

Chapter Seven - Public Promotion

In Chapter Five I showed the various means of communicating information about natural philosophy that existed in the eighteenth century and how the newspaper played a small role for communicating among natural philosophers. In Chapter Six I showed how the newspaper facilitated numerous contentious discussions on many topics. I also showed, however, that except for a number of debates that occurred over medical issues, it did not play a large role in the internal debates of natural philosophy. Instead, I demonstrated how the newspaper played a promotional role for rational empirical thinking to a larger audience. For example, the use of mathematical arguments with respect to the tobacco inspection law, the call for experiment in determining the healing prospects of a recently discovered spring, the one-sided presentation of the morality of lightning rods, and the critical reports of superstition, all promoted a rational and empirical world view.

In this chapter I further explore the language of promotion in articles that make direct or indirect reference to natural philosophy and how those articles leveraged everyday utility, exciting drama, epistemological authority and economic viability in the promotion of Enlightenment thought. In addition, the colonial reader would find the language of rationality, empiricism, measurement, mathematical representation and classification in articles covering a broad spectrum of topics; from politics, religion and economics to personal business and matters of love. In articles and advertisements, natural philosophy helped to sell the arguments of certain authors and newspapers while, in turn, simultaneously were sold by them.

As an introduction, I begin this chapter with the section *Kinnersley's Multifaceted Demonstrations* which shows the obvious use of showmanship and practicality to promote Franklin's theories on electricity through Ebenezer Kinnersley's electrical demonstrations. I then delve deeper -- while also casting a broader net -- in *That's Entertainment* by exploring drama and entertainment as a promotional aspect of articles on electricity, objects of mechanical interest mimicking a clockwork universe, and curiosities in natural history such as exotic animals.

In the section *Pragmatic Technology* I then examine a critical intersection where many colonists might see the potential benefits of natural philosophy: the technological artifacts of their everyday existence that plowed their fields, heated their homes and defended their lives and livelihood. While many of the technologies and techniques of the eighteenth century had a long craftsman tradition that predates natural philosophy, the newspaper presents them all as resonating with a culture of enlightened, and inevitable, "improvements". For example, in one instance, detailed below, an article in a newspaper extols the virtues of the latest mechanical means of improving on the ancient technique of grinding grains. In addition, by detailing institutionally supported contests such as the British Admiralty's search for turning salt water into fresh and similar contests promoted by the Royal Society, the newspaper plays a significant role in promoting the idea that the colonists themselves can contribute to these improvements.

In the chapter sections *Public Utility* and *Private Concern* I examine more articles establishing prosaic applications for natural philosophy: improvements potentially benefiting private individual and public needs. Articles providing detailed information related to weather, small pox inoculation and other medical advancements, and techniques from agriculture to navigation, demonstrate natural knowledge's presentation as a public good. Examining the sale of courses, books, pamphlets, medicine and other artifacts with the articles of natural philosophy demonstrates the direct link between natural philosophy and private gain as well.

As one of the letters of the chapter's next section *Authority and Metaphor* clearly indicates, the newspaper made little distinction between the improvements of technique, artifact, or worldview that the age of "late wonderful Discoveries, and Improvements of Arts and Sciences" held for the colonists. There is little distinction between discovery for its own sake and practical knowledge. Recognized natural philosophers share space with gifted amateur inventors. As it was presented in the colonial newspaper a "[w]orld [that] is now daily increasing in experimental knowledge" benefited from the whole of enlightened thinking including rationality, experiment, improvement, collection and categorization.³⁷⁵

³⁷⁵ Quotes from an article in the *Pennsylvania Gazette*, 10/14/36.

The section *Authority and Metaphor* also allows me to show how the importance of possessing natural knowledge - the mark of a gentleman - became promoted through the newspaper's recognition of enlightened individuals. I present instances where the language of rationality and natural philosophy infuse articles on subjects as diverse as alcoholism, love, gambling, death, politics, religion and the pleasures of business. I then conclude the section with several articles that directly promote the value of mathematics, experimentation and natural knowledge.

In the end, the pervasiveness with which the concepts of the Enlightenment, specifically rational empiricism, permeate the colonial newspaper should appear obvious. By utilizing the language of rational empiricism, the newspaper positioned the process and products of natural philosophy as relevant to most colonial concerns.

Kinnersley's Multifaceted Demonstrations

In Ebenezer Kinnersley's demonstrative lectures on electricity, small model houses and churches protected and unprotected from lightning sat side by side. Kinnersley took the rod attached to the Leyden jars filled with static charge and brought it near the steeple of the first, unprotected church. A small shot of stored electric charge instantly set the object afire. He then brought it near the "protected" house, a small working replica of Franklin's sharp pointed lightning rod affixed to its roof. The house remained untouched, a bell rang to prove the charge had passed through. In a similar way Kinnersley demonstrated the power to both kill and protect small animals with an electric charge. Thus, Kinnersley showed that protection from lightning lay within man's reach and was not reserved for the Almighty.

Beyond the metaphysical aspects of this demonstration lay an everyday pragmatic value. Lightning strikes and their resulting fire or death threatened all colonists. From the beginning, in Kinnersley's very first advertisement for electrical experiments in the *Pennsylvania Gazette* of April 11, 1751, a considerable part of Kinnersley's advertisements on his electricity lectures included the potential for the usefulness of such knowledge in protecting property by describing the ability of the lightning

rod to carry the charge harmlessly to the ground. The Kinnersley advertisement from the *Gazette* on March 26, 1754 stated:

. . . very curious and entertaining Experiments; by which, among other Things, will be demonstrated, that the electrick Element, extracted from the Earth, by the Attrition of Glass and other electrick Substances, is the same with Lightning, and subject to the same Laws; and that Houses, Ships, &c. may very easily be secured from being ever damaged by Lightning.

Articles and advertisements promised the protection available to all by grounding through a conductor. A January 31, 1760 Kinnersley advertisement noted that "soldiers might easily protect themselves using bayonet or pike in the simplest manner." Other Kinnersley advertisements noted that masts on ships could be grounded.

If used judiciously electricity also promised benefits towards health. A report in the *Maryland Gazette* for October 18, 1749 wrote of Kinnersley, "The gentleman who has been entertaining us with a course of experiments has also applied the electrical fire to the human frame, with remarkable and speedy success, in curing the tooth ache, pains in the head, deafness, . . ." Reports from overseas also noted the potential to cure toothaches, such as the February 11, 1755 report from Stockholm in the *Pennsylvania Gazette*.

More than promise benefits in health, the "gentleman who has been entertaining" the public did precisely that - entertain. The advertisements for electrical demonstrations promise, among other things, an "electrical pony race," "a woman repulsing a suitor's kiss" with an electrical shock, and audience participation in forming human electrical chains. Most of the advertisements' content actually had to do with the entertainment value in electricity. For those who did not attend the lectures, the dramatic textual representations of lightning strikes could also shock and intrigue.

The newspaper positioned an understanding of electricity as both a private enterprise and a public good. The articles promised that the public at large could benefit from the protection of life, property, and His Majesty's ships and troops. A March 19, 1761 advertisement for his lecture specifically noted that "five houses in Philadelphia were struck by lightning last year," clearly indicating the potential savings benefit in attending his lecture. In a society where many people

discouraged secular drama the public also likely benefited from the entertainment value in electrical experiments. His theories on lightning were economically viable for private concerns as well. Kinnersley and others made money by charging for their lectures as they traveled the colonies giving demonstrations - Kinnersley did quite well at it. Craftsman probably benefited from number of homeowners that "affixed rods" to their houses.³⁷⁶

Electricity exemplifies only one of the disciplines of natural philosophy the newspaper positioned as potentially beneficial to the everyday and long term concerns and desires of the colonists. To varying degrees, the newspaper similarly depicted most of those disciplines and, more than that, created an aura of authority around natural philosophy; not only in matters of natural phenomena but in matters of state, economy, and personal happiness. The language of rationality, empiricism, measurement, and classification infused newspaper articles on a wide range of subjects. The language of newspaper science also relied on the public need for amusement. The entertainment value in exploring natural phenomena both sold the newspaper and is sold by it; from the colorful descriptions of volcanoes and earthquakes to the promised thrills of Kinnersley's lectures.

That's Entertainment

Ebenezer Kinnersley became a voice of authority in the description of a natural phenomena. That authority educated and enrolled the public in empiricism, exalted God's handiwork and appealed to other human emotions that transcended the presentation. His technique included humor, fear, surprise, and romance. This staging became a metaphor for the natural world and the implied relevance of the ideas about electricity to the world of the observer. Through the power of natural inquiry, the mysterious and frightening world became negotiable and, more than that, controllable.

Publishing his syllabus, Kinnersley enticed an audience with the magical, mechanical world of a 'microcosm,' powered with a bolt from heaven. This syllabus appeared with slight modifications with additionally examined theories and derived presentations throughout the 1750s and 1760s. A list of exhibits included:

³⁷⁶ While I can find no advertisement for the service of fixing a lightning rod to a house, or for a physician using electricity to cure toothaches, a number of articles mention the fact that such things occur. I can only guess that the services were charged for.

A Shower of electrified Sand, which may be seen rising again as fast as it falls. An artificial Spider, animated by the electric Fire so as to act like a live one. A Representation of the Sensitive Plant. A new Property discovered in electrified Points; by Means of which will be exhibited a Sort of electrical Horse race. The salute repulsed by the Ladies Fire; or Fire darting from a Lady's Lips or Cheek, so that she may defy any Gentleman to salute her. Eight musical Bells rung by an electrified Phial of Water. A Battery of eleven Guns discharged by Fire issuing out of a Person's Finger. Electrified Money, which scarce any Body will take when offered to them. A bright Flash of real Lightning, darting from a Cloud in a painted Thunder Storm. The Force of a small Quantity of it, making a fair Hole through a Quire of Paper. An Animal Killed by it instantaneously. Metal melted by it on Glass, and incorporated with the Substance thereof. Wire heated by it, so as to become red and burning hot. An Experiment shewing why Thunder Clouds lie flat lower in the Air than other Clouds; and why Eminences are most frequently struck by Lightning. A Flash of Lightning made to strike a small House, and dart towards a Little Lady, sitting on a Chair; who will notwithstanding, be preserved from being hurt; whilst the Image of a Negroe standing by, and seemingly further out of Danger, will be remarkably affected by it.

Other lecturers entertained the public as well. A *Virginia Gazette* advertisement in 1/9/46 has a Dr. Spencer teaching philosophy. In his autobiography, Franklin made reference to a "Dr. Spence" as having inspired his examinations in electricity. A fair number of itinerant lecturers in electricity roamed the continent in addition to Kinnersley. Lectures in anatomy also proved popular.

