been further very justly observed that the most barbarous nations, as the American Indians and African Negroes, who more closely pursue Nature, rather exceed in parental affection than come short of the more civilized matrons (as they are accounted), and therefore many of those stories collected from accounts of remote places and not within the reach of our inquiry, are greatly to be suspected. But though they were found to be generally true, they prove no more than this, that there is no law, no affection, no appetite, no principle whatsoever, innate or acquired, so radicated in the heart of man, but that by a fixed resolution he may conquer it. For he was formed an accountable creature, and therefore had also, superior to all those appetites and principles, a freedom of will, to which all other things in his power must necessarily submit; and to suppose him divested of this would be to put him in the same rank with inanimate beings, for brutes themselves have something of a will, though we do not allow them to have the power of election.

Some accounts indeed we have that it was practice amongst the ancient Greeks and Romans to expose those of their infants they had no mind to raise, and as the fathers, especially among the latter, had the absolute power of their children's lives, at least until they were married, to destroy them was esteemed no crime. But as this power lay only in the father, it was exercised by him alone, and the poor mother, whose issue was undoubtedly as dear to them as it has been universally known in all ages and in all countries to be to all mothers (can a woman forget her sucking child that she should not have compassion on the son of her womb? says the Prophet [35]), I say the afflicted mothers frequently found some means to elude the cruel order.

And thus much I judged necessary to observe on this unhappy mistake in the subject of morals in that great man, whose exactness in his proper subject has ever appeared to me to be beyond exception.

LOGAN'S NOTES

[1] *Υπόθεσις ήθική, De Officiis Secundum Naturae Jus*, 8vo, Oxon. 1660. This author [Robert Sharrock], in making pleasure the inducement to virtuous actions, shows that it is ordained by Nature that these should be attended with pleasure, than which he could never have advanced a greater truth, as it is hoped will fully appear in this present chapter.

[2] His own words are, "Honestae cujusque actionis, omniumque quae secundum virtutem fiunt, finis, sollicitudinis anxioque perturbationis videtur solutio; et contra, tranquillitatis serena et gaudii fruitio, quae omnia sub nomine voluptatis (quod jam diu invidiam apud plerosque contraxit vocabulum) intellexerunt veteres." p.4. He also allows the moral sense in these words, p.11, "Suppono jam, quod suo loco conclusum satis existimo, innatas esse homini notiones quibus quisque sibi sancitum cogitat, ne quenkum innocentem laedat, ne fidem violet, ne ingratus sit, aut in inopes et calamitosos inhumanus," with more in other places.

[3] from Maxwell's translation which by a mistake was sent the writer instead of the original.

[4] Pufendorf, a German by country, but a counselor to the King of Sweden, published his work *De jure naturae et gentium* in 1672, an excellent performance, but he has not carried his inquiries into the *fons juris* as founded in Nature any further than those who had wrote before him, only he has introduced the new term of *moral entities*, which (in Kinnet's translation) he defines thus: That they are certain modes superadded to natural things and motions by understanding beings, chiefly for guiding and tempering the freedom of voluntary actions, and for procuring a decent regularity in the method of life. And he says, the original of these is justly to be referred to Almighty God—But the greatest part of them were afterward added at the pleasure of men. Bo. 1, Ch. 1, §3. And

after a large inquiry into the law of Nature, he makes this the fundamental, that every man ought, as far as in him lies, to promote and preserve a peaceful sociableness with others, agreeable to the main end and disposition of the human race in general. Bo. 2, Ch. 3, §15. And though (§13) he had denied any law to be innate, he founds this sociableness on benevolence, peace and charity, as a silent and secret obligation on Mankind, and he expressly says: that all actions which necessarily conduce to this mutual sociableness are commanded by the law of Nature, and all those on the contrary are forbidden which tend to its disturbance or dissolution. *ibid.* §15 He desires further, it may be observed, that this fundamental law of Nature established by him does not disagree with that laid down by Dr. Cumberland. Grotius (with Cicero and others) had before Pufendorf carried this natural principle somewhat further. For as he was before cited in Chapter 1, he observes that children previous to any instruction show a natural disposition to benevolence or beneficence, compassion, etc., and *Prolegomena* §12, he says the principles of society or social law, though proceeding from internal principles in Man, are to be ascribed to God, because it was his will they should be implanted in us.

[5] and that moral good and evil are coincident with right and wrong.

[6] This is so frequently met with in the Schools, that is, the Universities and amongst those who have been educated there, that it is not to be imputed to any single writer, because custom may excuse it. The most judicious Grotius himself has been free enough in this way, for the last of the thoughts above quoted is exactly his, and to the very same purpose expressed. (*De jure belli ac pacis*, Lib.1, C.1, §10, n.5) But he there explains the meaning of that way of speaking, and says that “*quæ ita dicuntur, tantum, sensum, autem qui rem exprimat nullem fabent,*” that is, that such things as are said to be out of the power of the deity are only expressions of things without sense as impossibilities or contradictions, such as that 2 and 2 should not make 4, etc. But certainly it might be altogether as sufficient in simple terms to declare the impossibility as to affirm a truth, without swearing to it.

[7] On mentioning this, it may not be improper, for the better illustrating what has been said of the nerves in the preceding chapter, to observe here, that, as the strength of liquor prevails, in some men the nerves that serve the feet, in others those that go to the tongue, in others the eyes, are first affected, and in some again the whole seat of reason. Some preserve their understanding when scarce able to move out of the place, and are sensible and perhaps ashamed of their condition, while others acting furiously or foolishly have not the least sense of their disorder, and how different parts came to be so differently affected may perhaps prove matter of speculation to the more curious.

[8] Selden, *De Jure Naturali et Gentium juxta disciplinam Ebraeorum*, Lib.1, cap. 7, p. 88. (Note that in the English above the sense of the author only was considered, and no exact translation intended.):

Ut vero rite hac de re dispiciamus, Ratio ejusque usus depliciter sumitur: Aut qua per se Simplex nudusque, nec alicujus Humana natura Superioris, sive indicationem, sive auctoritatem respicit, aut qua auctoritatem ejusmodi seu indicationem Boni Malique officiorumque debitionis terminos designantem agnoseit. De modo secundo agitur capite sequenti ceterum de Ratione in criterium primo modo adhibito, animadvertendum est, non modo non adeo Certum esse, aut sibi Constantem ac similem apud homines ejusdem in hisce discernendis usum, ut, quid ex eo melius, aut optatius sit, semper satis liqueat, vertum etiam nec inde solum, licet certissimus esset sibi que similimus et constantissimus, erui sic posse Obligationis, atque Permissionis (quod heic caput est) legitimae Causam. Quod ad Incertum atque Inconstantium, qua laboravit semper liber nuda Rationis ille in hisce usus, spectati ut vulgus humanum cui deligentior Rationis qualiscunque esse solet, satis alienus praetermittam, nemo humanior nescit, de Bono et Malo eorumque finibus numerosissimas fuisse olim etiam Rectae Rationis professorum seu antistitum, id est, philosophorum, desceptiones, sed mirum on

modum invicem discrepantes. Neque erat, qui tantas potuit companere lites. Sectae erant perquam multiplices, et tam faecunda dogmatum seges, ut philosophia, quae accuratissima, pro disquirentium viribus ac ingenio, ratione nitebatur, ad CCLXXXVIII sectas, non quae jam essent, sed quae esse passent, adhibitis quibusdam differentiis, facillime mi perveniret, quod observavit olim togatorum doctissimus Varro.

[9] Ibid., cap.8, p.m.94:

Id est, de Naturae Parentis seu numinis sanctissimi imperio, Autoritate, atque indicatione. Nimirum docent, tum, Philosophi magni, tum Patris Christiani, quemadmodum etiam Jurisconsulti nonnulli expressim, Deum, ut Naturae Parentum universique Rectorem, hominum animis insevisse, indicasse, imperasse, alia quaedam, sigillatim etiam designata, Boni et Honesti nomine observanda, alia similiter nomine Mali ac Turpis perpetuo fugienda, atque inde conflari jus naturale seu ejusdem velut in unum corpus partes coalescere singulares.

[10] [Greek text] “Victorious Love—that in young damsel's blooming cheeks takes up thy soft repose.” Sophocles, *Antigone*, v.793, etc.

[11] Diodorus Siculus says the Egyptians for this reason rejected it – [Greek text], Lib1, c.7 p.m.Gr.51 [*Bibliotheca historica*, or Βιβλιοθηκη]. And Sextus Empiricus, *Adversus Mathematicos*, L. 6, tells us that even Epicurus and his followers (which is somewhat strange) condemned it. [Greek text] etc. p.m. Genev.131.

[12] “At liquidas avium voces imitauer ore ante fuit multo quam levia carmina cantu concelebrare homines possent aurisque juvare.” [“Imitating with the mouth the fluid voices of birds came long before men were able to harmonize light melodies and please the ear.”] Lib.5, v.1378, etc. [Lucretius, *De rerum natura*], and he goes on to say that probably they were farther induced by observing the whistling of the wind amongst reeds, etc.

[13] Strada, *Prolusiones Academicæ*, Poet. 6. The poem is Strada's own, but he assigns it to Balthasar Castiglione, author of the famed piece *Il Cortegiano*, or *The Courtier*.

Music

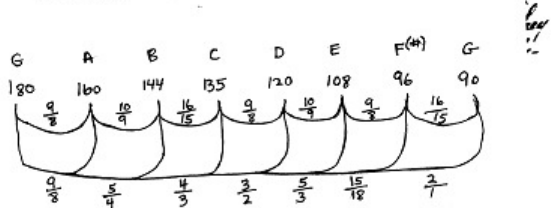
[14] Though the writer confesses himself altogether unskilled in the practice of music, yet having considered its principles as founded in Nature, he thinks fit to subjoin here some observations he has made in confirmation of what is said above.

That the Ancients had long practiced music from a bare observation only of what was by nature agreeable to the ear, is not to be doubted, and even after Pythagoras made the above-mentioned discovery and applied it to composition, a great part of the succeeding musicians rejected the method, and stuck solely to the judgment of the ear. Whence there were two sects, the Pythagoreans who used numbers, and the Aristoxenians, from Aristoxenus (a hearer of Aristotle), who rejected them and were the most numerous; and it is observable that of the nine Greek authors on music that we have extant, of whom Aristoxenus is the first, Nicomachus alone is purely Pythagorean. And it is he who gives us the above-mentioned account of Pythagoras' discovery, which is briefly thus: that the philosopher one day in his walks, listening to the sound of smiths' hammers working on an anvil, observed that they differed in gravity or acuteness of sound by the intervals or notes that we now call an octave, a fifth, and a fourth, and examining the reason of this consonance, he found it depended wholly on the different weights of the hammer heads. From this taking the hints, he went home, and straining various strings (the author says all of the same length) with weights in proportion to the hammers, he found them exactly answer, and from thence fell into the way of reducing sounds to numbers. The same story is likewise given by Iamblichus in the life of Pythagoras and in the same words, but there are some gross mistakes in it as it stands in both authors, which the critical Meibomius and Küster have nevertheless both overlooked, as the writer has fully shown on another occasion.

