

## *Benjamin Franklin and the Universality of Science*

**B**ENJAMIN FRANKLIN was a man of the Enlightenment with his feet on the ground and his thoughts focused on the welfare of mankind. Typical of the eighteenth-century natural philosophers, he believed that science transcends politics and that scientists are citizens of the world. As "Plenipotentiary from the Congress of the United States to the Court of France" he was concerned immediately with the problems of enlisting French aid for the Americans in their revolt against England; yet he was not too busy to recommend the safe passage of Captain James Cook when the famous English explorer was expected to return from his third voyage into the Pacific.

At Passy, on March 10, 1779, Franklin addressed a letter "To all Captains and Commanders of armed ships acting by Commission from the Congress of the United States of America, now in war with Great Britain" in which he asked them to respect the nature of Cook's expedition—

an Undertaking truly laudable in itself, as the Increase of Geographical Knowledge facilitates the Communication between distant Nations, in the Exchange of useful Products and Manufactures, and the Extension of Arts, whereby the common Enjoyments of human Life are multiply'd and augmented, and Science of other kinds increased to the benefit of Mankind in general.<sup>1</sup>

Nine days later, M. Sartine, secretary of the Marine Department at Paris, issued a similar letter:

. . . it is the King's pleasure, that Capt. Cook shall be treated as a Commander of a neutral and allied Power, and that all captains of armed ves-

<sup>1</sup> Albert Henry Smyth, ed., *The Writings of Benjamin Franklin* (New York, 1907), VII, 242, hereinafter cited as Smyth. A year later, Franklin further exhibited a concern for those employed for the common good when he expressed a wish to see the Armed Neutrality extended to "ordain that unarmed trading ships, as well as fishermen and farmers, should be respected, as working for the common benefit of mankind." *Ibid.*, VIII, 80.

sels, etc. who may meet that famous navigator, shall make him acquainted with the King's orders on this behalf, but at the same time let him know that on his part he must refrain from all hostilities.<sup>2</sup>

In the spring of 1784, the Royal Society of London struck gold, silver, and bronze medals in honor of Captain Cook, who had been killed by natives in the Hawaiian Islands. The King and Queen of England, the Prince of Wales, and fellows of the Society who subscribed twenty guineas received gold medals. The Society sent two gold medals abroad: one to the King of France in recognition of the protection he had granted the Cook expedition, and one to the Empress of Russia because of the friendly reception of the English ships in Russian dominion ports. The surplus funds were used to strike additional gold medals as presents to others, including Mrs. Cook, the Earl of Sandwich, and Benjamin Franklin.<sup>3</sup>

Franklin received not only the gold medal from the Royal Society, but from Lord Howe a copy of Captain Cook's *Voyages*, sent "by his Britanic Majesties orders as a testimony of his Royal approbation of the same liberal conduct."<sup>4</sup> Franklin's letter of thanks to Lord Howe reveals the humbleness of the universal scientist: "The Reward vastly exceeds the small Merit of the Action, which was no more than a Duty to Mankind."<sup>5</sup>

Because Franklin sent his directive to the commanders of American cruisers on March 10, more than a week before Sartine's letter was written, one might conclude with Andrew Kippis "that the first thought of such a plan of conduct was probably owing to Dr. Benjamin Franklin."<sup>6</sup> The mere chronology of the orders, though,

<sup>2</sup> *Gentleman's Magazine*, XLIX (1779), 209.

<sup>3</sup> The Congress of the United States did not receive a medal, probably because of the false report that that body not only had failed to concur with Franklin's recommendation, but also had reversed his orders and directed the seizure of Capt. Cook. The court of Spain was accused of similar action. Andrew Kippis, *The Life of Captain James Cook* (London, 1788), II, 269-270. To the credit of Kippis it must be added that he apologized for using misinformation. *Gentleman's Magazine*, LXV (1795), 715. A recent biographer of Cook, nevertheless, refers to Franklin as a "civilized man" for his instructions, but denounces the members of the American Congress and the Spanish government for wanting to capture Cook. Christopher Lloyd, *Captain Cook* (London, 1952), 127.