Not only lectures, but books and pamphlets related to the understanding of the sciences also became advertised through the periodical. Books played an important role in the intellectual role of the colonists. An *American Weekly Mercury* of 5/1/29;31 had a short note that a vessel had arrived in Venice in 2/19/29 with news of books on their way to the colonies. The *Maryland Gazette* of 10/23/51 had a long letter extolling the virtues of books. Many expressed the accessibility of enlightened thought, even to children:

Just imported, and sold by B. Franklin, The CIRCLE of the SCIENCES, &c. In Three Volumes. . . . The Child's NEW PLAY THING: Being a SPELLING BOOK intended to make the Learning to READ, a Diversion instead of a Task, &c. &c.³⁷⁷

Beyond positioning natural philosophy as authoritative and economically viable, beyond locating natural history, medicine, and techniques as sources of physical, political, and economic welfare, the

Gazette moved natural philosophy to speak through the condition of being human. Science could display the wonders of the natural world, the drama of those discoveries, and, as the above citations imply, the fun of the discovery process. The literary technology of the *Gazette* created the appealing theater of experimental philosophy.

The process of entertaining with philosophy in the colonies had one major advantage that would not be found in most of America today: some leaders of Protestant denominations frowned on human dramatic representations. For example, Philadelphia was run by a small Quaker oligarchy in the early 18th century: a pious group who collected books and libraries, built formal gardens, and did not tolerate the arts of painting and theater³⁷⁸. Thus, lectures in natural philosophy did not have as much competition in entertaining the public as they might have had. A letter to the *Pennsylvania Gazette* editors on March 19, 1754, displays a common perspective by the clergy of the Church of England:

Friends FRANKLIN and HALL, As I apprehend publishing the Sentiments of some of the most esteemed of the Church of England concerning Theatrical Entertainments, may be of Service at this Time, the giving the following Quotations a Place in your Paper, will much oblige your Friend. A.B.

Britain's Remembrancer, printed in Philadelphia, Page 27. SHOULD I pretend to give a View of the Wickedness of the Theater, I should not know where to begin, or to what Length the Subject would carry me. For whether I insisted on the Lewdness or Impiety of most of the Plays themselves; on the infamous Characters of the Actors and Actresses; on the scandalous Farces they commonly tag the gravest Plays with . . . a good Play is no other than a Trap to draw in the Modest and Innocent to a Love of Theatrical Entertainments: And the Minds of the Spectators are not the safer from being polluted and debauched, tho' the Play itself be in the main decent and modest; since the ingenious Contrivances of the Managers entirely prevents the good Effect of any worthy Sentiment expressed in the Play, by introducing a painted Strumpet at the End of every Act. . . . Hear what the great Bishop Burnet, than whom no Man better knew Human Nature says of the Stage; "The Stage is the great Corrupter of the Town; and the bad People of the Town have been the chief Corrupters of the Stage; who run most after those Plays that most defile the State. The Poets pretend their Design is to discourage Vice; but they really do recommend it in the most effectual manner . . . certainly our Plays are the greatest Debauchers of the Nation." I shall add the Thoughts of . . . Archbishop Tillotson, who in his Discourse against corrupt Communication, speaking of Plays, says,

³⁷⁷ *Pennsylvania Gazette*, September 3, 1747.

³⁷⁸ Bridenbaugh, 1964. p.79. Bridenbaugh also notes on page 2: "There was little gaiety and less elegance; a dreary commercialism clothed in the austere garb of Quaker principles, permeated the air".

"They are intolerable, and not fit to be permitted in a civilized, much less in a Christian Nation. . . ."

Within one month of this letter, the first ever advertisement for a theatrical production appeared in that paper. By permission, a company of London comedians performed a "Tragedy of the Fair Penitent with a new occasional Prologue and Epilogue to which will be added, a Farce, call'd Miss in her Teens."³⁷⁹ Three subsequent weeks also had a play advertised that benefited, respectively, Miss Hallam, Mr. Adcock, and the Charity School. Apparently, the opponents of the debauchery of actors and acting could not persuade the government to disallow the plays, but the presentations all aspired to a morally upright character, included additional descriptions to clarify this purpose (one was even printed in the 6/20 *Pennsylvania Gazette*), and benefited various charities. The conflict did not subside. Only between June and December of 1759 did another string of advertisements for productions appear in the *Pennsylvania Gazette*; once again, all "By Permission" and "to benefit."

Besides the occasional advertisements for dancing lessons (the first in 1755), one Punch and Joan show (1742), two armonica concerts (1764), three fairs (1760 - 1764), and the above plays, the entertainment world of colonial America, at least as seen through the lense of the *Pennsylvania Gazette* appears oriented towards natural history, natural philosophy, or techniques. Mechanical instruments and figures, dioramas, exotic animals, and philosophical lectures in Shippen's anatomical theater³⁸⁰ or using Kinnersley's electrical apparatus vied for audiences.

The mechanical marvels of the eighteenth century also display beauty, drama, and wonder of nature and human invention. The December 18, 1755 *Pennsylvania Gazette* advertisement appealed to the broad educational value and entertainment of the piece, "which as been the Admiration of every Spectator, and proved itself by its singular Perfections the most instructive as well as entertaining Piece of Work in Europe (and ought to be seen by all Degrees of People.)." The advertisement:

To be seen, and a Lecture heard upon it . . . That ELABORATE and CELEBRATED Piece of MECHANISM, called The MICROCOSM: Or, the WORLD in MINIATURE. . . after Twenty two Years close Study and Application,

³⁷⁹ *Gazette*, 4/11/1754. The three subsequent advertisements were on 6/6, 6/6, and 6/13. The only advertisement for a theatrical production before the one on 4/11/54, was a Dec 30, 1742 ad for a farcical presentation of two foot high puppets, 'Punch and his wife Joan.'

³⁸⁰ According to ads, Dr. Shippen held a several month course on anatomy each fall at the hospital.

by the late ingenious Mr. HENRY BRIDGES, of London; who, having received the Approbation and Applause of the Royal Society, &c. . .

. . . A most beautiful Composition of Architecture, Sculpture and Painting. The inward Contents are as judiciously adapted to gratify the Ear, the Eye, and the Understanding; for it plays with great Exactness several fine Pieces of Musick, and exhibits, by an amazing Variety of moving Figures, Scenes diversified with Natural Beauties, Operations of Art, of human Employment and Diversions, all passing as in real Life, &c.

The device had the lyrical and magical, "the nine muses playing concert," the practical, "a Carpenter's Yard, wherein the various Branches of that Trade are most naturally represented, &c.," and several other scenes all under the key scene of "the celestial Phaenomena":

. . . with just Regard to the proportionable Magnitudes of their Bodies, the Figures of their Orbits, and the Periods of their Revolutions, with the Doctrine of JUPITER'S Satellites, of Eclipses, and of the Earth's annual and diurnal Motions, which are all rendered familiarly intelligible. In particular will be seen the Trajectory and Type of a Comet, predicted by Sir ISAAC NEWTON, to appear the Beginning of 1758; likewise a Transit of VENUS over the Sun's Disk, the 6th of June 1761; also a large and visible Eclipse of the Sun, the 1st of April 1764, &c.

Finally a look at the insides: "Is shewn the whole Machine in Motion, when upwards of twelve hundred Wheels and Pinnions are in Motion at once." However, "Tickets to be had at the above Place at FIVE SHILLINGS each," went up to "Seven Shillings and Six pence each," for the inquisitive souls who could afford it. The higher price entitled the patron "to see the internal Parts of this Machine in Motion, and upon what Principle the Whole is performed, so worthy the Notice of the Curious, &c." A January 8, 1756 letter to the *Pennsylvania Gazette* editor (which could very well be an advert) went on to paint an even more colorful picture of the device:

When I came at last to see the internal Parts of this Machine, what was my Surprise, when, from the most plain and simple Principles, I found this noble Entertainment flowed; but pardon me, Gentlemen, I only steal your paper in vain by thus endeavouring to paint the Beauties of a Work which loses all itself in me, even as myself was lost in that.

The newspaper also shows that mechanical devices could represent human drama. On August 5, 1756,³⁸¹ "By his HONOUR'S permission . . . A CURIOUS Machine, exhibiting the tragedy of Bateman, viz. the doors fly open, the curtain drawn up presents a company at the wedding dinner of old Germain, and Bateman's intended Bride; Bateman hangs himself, and is moved off, she changes countenance and suddenly dies, and is also carried away; the curtain falls, and ends the first act." This mechanical diorama also included a carpenter's yard, "wherein is represented the various employments of that business, such as hewers, sawyers, plainers, grinders of tools, caulkers, &c."

The advertisement could draw enough interest, not only through mechanical representations of literary drama, but through the sheer beauty of the mechanisms and its metaphorical relationship to a clock like universe ripe for discovery. One advertisement read: "A MACHINE made with two Frames of equal Dimensions, wherein are several Wheels, all of equal Diameters and Number of Teeth, and turn one another round by laying hold of each other; in which are the following remarkable Observations, viz. . . ." All goes to show "those that suspect the truth of the above Observations, may for the same Price be convinced that the wisest Men may be sometimes deceived, by trusting to their own Judgment without Experience."³⁸²

Interestingly, in mid-century colonial America, advertisements for mechanical amusements strove to alleviate the concern that these works exposed the artistry as vanity and pride. Almost half the text of the advertisement for one on 11/14/51 in the *Pennsylvania Gazette* positions the work as benefiting charity:

These mechanical Works are not made or exposed to View with any pride or Vanity, or Self interest; and I do declare, that if this design shall prove profitable, the Money arising therefrom shall be applied to publick Uses, especially for the Poor. What is here erected, is not of myself, nor can I, or all the World, do any thing of themselves, as it appears to me, no not so much as to make a Ten penny Nail, or a small Chip, or the minutest Thing that Tongue can mention. If the greatest Artist in the World, did but look on a Spider and his Works, he would there see his Masterpiece, and the World's Masterpiece.

³⁸¹ *Pennsylvania Gazette*, August 5, 1756.

³⁸² *Pennsylvania Gazette*, March 16, 1758.

Those on the edges of the civilized world, such as hunters and fishermen, often discovered interesting natural phenomena that became fodder for natural historians and became dramatically represented in the colonial press. Animal exhibits advertised with an appeal to the wonder of strangeness, biblical connections, ferociousness of nature, and the drama of the pursuit. From the May 22, 1740, *Pennsylvania Gazette*, "NOTICE is hereby given to all Persons, that there is come to Town, a very Wonderful and surprising Creature to all Persons in these Parts of the World; and it is in Scripture the very same Creature, which is there called a Camel." From October 18, 1744, "To be SEEN, at the Indian King, in Market Street, Price 1s. for Men and Women, and 6d. for Children. A Beautiful Creature, but surprizingly fierce, called LEOPARD, his Extraction half a Lion and half a Pardeal; his native Place of Abode is in Africa, and Arabia." On 11/29/59 and 1/10/60 the reader saw advertisements for a large lion, on 7/4/65 an advertisement for a buffalo calf: "his horns are short, leaning backwards, and his look as fierce and frightful as any Animal in Nature."