But what is remarkable on this head, and is chiefly intended to be spoke to here, is this: A concord being the agreeableness of two sounds, whether both sounded together or in direct succession, it is only in the measure of the interval, or difference between them, that this agreeableness can consist, and therefore the proper subject of musical proportion must be differences only. Accordingly, harmonic proportion, which is a kind of compound of both arithmetical and geometrical, consists in this, that in three terms, the difference of the 1st and 2nd shall be to the difference of the 2nd and 3rd, in the same ratio as the 1st is to the 3rd; as in these three numbers, 3, 4, 6, the difference between 3 and 4 is 1, the differences between 4 and 6 is 2; then as 1 is to 2, so is 3 to 6. So if three sounds or notes be expressed by these numbers, 180, 120, 90, the first and last of which make an octave or an eighth ascending, the 1st and 2nd a fifth, and the 2nd and 3rd make a fourth; as the difference of the two first sounds expressed by the number 60, is to the difference of the 2nd and 3rd expressed by 30, so is the sound of the 1st, 180, to the 3rd, 90, that is, as 2 to 1. And such sounds in sequence, for the [reason] given in the second chapter, prove always the most agreeable to the ear, from a plain and certain foundation in Nature. It seems, therefore, unaccountable that, after Pythagoras had made these discoveries, neither any other of the Ancients, nor even those of his own sect (as Nicomachus) appear to have observed this in the division of their scales, either diatonic, chromatic, or enharmonic, the two last of which, and especially the 3rd, though accounted their finest music, most widely receded from it. But in the most natural diatonic scale which now obtains, and for justness far exceeds all those of the Ancients and all others, as it is here annexed, though none of the authors that the writer has seen on the subject appear to have observed it, these harmonic proportionals have a very great place. For there are to be found in it no less than these seven following, viz., an eighth GDG composed of a fifth and a fourth; two fifths GBD and CEG of a third major and minor; two thirds Maj. GAB and CDE of a tone Maj. and a tone Min; and two sixths Major GCE and ADF [F# in modern notation-PV], of a fourth and third Maj.; and in the compass of two octaves there are many more. But a fourth, i.e. $\frac{4}{3}$, admits of no mean in the scale, for though it may

On the other hand, what is called a good ear, or
 the hearing Music, plays & referring to examine it, may
 perhaps (if it be instrumental) attend only to the Tenor or
 solo, for in these must what we may properly enough
 call the body of the music principally be found, and then
 considers of Consonance of Notes, their sequence, & measure.

In on the subject appear to have observed it, these Harmonies
 notional have a
 very great place for
 are are to be found with
 left than the design
 flowing, viz an 8th G D G composed of a 5th & a 4th; two fifths G B D and
 E G of a 3rd major & minor; two thirds Maj. G A B, C D E of a 2nd &
 in Maj & a 3rd Min; & two sixths Major G C E, & A D F of a
 in the 3rd Maj and in the compass of two Octaves there are ma-
 ny more. But a fourth, i. e. 2:3 admits of no mean in the Scale for



be divided into $\frac{7}{6}$ and $\frac{8}{7}$, yet these, though they are not so far
 distant from the other concords as the two tones $\frac{9}{8}$ and $\frac{10}{9}$, yet
 they are said to be greater discords, or more harsh to the ear, for
 7 being a primary number, they say, will by no means come with
 any grace into music. And a fourth being thus incapable of a
 division into any such other notes as can be admitted, it may
 probably be owing to this (though the writers on music have not
 observed it, nor assign any other reason for, than its harshness),
 that some allow it not to be any concord, but rank it amongst the
 discords. It is further also to be noted here, that in the Flat Scale
 or B mol, where in proportion to the preceding numbers, the
 variable note B is 150, E $112\frac{1}{2}$ and F 100 (though these also are
 sometimes otherwise varied), the greater part of these harmonic
 proportionals are lost, and therefore, though it is necessary

sometimes to bring in and even to proceed to these flats, yet, for the reasons given, the scale itself is not near so natural as the other. All which is noted here in confirmation of the above, to show that Nature works by proportion, and could we possibly, as we cannot, find means to reduce what is grateful to the other senses to such certain rules, as we may in a great measure the objects of these two, the sight and hearing, it is not to be doubted but we should find the like laws obtain in those, and so in every part of our frame and throughout the whole Creation.

But further on the same subject of music, it may be added here, that in melody or music of one single part, which it appears was the only kind the Ancients were acquainted with, there are in the first place these three things to be observed: as the gratefulness of the simple sound itself to the ear, the concords or proportion of the notes in succession, and the time or measure, in which last even the most barbarous nations, as Negroes and American Indians, are exact, for they beat their drums or kettles in due time, and the ground as duly with their feet to answer these in their dances. But the great art and masterpiece of all is the composition of the whole melody or tune, for on this alone must depend the basses and all the parts in harmony. To show in what this consists belongs not to the writer, but it will be confessed by all, that on the proportion of the several members, the rises and falls, cadences and returns, the whole must principally turn to please. Yet besides all the rules of art, there appears to be some thing else, one knows not what, that gives the true air of excellency, which no art or study by the dint of labor and application only, can with certainty attain. Hence it is that the utmost skill cannot always be sure of composing a piece of melody that shall justly please the ear. And it is said there have been some masters who, though excellently well-skilled in all the art of composition, would sometimes, without any study or premeditation, give volunteers [ie., improvisations-PV] surpassing their best performances or works of their art with study and application; which fully evidences the power of Nature in giving the spirits such a regular flow, and the nerves so harmonical a tenor, as by the force of their direction alone, without the application of thought, could produce such rapturous performances. The same also holds in

poetry and rhetoric, wherein, though art and study with judgment contribute greatly to their perfection, yet it is the commanding genius alone that gives the life and spirit and animates the whole.

[15] It is a common saying that Art improves Nature, and in diverse cases it is most just, yet it still is no more than (according to the expression) Nature improved, for when this is deserted, all is mere dryness and becomes contemptible. Hence those who have more labored to refine their Arts always find, at last, that they must return to Nature, and from her laws study perfection. And still the more a taste is refined, the more beauty it discovers in all kinds of ornaments and embellishments in proportion as they approach to a natural simplicity.

[16] Among the Orientals, or those who spoke the languages now commonly so called, which were the first we know of, were but several dialects from the same matrix, as Hebrew, Chaldee, Syriac, Aethiopic, and Arabic, we do not find they had any word for it, other than what signified *good* or *just*, and hence the word *virtue* is not to be found in our English version of the Old Testament. In the Arabic, which is known to be as old as any of those languages, they have now some proper words for it, especially two, one agreeing nearly with the name of their new Prophet and from the same original, *machmad*, honorable, the other more common, *fadsila*, a thing eminently excellent (See Goly Lea. Arab col 651 & 1808), but these we may reasonably suppose were brought into use amongst them on their becoming acquainted with the writings and learning of the Greeks in the 7th and 8th Centuries. The word itself, as it is Latin, originally signified no more than manhood, and manly courage in war was generally intended by it, until the Romans, coming to study the philosophy of the Greeks, applied it to the sense it is now used in. The Greek word for it, Αρετή, *arête*, is of uncertain derivation, some deducing it from the Greek name of Mars, others from a verb which signifies to please. Plato in his *Cratylus* (H ste vol1.pa.415) first proposes for its etymology ἀειπετή, “always smoothly following” (and indeed Homer in this excellent line, *Odyssey* 329 [Greek text] uses the verb in the same sense), but he afterwards proposes ἀρετή for the original of the word as signifying “a thing to be chosen.” But this is remarkable, that there is not in either of these two learned

languages one adjective that properly signifies *virtuous*, which shows how little the word was in use in the common speech of those people. Though with the terms signifying the common practical virtues, as good, just, pious, pure, etc., both those and the other nations were well enough stored, and with the names of the particular virtues in the abstract, as justice, etc., they were sufficiently furnished.

[17] [Greek text] *Nicomachean Ethics*, L.2, c.5.

[18] [Greek text] *Ibid*, L 2., c 6.

[19] [Greek text] Plato in [Greek text]. Which, though some doubt whether the collection be Plato's own, it is allowed that the definitions themselves are generally his.

[20] "Virtus nihil aliud, nisi perfecta et ad summum perducta natura." ["Virtue is nothing other than nature perfected and taken to the highest point."] Cicero, *De Legibus*, L.1.8.

"Virtus est affectio animi constans, conveniensque, laudabileis efficiens eas in quibus est, et ipsa per se, sua sponte, separata etiam utilitate, laudabilis: ex ea proficiscuntur honestae voluntates, sententiae: actiones, omnisque recta ratio: quamquam ipsa virtus brevissime recta ratio dici potest." ["Virtue is a uniform and fitting affection of the mind, making those who possess it praiseworthy, and being itself and for its own sake, even without reference to its utility, deserving of praise, there proceed from it good volitions, sentiments, deeds, and everything that belongs to right reason, although virtue itself might be most comprehensively defined as 'right reason.'"] Andrew P. Peabody, trans.] *Tusculanae Quaestiones*, L.4.15.

"Est enim virtus perfecta ratio." ["For virtue is the perfection of reason."] *De Legibus*, L1.16.

"Virtus est rationis absolutio." ["Virtue is the completeness of reason."] *De Finibus Bonorum et Malorum*, L.5.

"...absoluta ratio, quod est idem quod Virtus." ["...absolute reason, for that is what virtue is."] *Tusculanae Quaestiones*, 2. L.4.

[21] Lipsius in his *Manuductionis ad Stoicam Philosophiam*, L.2, Diff.14-20, from various authorities, gives a large account of their sentiments on this head, which are well worth consulting. Zeno their founder placed happiness, or the highest virtue, in living ομολογδμένως, consistently, which

Seneca, *Epistle 74*, explains thus: “virtus enim convenientia constat; omnia opera ejus cum ipsa concordant et congruunt.” [“For the underlying principle of virtue is conformity; all the works of virtue are in harmony and agreement with virtue itself.”] And again: “Accedat, ut perfecta sit Virtus, aequalitas ac tenor vitae per omnia consonans sibi,” that is, that virtue consists in a constant tenor of good actions. But Zeno’s successors in his School, added consistently with, or agreeable to, Nature. Clement of Alexandria, *Stromata 2*, says [Greek text], that is, the Stoics declared the end of Man was to live conformably to Nature, decently changing the name of God into that of Nature. And Epictetus in *Arrian Discourses*, L.1, Dis. 20, says [Greek text], “Man’s end is to follow the gods.”