<sup>4</sup> Joseph Banks to Benjamin Franklin, Aug. 13, 1784, Smyth, X, 350 (note).

<sup>5</sup> Franklin to Lord Howe, Aug. 18, 1784, *ibid.*, IX, 258.

<sup>6</sup> Kippis, II, 267.

may not have very much significance. The Marquis de Condorcet claimed that the measure originated with Turgot:

Dans le moment où la guerre se déclara, M. Turgot vit combien il seroit honorable à la Nation Française que le vaisseau de Cook fût respecté sur les mers. Il dressa un Mémoire pour exposer les motifs d'honneur, de raison, d'intérêt même qui devoient dicter cet acte de respect pour l'humanité; & c'est sur son Mémoire, dont pendant toute sa vie l'auteur est resté inconnu, qu'a été donné l'ordre de ne pas traiter en ennemi le bienfaiteur commun de toutes les nations européennes.<sup>7</sup>

The memorial referred to concluded:

Dans le cas de rupture entre les deux couronnes, on propose à S. M. d'ordonner à tous les officiers de sa marine, ou armateurs particuliers, qui pourraient rencontrer le capitaine Cook, de s'abstenir de toute hostilité envers lui et son bâtiment, de lui laisser continuer librement sa navigation, et de le traiter à tous égards comme il est d'usage de traiter les officiers et les navires des nations neutres et amies, en lui faisant connaître cette marque de l'estime du Roi pour sa personne, et le prévenant que S. M. attend de lui qu'il s'abstiendra de son côté de tout acte hostile.<sup>8</sup>

Whatever the claims for priority may be, the whole question of origin is complicated further by the fact that Franklin and Turgot knew each other both as official agents of their countries and as personal friends. As representative of the United States Congress, Franklin acted in various capacities, including that of director of naval affairs. In March, 1779, the month in which the passports for Captain Cook were issued, he was helping the French Ministry of Marines plan a joint attack on the coast of England. As controller general of finance, Turgot must have been involved in that planning.

From their first meeting, Turgot developed a strong personal regard for Franklin, an esteem he expressed in his famous epigram—*Eripuit caelo fulmen sceptrumque tyrannis*. They called on each other, met at social functions, and exchanged letters and ideas; they could very well have discussed protection for Captain Cook on any of those occasions. It is highly probable, therefore, that the idea which

<sup>7</sup> J.A.M.C. Condorcet, *Vie de M. Turgot* (London, 1787), 203.

<sup>8</sup> Gustave Schelle, ed., *Oeuvres de Turgot et Documents le Concernant* (Paris, 1923), V, 509–510. The editor added a note: "Ce petit mémoire a été remis, par une main tierce, à Sartine qui n'en a jamais connu l'auteur, main qui soumit la proposition au Roi. Ordre fut donné de respecter le vaisseau, la personne, la mission de Cook. L'Angleterre fit de même lors des voyages de La Pérouse, d'Entrecasteaux, de Baudin."

prompted the actions of Franklin and Sartine belonged to the climate of opinion rather than to any one individual.

The determination of the exact origin of the measure could scarcely alter the reputation of either Turgot or Benjamin Franklin. Yet the almost simultaneous issuance of the orders is quite significant for another reason: the two directives represent a culmination of the universal nature of the modern scientific spirit as it developed in the seventeenth and eighteenth centuries. Scientists of the world had evolved a general cosmopolitan attitude, a cosmopolitanism resulting from a combination of factors during the last half of the eighteenth century. In preceding periods, a few individuals of learning and genius had gained prominence, but their inquiries had to await consolidating forces to make them generally beneficial.