The effort to entertain occurred not only in demonstrations and exhibitions advertised in the text but also within the text itself. Some of the descriptions of earthquakes and atmospheric phenomena we examined in Chapter six are excellent examples of text that sought to thrill but also allow for philosophical explanations.

The February 28, 1733 letter from Boston in the *Pennsylvania Gazette* gave a thrilling account of the capture of the "Greenland bear". The commercial nature of natural discovery played into the capture of the "Greenland bear" -- not only in the fees charged to the observers in Boston, but also in the captain and crew's presence in Greenland for fishing. Additionally, only a small part of the article described the creature. Mostly, the exciting aspects of the catch and the fierceness of the animal were conveyed:

The Captain hoisted out his Boat, and with five Hands more, arm'd, rowed with a Design to shoot her, and if possible catch the young One. As soon as the Bear saw the Boat, she made towards it with the utmost Rage and Fierceness, roaring out in the most hideous Manner, plunging into the Seas, and swimming with open Mouth to seize and devour them; her Cub hastening after, and roaring also. Three times they shot and hit her, which she nothing minded: But a fourth Shot pierc'd in to her Head, and kill'd her at once. Upon this the Cub made up to her, got upon her and with great Noise and Fury fought them in their Attempts to take him.... However, throwing Ropes with Nooses at him, they at length entangled him, drag'd him to the

Sloop; and hoisting him up with Tackles, keeping at a Distance from him, lower'd him into the Hould, and brought him home. He is naturally as white as Snow, tho' now somewhat sullied, by the Dirt of the Cage. He is very fierce, and roars: and is to be seen at the south Side of Clark's Wharff, at the North end of Boston.

However, a naturalist description of the creature still played an important role in the article. The article not only thrilled but educated the reader on an aspect of the natural world:

. . . They generally keep near the Edges of the Cakes of Ice on the Greenland Seas, to catch Seils, which they chiefly live on. They will swim and dive like Fishes: When they see a Flock of Fowls on the Water, they will dive down at a proper Distance, and when they come under them, will suddenly rise up and catch them: And they are so couragious and fierce, they are afraid of nothing. They never show the least Fear of Men, nor of their Weapons. Firing at them does but whet their Rage; and they are for falling on and devouring every living Thing they meet with.

Natural phenomena other than the discovery of exotic fauna allowed for sensationalistic descriptions as well. Numerous articles displayed the force of lightning to surprise and destroy with colorful and dramatic language. From the August 12, 1736 *Pennsylvania Gazette*:

We hear from Virginia, that not long since a Flash of Lightning fell on a House there, and struck dead a Man who was standing at the Door. Upon examining the Body they found no Mark of Violence, but on his Breast an exact and perfect (tho' small) Representation of a Pine Tree which grew before the Door, imprest or printed as it were in Miniature. This surprising Fact is attested by a Gentleman lately come from thence, who was himself an Eye witness of it; and 'tis added that great Numbers of People came out of Curiosity, to view the Body before it was interr'd.

Even the articles on lightning strikes that appear after the publication of Franklin's concepts of the "sameness of lightning and electricity" have a flair for the dramatic. From the December 20, 1753 *Pennsylvania Gazette*:

Thunder cloud burst over the House . . . which tore the Shingles of that, and the House of Dr. Chovet . . . Mrs. Gutteres was then sitting in a very low Chair in the Back hall, and the Lightning went over her Head, where it battered the Wall, without offending her; in the first Floor it dispersed itself in every Part of the Rooms, splintering the Frames of many Pictures that were glazed, without damaging the Glasses over them . . . [I]t likewise passed behind a Chest of Drawers, where it entered the Crevices, and only cracking the back part it visited every Drawer. . . . When this happened Dr. Chevot and his Wife were both sleeping in Bed in their lower Back room, but being suddenly awaked, found themselves surrounded with

forked Lightning darting on all Sides of the Room, entering through the Partition wall, and at the Window, but through the great Mercy of Providence, neither he, nor his Wife were hurt, though the great Quantity of sulphurous Vapour had almost suffocated them.

In these articles the victims seemed helpless in the face of the power of nature. Juxtaposed with these reports was the almost deadpan tone of Franklin's descriptions. The authority of natural philosophy was matter of fact and unafraid. For example, after the description on how to construct the kite to test electrical charge in the atmosphere in the 9/14/52 *Pennsylvania Gazette*, Franklin only stated at the end: "and thereby the Sameness of the Electric Matter with that of Lightning completely demonstrated." A July 15, 1762 report of a lightning strike had part of Franklin's work on electricity tacked on, seeming almost an admonition to those unaware.

The world of show biz has its ups and downs, however. And every advertising campaign can eventually tire or miss its intended audience. A July 28, 1759 letter from Franklin to Kinnersley revealed the risks of any endeavor trying to reach an audience -- it could so quickly become a slumping fad:

I once thought of advising you to make trial of your lectures here, and perhaps in the more early times of electricity it might have answered; but now I much doubt it, so great is the general Negligence of every thing in the Way of Science that has not Novelty to recommend it. Courses of Experimental Philosophy, formerly so much in Vogue, are now disregarded; so that Mr. Demainbray, who is reputed an excellent Lecturer, and has an Apparatus that cost nearly 2000 pounds, the finest perhaps in the World, can hardly make up an audience in this great City to attend one Course in a Winter.³⁸³

The novelty of public electrical experiments had already worn off in London. Within several years, the audiences in America would wane as well. Natural philosophy could not count on its entertainment value to hold the public imagination, at least not enough for public participation. Electrical experimentation recovered more of its private side, back into the hidden labs. As the colonies became more cosmopolitan, other sources of entertainment probably competed with

³⁸³ Lemay (1961), p. 98, cites Horatio Gates Jones, "Letter of Benjamin Franklin to Professor Kinnersley," *Pennsylvania Magazine of History and Biography* 13 (1889): 247-48. It appears that this letter represents an example of where "Science" seems either synonymous with or encompassing "Experimental Philosophy".

electrical shows where once they, along with speakers such as Whitefield, had been unique public spectacles.

Pragmatic Technology

While the intricate gear work and verisimilitude of mechanized objects -- like the above device "exhibiting the tragedy of Bateman" -- proved curiosities for the colonists, most of their experiences with technology obviously came from more prosaic applications. Everyday the colonists interacted with artifacts that helped sail the ships, cook the food, heat the houses, till the fields, mill the wheat, kill their enemies and transport the mail. The colonial newspaper made reference to these pragmatic technologies in several terms. It recognized the limitations and dangerous aspects of many of them while still celebrating their potential and promoting their development. It also placed them in the context of international competition, institutional support and public service and made their importance to an enlightened and, therefore, successful society very clear.

Similar to today, the failure of man-made objects could play a significant role in the lives of the colonists. As we noted earlier, the ice in winter frequently stopped ships from entering or leaving the harbors of Northern and middle colonial cities, and thus, stopped the flow of information from and to distant places. Mechanical failures could stop the flow of information as well. According to the 5/29/60 *Maryland Gazette*, the Press had broken the week before and caused a delay in publication. These kind of problems, while inconvenient, rarely proved fatal. However, the newspaper articles reveal that many of the technical objects and practices that assisted the colonists in their daily lives also threatened them bodily. These objects might reside in the home or workplace, endangering individuals or the whole community.

Stored gunpowder frequently proved dangerous. One article in the *American Weekly Mercury* has a letter from London, 10/5, with news of a thunderbolt setting off magazine of powder.³⁸⁴ Another article in the *Maryland Gazette* of 10/21/47 has a 9/21 report from Boston where a small spark from a blacksmith's forge got into next shop's keg of gun powder and blew the place up. On

³⁸⁴ *American Weekly Mercury*, 1/12/33.

12/14/52 the *Gazette* printed a report from London, 8/25, about an odd accident in Genoa where people were killed by a stray spark hitting gunpowder. The 1/16/55 issue told of a gunpowder explosion in London where many warehouses had been destroyed. Any fire could quickly set a house or the whole city ablaze. An example 3/22/36 letter reporting violent winds in Boston has sparks flying out of dirty chimneys in Salem and burning a house down.³⁸⁵ Lightning frequently set houses or ships ablaze, gunpowder or no.

Travelling long distances often proved dangerous: Indian attacks along roads and the weather and pirates that could plague ships among other things. Local travel also threatened passengers. In the *American Weekly Mercury*, 5/26/37, a report from Bristol, Eng., 12/18, where "last Tuesday the 28th" sixty people drowned in storm sunken ferry. From the *Maryland Gazette* of 3/29/53 we learn that Matt Tilghman dies when the cart he is pushing throws up a piece of wood that breaks his leg.

Just as today, guns often proved accidentally fatal. In a *Maryland Gazette* of 1/4/53, a boy accidentally fired a gun between his father's legs and mortally wounded him. The *Maryland Gazette* of 9/26/54 reports:

From Pequea we have an Account of the following melancholy Accident happen'in ther on Firiday last, occasioned bya Person, who had been a guning, and stopping at the House of one Mr. Cowan, left his Piece standing at the Door loaded, which was accidentally thrown down by a Child, and the Lock striking on the Threshold, it went off, and shot Mrs. Cowan under the short Ribs, of which she died, and has left a disconsolate Husband, and five young Children.

Articles revealing the dangers in the workplace appear frequently. The *Maryland Gazette* of 8/9/53 reports: "Philadelphia, July 19, Last Week a Brewer's Servant of this City fell into a boiling Copper, by which he was so scalded that he died soon after." The *Gazette* also told of a coal pit accident where seven Colliers were suffocated in Glamorganshire. The letter from London reported the event this way:

This unfortunate Affair was owing to a Coal Work adjoining to the Company's from whence for many Years their Work was supplied with Air, being lately shut up, whereby the Company were prevented working their Coal; by this Means

³⁸⁵ *American Weekly Mercury*, 4/8/36.

several Colliers were thrown out of Employ, and the Company put under a Necessity of sinking a new Air Pit, which was just finished, when these poor People (who have almost wanted Bread for many Weeks past) being solicitous to go to Work again, ventured in too soon, and thereby lost their lives.³⁸⁶

Some articles worked hard to dramatize tragic events in excruciating detail. The *American Weekly Mercury*, 7/28/37 issue tells of a miller sucked into the gears of a gristmill and crushed. It includes a description of the path of the miller's body through the machine:

Mr. Samuel Smith of this Town, was on the 21st, grinding in a Grist Mill, and as it is conjectured, was about to wedge some of the Rounds of the Trundle-Head as the Mill was going, and was caught by his left hand between the Cogs and the Rounds which threw his Arm through the same and mash'd all to . . . his Body was force back again between the Cogg Mantel and the Bridge-tree, where is no more Room Than three Inches and an Half, the Coggs came across his Beast while his Back was crowded against the Bridge-tree, which broke in his Breast-bone and Back in two Places, and all his Ribs on both Sides, and both Shoulders, so that his Bones came out through his skin. . . He has left behind him a sorrowful wife and Ten small Children...