[22] “Primam illam partem bene vivendi a natura petebant (Platonici) eique parendum esse dicebant, neque ulla alia in re, nisi in natura, quaerendum esse illud summum bonum, quo omnia referentur.” [“And for the first of these sections, the one dealing with the right conduct of life, they (Platonists) went for a starting point to nature, and declared that her orders must be followed, and that the chief good which is the ultimate aim of all things is to be sought in nature and in nature only.” H. Rackam, trans.] Cicero, *Academica*, L 1.5.

[23] “Sane lucis corpusculum unum ab arenula quavis litorea plusquam ea fortassis proportionem superatur, qua tota quanta est mundana moles arenulam istam excedit; id quod non ita consebit absonum, quisquis ad complures fatis obvias apparentias mentem adverterit.” *Lectiones Opticae et Geometricae*, [Lect. I, IX, 2.] pa.8.

[24] “Haec enim una Virtus (Justitia) omnium est domina et regina virtutum.” [“For this one virtue (Justice) is mistress and queen of all the virtues.” Andrew P. Peabody, trans.] Cicero, *De Officiis*, L3, c6.

[25] [Greek text]. Aristotle, *Nicomachean Ethics*, L.5, c.3. But the verse here cited by Aristotle as proverbial, we have now extant amongst the moral precepts or sentences of the old poet Theognis, v.147.

[26] “Justitia est constans et perpetua voluntas jus suum cuique tribuendi,” [“Justice is the constant and perpetual desire

to give to each that to which he is entitled.”] [Domitius Ulpianus], *Institutiones*, L.1,T.1.

[27] Hence then may that question be easily solved, whether or not there are antecedent reasons for virtue? A question that one may justly admire how it was possible for a person of so clear an understanding in other respects as the author of the *Inquiry into the Original of our Ideas of Beauty and Virtue*, and *Essay on the Passions* [Francis Hutcheson], not only to put, but in above 30 pages (illustrations in his 2nd Vol., Sect. 1), to combat the affirmative and at length determine wrong. That ingenious gentleman had obliged the world in publishing his first book, wherein he very well illustrated the doctrines advanced by Crousaz and Shaftesbury before. The first part of his 2nd book was also well, but it was truly unhappy that in the next he should attack the sentiments of two illustrious modern authors justly received by the world with the highest approbation, Dr. S. Clarke and W. Wollaston, on whom he spends his two next sections, wherein he has shown his skill in logical or technical distinctions much more than his judgment. In the first of these, he canvasses and boulds the Doctor’s term of fitnesses in the relation of things, until he allows it scarce any meaning at all. And yet it is hoped it will appear from what is advanced here, to be as proper and significant a term as any that could be applied to the subject and the purposes it is used for. In his next section, he is yet at more pains in opposing the other author’s significancy of truth in things, which he must allow us leave to say is entirely owing to his misapprehending that excellent writer’s meaning, and taking it vastly short of his intention, which he may easily yet discover on a more close and considerate perusal of the 8th, 9th, 10th, 11th, and 12th pages of that most valuable treatise, The Religion of Nature Delineated, than which the writer is of opinion there was never anything more just or more complete published on the subject. It is plain from those pages, that judicious author never meant by the truth of things any other than the truth of the relations of things to each other and the conformity of actions to such truth, the outward expression of which, whether by words or signs, is but as a secondary truth, and not that which the author principally intended (see page 12, l. 11, etc.). Our idea or notion of

property, for instance, is exceeding clear, and is one of the first, next to those of sensible objects, that even children entertain, for they very clearly understand what is meant by a thing being their own. All mankind who think at all, have a clear notion of the relation between an owner and the thing owned; they have generally also a clear notion of right in ownership, and know that it is not possession only that gives it. Now if another commits an action inconsistent with that relation while it truly subsists, he by that action denies its truth. It will not avail to say it is equally true that a robber or person perishing for hunger wants the thing, as that the property is in another, this no way affects the truth of the relation here considered; but to violate that truth is certainly evil *quoad hoc.*, though there may be other truths in the relation of things to which this ought to be submitted. The principle therefore in itself is just, sound, and well-laid, yet it must be acknowledged, that if all the cases in ethics or of duties were to be explained by that as a rule, it might be found too intricate and perplexing. The author however, on that as a foundation, has built a most beautiful, consistent, and excellent superstructure, the character of which no well wisher to the cause of virtue ought by any means to attempt to lessen, but more especially not by a misconstruction of the author's meaning.

[28] That, though Epicurus (very justly) placed happiness in pleasure, he intended nothing by this position but such pleasures as were not only consistent with virtue, but such principally as arise from the practice of it, is so evident from the tenth book of Diogenes Laertius, which is wholly spent on his life and doctrine, and many of the other remaining fragments from the quotations of others that we have on his subject, that this point appears indisputable. And though Cicero himself was no friend to him, yet towards the close of his *Officiis*, Lib.3.33, he has these words, “Atqui ab Aristippo Cyrenaici, atque Annicerii philosophi nominati omne bonum in voluptate posuerunt virtutemque censuerunt ob eam rem esse laudandam, quod efficiens esset voluptatis. Quibus obsoletis floret Epicurus, ejusdem fere adjutor auctorque sententiae,” [“And yet the Cyrenaics, adherents of the school of Aristippus, and the philosophers who bear the name of Anniceris find all good to consist in pleasure and consider virtue praiseworthy only

because it is productive of pleasure. Now that these schools are out of date, Epicurus has come into vogue, an advocate and supporter of practically the same doctrine.” Walter Miller, trans.] in which sentence it is plainly acknowledged that virtue affords pleasure.

[29] “Honestum; quod, etiam si nobilitatum non sit, tamen honestum sit; quodque vere dicimus, etiam, si a nullo laudetur, laudabile esse natura. Formam quidem ipsam, Mario fili, et tamquam faciem honesti vides; quae si oculis cerneretur, mirabiles amores (ut ait Plato) excitaret sapientiae.” ([Greek text] Plato) [“Moral goodness; something that, even though it be not generally ennobled, is still worthy of all honor; and by its own nature, we correctly maintain, it merits praise, even though it be praised by none. You see here Marcus, my son, the very form and as it were the face of Moral Goodness; 'and if,' as Plato says, 'it could be seen with the physical eye, it would awaken a marvelous love of wisdom.'” Walter Miller, trans.] *De Officiis*, Lib.1, c.iv,v.

“Nihil est virtute formosius, nihil pulchrius, nihil amabilius.” [“There is nothing more beautiful, fairer, more loveable than virtue.”] *Epistulae ad Familiares*, L9.14.

“Nihil est enim amabilius virtute, nihil quod magis adliat homines, ad diligendum, quippe cum propter virtutem et probitatem eos etiam, quos numquam vidimus, quodam modo diligamus.... Quod si tanta vis probitatis est ut eam vel in vis quos numquam vidimus, vel, quod majus est, in hoste etiam diligamus, quid mirum est, si animi hominum moveantur, etc.” [“There is nothing more loveable than virtue, nothing which more surely wins affectionate regard, insomuch that on the score of virtue and probity we love even those whom we have never seen.... 9. But if good faith has such attractive power that we love it in those whom we have never seen, or, what means still more, in an enemy, what wonder is it if the minds of men are moved....” Andrew P. Peabody, trans.] *Laelius de Amicitia*, c.8 and 9.

“Quod si ipsam honestatem undique perfectam atque absolutam, rem unam praeclarissimam omnium maximeque laudandam, penitus viderent, quonam gaudio complerentur, cum tanto opere ejus adumbrata opinione laetentur?” [“But if they

could fully discern Moral Worth itself in its absolute perfection and completeness, the one thing of all others most splendid and most glorious, how enraptured would they be, if they take such delight in the mere shadow and reputation if it.” H. Rackam, trans.] *De Finibus Bonorum et Malorum*, L.5, c.24.

“Sumus enim natura, studiosissimi adpetentissimique honestatis; cujus si quasi lumen aliquod aspeximus, nihil est quod, ut eo potiamur, non parati simus et ferre et perpeti.” [“We are naturally desirous and very much inclined to do what is honorable, of which, if we discover but the least glimpse, there is nothing which we are not prepared to undergo and suffer to attain it.” Charles Duke Yonge, trans.] *Tusculanae Quaestiones*, L.2, c.24.

Shaftesbury: beauty and virtue

Besides the Earl of Shaftesbury’s tract in his 2nd Vol. of *Characteristics* entitled An inquiry concerning virtue and merit, in which this subject is professedly treated of, there are in his other pieces some beautiful and strong passages to the same purpose, and in confirmation of our preceding way of reasoning, particularly this beautiful passage which, though somewhat long, shall be transcribed here:

It is impossible we can advance the least in any relish or taste of outward symmetry and order, without acknowledging that the proportionate and regular state is the truly prosperous and natural in every subject. The same features which make deformity create incommodiousness and disease. And the shapes and proportions which make beauty afford advantage, by adapting to activity and use. Even in the imitative or designing arts, the truth or beauty of every figure or statue is measured from the perfection of Nature in her just adapting of every limb and proportion to the activity, strength, dexterity, life and vigor of the particular species of animal designed.

Thus beauty and truth are plainly joined with the notion of utility and convenience, even in the

apprehension of every ingenious artist, the architect, the statuary, or the painter. It is the same in the physician's way: natural health is the just proportion, truth, and regular course of things in a constitution. It is the inward beauty of the body. And when the harmony and just measures of the rising pulses, the circulating humors and the moving airs or spirits are disturbed or lost, deformity enters, and with it calamity and ruin.

Should not this (one would imagine) be still the same case, and hold equally as to the mind? Is there nothing there which tends to disturbance and dissolution? Is there no natural tenor, tone or order of the passions or affections? No beauty or deformity in this moral kind? Or allowing that there really is, must it not of consequence in the same manner imply health or sickliness, prosperity or disaster? Will it not be found in this respect above all: "That what is beautiful is harmonious and proportionable, what is harmonious and proportionable is true, and what is at once both beautiful and true, is, of consequence, agreeable and good?"

Where then is this beauty or harmony to be found? How is this symmetry to be discovered and applied? Is it any other art than that of philosophy, or the study of inward numbers and proportions, which can exhibit this in life? If no other, who then can possibly have a taste of this kind without being beholden to philosophy? Who can admire the outward beauty and not recur instantly to the inward, which are the most real and essential, the most natural affecting and of the highest pleasure, as well as profit and advantage?