One of those forces was the scientific society. Although many of the original groups may have started as rather simple forms of dilettantism, they developed into serious organizations interested in the promotion of useful knowledge. As scientists increased their knowledge of the physical world, they formed more specialized bodies, and improvements in arts and manufacturing, agriculture and botany, and health and happiness flourished along with theoretical learning. The societies maintained a spirit of universality even through the revolutionary periods; and in 1809 Thomas Jefferson observed that "like the republic of letters, they form a great fraternity spreading over the whole earth, and their correspondence is never interrupted by any civilized nation."<sup>9</sup> As a member of learned societies in Philadelphia, Boston, London, Paris, Edinburgh, Göttingen, Rotterdam, Padua, and Turin, Franklin certainly enjoyed a well-established position in that fraternity.

Franklin was thoroughly familiar with the concept of the scientist as a benefactor of mankind when he composed his letter to American naval captains; he had been a fellow of the Royal Society since 1756 and an *associé étranger* of the Académie Royale since 1772, and, of course, he was a founding member as well as president of the American Philosophical Society.

The beginnings of these three societies—to limit the list to those nations represented by Captain Cook, Turgot, and Franklin—were

<sup>9</sup> Quoted in Gilbert Chinard, "Jefferson and the American Philosophical Society," *American Philosophical Society Proceedings*, LXXXVII (1943), 263.

influenced directly or indirectly by the ideas of Sir Francis Bacon's "House of Salomon" (1627) in which the essayist expressed his intention of transcending political boundaries. "The End of our Foundation is the knowledge of Causes, and secret motion of things; and the enlarging of the bounds of Human Empire, to the effecting of all things possible."<sup>10</sup> And after enumerating "the riches of Salomon's House," he listed the duties and offices of its fellows. Among those fellows were "twelve that sail into foreign countries, under the names of other nations, (for our own we conceal) who bring us the books, and abstracts, and patterns of experiments of all other parts. These we call the Merchants of Light."<sup>11</sup> If the state of international rivalries did not sanction a friendly interchange, Bacon, at least, recognized the importance of learning from others, for he believed that "the true and lawful goal of the sciences is none other than this: that human life be endowed with new discoveries and powers."<sup>12</sup>

Clearly reflecting Bacon's concept of the House of Salomon, the Royal Society of London grew out of informal meetings of Englishmen who were interested in experimental knowledge. The progenitors of the formally organized Society intended to conduct a study "whereby Mankind may obtain a Dominion over *Things*, and not over one another's *Judgments*."<sup>13</sup> They professed, furthermore, "not to lay the Foundation of an English, Scotch, Irish, Popish, or Protestant Philosophy; but a Philosophy of Mankind."<sup>14</sup>

Firmly organized under a charter from Charles II in 1662, the fellows of the Royal Society emphasized the performance of experiments by the members themselves; nevertheless, from the beginning they promoted the exchange of information with foreigners. Bishop Thomas Sprat, first historian of the Society, was able to write as early as 1667 that the fellows had "begun to settle a Correspondence through all Countries."<sup>15</sup> Sprat singled out the French for a particular spirit of co-operation,<sup>16</sup> and he further pointed up the universal

<sup>10</sup> James Spedding, *et al.*, eds., *The Works of Francis Bacon* (London, 1857), III, 156.

<sup>11</sup> *Ibid.*, 164.

<sup>12</sup> Sir Francis Bacon, *Novum Organum* (1620), Aphorism LXXXI.

<sup>13</sup> Thomas Sprat, *The History of the Royal Society of London, for the Improving of Natural Knowledge* (London, 1734), 62.

<sup>14</sup> *Ibid.*, 63.

<sup>15</sup> *Ibid.*, 86.