Even conducting experiments might prove dangerous. The *Virginia Gazette*, 11/17/52, tells of three experimenters in Italy who discover the shocking capacity of electricity:

They write from Bolgna. That Mess. Verati and Mameteucci. . . [have lately made] the Electrical Experiment relating to Thunder. Whilst one of them held the Iron Rod in his right Hand, and another the Chain with both Hands, a third accidentally laying his Head on a silken String fastened to the Chain, a Scintillation ensued, which was attended with a Noise like that of Thunder. . . the three Gentlemen felt a concussion, but different in each of them.

Despite these obviously inherent problems with many of the devices and products used by the colonists, newspaper articles largely profiled the colonist's relationship with technology as not only inevitable but highly desired. The issue of domestic manufacturing proves this adequately. As we have seen, articles written in England cautioned against American development in manufacturing, but domestically produced essays on manufacturing seem nothing if not promotional.

³⁸⁶ *Maryland Gazette*, 2/6/55.

In addition, the language referring to accidents involving technology does not put the technology at fault. The third experimenter in Italy "accidentally [lay] his Head" on the silken string. The unfortunate miller had the gears "caught by his left hand." The colliers did not toil in a dangerous mine, their eagerness to work made them return to the mine "too soon."

At the same time, the newspaper presented further technological development as improving on the old and as the cure for the problems brought by technology itself. For example, the mills may still have been potentially dangerous, but a 9/4/60 *Maryland Gazette* article noted that the new mill at Wind Mill Point "will grind 12 bushels an hour."

Fighting the fires that devastated the wooden houses of the British citizens was facilitated by the newly improved pumps and engines. The *Maryland Gazette* of 12/27/49 writes from London, 9/2, about a fire at "Mr. Harwood's in Grocer's Alley." According to the article, "The fire would probably have done more mischief, had there not been great plenty of water, and speedy assistance from Newsham and Ragg's engines." The *Maryland Gazette* of 5/8/55 proudly announced the new fire engine recently imported to Annapolis from London. Ten years later, in the 11/1/64 issue, the paper still printed articles about fires and the success of fire engine in fighting them. More than thirty years earlier, the *American Weekly Mercury* of 1/22/34 had boasted of a domestic fire engine even better than those from London.

Some institutional support for technological development also existed. The governments and local merchants organized public lotteries to finance technical projects, promoting them as a public good. The *Maryland Gazette* of 11/29/53 mentions a "Lottery for Wharf in Town". The 2/8/60 issue noted " a lottery will be held to buy fire engine for Fredericktown." The 4/3/60 issue had a "Lottery for repair of public wharf and erection of public grammar school."

Support for development also occurred at the highest levels. In the chapter on negotiated knowledge we saw the numerous contests and prizes for improving on finding longitude or making seawater fresh. In addition to this, numerous articles seem to indicate the risk the British take in not supporting technological and scientific development by comparing the work and rewards to those of the French. A letter in the *Maryland Gazette*, 11/28/54, relays: "London,

8/10, They spare no Pains or Expence at present in France to encourage the Arts of Clock and Watchmaking, laying it down as a certain Maxim, that if their Artists can once reach Perfection, they will soon draw to themselves all the Advantages that can possibly result from it as a Trade." A reprint of a letter from London in the *Virginia Gazette* of 11/24/52, implies the considerable dangers in not supporting British inventors. It appears that two inventors and their "efficacious canon," rejected by English examiners, took their invention to France where it received enthusiastic support to the possible detriment of the British:

The Project, upon which Baron Stark and Mr. Moore, are gone to France is, to make Cannon lighter, more lasting, and more efficacious than they are at present. They have contrived a new Species of mixed Metal, and they give out, that a Cannon made of this Metal, on fifth of the Weight of a Common Cannon, will carry farther with Half the usual Quantity of Gunpowder, fire more expeditously, and be less liable to burst or melt. . .

. . . The Experiment was in Part tried here, but not approved of by those who were appointed to inspect it: They therefore made Application to the Court of France, where after repeate Trials, they have so far succeeded, that it is reported they have been offer'd 26,000 Louis D'ors, upon the Discovery of the Secret, 12,000 Louis D'ors yearly between them, which Annuity is to be continued to the Survivor, and to be besides entitled to the Rank and Pay of Lieutenant Colonel in the French Army.

Almost as a warning to the British Admiralty, the very next article described another invention submitted for approval:

We hear a Proposal will soon be laid before the Lords of the Admiralty, relating to a Machine design'd for keeping Persons floating after Shipwreck: It is so contriv'd, that every Sailor may carry it about him at all Times, without the least Incumbrance or Inconveniency, and it is to keep them buoyant as long as they can live above Water, in spite of Surfes or Breakers.

The British fear of a considerable improvement in French cannons obviously played well for most of the century because several notices appear indicating the invention. The *American Weekly Mercury* of 8/4/37 has a notice of fast firing cannon invented in France from a London, May 21 letter. The *American Weekly Mercury* again in 12/4/40 from a 9/23 London letter writes: "they write from Paris, that some new cannon, of the invention of the Chevalier de Beac, were tried a few days ago, and made 11 different discharges each in the space of one minute."

The fear of French discovery of the solution to the longitude problem also arose occasionally. The *Virginia Gazette* of 4/18/51 prints a letter from Europe: "Utrecht, Dec. 11. We have Advice from Dantzick, that a Person of that City, after a close Application of ten Years, has found out a perpetual Motion, which, if ingeniously applied, may serve as a Foundation for the Discovery of the Longitude."

Some of the foreign inventions must have seemed simply amazing to the colonists. The *Maryland Gazette* of 1/23/52 has a letter from Copenhagen, 9/18, mentioning a device to walk on water. The *American Weekly Mercury*, 11/5/30, has a letter from Paris, July 26, that writes of a device invented in France to recover large sunken objects such as ships:

The company, who by means of the new machines invented by m. gambert, an engineer, have undertaken to fish up the cannon, vesels, and other effects, that have perished in the sea-ports, and other places on the coasts of France, Sain, England, and of the other northern potentates, have made treaties with those prices, to settle what share they shall have of those things they fish up, and they are to go forthwith to the port of vigo, where several galleons have been lost.

Another *American Weekly Mercury* story on 1/12/31 writes of a dramatic improvement over the standard mill to benefit the French:

Paris, 9/16. M. Compagnot, an engineer, has invented a machine for which the King has granted him a patent, his majesty and the whole court having first seen in work at Compiegne, and he having produced a Certificate from the Academy of Sciences. The Machine, with the Assistance of a Man or two, does all that can be perform'd by Water Mills; and among other things, blows a Pair of Forge Bellows, and strickes 600 Strokes in an Hour, with a Hammer weighing 1000 or 1500 l. weight; so that with this machine the Works at large Forges may work in any Weather, whether it be Frost or Drought."

According to this 3/20/52 *Virginia Gazette* article, however, the British should have little to fear from the French since the problem of human flight lay within their grasp. In another rare instance of editorial comment, a suggestion is made for its use in delivering the post:

London, October 4. There is lately arrived in Town from the East-Indies, but last from Lisbon, a Man of the most surprizing unaccountable Genius. . . This wonderful Man, after fourteen Years great Labour and Expencc, has compleated on of the most astonishing and compleatest Pieces of Mechanism, the World ever yet beheld. It is a Case of a most curious Texture and Workmanship,

which by the Help of Clockwork, is made to mount in the Air, and to proceed with that Rapidity of Force and Swiftnes, as to be able to travel at the Rate of seven Leagues an Hour. It is in Shape of a great Bird, the Extent of whose Wings, from Tip to Tip, is twenty two Feet; the Body is composed of Pieces of Cork, curiously held together by Joints of Wire, covered with Vellum and Feathers; the Wings of Catgut and Walebone Springs, and covered with the same, and folds up in three Joints each. In the Body of the Machine is contained thirty Wheels of peculiar Make, with two Rollers, or Barrels of Brass, and small Chains, which alternatively wind off from each other a counterpoise Weight, and by the Help of fix Brass Tubes, that slide in Groves, with Partitions in them, and loaded with a certain Quantity of Quicksilver, the Machine is by Help of the Artist, kept in due Equilibrium and Balance. . .should any of the springs or wheels give Way he must inevitably fall to the Earthy, like a Mill-stone out of the Clouds, for which Reason he never soars above the Height of a common Tree; nor has but once adventured to cross the Sea, which was from Calais to Dover, and the same Morning arrived in London, to which Metropolis he was out of Curiosity drawn. . .When his new Machine is fully completed, he proposes to teach any Gentleman the Art and Use of it in a Month's Time, for Fifty Guineas, provided they do not live above the Distance of a Hundred and Fifty Miles from London. --- *This (if true) would be a fine Instrument for the Post-Offices and News-Mongers, provided no Body else was allowed the Use of it.*

Not all recommendations for solving technical problems needed government assistance or seemed threatened by the French however. Many authors viewed specialized knowledge as a freely shareable potential public good. Many, such as "L.T." in the below example, did not feel the need to ask for remuneration or sign their name to the tacitly gained information. A letter from the *Gentleman's Magazine* for August, 1737 that both the 1/20/38 *Virginia Gazette* and the 12/15/37 *American Weekly Mercury* printed detailed how to stop a leaking hull at sea. The author seems urgently driven to impart the information after reading in the *Gentleman's Magazine* about the cannibalistic behaviors of castaways and shipwreck survivors:

Sir,

Reading in your *Magazine* for *July* the deplorable Condition of the Wretches who eat one another, and the first Cause, it induced me to write to you the following Remedy for a Leak in a Ship, not thinking it is known or practiced; but can assure it was tried with Success on his Majesty's Ship *Antelope*, above 20 Years ago; viz. Let a small Net be made with the Meshes 4 or 5 Inches Diameter, and fill'd with Oakum, with proper Weights just enough to sink it; let it be gently hawled fore and aft the Outside of the Ship, and it will quickly find out the Leak, by the Violence of the Suction, and the Oakum continually drawing thro' the Meshes of the Net, will stop it and stick fast, until proper Means can be used to do it more

effectually. If you please to publish this for the Good of my Countrymen who use the Seas, you will oblige,
Your humble Servant, L.T.