And to the very same purpose Cicero: "Et ut corporis est quaedam apta figura membrorum cum coloris quadam suavitate, eaque dicitur pulcritudo: sic in animo opinionum judiciorumque aequabilitas et constantia, cum firmitate quadam et stabilitate virtutem subsequens, aut virtutis vim ipsam continens; pulcritudo

vocatur.” [“Still further, as there is in body a certain fit shape of the members with a sweetness of complexion, which is termed beauty, so in the mind the same name is given to an equability and consistency of opinions, with a certain firmness and steadfastness, engaged in the pursuit of virtue, or containing all that gives strength to virtue.” Andrew P. Peabody, trans.] *Tusculanae Quaestiones*, 27, L. 4, c.13. Also Shaftesbury again: “There is a power in numbers, harmony, proportion and beauty of every kind which naturally captivates the heart and raises the imagination to an opinion or conceit of something majestic and divine.” Vol. 3, p. 30. And again: “The real honest man, however plain and simple he appears, has that highest species honesty itself in view, and instead of outward forms and symmetries, is struck with that of inward character, the harmony and numbers of the heart, the beauty of the affections which form the manners and conduct of a truly social life.” *Ibid.*, p. 34.

[30] These two persons are frequently mentioned as an example of true friendship under the names of Pythias and Damon from Val Maximus, who *Lib.4, c.7* has the story. But we have it much more fully and particularly as here given in Iamblichus, *De Vita Pythagoras*, cap.38, who took it, he says, from a book of Aristoxenus, contemporary with the tyrant, on the same subject, who had it from Dionysius’ own mouth at Corinth where, after his expulsion for his tyranny, he was obliged to teach school for his bread. Cicero also, *de Officiis*, L.3, c.10, gives the same story, but much more briefly in some older editions, under the names of Pythias and Damon, but the latter have it Phintias with Iamblichus. To these two, the old poet Manilius doubtless alludes in these lines, [*Astronomica*] *Lib.2, v. 605*:

Et duo, qui potuere sequi: vix noxia poenis
Optavitque reum sponsor non posse reverti,
Sponsoremque reus timuit, ne solveret ipsum.

The first line of which has some error in it that the critics have not yet been able to cure, being differently rendered in all those editions of the author that I have seen, yet in the two next lines they all agree. But certainly Jos. Scaliger mistook widely when, in his 2nd edition of that author (I have not seen his 3rd), he

refers to Pylades and Orestes who are mentioned in the preceding lines, as we shall see anon.

[31] Cicero, *De Finibus Bonorum et Malorum*, L.5, c.22:

An obliviscimur quanto opere in audiendo in legendoque moveamur cum pie, cum amice, cum magno arimo aliquid factum cognoscimus? Quid loquor de nobis qui ad laudem et ad decus nati, suscepti, instituti sumus? qui clamores vulgi atque imperitorum excitantur in theatris, cum illa dicuntur, "Ego sum Orestes," contraque ab altero, "Immo enimvero ego sum, inquam, Orestes!" Cum autem etiam exitus utroque datur conturbato errantique regi: Ambos ergo una necarier precamur, quotiens hoc agitur, ecquandone nisi admirationibus maximis?

And the same excellent author, in his tract of friendship [*Laelius de Amicitia*], makes his speaker Lalius express himself to the same purpose in these words [v.24]:

Itaque si quando aliquod officium exstitit amici in periculis aut adeundis, aut communicandis, quis est qui id non maximis efferat laudibus? Qui clamores tota cavea nuper in hospitibus et amici mei M. Pacuvi nova fabula! cum ignorante rege, uter Orestes esset, Pylades Orestem se esse diceret, ut pro illo necaretur, Orestes autem, ita ut erat, Orestem se esse perseveraret. Stantes plaudebant in re ficta; quid arbitramur in vera fuisse facturos? Facile indicabat natura vim suam, etc.

I have, in the text above, taken the liberty to compound both the preceding passages of Cicero into one, having regard chiefly to the fact of which the story is briefly thus: Agamemnon, King of Argos, etc., at his return from Troy, being murdered by his Queen Clytemnestra and Agisthus her gallant, to save the life of Orestes, son to both the King and Queen, his elder sister Electra found means to convey him to Strophius, King of Phocis, where he was carefully educated with that King's own son Pylades. Orestes, being come to the years of manhood, went, accompanied with Pylades, to Argos his mother's seat, and in revenge of his father's death slew both her

and her gallant, as he also afterwards did Pyrrhus Achillus his son, in Apollo's Temple at Delphi, for marrying Harmione, his uncle Menelaus' daughter, who had been betrothed to him before. For these murders, he was haunted by the Furies, and, consulting the Oracle how he might be relieved, was answered that he should bring the image of Diana that was kept in her temple in Taurica Chersonelus into Greece. In order to this, he set out with his friend Pylades, and arriving at the place, they endeavored to conceal themselves, but were discovered by the shepherds, presented to Thoas, King of the country, and, pursuant to their law, ordered to be sacrificed. Iphigenia, Orestes's own sister, happened to be priestess, and, finding by their language they were Greeks and that the oracle was given but to one of them, she interposed and was willing to save one of their lives. Upon which only Orestes' life was required by the King, but it not being known which of the two was he, the dispute here hinted at arose, and both their lives were saved, for Iphigenia, discovering Orestes to be her own brother, assisted them in their plot and fled with them. Great part of this we have in Hyginus, *Fabulae*, 120, 121, and the rest from other authors. Manilius mentions them in these lines, the next preceding to those quoted from him in the case of Phintias and Damon:

Id circo nihil ex semet natura creavit
 Pectore amicitiae majus nec rarius umquam;
 Unus erat Pylades, unus qui mallet Orestes
 Ipse mori; lis una fuit per saecula mortis
 Alter quod raperet fatum, non cederat alter.
 (Manilius, L.2, v.602 Seq.)

Ovid also tells the story of their contest, and as it was the same country he was banished to, affirms that their memory still continued in his time, as in this distich:

Mirus amor juvenum, quamvis abiere tot anni,
 In Scythia magnum nunc quoque nomen habent.

["The youths' love was wonderful: though many years have passed, they still have great fame here in Scythia."] [*Epistulae ex Ponto*] L.3, Ch.2, v.95.

[32] [Greek text from Aristotle, *de Anima*.]

[33] Cicero, the greatest and most valuable of all the Roman writers, lays so great a stress on the dictates of Nature

that he says not only every man by its conduct may attain to virtue ("Nec est quisquam gentis ullius, qui ducem Naturam nactus ad virtutem pervenire non possit." ["And therefore there exists not a man in any nation, who, adopting his true nature for his true guide, may not improve in virtue." Francis Barham, trans.] *De Legibus*, L.1, 10.), but though he extols reason to the highest as the perfection of Man, and that by which we became related to the gods, yet he as highly extols Nature in this passage as well as elsewhere, *Tusculanae Quaestiones*, L.3.1:

Quod si taleis nos natura genuisset, ut eam ipsam intueri et perspicere, eademque, optima duce cursum vitae consicere possemus: haud erat sane: quod quisquam rationem, ac doctrinam requireret nunc paruulos nobis dedit igniculos, quos celeriter malis moribus, ut nusquam naturae lumen appareat. Sunt enim ingeniis nostris semina innata virtutem, quo si adolescere liceret, ipsa nos ad beatam vitam natura perduceret.

[Had Nature given us faculties for discerning and viewing herself, and could we go through life by keeping our eye on her, our best guide, there would be no reason certainly why any one should be in want of philosophy or learning; but, as it is, she has furnished us only with some feeble rays of light, which we immediately extinguish so completely by evil habits and erroneous opinions that the light of Nature is nowhere visible. The seeds of virtues are natural to our constitutions, and, were they suffered to come to maturity, would naturally conduct us to a happy life. (C.D. Yonge, trans.)]

[34] Virgil, *Aeneid* 6, verse 434 ["...although innocent, took death by their own hands; hating the light, they threw away their lives." Allen Mandelbaum, trans., *The Aeneid of Virgil*, New York: Bantam Books, 1972. p. 147.]

[35] Isaiah 49.15

LOGAN'S FRAGMENTS

Another draft beginning of Chapter 5

We have seen in the preceding that Man is formed for Society, and has in his frame and constitution several natural instincts that lead him into it; but his great distinguishing characteristic is his reason. Now as all agree it is his duty to cultivate Society, yet we find those who have treated of the subject have, in appearance, run wide in their conceptions of the impelling motives or operative powers that lead to this. These are now to be considered.

That pernicious thesis of Hobbes, that men in a natural state are enemies to each other, and that only fear led them into Society, has been combated by many writers, not without a commendable success. Bishop Cumberland wrote largely to prove that the perfection of human nature consists in a general benevolence. The Earl of Shaftesbury in a beautiful scheme showed that Man was a part of one great whole; that order was established in that whole; that it is Man's duty as a part of it to act up to that order; that he is framed by Nature to pursue it, and is rewarded by the greatest happiness he is capable of in life. And though no system can be more excellent, yet others thought something further was necessary to show Man's obligation. Dr. Clarke laid this down in the created aptitude or fitness of things. W. Wollaston, in a most valuable discourse, made the truth as in the nature of things the grand rule, which is nearly coincident with the Doctor. F. Hutcheson, in two treatises, was for reducing it to a *moral sense* much the same with Shaftesbury, that is, that Man by his formation is endowed with dispositions that lead him to the discharge of his duty. A clergyman, as the title of his book indicates him, opposes this as degrading man too much by reducing him to instinct, the only rule of brutes, and would ascribe all to the direction of reason, in which all his pre-eminence above the brutal kinds consists; and another, said also to be a clergyman, in his peculiar way treats this moral sense with contempt and ridicule, as F. Hutcheson also opposes Dr. Clarke's and W. Wollaston's schemes. But as the views of all these gentlemen since Hobbes had the same tendency to promote the cause of virtue, and to bring Man to a more lively sense and

from thence to the discharge of his duty, it were to be wished that each when he [...]

Logan's notes from Hutcheson

Hutcheson's *Inquiry concerning Moral Good & Evil* [a little more than 2 pages of notes]

Principal contents in Hutcheson's *Essay on the Nature and Conduct of the Passions and Affections*, London 1730, pag. 333 [13 pages of notes, subdivided as follows.]

§ I The nature of human actions...

§ II Of the affections and passions, the natural laws of pure affection, the confused sensations of the passions and their final causes.

§ III Divisions of the affections and passions.

§ 4 How far the passions are in our power.

Sect. 5 Comparison of the pleasure and pain of the several senses.