<sup>16</sup> *Ibid.*, 125.

nature of such societies when, in his dedication to King Charles II, he observed that "to increase the Powers of all Mankind, and to free them from the Bondage of Errors, is greater Glory than to enlarge Empire, or to put Chains on the Necks of conquer'd Nations."<sup>17</sup>

At approximately the same time, amateur men of science in France were co-ordinating their own work while they entertained foreigners and corresponded with other natural philosophers, especially those who founded the Royal Society of London. Under the influence of Colbert and the royal patronage of Louis XIV, the Académie des Sciences was created in 1666. Although the society was similar to the Royal Society of London, it developed as a governmental institution because of the financial support from the King, but official financing did not prevent the exchange of ideas and knowledge with scientists in other countries. When the Académie underwent a reorganization in 1699, the new constitution provided for the selection of twenty associate members, eight of whom were to be foreigners, and the cultivation of correspondence with learned men. Also, under the new regime, the Académie began the annual publication of its proceedings which were exchanged with other scientific organizations throughout the world. By the end of the eighteenth century, the Académie des Sciences had not only contributed greatly to the advance of science, particularly in the field of astronomy, but had also influenced academies established in other countries.<sup>18</sup>

Among those scientific societies formed in the eighteenth century were several organizations in the Anglo-American colonies. It was only natural that the Royal Society of London should be the most immediate model for the early American organizations, because numerous colonial names appeared on the membership rolls of the London society. John Winthrop, Jr., had been a charter member, and others admitted as fellows included Cotton Mather, James Bowdoin, Paul Dudley, Roger Williams, Professor John Winthrop, David Rittenhouse, John Morgan, William Byrd, II, John Mitchell, John Tennent, Alexander Garden, and Benjamin Franklin. As early as 1683 Increase Mather had attempted to form a private philosophical society in Boston, but the venture was premature in frontier

<sup>17</sup> *Ibid.*, Dedication.

<sup>18</sup> Martha Ornstein, *The Role of Scientific Societies in the Seventeenth Century* (Chicago, 1938), 139-164.

America.<sup>19</sup> In the first part of the eighteenth century, however, Americans in the urban centers acquired more wealth and leisure and had more time to familiarize themselves with Newtonian philosophy and French rationalism. They found themselves "in circumstances that set them at ease, and afford leisure to cultivate the finer arts and improve the common stock of knowledge."<sup>20</sup>

The American Philosophical Society, finally established on a permanent basis in January, 1769, climaxed efforts to form a scientific body in the English colonies, a fruition that Franklin had sought for more than twenty years. Since different groups had combined to form the new Society, Franklin expressed his hope that factions would not interfere with its work. From London, September 7, 1769, he wrote to Cadwalader Evans: "I should be very sorry that any thing of party remained in The American Philosophical Society after the union. Here the Royal Society is of all parties, but party is entirely out of the question in all our proceedings."<sup>21</sup> The spirit of universality which prevailed in the Royal Society and the Académie des Sciences also characterized the American organization, and the charter, granted by the General Assembly of Pennsylvania on March 15, 1780, contained a direct statement of the international concept: "The experience of ages shows that improvements of a public nature, are best carried on by societies of liberal and ingenious men, uniting their labours, without regard to nation, sect or party, in one grand pursuit."<sup>22</sup> It further emphasized that principle by authorizing members

. . . at all times, whether in peace or war, to correspond with learned Societies, as well as individual learned men, of any nation and country, upon matters merely belonging to the business of the said Society, such as mutual communication of their discoveries and proceedings in Philosophy and Science; the procuring books, apparatus, natural curiosities, and such other articles and intelligence as are usually exchanged between learned bodies, for furthering their common pursuits.<sup>23</sup>

Although the spirit had already become manifest in the European scientific societies, natural philosophers in the New World had a

<sup>19</sup> Ralph S. Bates, *Scientific Societies in the United States* (New York, 1945), 4.

<sup>20</sup> Smyth, II, 228.

<sup>21</sup> *Ibid.*, V, 226.

<sup>22</sup> American Philosophical Society *Year Book*, 1955 (Philadelphia, 1956), 29.