Perhaps not all seamen had read the at least three locations this had appeared however for a year later an article describing a slow leak and sinking appeared: "Extract of a Letter . . . giving an Account of the Loss of the Anne Brigantine . . . On Sunday Morning last we sprung a Leak; on the Discovery whereof we came to an Anchor . . . and pump'd all Hands for eight Hours . . ." ³⁸⁷
The ship later sank with a number of men aboard.

Public Utility

The health of the economy in colonial America depended considerably on agriculture, trade and, to a lesser extent, manufacturing. The bulk of the colonies' income came from shipping. ³⁸⁸ A large proportion of the gazettes related the comings and goings of ships and cargoes. Weather and navigation were important, and articles and advertisements reflect that importance. The potentially catastrophic loss of investment always played a role in the reports, in most cases the destruction (or occasionally the lucky salvation) of property involved. Lotteries for establishing landmarks and lighthouses, articles on river navigation, advertisements for government support of removing hazardous obstructions to navigation, and the ever-present advertisements for navigational instruction and technology, positioned the products of technique and natural philosophy as relevant. Numerous weather reports archived the patterns of winds and storms. By mid century the percentage of reports from ships decreased as the shipping industry probably began to develop its own historical database and the risks involved lessened. ³⁸⁹ The newspapers displayed articles that showed the potential or realized utility of natural philosophical inquiry and praxis with respect to human concerns.

³⁸⁷ *Virginia Gazette*, 5/18/39.

³⁸⁸ Numerous articles promoted trade as critical for the strength of the nation. See, among others, *Virginia Gazette*, 3/2/39 and *American Weekly Mercury*, 9/13/33.

³⁸⁹ Or, perhaps given the success of many of the public projects related to navigation, the shock value of numerous reports no longer seemed necessary.

An example of international politics driving the discussion for the need for a technical expertise concerns the need for better-trained mapmakers and the newspaper's essential promotion of their training. A *Virginia Gazette* 3/7/55 article notes that French geographers continually observe and chart terrain to the continued benefit of their respective countries and thus the colonists "to our great Scandal as a trading Nation ... have neither Maps nor Charts of our own, but are obliged to use those made by the very Neighbors who have corrupted them, to defraud us, and whom, therefore, we out not to trust." These "Mistakes" get perpetuated by even English mapmakers, continues the author, using the term "map-makers" as a derogatory comment and indictment of colonial map-making skills. For the colonists to protect themselves from the "Limits to our Territories in America . . . marked so erroneously, and to so much Disadvantage" the author indicates that "these Instance shew, that there is a Necessity for encouraging Geographers among ourselves, who may watch the Motions of these French Pirates, and expose their fraudulent Practices to the World, before they get Footing."

Another example: as we saw earlier, the numerous articles which promoted smallpox inoculation with detailed instructions for applying the pus to an opened sore and caring for the patient to make the process as painless as possible. The articles were also timely since they usually received publication during a Small Pox outbreak.³⁹⁰ Advertisements hawked the instructional pamphlets available. Statistical, anecdotal, and historical evidence showed the validity of the technique³⁹¹.

Most colonists were concerned with smallpox. The eighteenth century had seen a new strain develop that often resulted in the death of the one infected. People removed themselves from the locality where it raged the strongest. The extent to which people became affected can be seen in the articles on the spread of the pox in Boston, New York, Philadelphia, Charleston, and among the Native Americans. In addition, the majority of advertisements for runaway slaves, servants, or criminals noted a related distinguishing facial or body feature: "face pocked by small pox" or "left

³⁹⁰ Although, as noted earlier, they were not necessarily the latest advices.

³⁹¹ Although no one has done a detailed examination of smallpox inoculation in colonial America, Brunton (1990) argues that inoculation had little effect on mortality rates on the population as a whole. The smaller population and percentages inoculated in America might, however, show a different story. These statistics paralleled the investigations of the Royal Society. Brunton writes on p.21 that James Jurin and John Gaspar Scheuchzer collected "accounts of all inoculations performed in Britain and investigated all reported deaths. They attributed many to complicating factors - such as a tendency to convulsions, or the patients drinking before the operation. Even so,

side reduced by small pox." Slaves for sale most always included: "has had small pox." As in Britain and Scotland, natural philosophers tried to show the value of their endeavors with small pox to the public at large. Franklin reused the 1714 and 1715 reports from John Woodward and Jacob Pylarini (later published in the Philosophical Transactions) to connect the Royal Society and inoculation.³⁹²

The asiaticks have introduced this practice of procuring the smallpox by a sort of inoculation for about 40 years at Constantinople: and though at first twas used with caution, yet the success it has met with in thousands of subjects for 8 years past has put it beyond all suspicion and doubt; since None who have had it this way have been found to die of the small pox; when at the same time it was very mortal when it sensed the patient in the common way, of which half the affected died.

Not only explicit techniques for curing smallpox appeared in the paper. As we have seen, Tennent gave explicit instructions related to pleurisy. This article from the 1/5/31 *American Weekly Mercury* gives the surgical details for amputating the humerus:

Paris, Sept 27. An extraordinary Operation in Surgery, recommended in the Demonstrations laid down in Lectures by M. Hunauld, Professor of Physic at the Royal Garden in this County, viz. An amputation of the humerus, or shoulder, in the joint, when there is no possibility of saving the Patients Life, having been actually done in Holland in the Presence of Dr. Boerhave with success, was thus performed by M. du Verny, Surgeon. First, a very strong Ligature was made on the great Artery, by passing a Needle under the Arm, near the axial, to prevent an Hemorrhage: Then, by a Semicircle incision on the Top of the Shoulder, it was disjointed, leaving as much Flesh underneath, together with the Ligature, as served to turn up, and cover the wound and naked part of the scapula, neatly turned, in order to unite thereto: And this with proper Compress and Bandage, partly as in a Luxation of that Joint, finished the work.

Health in general (along with husbandry) was enough of a concern to be one of the first fields to have a separate journal. Franklin promoted the value of self-health by stocking and selling numerous books and pamphlets.³⁹³ His General Magazine and Poor Richard included articles on health concerns.³⁹⁴ Articles, letters, and even advertisements gave specific prescriptions for various

they calculated that on average around one in fifty patients died as a result of inoculation, whereas nearly one in twelve of those catching natural smallpox died of the disease."

³⁹² See Brunton (1990), p.13.

³⁹³ For instance, the *Poor Planter's Physician*.

³⁹⁴ See, for example, the 8/22/42 Ad for importing books, the 2/19/41 ad for the *General Magazine*, and the 12/6/39 ad for Poor Richard which mentions Tennent's cure for pleurisy.

ailments. Interestingly, later in the period I am examining, the number of advertisements in the *Pennsylvania Gazette* for health related books dropped considerably, while the number of advertisements for physicians' services rises.³⁹⁵

The public utility of health care could be potentially realized through the mechanism of the hospital. The hospital allowed the physician to better isolate patients and, thus, perhaps causes and cures for particular ailments. Initially, the hospitals needed public assistance to exist. The *Pennsylvania Gazette* promoted the Philadelphia Hospital after 1750 by placing yearly calls for donations, calls to elect the board of governors, lists of the elite citizens who were donating members (including Franklin and Hall), and lists of the hospital's successfully treated cases. A number of citizens apparently became so impressed with the hospital and its status that they acquired permission from Governor Denny to put on a charity play and thus, with the receipts, become members. The board of the hospital seemed to quickly distance itself from the benefit performance.³⁹⁶ Numerous people did not approve of theatrical productions and this may have included those on the board.

The importance of agriculture in colonial American life also demanded that it receive detailed attention from the newspapers. The planting and cultivating of crops -- husbandry -- were represented in the newspapers by numerous articles. One could find articles on irrigation, the elimination of bugs, and details on raising hemp, flax, and silk worms. One report detailing the economic and climatic aspects of the colonies indicated they were ripe for the growing of grapes by a "friend of the colonies":

I own it is to me astonishing, that none but partial and pusillanimous Trials have yet been made, in this important Matter, in that Part of the World. A few Vines have, it is true, been planted, without Success; but should that deter others from making a more rational Trial? Experiments injudiciously made, are the Ruin of many good Projects; People are apt to conclude, that if an Undertaking fails of Success in one Man's Hands, there is no Reason to hope it will thrive any better . . . the best Vines which grow on the Banks of the Rhine and Moselle; these would thrive well in Virginia, Pennsylvania, North Carolina, New York, and the Province of Massachusetts; . . . As to the Southern Colonies, Maryland, South Carolina, Georgia, Florida and Louisiana, I would recommend that Cuttings from the Madeira Vines be planted. . . . Were the Colonies in North America to take to making Wines,

³⁹⁵ Ferro, 1995, p. 51.

³⁹⁶ See the 12/27/59 *Gazette* ad for the play to benefit the Pennsylvania Hospital and the 1/10/60 ad from the manager of the hospital.

we should soon have them in great Perfection from thence, and it would prevent their interfering with any of our English Manufactures; on the contrary, the Profit arising from the Sale of their Wines, would enable them to purchase all their necessaries from England, which it is now out of their Power to do, they are therefore obliged to make them at home. . . . I know but one Way to encourage the planting of Vineyards, and making Wines in America; which is, to grant a Bounty on the first Thousand Pipes of good Wine, which should be imported from any of our North American Colonies, being made from Grapes which were the Growth of those Colonies; suppose this Bounty was to be 30 l. a Pipe, I own I should think 30,000 l. of the Publick Money very well laid out in this Manner.

The author of this piece made it plain that the empiricists of North America should concentrate on subjects sure to bring economic success to the colonies at the expense of Britain's enemies of France and Spain, without "interfering with any of our English Manufactures." The author even wanted to fund the experiment: a nationalistic project choice that does not disturb the colonial hierarchy.

Private Concern

In the eighteenth-century the great majority of those doing enlightenment science in America did not have institutional support and so made their livings as farmers, physicians, apothecaries, teachers, ministers, merchants, and craftspeople. The remainder were individually wealthy or had found some private patronage. The Baconian ideal of empirical proof proved durable and appealing to a growing middle class with pragmatic, utilitarian aspirations. So despite the initial concept of secret knowledge passed to the masses, envisioned by Bacon and to an extent realized by esoteric practice and protected laboratory space³⁹⁷, experimental philosophy becomes a popular empirical practice linked to the capitalist exchange of goods and services.