Sect. 6 Of the management of our desires and principles necessary to happiness.

The clergyman's foundation of moral goodness, against Hutcheson [2 pages]

Morality universal despite "strange stories"

Notwithstanding the many wild customs said to prevail among many different nations (as Nature is too easily perverted), yet there are some for which the sense of all mankind may be referred to. Does not a public spirit; benevolence; piety to parents, brethren, etc.; fidelity to husbands and wives and in discharging trusts; restoring a deposition to the heirs of the deceased, with many others, gain universal approbation?

Note the falsehood of many reported customs from the fondness of telling strange stories. Though many of them true, yet a great many feigned or taken up by mistake.

What Protagoras in Plato says, if a man should own himself unjust he would be accounted out of his wits. No man will own himself bad.

Logan's notes "from Locke's *Essay*"

Book 3, § 1 Moral principles require reasoning and discourse and some exercise of the mind.

ibid It may suffice that these moral rules are capable of demonstration.

2 Thieves find justice amongst themselves necessary for the convenience.

3 Nature I confess has put into Man a desire of happiness and an aversion to misery. These indeed are innate practical Principles which (. . .) continue constantly to operate and influence all our actions without ceasing. These may be observed in all persons and all ages steady and universal. But these are inclinations of the appetite to good not impressions of truth on the understanding. I deny not that there are natural tendencies imprinted on the minds of men, and that from the very first instances of sense and perception there are some things that are grateful and others unwelcome to them, some things that they incline to and others that they fly. But this makes nothing for innate characters on the mind which are to be the principles of knowledge regulating our practice—as we do the others on the will and appetite which never cease to be the constant springs and motives of all our actions to which we perpetually feel them strongly impelling us.

6 That a great part of Mankind give testimony to the law of Nature.

ibid For God having by an inseparable connection joined virtue and public happiness together and made the practice thereof necessary to the preservation of society and visibly beneficial to all with whom the virtuous man hath to do.

8 Conscience—which is nothing else but our own opinion or judgment of the moral rectitude or pravity of our own actions.

9 Examples of allowed immoralities.

10 That there is scarce that principle of morality to be named, or rule of virtue to be thought on (those only excepted that are absolutely necessary to hold society together) which is not somewhere or other slighted and condemned by the general

fashion of whole societies of men, governed by practical opinions and rules of living quite opposite to others.

+ 12 Parents preserve and cherish your children not innate.

p. 21 13 Principles of actions indeed there are lodged in men's appetites, but these are so far from being innate moral principles, that if they were left their full swing they would carry men to the overturning of all morality.

ib. ad. fin. And I think they equally forsake the truth who running into the contrary extremes either affirm an innate law, or deny that there is a law knowable by the light of Nature, i.e., without the help of positive revelation.

ib.ad. fin. Against predestination—who cannot put morality and mechanism together.

21 People espouse contrary principles and will sooner part with their lives than with them.

B2 c28 §11 It is no wonder that esteem and discredit, virtue and vice should in a great measure everywhere correspond with the unchangeable rule of right and wrong which God hath established, there being nothing, etc.—And therefore men, without renouncing all sense and reason and their own interest, which they are so constantly true to, could not generally mistake in placing their commendation and blame on that side that really deserved it not.

X Nay, even those men whose practice was otherwise, failed not to give their approbation right, few being depraved to that degree as not to condemn, at least in others, the faults they themselves were guilty of. Whereas even in the corruption of manners, the true boundaries of the law of Nature, which ought to be the rule of virtue and vice, were pretty well preserved.

§ 8 The divine law whereby I mean that law which God has set to the actions of men, whether promulgated to them by the light of Nature or the voice of revelation.

Franklin to Logan, 1737?

Having read the chapter on moral good or virtue, with all the attention I am capable of, amidst the many cares that

continually infest me, I shall, as the author condescends to desire, give my opinion of it, and that with all sincerity and freedom, neither apprehending the imputation of flattery on the one hand, nor that of ill manners on the other.

I think the design, and the management of it in the main, good; a short summary of the chapter placed at the beginning, and little summaries of each paragraph in the margin being only necessary, and what will in my opinion sufficiently remove any disgust that the authors dilate manner of writing may give to some readers; and the whole is so curious and entertaining, that I know not where any thing can be spared.

It seems to me that the author is a little too severe upon Hobbes, whose notion, I imagine, is somewhat nearer the truth than that which makes the state of Nature a state of love: but the truth perhaps lies between both extremes.

I think what is being said upon music, might be enlarged to advantage by showing that what principally makes a tune agreeable, is the conformity between its air or genius, and some motion, passion or affection of the mind, which the tune imitates.

I should have been glad to have seen the virtues enumerated, distinguished, and the proper ideas affixed to each name; which I have not yet seen, scarce two authors agreeing therein, some annexing more, others fewer and different ideas to the same name. But I think there is some incorrectness of sentiment in what the author has said of temperance, concerning which I have not time to explain myself in writing (*caetera desunt*).

B. Franklin

Locke “most absurd”

Locke, that pleasure and pain are the root of all the passions B 2 c 21 & §5, that a father loves his child because he delights in his doing well—most absurd. The passions are as natural as pleasure or pain; they are implanted in us to obtain or avoid these.

If attraction be in all bodies, or centripetal and centrifugal forces, and it is found as far as philosophy has reached that these alone must account for many appearances, it

seems much more clear that love and hatred or aversion are the primary qualities of the soul.

These bodily qualities are inherent for an end; what?

These animal ones are to gain pleasure or avoid pain.

Another draft of Logan's "Answer to Locke, after the moral sense and ground of virtue is stated."

But before we leave this subject, it may be necessary to take notice of some things advanced by J. Locke in the 2nd Chapter, Book 1 of his excellent *Essay on Human Understanding*, which seem to contradict what is here laid down. And his reputation and authority is so firmly established in the minds of great numbers of the most rational thinkers, that whatever carries an appearance of inconsistency with his doctrine will scarce fail of meeting with strong prejudices against its reception.

That gentleman, with the greatest success, combated and entirely demolished the notion of innate ideas which, before his time, had prevailed with many, and in giving us the process of our understanding, he has created an edifice truly uniform and all of a piece, as he himself expresses it. But as he owns in the last section of the 2nd chapter, speaking of himself, that we all are too apt to be too fond of our own notions when application and study have warmed our heads with them, it will appear very evident that his subject having been only that of the intellect, by his endeavors to reduce all within us to a uniformity with his notions on that head, he has not applied his usual care and the same exact judgment on the subject of *morality*. In Book 2, Chapter 28, §7, etc., his doctrine plainly infers that Man has no other rule for directing his actions than the fear of punishment in a future state, the fear of it from the civil magistrate, or the fear of shame from his neighbors. For though he makes the divine law to be that which God has set to the actions of men, whether promulgated to them by the light of Nature only or by the voice of revelation, yet it is plain from his 3rd Chapter, Book 1 that by this light of

Nature, which might be understood a very comprehensive term, he means nothing at all.

To deny innate practical principles— if by principles he meant enunciative axioms, or a truth consisting of terms expressing ideas of the mind— is very just. But then it was altogether needless, for if there be no innate ideas of any kind, how can a combination of them be innate? He must therefore have intended by a principle something directive in man, as instincts are in brutes. And in §3 he says, “Nature I confess has put into man a desire of happiness, and an aversion to misery. These indeed are innate practical principles, which (as practical principles ought) do continue constantly to operate and influence all our actions without ceasing”— but “these (he says) are inclinations of the appetite to good, not impressions of truth on the understanding.” Here inclination is allowed to be an innate practical principle, but not of the understanding. For of these, he had, in the preceding §2 by way of query, denied that there is any practical truth that is universally received without doubt or question, not even Justice, to which purpose in §10 he is more express, what he there says being the sum of what he concludes from a heap of instances in §9 of the detestable, irregular practices of the people of diverse far countries, as taken from those Oracles of Truth, the accounts of travelers.

And from these and other observations will not in §12 allow this precept, Parents preserve and cherish your children, to be either an innate principle directive of the actions of all men, or an innate truth known to all men. For the Greeks and Romans exposed their children, the Mingrelians bury them alive, the Peruvians eat them, etc.; but were it an innate principle, all men must necessarily obey it. Yet pray why so? His indefinite use of the word principle renders his method of arguing in that chapter confused, and exceeding unlike his course of reasoning in most other parts of the book. He allows the desire of happiness an innate practical principle from inclination, but he here denies that the love and care of parents to and for their children is such an innate principle, or otherwise why did he bring a heap of examples, such as they are, to prove it is not a directive principle to all, and therefore not innate? But if the desire of happiness be an innate principle from appetite, are not the appetite for food,

the horror of death, and the *conjunctionis appetites* equally so? Are not these innate principles as much as the desire of happiness in all the species of animals without exception? And is it any proof of the contrary that diverse people have refused eating and starved themselves, and that whole orders of men and women vow chastity or virginity? He surely forgot in this place that Man with these principles is also born to free will, which, notwithstanding, he carries with him throughout most of his book. Had Man such innate principles as would force him to determinate actions, as body must gravitate, he could not properly be called an agent at all, and all morality would be at an end, until, as he says (§14) morality and mechanism can be reconciled.

The sense of the author as it evidently appears in the cited sections has been here spoke to. In the same §12 he goes on, and were it not for the respect due to a name deservedly great, one would almost say *willingly*, to add that (speaking of the same principle or precept of parents care for their children) to make it capable of being assented to as true, it must be reduced to some such proposition as this: It is the duty of parents to preserve their children. And why did he not put it so at first? But either the one way or the other, it is the same when considered as innate. For should we state his first allowed principle thus, “the Author of Nature in framing Man enjoined this law upon him: Man pursue thy happiness”; or, “Man shall pursue his happiness”; “I have made it the duty of Man to pursue his happiness”; would the principle considered in itself be in the least altered by these various ways of its being expressed by us? The desire of happiness and the care of parents over their children are the principles, the other varieties are but modes in the consideration of them, and no way affect or change the nature of the principles in themselves.

He proceeds: “But what duty is cannot be understood without a law, nor a law be known or supposed without a lawmaker, or without reward and punishment.”

This indeed is a home stroke upon us, and if it can be applied to what has been advanced in this chapter, will fairly upset the whole of what has been principally labored in it. For there has not the least notion of a lawmaker, with reward and

punishment as the formal sanctions of a law, been considered in this sense, since here positive laws (as they are called) seem to be intended.