<sup>23</sup> *Ibid.*, 34.

more immediate precedence for it in the ideology and activity of Benjamin Franklin, who was president of the Philosophical Society from 1769 until his death in 1790. His "Rules for a Club Established for Mutual Improvement," drawn up in 1728, contained a pertinent question: "Do you think of any thing at present, in which the Junto may be serviceable to *mankind*, to their country, to their friends, or to themselves?"<sup>24</sup> When he circulated "A Proposal for Promoting Useful Knowledge among the British Plantations in America" in May, 1743, he expressed his hope of producing "discoveries to the advantage of some or all of the British plantations, or to the benefit of mankind in general."<sup>25</sup> He also recommended that the subjects of correspondence include "all philosophical experiments that let light into the nature of things, tend to increase the power of man over matter, and multiply the conveniences or pleasures of life."<sup>26</sup> His wish was "that a correspondence, already begun by some intended members, shall be kept up by this Society with the ROYAL SOCIETY of London, and with the DUBLIN SOCIETY."<sup>27</sup> Those ideas came from Franklin a full decade before he became a fellow of the Royal Society and three and a half decades before he directed protection for Captain Cook.

While the principal learned societies of the world published accounts of their experiments and then exchanged those publications with other such organizations, individuals did perhaps even more to promote the universality of scientific work through their personal correspondence. Their letters fit into two categories, those written to exchange personal feelings and views with fellow scientists, and those drawn up as reports to be read before a society and possibly published in its transactions.

In earlier times discoveries and communications had been more or less accidental; consequently, knowledge had been partial and ignorance almost universal. During the eighteenth century learned men in different nations communicated information so freely that one editor wrote in 1800: "It is a circumstance, perhaps the most honourable of any recorded of the human race, that in matters of general utility,

<sup>24</sup> Smyth, II, 89.

<sup>25</sup> *Ibid.*, 228.

<sup>26</sup> *Ibid.*, 229-230.

<sup>27</sup> *Ibid.*, 230.



whether in what is conducive to health, to plenty, or general happiness, arising from discovery, the world is but as one family, and whatever is known is as freely communicated."<sup>28</sup>

Long before Franklin issued his directive concerning Captain Cook during the American Revolution, scientists in different parts of the world had expressed an apprehension over the interference of politics and warfare with the international exchange of scientific information and materials. Peter Collinson, the indefatigable London merchant, friend and correspondent of Franklin, and promoter of scientific interests, wrote to Linnaeus: "I hope the seeds I now send you . . . will be acceptable to you. If the French had not taken two North American ships you should have had a great many more."<sup>29</sup> Another London merchant, John Ellis, who demonstrated the animal nature of corals, told Linnaeus of his happiness with being able to extend his correspondence in time of peace,<sup>30</sup> but he was indignant that international troubles should prevent English botanists from going ashore when Captain Cook stopped at Rio de Janeiro.<sup>31</sup>

From Charleston, South Carolina, Dr. Alexander Garden, who conducted an extensive correspondence with both Ellis and Linnaeus as well as with Franklin, lamented that warfare broke his contact with the Old World: "The French war quite puts me in the hip, as I can easily see it will prevent my hearing from you as often as I could wish, and vessels going home heavy loaded are much apter to fall into their hands than those outward bound."<sup>32</sup> Yet the scientists were remarkably persevering in the face of such hardships, and whenever possible they duplicated their efforts that were thwarted by the enemy. Garden exemplified that zealous spirit when he wrote to Ellis, February 17, 1759: ". . . must first tell you what I wrote you by his Majesty's ship *Winchelsea*, Captain Hale, who had the misfortune to be taken, and thus the thread of my correspondence was broken."<sup>33</sup>

Garden saw the approaching conflict between the American colonies and England well before the Declaration of Independence

<sup>28</sup> *Gentleman's Magazine*, LXX (1800), 1273.

<sup>29</sup> Collinson to Linnaeus, Mar. 10, 1747/8, Sir James E. Smith, ed., *A Selection of the Correspondence of Linnaeus* (London, 1821), I, 16-17, hereinafter cited as *Correspondence of Linnaeus*.

<sup>30</sup> Ellis to Linnaeus, Dec. 21, 1762, *ibid.*, 161.