Through articles, the newspaper sold the products and attendant epistemology that characterized an ideal style of rational thinking. Advertisements made use of these arguments as well. In the process, fortunes were made, positions of power acquired, the right to own property and the value of representative democracy promoted. Typically, while articles extolled the virtues of rational thought, notices told of the availability of books, lectures, and courses for those interested in

³⁹⁷ Shapin and Shaffer, Leviathan and the Air Pump.

pursuing such philosophy. The dissemination of books in particular established a substantial knowledge base from which science drew further authority. Meanwhile, lectures promoted natural philosophy through their potential entertainment value. As noted above, demonstrations in electricity were particularly appealing. The newspaper positioned the products of natural philosophy and natural history, and devices and techniques of the enlightenment as utilitarian, authoritative, and profitable.

The direct links between natural philosophy and commodities are numerous. We can find instances of articles that supported an individual's business, or ran concurrent with advertisements on the same subject. The writers submitted their works to the editors of the newspapers knowing that the public opinions engendered might turn to benefit their respective projects. They did not obviate the potential personal economic gain. There seemed adherence to some kind of protocol that differentiated between articles and advertisements. In a small community, these affiliations may have been entirely obvious anyway. They wrote, instead, in a style that did not directly link their potential personal welfare to the marketing of ideas and thus reflected the 'soft sell' approach that many advertisements of the time used.³⁹⁸

Franklin and Hall owned and operated a print shop and store. The publishing and delivery of the newspaper itself -- especially if shown to be of superior quality -- promoted the print shop as available for private use (books, pamphlets, almanacs, handbills) and government contracts (paper money and government documents). Franklin guaranteed himself government work when he became the clerk of the general assembly. And the acquisition and promotion of superior printing techniques established paper currency, for it became more difficult to counterfeit. Franklin remained intricately involved in the printing and distribution of information in the colonies throughout his career. He started several other *Gazette* style newspapers, owned a paper mill, and became postmaster general, designing the distribution network for America.³⁹⁹

The store operated as brokerage for goods and services (many advertisements specified "enquire of the printer hereof") and post office. In addition, there Franklin or Hall sold the famous stove,

³⁹⁸ Barrow (1967), pp.104-109.

³⁹⁹ For more on Franklin's printing network see Frasca, 1994.

Crown Soap, stationary, and, mainly, the numerous books and pamphlets most of which made up the canon of the enlightenment.

JUST IMPORTED And to be sold by B. FRANKLIN, VARIETY of Bibles and Common Prayer Books, Books of Physick, Surgery, Chemistry, and Metallurgy, Navigation Books of several Sorts, School Books of most Sorts, with Variety of Sermons, Poetry, History, &c.⁴⁰⁰

The Philadelphia Academy (English, mathematics, philosophy), medical school, college (three philosophy schools, Latin and Greek), and charity schools⁴⁰¹ educated hundreds of students, all needing books. So did the numerous tutors and Quaker schools, trade instructors, and Franklin's own Library Company. The promotion of philosophy, mathematics, trade knowledge, and the classics fit into Franklin's general program of importing commodities, and promoting education and individual reading.

Some differences between the newspapers in promoting certain kinds of books existed. Not all newspaper publishers, importers and printers focused as much on enlightenment subjects. The publishers of the *Pennsylvania*, *Virginia*, and *South Carolina Gazettes* advertised those types of books more often than either the *American Weekly Mercury* or the *Maryland Gazette*. You would see more religious texts from Bradford at the *American Weekly Mercury*.

The newspaper often positioned technical articles and advertisements in support of one another. In 1744, Franklin placed a January article on finding Jupiter, a February article on comets, a March article on the aurora borealis, and an April article on positions of stars for viewing. In late April an advertisement for mathematics and astronomy instruction appeared.⁴⁰² The same thing happens with respect to navigation in 1745. Two short articles on navigational techniques to determine longitude occurred on May 30 and December 6. Starting in 1746, numerous advertisements for math and navigation instruction and navigation books and charts appeared, and Poor Richard

⁴⁰⁰ *Pennsylvania Gazette*, May 12 1743. This advertisement was somewhat unique for Franklin & Hall (and for other advertisers as well) in that it only listed categories of books. Most advertisements list so many titles as to seem to be an inventory of the whole store.

⁴⁰¹ Franklin lent a big hand to creating these institutions as early as 1743. Bridenbaugh (1965), pp. 29-79.

⁴⁰² *Pennsylvania Gazette*, 4/20/44.

becomes 'Improved' celestially in 1747. In both cases Franklin and others stood to benefit from the commodification of astronomy and navigation.

The *American Weekly Mercury* published at least twenty-two advertisements for Thelonius Grew's courses in mathematics and navigation between 1734 and 1736. One appeared the same 3/9/36 issue as his submitted article on calculating the lunar eclipse.

The January 6, 1747 *Pennsylvania Gazette* letter noted in a previous chapter that questioned the curing properties of the water from newly discovered wells in Virginia shows a regard for the experimental method and the authority of those who practice it. It also had been submitted by Thomas and Phineas Bond, who owned a successful apothecary in Philadelphia. A "healing spring" could have cut into their business of patent medicines, curative herbs, and medical practice.

Authority and Metaphor

Eighteenth-century natural philosophy relied on the social standing of individuals and organizations, the empirical allure of pragmatic technology and rational techniques, and the power of textual representations for viability.⁴⁰³ Taken together, these elements all became essential ingredients in the contributions to newspaper science. Through a circle of confirmations, the newspaper both sold empirical and rational thinking and used it to sell.⁴⁰⁴

The understanding of natural philosophy, natural history, technology, medicine, economic, personal and political welfare all became wrapped up in the image of the Enlightenment man. To at least dabble in the world of science showed the mark of a gentleman.⁴⁰⁵ And, while gentlemen might be born, in colonial America they were also made. The newspaper of the eighteenth century played a literary position that allowed for numerous articles directed towards the moral and philosophical

⁴⁰³ Shapin and Shaffer use the term "technologies" to make a similar argument. Shapin and Shaffer (1985).

⁴⁰⁴ Many of the articles that I quote below in this section are not presented sequentially. While I've tried to avoid large leaps in time for any particular point, such as assuming no historical difference between an article written in 1729 versus one in 1765, sometimes there is not enough evidence to always support an evolutionary argument. There is also always the possibility that not much had changed or that perspectives reflected the developmental stage of the newspaper and its community more than the date. Many things remain to be explored.

improvement of its readers. While many of these articles might never directly touch upon experiments with air pumps or electricity, many did utilize the language metaphorically or analogously. Many placed an enlightened individual within an enlightened and improving society with its numerous rewards for the individual.

The newspaper recognized and trumpeted some of the recognition accorded natural philosophers, giving credence to their actions. Mrs. Mapp, a London bonesetter, had a play put on in her honor according to the 3/1/37 *American Weekly Mercury*. The *Maryland Gazette* of 3/21/54 noted that Royal Society cited Franklin for his work on electricity. The 8/16/53 issue of the *Maryland Gazette* recognized Franklin again for an honor at Harvard. The March 5, 1745 *American Weekly Mercury* had a front-page letter from The Hague dated September 16, that gave a long description of John Vaudendeim and his celestial machines and observations. The 7/21/43 *American Weekly Mercury* had a long epitaph for "Mrs. Jane Squire, Author of the Treatise lately publish'd for determining the Longitude" who had died April 4th. Mrs. Squire demonstrates a true spirit of intellectual curiosity by her pursuit of knowledge:

On Monday the 4th Inst. Died, after a few Weeks Illness, "Mrs. Jane Squire, Author of the Treatise lately publish'd for determining the Longitude, in the Compiling of which she greatly weaken'd her Constitution: She was a Lady excellently well vers'd in Astronomy, Philosophy, and most Parts of polite Literature; she led a most moral Life, and was often more charitable than her Circumstances would permit. . . It is a great Loss to Navigators that she has not liv'd to finish her Catalogue of Stars, dexcribing their Longitude, Latidude, and Place in both Hemispheres, in a manner entirely new, and more certain than any ever done before.

Beyond the biographies and recognition given to natural philosophers, the individual read that the rational world, superior to that overrun by emotion, yet finding the "true" heart, promised joy and profit. That the world naturally inclines towards this position seems obvious to a writer in the 8/26/46 *Maryland Gazette* who notes "The *true Taste* may be called, that Faculty of the mind, which discerns what is decent in *Company*, and elegant in *Arts*, what is just in *Society*, and beautiful in *Nature*, and the order of the World." "The Philosopher's conduct is fitted to the strictest Interest of Mankind and Society, his Behaviour to his Rank and Dignity in Nature, " continues Euphrator, "A MAN who models his taste aright, with Relation to natural Objects, such as Painting, Music,

⁴⁰⁵ Fortune and Warner, Introduction.

Architecture, or Geometry, will never attempt to bring Truth and nature to his own Humours but leaving these just where he found them, he will accommodate his Taste and Fancy to their Standard; and if he does the same in the moral System, he will in Reality become a great and wise Man".

Epitaphs often repeat these ideas in their descriptions of recently deceased gentlemen, even those not intimately familiar with the Arts and Sciences. From the 9/2/36 *American Weekly Mercury*, an ode to Andrew Pitt from London, April 24:

. . . If we consider him in his private capacity, or as a gentlemen, he has no great learning; or extensive knowledge of arts and sciences; but husbanded what he had obtained, and inside it go the furthest of any man I ever knew. for he had a good natural discernment, large acquaintance with the world, and consummate prudence, which reserved him from even attempting to speak upon subjects that he did not clearly understand - a letter from gentlemen last named.

Another author writing an essay on charity in the 6/18/1730 *American Weekly Mercury* posits that "Among all the *Arts and Sciences* in the World, and of all the several kins of Knowledge which Men, with great Labour and Anxiety, have found out: the greatest, the most noble and useful is *Moral Science*". However, in the process of writing the author recognizes the value of *Arts and Sciences* and industry and warns "Great care should be taken that we don't bestow our Charity upon *idle Persons*, for 'tis generally thrown away."

Some attempted to rationalize feelings beyond thoughts. A "Phoboas" writes that courage is a result of reason and a good conscience but true courage comes with fear and the bravest are subject to it as shown by Homer. Nature could instill fear but even this might have benefits. "But besides, I have found Fear to be medicinal; it will cure the Hickup, the Gout, and a constigated Belly."⁴⁰⁶ Another writer notes that "Our great Creator has wisely given us Passions, to rouse us into Action . . . but at the same Time he has kindly given us Reason sufficient, if we will but give that Reason fair play, to control those Pasion[s]; and he delegated Authority to say to them, as he said to the Waters, 'Thus far shall ye go and no farther'. "⁴⁰⁷ "Humanity and Greatness of Mind" might be found by 'temper[ing] our Passions" echoes another writer in the *South-Carolina Gazette* of December 27, 1735 reprinted

⁴⁰⁶ *Maryland Gazette*, 1/1/1756.