But let us examine it. That any nation in the world had positive laws directly from God but the Jews has never been alleged, though most of the legislators pretended the assistance of some divinity. And according to the common computation, the world had subsisted above 2400 years before these were given. Nor before that time, nor for several hundreds years after, have we reason to believe that any nation in the world had written laws that were communicated to the people; nor is even so much as the word νόμος, a law, to be met with in Homer's works, who, as it is judged, was not born within less than 500 years after Moses*. Yet in all this time (or let us say for 1500 years after the Deluge) the affairs of life in all societies, all countries, and nations wherever mankind were spread went on very much in the same manner. Some modes and circumstances changed, as they do at this day, but the sexes loved each other, they had with great tenderness educated their children, and what is most worthy of notice, the nations accounted the most barbarous, as if they more nearly approached the brutes that most strictly obey Nature, are generally the fondest this way, and children also revered their parents.

(* Nor does it occur in the sense of a law to Man in Hesiod, nor has he the word θεσμός, though he dwells so much on justice, and gives so many excellent precepts for it, and strongly inculcates the observation of it, yet scarce ever uses any other, though he speaks of judges and judgment, than θεμις and δικη, right and justice.)

But this must particularly be observed, that, though in several ages and different parts of the world people have exceedingly differed in their manner of living, as some have chose to dwell in well-built cities, affected palaces and magnificent structures, splendid apparel, fine food, while vast nations of others, who were far from being fools, chose to live only in tents or huts; and some neither plowed nor sowed nor affected any one part of what is called polite; and so in every custom and manner that can be named which is not essential to life, no less than if they were of different species of creatures.

Also in respect to divine worship, though in Cicero's age, and that of Maximus Tyraeus, it was believed there was not a nation in the world who acknowledged not a deity, and it is certain there are exceeding few now, if it be true that there are any, yet their methods of worship and their notions of religious performances have been inconceivably various, and many of them most absurd and ridiculous. To mention only those two again, Homer and Hesiod, the two oldest writings we have excepting the Scriptures, can anything be more monstrous or senseless than what they have delivered concerning their gods? Yet in points of justice, in their notions of right and wrong, in the offices of humanity, the rights of hospitality, it is evident that they judged and wrote as clearly and justly as any others. They even told the most detestable stories, the most abominable acts, of their divinities, and yet they had clear notions of the true worship suitable to a divine being. Hesiod, though he tells us of Jupiter's dethroning of his father whose reign was the Golden Age, with diverse of his flagitious acts in his *Theogonia*, yet he directs [Greek text] to perform sacred rites to them with chastity, or rather holiness and purity, and he makes them everywhere dispensers of Justice. And Homer, who much more defames them, yet says of them, [Greek text], The gods love not unrighteous actions, but honor justice and the pious or good works of men, and everywhere shows the power and dominion of justice, insomuch that so able a judge as Horace preferred his poems on that account to the writings of the most famous of the Stoics, who were the most rigid professors of that virtue.

Now can we from these instances avoid concluding that, since the deductions from reason only have been in all ages so exceedingly various in directing men in their manner of life and in the worships of their supposed divinities, yet their notions of justice and all the social virtues have been constantly and invariably the same? Can we avoid concluding that this can proceed from nothing less than a principle universally fixed in all mankind, and which as unerringly exerts and displays itself as an appetite for food, the *storge* or natural affection of parents for their children, and such like, to dispute which would be an attempt that a Pyrrho or any of his followers would have reason to be ashamed of?

To argue that men, when they come to the use of reason, collect this by inferences from the necessity of it, is equally just with Lucretius' account (from his *Mas Epicurdis*) of the original of the world from chance only. For if we thoroughly examine the history of mankind, we shall find good cause to conclude that, excepting in things of pure speculation and matters that no way affect our interests or the conduct of our lives, there is not any one practical rule universally agreed on to this day but such only as are grounded in interior principles.

For the 6th Chapter: On the Will

The danger of blindly following Locke

In considering the *will* on which all action depends, it may be required to take notice of some of Locke's notions in his chapter *Of Power*, Book 2, Chapter 21, where he says §35 that, It seems so established and settled a maxim by the general consent of Mankind that the greater good determines the will, that he did not at all wonder that when he first published his thoughts on the subject he took it for granted. But he there shows he had changed his mind, for he found that what determines the will is a desire to be freed from the greatest present uneasiness, and therefore he had laid it down §31 that all pain of the body and disquiet of the mind is uneasiness, and with this is always joined desire, equal to the pain or uneasiness felt, and scarce distinguishable from it. For desire (he says) being nothing but an uneasiness in the want of an absent good, in reference to any pain felt, ease is that absent good, and he very much enlarges on this subject giving many examples of it, which in those particulars are most undoubtedly true.

But in this we have a most clear instance of how dangerous consequence it may prove for an author of great abilities and an established reputation to decide universally on any important point, without being first well assured that his induction, from whence he draws his conclusion, has likewise been equally universal, and how necessary it is for him to use, at the same time, the utmost caution, that he guard against all the undue inferences that may be made from his positions, in case he should have failed in it. For, when an author appears to have been master of great abilities and is once supposed to have well considered his subject, and from thence to have perfectly understood it, mankind have generally so great regard to their own ease, that they are very willing to acquiesce in what they conceive to have been perfectly well done and settled to their

hands. And the esteem they further conceive for the high merit of the person from whom they are pleased to take their opinions, allows them no other ambition in the case than to make themselves as much masters as they can of his sentiments, and in this they value themselves on their proficiency.

How pernicious this has proved to knowledge, and how injurious to truth, is abundantly known, or will be evident and manifest on a little reflection. Aristotle was at least one of the ablest and greatest men that ever wrote, and for one man performed wonders. His writings on rhetoric, poetry, government, ethics, his history of animals, with some other pieces, have ever been acknowledged justly beyond contradiction, and what he said on Physics was looked on as much the best of what had been wrote on the subject. Hence his writings came so much into esteem and gained so universal a reputation, that for near a thousand years, after the Saracens, having established a mighty power of empire, applied themselves to study the sciences and philosophy, those writings were reputed the sole oracle in point of natural knowledge. Not only by those Mahometans, but they were even outdone in this blind veneration for that author by the greatest Doctors in the Christian Church, who could not be satisfied to explain so much as an article of faith without establishing and confirming it on his doctrine. Nor were these men persons of low or mean capacities, for it is to be questioned whether any ages ever produced men of sharper wits or greater natural abilities than the Scotus, Aquinas, Tostatus, Suarez, etc., though the unhappy turn of mind that prevailed in the ages they lived in gave those great abilities no less unhappy direction. To the vast numbers of others may also be added the great Julius Scaliger, preferred by many for judgment and in some other respects to his very great son Joseph, of whom (that is of Julius) the admired Lipsius says* (**Epistolae*, Centuria 2, ep. 44) that Homer, Hippocrates, and Aristotle were the three he used above all others to admire, yet he must add a fourth, Julius Scaliger, “qui natus in miraculum et gloriam nostri avi,” who was born (says he) to be the wonder and glory of the age. Yet this very great man had made so full and absolute a surrender of all his intellectual faculties to the Divine Philosopher, as he calls him, his master Aristotle, that when

Cardan, a good mathematician and well skilled in astronomy had abundantly proved* (**De subtilitate rerum*, L. A) that comets could not be composed of vapors, or lower than the moon, but were permanent stars or planets, because this was contrary to Aristotle's opinion of them, this same great man directly opposes him, and asserts the old absurd notion that they were composed only of exhalations from the Earth, though this was then from astronomical observations losing credit in the world. Which, as it is a most flagrant instance of the power of prepossession in opinion, is mentioned here only to show that, as what has been, may be again, and therefore those who sincerely make the knowledge of truth their sole aim should most carefully guard against all preoccupation. No man is able to judge of anything without himself but by something within him, nor has any man a right magisterially to pronounce and dictate to others in such cases wherein the judgment being to be formed only from what passes within ourselves. Each man has the same opportunity, if he has but the capacity of turning his own eyes inward and there viewing how the matter stands within doors, etc. in his own economy of judging for himself, and a better right to it than any other can pretend to. Provided always, as has been said, that he is capable, and the point relates not to duties to another, for it is not, or at least ought not to be, any rule to him that it must needs be so with him because another person entirely distinct from him say he finds it is so on his part.

A little pamphlet published in 1725

A person much afflicted with severe paroxysms of the gout and a most crazy constitution, which was known to be J. Locke's case, could not avoid turning his thoughts very much on the pain he so sensibly endured, nor could he avoid the most vehement desires for ease, and this might make such strong impressions on his mind as that the vein and tincture would run through the whole of his reasonings on the subject. But as his reasonings throughout that deservedly admired piece, his *Essay*, have appeared and obtained the reputation of being strong and just, an effect and instance of the same kind with what, in relation to another, was observed above, has directly ensued in a

little pamphlet published in the year 1725, sent, as its author pretends, to his friend with Wollaston's *Religion of Nature Delineated*. Wherein the reasonableness of a belief of the immortality of the soul being asserted, from the inequality of the distribution of the goods of this life and of pleasure and pain, in order to overthrow an opinion so dangerous to the atheistical tenets that writer and probably his friends had embraced, he there with great resolution undertakes to raise a superstructure on the foundation of that chapter of Locke, which we may rationally believe was very far from that great man's intention, to prove that the degrees of pleasure and pain are exactly equal to every individual in this life. And therefore that there can be no occasion for any further adjustment or compensation to those who suffer for the cause of virtue, and that, in the truth of things in regard to the Supreme Being, there can be no such thing as virtue and vice in the world. And his whole argumentation turns on this: that all action whatever springs from pain or uneasiness; that without it all the animal kind would stand, as he says, stock still without action or motion; that all pain produces a desire to be freed from it exactly equal in degree to the pain; that all pleasure is founded in the gratification of desire, which pleasure and desire are also in degree always exactly equal; and from this equality on both sides of pain and pleasure to the medium, desire, between them, they are also between themselves exactly equal. And is this not mathematical demonstration? This article was touched before in the preceding chapter with an expectation given that in this it should be more closely spoke to. And now let us inquire into it in a manner more suitable to the importance of the subject, and in the first place consider it in its foundation as laid down by J. Locke himself, an author much more worthy of our regard.

But first, it may be worth our notice that here again we have another instance, and a very unhappy one, of the ill consequences that may attend that method, hinted at in the preceding chapter, of resolving points generally into some certain established principle, where a mistake was evidently shown in the same author. And so here, though it is very true that the greatest present uneasiness cannot fail of determining the will, yet that all action arises from uneasiness (unless we will fix

meanings on words unknown in the common use of them, a method unworthy of J. Locke) will be found absolutely false, and much more so that it was ordained so to be (as the later author asserts) by God in our formation. Pleasure and pain are both positive things, but each is a negative ...[page torn] or a negation of the other. But if a person is possessed of what we will call ten degrees of pleasure, and at the same time of five degrees of pain (for some terms must be used for calculation), he may then be properly said to have upon the whole just five degrees of pleasure, as if that person took great delight in music and were at a concert that charmed him, which we call the 10 degrees of pleasure, but at the same time he had the head or toothache to 5 degrees of pain. Again, if he were afflicted with a sharp fit of the gout, which we will call 15 degrees of pain, and in order to soothe or lull his agony could have the same concert played to him which he gave his attention, he would then be sensible in the whole to but 5 degrees of pain. So a person may be content to stand in an exceeding cold place or to bear a very hot Sun for a long time to see or hear what delights him and, being at his liberty, stays or goes according as either his pleasure or his pain prevails one above the other. Now let us fix this in our minds and then proceed to the proposition.

The true intention of pain

That all pain in the body and disquiet of the mind is uneasiness nobody will deny, for it amounts to no more than an *idem* for *idem*, for doubtless all pain and disquiet is uneasiness, and they will naturally excite a desire to be rid of them in proportion to their intenseness. But on this subject of the will, it was by no means proper to allege bodily pain, for it is not natural, since we may clearly conceive that the sensation of pain was given us with this view only, that we should be obliged to take care of our own preservation by so sensible a monitor. All animals we see, and mankind with the rest, are possessed with a natural instinct to avoid what may occasion their dissolution. Thus, without thought or reasoning, the dove is seized with terror at the sight of the hawk, the hare on hearing the hound, and every living creature at the apprehension of its enemy. And

though Man may by reasoning sometimes overcome this fear, yet death has justly enough borne the character of the Prince of Terrors. And the more effectually to excite our abhorrence of it and our endeavors to escape it, it is in a general way attended, or, more properly speaking, preceded by pain. So as what the surgeons call a *disolutio continui*, the violence of fire, fracture, or bruises might highly endanger life itself or mutilate or disable the body, for this end was our frame so constituted that all such injurious attacks should be attended with an uneasiness that would, with the utmost caution or endeavors, force us to prevent them. But no pain is on any other account according to the institution of Nature, which puts us on all methods of avoiding it, save in the two cases of parturition and dentition, which, it must be owned, are not to be accounted for. Surely no man was ever so absurd as to imagine that Nature, which has shown deep design in the formation of every the minutest part of us, intended that we should be ever ailing in our bodies and ever applying for a cure. Few other animals we see, when left to live in their own natural way and not under the direction of Man, are subject to any diseases. Whoever found or saw a dead sparrow that was not killed by violence, though so numerous in many country places about hedges and houses? Scaliger himself thought this worthy of noting, and does it with admiration. Or whoever saw a wild hare or a fox dead by any natural distemper? When their natural period of life is near, they have some way unknown to us of retiring out of sight so as never to be found or seen. Man indeed is subject to many ails and diseases brought on him generally by irregular courses, unwholesome or unsuitable diet or exercises, either directly by his own means, or derived from his progenitors. But amongst those called the less civilized nations, and in the more simple ages that were strangers to luxury, very few were known, nor were even the smallpox or measles known to the Greeks or Romans, or longer than for about a thousand years past. Seeing bodily pain then, though probably it might be the sole cause of that author's changing his mind, is not by the institution of Nature, nor is the sensation of it given on any other view than for prevention— for even as the world now stands, corrupted and depraved as it is, diverse have been known to arrive at a good old age without so much as one day's sickness—

we are entirely to discard this kind of pain out of the question, nor will it be found more difficult, it is hoped, to manage the other.

That all disquiet of the mind must naturally be attended with a desire to be eased from it, will pretty generally hold, though even this would admit of exceptions, but that all desire springs from pain or uneasiness equal in degree is denied. And those who will be so kind and just to themselves, pursuant to a preceding hint, as to assert their right in judging from what they find pass within them, instead of giving up their understanding to other men's opinions, will easily be convinced of it. That will and desire, for the benefit of discourse, ought to be distinguished, is very certain, but that they are such disparata or so different in their own nature will not be allowed. For in both cases the act or operation of the mind is very much the same, and the difference lies chiefly in this, that willing is applied to what is in the power of the willer, and desiring to what is not, and it is principally in this they differ. Thus princes and testators who have a good assurance they will be obeyed in their injunctions, instead of desiring or requiring very frequently make use of the term and say they will this or the other thing to be done, though it is to be done by others. Now no man will ever imagine that all acts of volition arise from an uneasiness of the mind. It is absurd in itself, for if the uneasiness be worth the removing and it can be removed by volition only, it is done instantaneously by an act of the will or it cannot be said to give him uneasiness, because it is as he would have it to be, for otherwise his will would be against it and consequently it would necessarily be removed. So whether a man is to perform himself the thing he wills, if it be an outward act as above in the case of a prince or testator, or whether he desires it be done by another, when he is sure of having it done his will and his desire is both the same. I may think in my judgment it is better for me to put on my shoes than go all day in my slippers, and according to this determination, without any manner of uneasiness, I will to have my shoes on, and may put them on if I can; or if I cannot, or think it too troublesome, it is my desire or will that another, my servant perhaps, shall put them on for me, and thus the will and desire in

all things in our power we see are both very much, if not entirely, the same.

Locke refuted

Thus much for the words and their distinction. And now to show that it is not pain or uneasiness that either constantly or generally puts us upon action, and that it was so far from the intention of Nature that Man should be continually subjected to a flux or series of succeeding uneasinesses and these should be the inciters or spurs to action, that it may be much more evidently proved directly to the contrary that Man was truly intended for a state of pleasure. For if we look back to the state of infancy and childhood, though in great cities children are often subject to great disorders, and many die of fits, yet in very many other places this distemper is scarce known, which evidently shows it is not natural but some way circumstantial, and so for the most part are all their other ails owing to some infirmities or irregularities in the parents prior even to conception, or during gestation, or to the nurse's milk. For Nature undoubtedly designed and formed our species as sound and healthy as other animals that we see feel nothing of the kind, and therefore when otherwise with us it must be owing to our own mismanagement. Hence infants, when bred and treated according to the prescriptions of Nature, know no uneasiness, unless, as was hinted before, it may be in their dentition, a work that was postponed lest being furnished with these from the first they should in sucking be injurious to the nipple, and even in these many children appear no more affected at their first breeding than afterwards they are, about their seventh year, with casting them. These children again, when fit for action, as they are incapable of any that's useful in life, we see are by Nature possessed with a most strong propensity to play, that both their bodies and minds, strengthened by continual exercise, may be fitted for the affairs of life. In the pursuit of which, with a continual gaiety, they are led on from one pleasing prospect to another with nothing but delightful scenes in view, and when one pastime, like food to the satisfied appetite, begins to lose its taste, they immediately project another. For that this is so, let any of those moody gentlemen, if they were ever so happy as to

witness a state of innocence in their youth or childhood and experienced the diversions that age is entertained with in a country place, reflect on those delightful days and try what their conscious thoughts will answer. Here, therefore, in this state of Nature we see paining desires have not yet usurped a place. Again, let any one in a clear summer morning walk out into the fields and behold the gaiety that overspreads the whole face of Nature, let them consider the chirping birds trilling and chanting their cheerful notes, or hopping from spray to spray with the kine and sheep, but especially their young in their frisking motions, and they will be obliged to confess these appear delighted in life and animated with gladness. So even one of ourselves, enjoying a full and perfect state of health, the state designed by Nature for us all, with the blood and juices in due tenor and every interior organ justly discharging its respective functions, will also witness the like sprightly pleasure much beyond the degree of apathetic ease only. Such a person, with the same continued gaiety, sets about every act his duty calls him to, with pleasure he sees it proceed under his hands, and when the time for refection calls him, with an appetite just raised to a height to give a pleasure in the gratification, he returns to it, not sensible of the least uneasiness, but with a serenity of joy diffused o'er all. And this is truly the condition of life designed for us by the Supreme Lord of Nature, but, by an abuse of the freedom of will also bestowed on us, through continual breaches of Nature's plain prescriptions so ordered as to be, not cogent, but directive only, Men corrupt and destroy their adjusted constitution of body and mind, and then ungratefully complain, or, at best, to support themselves, would impiously fix their own absurdest schemes on the Author of Nature, and represent the chaos they have reduced themselves to as the real condition for which they were designed.

Locke too influenced by a broken state of health

The reader, however, must be put in mind that this is not at all intended to reflect on the valuable author of the *Essay on Human Understanding*, who, without any other views than to

truth alone, as the writer firmly believes (for he knew the gentleman to be a person of greatest probity), offered the world his thoughts as they appeared to him, but in this point he was doubtless too much influenced by a most infirm and broken state of health (as even his printed letters fully show to have been his case) to think of pain and the desire of ease, and so greatly to insist on them in his writings. But it is a natural state alone that is to be considered here, when we pretend to judge of the intention of the great Author of all. Nor was it just to bring instances from a soaking sot and his dozing club, for we know all our appetites may, by contracted habits, be superlatively depraved. [Locke used the example of an habitual drunkard to illustrate his doctrine of uneasiness determining the will, in the *Essay*, Book II, Chapter XXI, §35.--PV] We know also, that when a person labors under any great uneasiness, if its present pressure more strongly affects him than the prospect of what his reason and judgment may pronounce a greater good, yet it must ever be that which carries the greater force with it at the time that must determine the will and give the turn to action. Nor is there any manner of difficulty in forming of a very clear idea of the whole. It is plain that uneasiness, or an unquiet state, was no more intended for the natural one of the mind, than a painful one was for that of the body.

And thus we see how dangerous it may prove for an author of great credit to drop, however undesignedly, what may be wrought up into a fundamental error. For from this very chapter we may, with great probability, suppose the unhappy author of the pamphlet, looking on whatever that first author of so established a reputation had wrote to be demonstratively true — as that the mathematicians do by Euclid's *Elements*, who, if they know a proposition is demonstrated there, for instance that a cone is the third part of a cylinder of equal base and height, never trouble themselves with considering the demonstration at the time, but use it— so in this case, if the greatest present uneasiness is what directs the will, and desire is always equal to the uneasiness, as J. Locke has asserted, the gratification give a pleasure equal to the desire. Here is not only an hypothesis, but a thesis that may be proved in mood and figure. But fortunately for mankind, the first part turns wholly on as false an hypothesis

as the mind can imagine. In some constitutions of mind uneasiness very rarely enters, and were there to be no action in the world but what sprung from uneasiness, the better and more innocent part of mankind would remain as stock still for want of it as that distressed or uneasy author imagined he must (as he says) thus ——— with the pen in his hand. For they bless the kind Author of their being they know very little of it in themselves, and are above being made uneasy by others.