⁴⁰⁷ *Maryland Gazette*, 3/24/1757.

in the March 23, 1736 *American Weekly Mercury*. An author in the March 11, 1736 *Virginia Gazette*, PHALARIS, has some concern with the emotional response to the every day event of death. "Among all the Absurdities and Weaknesses that human Nature give into, there is no one grounded with less Reasons, or carried to a higher Extravagance than that of grieving immoderately for the Death of a Friend or Relation."

In a 3/19/30 issue of the *American Weekly Mercury* an author writes "The Pleasure of the Body are incomparably inferior to the solid Satisfaction, serene Joy, and inexpressible Complacency that result from the Exercise of our superior Faculties." Rather than fall prey to the "afflicting and epidemical Distempers of Love and the Poetical Itch" an author, "Philalethes", urges the young to take his infallible cure, mimicking and mocking some of the medical emetics:

Take half a Grain of the South-East and by East Side of the Pith of common Discretion, two Grains of moderate vulgar Sense and solidity, gathered exactly an Hour and two Minutes before Sunrise, half a Dram of the inside Bark of solid Thought and Reflection, three Drams of common Modesty, half an Ounce of well-timed Diffidence, calcined in the Fire of Self-Examination, and a Pound of honest Industry and Diligence...beat all stoutly in a Mortar well propp'd with a good Understanding, and when all is reduced to a Powder, give it frequently only to the Quantity of half a Dram for a Dose; taking care all the while it operates, to stop well all the Crevices and Cracks of the Patient's intellectual Chamber. . .If thus used, it will in a little Time bring the Patient to a good Habit of Mind, so as that he shall neither heedlessly fall in Love at improper Seasons, or in improper Places.

There's always the chance someone could take offense at an extreme position however and advise moderation. On 2/4/46 another author inserts an article, perhaps even paid for, on the back page of the *Maryland Gazette* which mimics and mocks both the Philalethes article and the witnessing in advertisements for patent medicines. "Theophilus Poltpharmacus, M.D. for the public Good" writes that to his surprise, the cure of Dr. Philalethes did not so much make "a Cure of these unhappy demented Poets" but instead "has increased their Delirium to such a furious Height as to put them beyond all Hopes of Recovery."

Three Weeks ago, I was called to an unhappy Patient seized with a deplorable Furor Poeticus, and complicated Febris Amatoria, After feeling his Pulse, I asked him how long he had laboured under the Distemper, he surpriz'd me with a jingling Reply, *A well-turn'd Praise requir'd the nicest Skill,*

And he who writes ill-natur'd must write ill.

His own recipe included "four Lines out of any of Pope's poetical works, fix Lines of Milton's Paradise Lost, eight Lines of Garth's Dispensary, guarded with four Lines of Butler's Hudibrass; let the Doctor or Apothecary read these very loud to the Patient". This will produce a "substance neither saturated with the Salt of good Sense, nor flattened with the Phlegm of Nonsense."

Less contested seems the importance of the link between individual behavior and society. Just as the AWM author warned of charity to idle persons, others warned of the danger of gambling (or gaming) or drinking tea or rum to excess. Linking excessive drinking to the lack of production an author in the *Pennsylvania Gazette* of February 1, 1733 notes:

Whereas the drinking of spirits and strong waters is become very common amongst the people of inferior rank, and the constant use thereof tends greatly to the destruction of their healths, enervating them, and rendering them unfit for useful labour, intoxicating them, and debauching their morals, and leading them into all manner of vices and wickedness, the prevention whereof would be of the greatest publick good.

In contrast, the front page of the 8/2/49 *Maryland Gazette* has "REFLECTIONS on IMMODERATE Drinking" and notes that "A sober Man must do something consistent with Reason, he therefore calls about for something that pleases him also; this leads him to the Study of some sort of Science or other, or to the general Study of all Science, According to the natural Bent of his Genius". The 11/1/49 issue of the *Maryland Gazette* had "A RHAPSODY on RUM"

Great Spirit, hail! --confusion's angry sire
And like thy parent Bacchus, born of fire
The jail's decoy, the greedy merchant's lure
Disease of money, but reflection's cure

Not including the public lotteries, the proceeds of which often went to public works projects such as the construction of wharves or warehouses, gaming also often found short shrift in the newspaper. The *Maryland Gazette* article of 8/26/46 on taste and nature called gaming with cards and dice a "prevailing Gout" which "waste time and money to little purpose". The 1/20/48 issue had another

essay on the bad effects of gaming. A 1/17/50 issue had "Advice for tipplers" with drinking and gambling as a waste of resources.⁴⁰⁸

According to the London-Journal reprint in the *American Weekly Mercury* of 5/3/1733 "Gentlemen who are in Power, and Gentlemen who are out of Power, have their several Parts to act; which, perhaps, are both necessary for the Welfare of the Society. The Good of the Publick they should set constantly before them; they should have no other Mark in View, and then they'll seldom err." The good of the public and the goodness of the individual was a result of reason, a sentiment echoed in an essay from *Universal Spectator* on "Man's Sovereign Good by conviction of our own reason" reprinted in the 2/11/35 *American Weekly Mercury*. The reader finds these sentiments echoed again in a "SOCRATES" authored series of letters starting 1/17/1730 in the *American Weekly Mercury*. The author writes: "I will examine why any Men are bad; and how so many came to deviate from the Rules of Reason; and show, that tis not to be attributed to any Defects in Nature, but arises from other causes. "The reason" continues "SOCRATES" in part two, "is *wrong education*". Lack of morality cannot be blamed on the unseen for, 'tis the Actions, the constant and general Actions of a Man's Life, must speak the Man; and it is in the Works of God, we must seek the Character of God. There we are sure; all the rest is meer Imagination, and the fictions of our own brains."

The letter by SOCRATES distinguishes between the nature of being and nature in the world. Understanding the world remains the providence of those "late Enquiries into *Natural Philosophy*, or *Natural History*; For, Indeed, the Philosophy of Nature, is only the *History* of Nature; we know nothing of her, but by what she does."

The business of the world also remains the domain of the corporeal and includes the necessity for cultural and behavioral stability and, thus, fitting into the natural schema. Greed or the lure of Croesus might find reprobation in the newspaper, such as the *American Weekly Mercury* article of 8/28/35 that warned of material gain without moral. The 1/29/41 article from the *Universal Spectator* on sufficient wealth warns that wealth should be put to good purposes: "To be happy,

⁴⁰⁸ Interestingly, I found no such admonition against tobacco in these papers ; perhaps because of the importance of the crop to the middle and southern colonies.

bring your Mind to your Condition, and have an Indifferency for more than what is sufficient: The Generality of Mankind are the worse for their Plenty . . . tis the good Man that uses it, and uses it to good Purposes: But such are hardly found among the Prosperous." An article in the 2/26/41 *American Weekly Mercury* admonished businessmen to have "truthfulness in dealings" and another on 2/15/37 argued the power of following custom for economic gain.

This does not negate the pleasure or value of business, however, and its purposeful employment becomes a virtue: "Labour, or Business, is one of the most powerful *natural* Means of Virtue, because it preserves us from Want and Distress. . . Men are so well built or form'd for Society, that their greatest Happiness arises from standing well with one another; This is the grand Secret or Magnet by which the wise Author of Nature holds the World together. . ." ⁴⁰⁹ Another, in the *Maryland Gazette* of 1/22/56 found similar precedents in the ancient Greek society from Athenian orator Isocrates in a letter to his friend Demonicus. More than personal satisfaction, "Industry is the source of wealth, so it is the interest of all governments to promote and encourage it, if it was only for the sake of that peace and harmony amongst men, which tends so essentially to the ease of those who govern, and produces so many benefits to a community." ⁴¹⁰

The notions and terminology of the enlightenment imbue many of the articles and advertisements of the colonial paper for a variety of concerns. In a letter from Paris dated November 18, the *Maryland Gazette* reminds the reader of the power of the microscope to explore the unseen:

Since the arrival of two couriers from Petersburg and Copenhagen, which the court has lately received, the ministers appear more than ordinary busy: Tho, the contents of their dispatches are not generally known, yet every body perceives, without the help of a microscope, that they relate to the affairs of the North, wherein there seems to have been a great alteration.

A letter in the 6/17/36 *American Weekly Mercury* compared Government to a large machine. The 5/23/45 *American Weekly Mercury*, and a month later the *Maryland Gazette* of 6/14/45, had a reprint from the *Craftsman* on the UNIVERSAL BALANCE:

⁴⁰⁹ *American Weekly Mercury*, 1/25/32.

⁴¹⁰ *Maryland Gazette*, 10/10/1750.

I BEG Leave to convey, through the Channel of your Paper, an Account of a Machine I have lately invented, which I call the Universal Balance; and which, I doubt not, will be as useful in political Philosophy, as the common Balance is in mechanical and natural Philosophy. The common Balance takes only the absolute Gravity of a person; but this takes the Weight of his Talent, his Merit, his Virtues, and his Vices.

The readers of the *Gazette* could expect to be presented with the health of both the body and the economy as inextricably linked. This could occur through a metaphor, as in this 2/18/1729 article by Keimer:

We hear from Maryland, that many People are very sickly there, being troubled with the Pain of the Side. Money here seems very scarce. Trade has been long in a deep Consumption, her Nerves relax'd, her Spirits languid, her Joints have grown so feeble, that she has had of late so terrible a Fall that she now lies bleeding in a very deplorable Condition. 'Tis said several eminent Physicians have prescrib'd to restore her to her pristine Health, but in vain. But we are not without Hopes the President of the College will exert his utmost Skill, when 'twill not be doubted but she will recover her former Health Strength and Beauty.

The article represents the economy as both female and awaiting the expert skills of the sure to succeed and enlightened male "President of the College."

The authors interested in Natural, Historical, and Mechanical Philosophy who submitted their work to the newspaper did not only hint at or write obliquely about the value inherent in those fields. An article of 10/30/35 *Pennsylvania Gazette* on the value of mathematics links science, financial interests, and an appeal to those not yet enlightened using class distinctions. Here Franklin has editorialized, an unpaid advertisement on the usefulness of mathematics:

As to the usefulness of mathematics, tis well known that no business, commerce, trade, or employment whatsoever, from the merchant to the shopkeeper can be managed and carried on without the assistance of numbers -- for by these the reader computes the value of all sorts of goods that he dealeth in does his business with ease and certainty and informs himself how matters required at any time with respect to men, money, or merchandise to profit and loss, whether he goes forward or backward, grows richer or poorer. Neither is this science only useful to the merchant but is reconciled the *primum mobile* (or first mover) of all mundane affairs in general, and is useful for all sorts and degrees of men from the highest to the lowest.