Again, it is false that to be eased from pain gives a pleasure equal to the pain. If a person by sliding should break a leg or an arm, or by a debauch contract a violent disease, they will have in their bodies received a very large dose of pain which may gradually abate as they recover. But will those persons, for the several weeks they lie under it, at any time or at all the times put together, feel one grain of more pleasure than they would have done by keeping their bones whole and their health? And surely the mind cannot have one pleasant reflection while sensible of the folly of the cause of the loss of time, and the very pain which the mind can scarce without some pain reflect on, more than we can on a nauseous dose vastly offensive to the stomach. But never did anything more wild or extravagant enter the imagination of man than that a person dying by torture finds a full compensation in the thought that it will soon be at an end, or that so much pleasure may be crowded into one minute as full to balance ages of pain. That writer, uneasy and unhappy as he was, seems never to have been in his maker's condition, or to have felt the paroxysms of pain. If he had, they might have furnished him with very different ideas. Pain is a solid evil, and, as it is not natural, it is so ordered as to be rendered most terribly affecting, that the ends for which it was ordered, as has been observed, might be the more effectually answered. But pleasure in very few cases, scarce any but that one designed to force us to keep up the species, goes beyond the soothing or agreeable, and people under torture are scarcely capable of thinking at all, and much less of balancing their agonies with one reflection. What then are we to conceive of those unhappy creatures who have reduced themselves to so deplorable a state as to be obliged to run into such extravagancies of thought as these to support them, under that compacted and substantial structure of uneasiness they

have built up in and for themselves by their vices and follies? They scarce even deserve pity.

Another consideration on this head may be found worthy of the attention universally of all mankind, which if bestowed on it at the proper season of life, and more especially by the instructors of youth, might probably contribute to the happiness of the whole species more than all the studies besides taken together that it is possible to apply our thoughts to. Which is, in the first place, that a vicious and irregular course of life, by indulging the inordinate passions and appetites, is found by observation not only to weaken the abilities of the mind, but, which is of vastly greater importance, it destroys that steadiness and constant even tenor on which the calm and undisturbed peace of it, and all that solid satisfaction which results from a serene tranquility within, must entirely depend. And from that happy state, as it were a clear river when congealed into one lovely smooth and shining surface, which, by the impetuosity of winds and tides, we may sometimes see thrown up into the most confused piles and heaps of shattered fragments offensive to the eye and disagreeable to Nature, so the mind, by the like violences, becomes no less confused. And hence it is that a constant series of succeeding uneasinesses arise that banish all quiet, oblige the unhappy haunted person to fly from himself, or, which is the same, from his own inward thoughts, that rise on him in no other shape than those of terror, in vain to seek diversions to lull the restless vexing, and, by every step he takes bewildered in the devious path, the frightful hags but grow upon him. From hence it is that those who, at first setting out, have wandered wide from Nature, instead of endeavoring for a timely recovery of the only true road pointed out to them to tread in, becoming insensible to her genuine sweets and simple entertainments which their depraved tastes and vitiated appetites can no longer relish, first quarrel with her ordinances, rebel against her order, and labor to build up to themselves fortresses of security in their imaginary or preposterous schemes, to guard against the troublesome attacks of purer reason, but all in vain. Those very schemes abundantly show their inward weakness and disorder.

Hobbes, Locke: “unhappy adventurers”

All men must judge of things without them, as has already been observed, from something within themselves, and accordingly, one from his own natural pravity imagines all mankind born enemies to each other, and of this from the same disposition he takes indefatigable pains to persuade them. Another, finding an incessant uneasiness in himself which he is constantly laboring to remove, is so free as to tell the world his case (for that the piece here spoke of was intended for the public is not to be doubted), and, as no author would write without hopes of some regard being shown to what he says, he would doubtless be well pleased to have mankind subscribe to the truth of what he vents for his opinions, and, at the expense of their own peace, become admirers of his sense, and from thence his votaries. But those who know the value of a serenity of mind unruffled by those constant storms such unhappy adventurers bring upon themselves, while they pity his misfortunes, will undoubtedly with due gratitude bless the kind hand of Providence that has secured them from the like unhappy disorders.

For the 2nd Part

This to be kept

Recapitulate briefly the heads of the preceding part

On the existence of God

Now that we may apply the whole in a manner answerable to the title of this tract, and not only point out (as has been endeavored) the several foundations of our duties as laid in Nature, but further also, by laying these together from the dictates of that natural reason implanted in us, to form a plain and united system of them.

And in the first place, when we come to reflect on ourselves and consider how we are constituted, no thought can more naturally occur than to inquire whence we are and how came we to be thus formed. That we neither made ourselves, nor in any manner contributed to our own being, is manifest; we must then be from some other cause. And this thought leads directly to the consideration of a Superior Being, the Deity, or God.

A very little inquiry of this kind will naturally lead us to the notion of such a Being. For as we find in the course of our own reasoning and experience that every effect has its cause, and from hence, carrying our inquiries from cause to cause, the mind necessarily concludes on some first cause, which is called God.

Thus something exists or has a being as matter— this either had a beginning or was from eternity. But the atheist insists on it that he sees no necessity of concluding that anything but individuals had a beginning. The Universe is one machine and everything is produced according to the laws of its motions, which ever were and ever must be the same. And it is only the shortness of our lives and weakness of our reasonings in applying those little instances we are acquainted with to the laws of the whole, which we neither have nor can have proper abilities to comprehend.

Things are as we find them, and as we see in every the minutest circumstance in Nature, that we are entirely at a loss to know their true fabric. The essential nature of water, air, fire, that we are perpetually conversant with and by which we subsist, we understand not. How therefore can we pretend to understand what is so much more remote from us, the first cause or causes of all things, when we know not the very nearest to us? All things we see in Nature are carried on by sufficient causes in themselves, though we know nothing of them. And since it is plain we have not abilities to comprehend them, it is our business to make use of and enjoy them, and not to build up our own imaginations into idols of terror, as we see most nations have always done. And as we condemn the folly of these, so may we as justly condemn the whole practice, and, owning the truth, that is, that we neither know nor can know anything of the matter, sit down contented in our ignorance without presuming to leap the bounds that have been plainly set to us, and attempting to grasp at what never can be in our power.

This, I think, is the principal argument those who dispute the being of a deity can advance for their opinions, and, it must be acknowledged, it is not a trifling one, but such as vast numbers may be presumed to have taken up within all ages. But strong as it appears, there are others to be brought against it, of no less force, and those that have appeared to me to have the greatest weight, and what has proved sufficient to overbalance the other, are these that follow.

I know in myself that I think, and thence I become sensible of order and beauty in the several parts of what we call the Creation. I see effects adapted to their causes, though I know not the primary means of their operation, and from what I plainly discover I conclude (and so will the most obstinate atheist) that there is the like order and dependency through all the parts of the Universe. Of these I understand but very little, yet I understand enough to rapt me into admiration. And if I have so much thought from my constitution as to become sensible of this small, infinitely small, part which I know when compared with the whole, shall I conclude or can I imagine that there are no other intelligences or intellectual beings in the Universe but me or my species? Or will not my reason, that reason which I have from

Nature, lead me to conclude that, as I know some part, but there is infinitely more to be known, so there must be a mind at least as infinitely transcending mine in knowledge, as the whole that is to be known (or, in other words, that exists) exceeds the limits of that very little (which comparatively with the other may be accounted nothing) that I know? And he who will not allow this argument, in my opinion, is not to be argued with, more than a man who allows no principles or foundation to be argued on.

The Earth changes

Again, for the eternity of the world. That matter is not from eternity it must be owned can never be proved from reason, but that this globe of ours, in the condition it now is, or ever has been known by the species of mankind now on it to have been in, has been of no long continuance, is most evident. For we find in all countries whatsoever there are very considerable changes produced by time. Rudbeckius, a very learned Swede, in his whimsical *Atlantica* has justly observed the growth and increase of the black soil on the surface of the Earth in places where it had never been disturbed or moved by Man, and by a computation exact enough concluded that it must have been about 3 or 4000 years in attaining to that thickness, and therefore that the continuance of the Earth in its present condition could not have much exceeded that space of time. That the Earth was in former ages much more productive and fruitful than it now is, we have reason to conclude from the vast numbers of people it furnished with food from a much smaller compass of ground than is now found capable of supplying the like by any culture bestowed on it, nor can we find by the oldest writers on husbandry that they had any better methods of improvement than are now known and practiced. We have it from two of the best historians or writers of antiquity, Diodorus Siculus and Strabo, and from a third who may in this case also deserve some credit, that the Sybarites, who were possessed but of a small tract of land in Apulia in the south parts of Italy, led an army of 300,000 fighting men against the Crotoniates, who met them with 100,000 and defeated them; and yet according to that excellent geographer Strabo's account, these two cities were but 200

stadia, that is, about 25 English miles, distant from each other, and their dominions extended but a very small space round them, for each were surrounded with other powerful neighbors. The Romans in their first census under their King Servius Tullius, when they were not possessed of near so much as ten miles round them and could have no foreign supplies, numbered and mustered 80 thousand fighting men (Livy 1.43, *ex Fabio Pictore* [according to Fabius Pictor]), and yet the land around Rome was never accounted very fertile. The like observations may be made from all the histories we have extant of Rome, Greece, and Sicily in those ages. But the accounts we have of the numbers of the Jews who inhabited but a small tract of land for such multitudes afford surprising instances of this kind, as where Abijah (2 Chron.13), the third king from Solomon inclusive, led an army of 400,000 men against Jeroboam, who invaded him with 800,000, and 500,000 fell in the battle, yet their cities were not above 40 miles distant. So Abijah's son Asah kept an army of 300,000 out of the tribe of Judah only, and of 280,000 more out of the tribe of Benjamin, with which he opposed Zerah the Ethiopian's army of a million (Ibid., Ch. 14).

Now since it is certain that men required as much food in quantity in those days as now, let us make what allowances we can for their living on herbs, roots, etc., yet there are no places now known in the world that furnish such numbers with food and clothing in such spaces without supplies from the sea of other countries. It is further well known that moisture in many parts of the Earth has considerably abated, vast tracts of marshes and uninhabitable lands having, without art or means used, become dry and, if not arable, at least fit for pasture. The surface of the Earth has been known in many places to increase, large tombstones having been found many feet under ground, not by sinking, but from the Earth truly growing over them. But if any constant gradual alterations of this kind can be proved, it must certainly follow that the subject wherein it is discovered could not possibly be from eternity or continue to eternity, for should we suppose that this or any other globe either gains or loses but one inch in a thousand years, it must in eternity increase sufficiently to fill all space, or, on the other hand, entirely vanish. [End of the manuscript]

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