Another article in 10/14/36 *Pennsylvania Gazette*, and repeated in the 1/14/36 *Virginia Gazette*, champions the current age while relishing the great progress still to come. The article displays the ease with which the newspaper could display a wholistic approach to various elements of rationality, discovery, experimentation, classification and invention of the Enlightenment. It begins, "They had Philosophy without Experiments; Mathematicks without instruments." In the second paragraph it notes, "They made War without Powder," and a few sentences later, "They view'd the Stars without Telescopes; and measur'd Latitude, without Observation." A few more sentences later it notes, "They had Chirurgery [Surgery] without Anatomy."

Of the late wonderful Discoveries, and Improvements of Arts and Sciences.

THE World, but a few Ages since was in a very poor Condition, as to Trade, and Navigation; Nor, in deed, were they much better in other Matters of useful Knowledge. It was a green headed Time, every useful Improvement was hid from them; they had neither look'd into Heaven, nor Earth; into the Sea, nor Land, as has been done since. They had Philosophy without Experiments; Mathematicks without Instruments; Geometry without Scale, Astronomy without Demonstration.

They made War without Powder, Shot, Cannon, or Mortars; nay, the Mob made their Bonfires without Squibs or Crackers. They went to Sea without Compass; and failed without the Needle. They view'd the Stars without Telescopes; and measur'd Latitude, without Observation. Learning had no Printing Press, Writing no Paper, and Paper no Ink: The Lover was forced to send his Mistress a Deal Board for a Love Letter; and a Billet Doux might be about the Size of Trencher. They were cloath'd without Manufacture; and their richest Robes were the Skins of the most formidable Monsters. They carried on Trade, without Books; and Coreespondence, without Posts: Their Merchants kept no Accounts; their Shop-keepers no Cash Books. They had Chirurgery, without Anatomy; and Physicians, without the Materia Medica. They gave Emiticks, without Ipecoacanna; drew Blisters, without Cantharides; and cur'd Agues without the Bark.

As for Geographick Discoveries, they had neither seen the North Cape, nor the Cape of Good Hope South. All the discover'd inhabited World, which they knew, and convers'd with, was circumscribed within very narrow Limits. . . America was not heard of, nor so much as a Suggestion in the Minds of Men. . . The North Seas were hid in a Veil of impenetrable Darkness. . .

In these narrow Circumstances stood the World's Knowledge, at the Beginning of the 15th Century, when Men of Genius began to look abroad, and about 'em. Now, as it was wonderful to see a World so full of People, and People so capable of Improvement, yet so stupid, and so blind, so ignorant, and so perfectly unimprov'd; it was as wonderful, to see, with what a general Alacrity they took the Alarm, almost altogether; preparing themselves as it were on a sudden, by a general Inspiration, to spread Knowledge thro' the Earth, and to search into every Thing, that it was possible to uncover.

How surprizing is it to look back, so little a Way behind us, and see, that even in less than 200 Years, all this. . .

As they were ignorant of Places, so of Things also; so vast are the Improvements of Science, that all our Knowledge of Mathematicks, of Nature, of the brightest Part of human Wisdom, had their Admission among us within these Two last Centuries. . .

The World is now daily increasing in experimental Knowledge; and let no Man flatter the Age, with pretending we are arriv'd to a Perfection of Discoveries.

*What's now discover'd, only Serves to Show,
That Nothing's known, so what is yet to Know.*

The authority of empiricism, potentially when selling a product, becomes apparent when we examine the advertisements for patent medicines. These extensive advertisements, often in the misleading guise of a letter, attached individual's names to testimonials on the effectiveness of the cure. The 'proof' of their effectiveness came from the social witnessing, made more acute by the signatures. These advertisements invited the purchasers to try the experiment themselves at home; of course, paying for that privilege by buying the product first.

One advertisement placed in the *Pennsylvania Gazette* used individuals of 'unexceptional qualities,' prisoners in Whitechapel Prison, and had them sign their names to the effects on their persons. In a controlled environment, monitored by prison guards and witnessed by the sister of the keeper (a female 'objective' party of higher social stature), the 'laboratory rats' of Whitechapel can attest to the changes in their physical bodies but no more. The charitable Dr. Godfrey shows that even the lowly of moral standing can be physically cured of the 'flux' with a taste of his medicine.⁴¹¹

WE the underwritten poor prisoners in White chapel Prison London, having been informed that some of the poor prisoners had been lately cured of the bloody flux, by the help of Doctor Benjamin Godfrey's general cordial, and we being afflicted with that disorder since we have been brought in here, did apply to Dr. Benjamin Godfrey, in Bishopgate street London, for relief, and he very kindly assisted us with a free gift of several bottles of his general cordial, by means whereof we are quite rid of the bloody flux. Richard Rowland, James Philips, Henry Parks, James Gilchrist, Thomas Russell, Thomas Webber, Thomas Hoskins, John Purdey, Nathaniel Whitaker. Witness Catherine Jackman, sister to the keeper, March 3. 1748.

The advertisement continues by describing all the problems the rest of humanity can expect relief from. At the end the reader is told where the authentic item can be found locally:

Dr. Benjamin Godfrey's general cordial, so universally approved of for the cholick and all manner of pains in the bowels, fluxes, fevers, small pox, measles, rheumatism, coughs, colds, and restlessness in men, women, and children, and particularly for several ailments incident to child bearing women, and relief of young children in breeding their teeth, IS sold in most cities I have put my christian name on the top of the bottles, as above. Prepared by Benjamin Godfrey, M.D. Appointed by the Author, Benjamin Godfrey, M.D. to be sold wholesale and retail, by Christopher Marshall, at the Golden Ball, in Chestnut street, in Philadelphia; where country shop keepers may be supplied, with allowance to sell again.

Just as the advertisements for many patent medicines had used class distinctions to qualify arguments and market a product, so did Thelonius Grew in selling his services and products. The following advertisement of Oct 26, 1738 uses the allure and social substantiation of the ancients, Europe, and the upper class. The last sentence reminds us that Euclid's Elements and the Projection of the Sphere were imported commodities as much as the silk, which, in Grew's advertisement, became associated with mathematical learning (Italics mine):

FOR AS MUCH as Mathematical Learning is (and has been in all Ages) promoted in most Parts of the World, especially in all great Towns, and *generally pursued by the Gentry and those of the first Rank*, as a necessary Qualification; it is to be hope that this flourishing City will follow the Example and give it such Encouragement as it justly deserves. In order to which there will be taught this Winter, over against Mr. James Steel's in Second-Street, Philadelphia; Reading, Writing, Vulgar Arithmetick, Decimal Arithmetick, Accompts, *Euclid's Elements*, Practical Geometry, Mensuration, Gauging, Surveying, Algebra, Trigonometry, Geography, Navigation, *Astronomy*, Dialing, *Projection of the Sphere*, the Use of Globes, Maps, Quadrants, Scales, sliding Rules, and all other Instruments for the Mathematical Service, by THEOSOPHILUS GREW, Mathematician. *Where may be had choice green and blue Mantua, and other Silks, very cheap.*

Accession of Science

Perhaps some subjects lent themselves to dramatic retellings more than others did. Observations of earth, weather and the heavens far outnumber other subjects in general and far outnumber other subjects in their fluency and potential religious interpretation. However, as a means of selling newspapers, these types of dramatic articles served a useful purpose. So, while the newspaper

⁴¹¹ *Pennsylvania Gazette*, 9/6/1750.

might engage in a little hyperbole, we also see where that hyperbole usually became contained in unverifiable stories from distant shores while domestic stories usually appear more measured. In addition, many articles mixed both measured and excited tones. In this way, the newspaper enticed the public and sold the enlightenment.

These more measured stories often also gave specialized information in topics potentially removed from the everyday concerns of the colonists. The connection between earthquakes, the aurora borealis, meteors, comets, astronomy, and economic considerations might seem rather elusive. To some extent the short notices of astronomical events -- lunar eclipses, finding comets, emissions of Jupiter, planetary transits -- seem oriented towards an audience prepared to utilize the information. In many cases this would require special equipment, principally a telescope. These short articles might very well be aimed towards a smaller audience interested in observing celestial mechanics. In addition, while weather, lightning, earthquakes, and northern lights were all thought to be connected, the knowledge does not appear very pragmatic.⁴¹²

However, these articles illuminate several trends within articles of natural philosophy in the *Gazette*. First, the articles assist in the portrayal of natural philosophy as authoritative. The articles definitively ascribe to a naturalistic metaphysics: they do not leave room for supernatural explanation. Astronomy also has one economically exceptional quality. While even today astronomy has frequently not had to justify its expenditures through practical payoffs like many other sciences, there was a very practical payoff at the time, once again related to shipping. Most of the astronomy articles related to planetary transits, which were argued for use in determining more accurate longitudes -- the more problematic of the two dimensions required for navigation and obviously of benefit to the colonists.

The rational understanding and manipulation of natural phenomena became elements in an orbit of knowledge, economics, society and behavior. Natural knowledge became a commodity sold through articles and advertisements while helping to sell goods and services, including the

⁴¹² The connections between earth and sky are described in a reprint of Chambers on December 15, 1737. Franklin, and others, believed that the center of the earth was filled with compressed hot air and linked to terrestrial weather patterns. One could speculate on Franklin's hopefulness in eventually controlling the heavens and earth with his work on electricity and lightning, especially with his notion that he could 'rob the clouds of electricity.'

newspaper. Its popularity as entertainment as in Kinnersley's lectures, its importance for the technical needs of the colonists such as navigation, its presence in articles of various concerns such as economics and morality, points to its value in the colonial American world. The authority and utility of natural philosophical inquiry became an element in the most mundane matters.

In October 31, 1765, a shoemaker named William Ross sold "ALL Kinds of Boots and Half boots, double and single Channel Pumps, Cork soaled Shoes, plain Shoes and Pumps, suitable for the Season; the Cork soaled Shoes are highly approved by the best Physicians, and Gentlemen of good Understanding." Ross also had "an Engine for the Better fitting of Boots to Gentlemen who have long Heels, unknown to any One else on the Continent."⁴¹³ The ancient invention of the shoe had come under the sway of modern medical understanding and technology. Enlightenment philosophy had devised an 'engine' that worked with the human machine to create a better pair of shoes. To all who would wear shoes, what we now call science, technology and medicine, mattered.

⁴¹³ *Pennsylvania Gazette*, 10/31/1765.