<sup>31</sup> Ellis to Linnaeus, Nov. 27, 1769, *ibid.*, 242.

<sup>32</sup> Garden to Ellis, Dec. 24, 1755, *ibid.*, 359-360.

<sup>33</sup> *Ibid.*, 428.

and feared still further interference with his correspondence,<sup>34</sup> but the American Revolution did not stop communications between colonial scientists and Europeans. In 1779 the secretary of the American Philosophical Society wrote to Buffon: "But it is hoped the time is fast approaching . . . when the re-establishment of general peace, shall leave the friends and Devotees of Science, on both sides of the Atlantic at full liberty to unite their efforts for the advancement of wisdom, virtue and humanity, unconfined to Sect or nation."<sup>35</sup> Even though the war interfered with scientific experiments and observations, there were some who continued to work and to transmit their results to friends in England. On July 5, 1781, a letter from Joseph Willard to Nevil Maskelyne, Astronomer Royal, concerning the longitude of Cambridge in New England was read before the Royal Society. In it Willard asked for indulgence:

I hope, Sir, no umbrage will be taken at my writing to you on account of the political light in which America is now viewed by Great Britain. I think political disputes should not prevent communications in matters of mere science; nor can I see how any one can be injured by such an intercourse.<sup>36</sup>

Benjamin Franklin was well aware of what was going on among scientists throughout the western world. Besides pursuing his own scientific interests, he promoted correspondence among various men on both sides of the Atlantic and engaged in a prodigious program of letter writing himself. His almost constant communication with Peter Collinson alone would have kept him well abreast of scientific thought and activity; Collinson was only one of scores with whom he exchanged letters.

Letters transmitted from one correspondent to another through a third party were often left unsealed so that the intermediary might read them before sending them on. For example, Franklin ended his letter of November 28, 1745, to Cadwallader Colden in New York: "I shall forward your letter to Dr. Mitchell. Thank you for leaving it open for my perusal."<sup>37</sup> That Colden found such a system convenient is apparent from his comments to Linnaeus on February 9, 1748/9:

<sup>34</sup> Garden to Ellis, Jan. 26, 1771, *ibid.*, 587-588.

<sup>35</sup> Quoted in Gilbert Chinard, "The American Philosophical Society and the World of Science (1768-1800)," *American Philosophical Society Proceedings*, LXXXVII (1943), 3.

<sup>36</sup> *Philosophical Transactions of the Royal Society*, LXXI (1781), 507.

<sup>37</sup> Carl Van Doren, ed., *Benjamin Franklin's Autobiographical Writings* (New York, 1945), 47, hereinafter cited as Van Doren.

"If you will please to continue your favours of writing to me, Mr. Collinson of London will take care of your letters, to transmit them to me; or if they be sent to Philadelphia, to the care of Mr. Benjamin Franklin, postmaster there, they will come to my hands."<sup>38</sup> And a paragraph from Peter Collinson to John Bartram, September 20, 1751, illustrates their desire to circulate beneficial information: "Our good friend, B. Franklin, has some papers on husbandry, from a curious friend of mine,—from which it's likely thou may borrow some useful hints. . . . I have also desired him to let Mr. [Jared] Eliot, of Connecticut, see them; for they may tend to the improvement of that colony."<sup>39</sup>

In his own personal writings, Franklin early manifested an impatience over political interference with his desire to serve mankind, a utilitarian attitude which he maintained through the American Revolution and until the last years of his life. From Philadelphia on November 27, 1755, he wrote to the Society of Arts: "The French War, which came on in 1744, took off our Thoughts from the Prosecution of my Proposal for promoting useful Knowledge in America."<sup>40</sup> Also from Philadelphia on April 30, 1764, he advised Collinson that, because of the new threat to make Pennsylvania a Crown colony, "many talk of quitting the province, and among them your old friend, who is tired of these contentions, and longs for philosophic ease and leisure."<sup>41</sup> From Passy on July 22, 1780, he addressed a letter to Alexander Small, an eminent British army doctor then passing through Paris:

You see, my dear Sir, that I was not afraid my masters would take it amiss, if I ran to see an old friend, though in the service of their enemy. They are reasonable enough to allow, that differing politics should not prevent the intercommunication of philosophers, who study and converse for the benefit of mankind.<sup>42</sup>

And again from Passy it was a man old in years but contemporary in spirit who wrote to Sir Joseph Banks, July 27, 1783: "I join with you

<sup>38</sup> *Correspondence of Linnaeus*, II, 456.

<sup>39</sup> William Darlington, *Memorials of John Bartram and Humphry Marshall* (Philadelphia, 1849), 187.

<sup>40</sup> Quoted in Frank R. Lewis, "Benjamin Franklin and the Society of Arts," *Pennsylvania History*, IV (1939), 17.

<sup>41</sup> Van Doren, 144.

<sup>42</sup> Jared Sparks, ed., *The Works of Benjamin Franklin* (Boston, 1840), VIII, 481, herein-after cited as Sparks.

most cordially in rejoicing at the return of peace. I hope it will be lasting, and that Mankind will at length, as they call themselves reasonable creatures, have reason and sense enough to settle their differences without cutting throats."<sup>43</sup>

Of the second type of correspondence among men of science, that written for reading before learned societies, one of the most significant examples is the collection of letters which reported Franklin's experiments with electricity. Franklin's contribution to the study of electricity was undoubtedly his greatest scientific work, and his experiments, which he reported to Peter Collinson in London, excited the whole scientific world.

Although Franklin worked independently, he owed much to friends and correspondents abroad:

In 1746, being at Boston, I met there with a Dr. Spence, who was lately arrived from Scotland, and show'd me some electric experiments. . . . Soon after my return to Philadelphia, our library company receiv'd from Mr. P. Collinson, Fellow of the Royal Society of London, a present of a glass tube, with some account of the use of it in making such experiments. I eagerly seized the opportunity of repeating what I had seen at Boston.<sup>44</sup>

Because of the gift to the Library Company of Philadelphia, Franklin sent accounts of his experiments to Collinson, who was instrumental in having them read before the Royal Society. Aware that his papers were crude and incomplete, Franklin nevertheless communicated his findings to Collinson, "it being of more importance that knowledge should increase than that your friend should be thought an accurate philosopher."<sup>45</sup> Dr. John Fothergill and Collinson promoted the publication of the papers in London (1751), and soon all of Europe knew about "the Philadelphia Experiments."

Franklin himself apparently underestimated the initial reception given his papers in England,<sup>46</sup> but he soon became aware of the impact his papers had on Europe:

A copy of them happening to fall into the hands of the Count de Buffon, a philosopher deservedly of great reputation in France, and, indeed, all over

<sup>43</sup> *Ibid.*, IX, 546-547.

<sup>44</sup> Van Doren, 749-750.

<sup>45</sup> *Ibid.*, 85.

<sup>46</sup> Cf. I. Bernard Cohen, ed., *Benjamin Franklin's Experiments* (Cambridge, Mass., 1941), 77-100.

Europe, he prevailed with M. Dalibard to translate them into French. . . . my book was translated into the Italian, German, and Latin languages; and the doctrine it contain'd was by degrees universally adopted by the Philosophers of Europe.<sup>47</sup>

In acknowledgment of the significance of his work, the Royal Society presented him the Copley gold medal for 1753 and elected him to membership in 1756 without requiring the customary fee. And King Louis XV commanded the Abbé Mazeas "to write a Letter in the politest Terms to the Royal Society, to return the King's Thanks and Compliments in an express Manner to Mr. Franklin of Pennsylvania, for the useful Discoveries in Electricity, and Application of the pointed Rods to prevent the terrible Effects of Thunder-storms."<sup>48</sup> Obviously, Franklin the experimenter was well aware of the international nature of true scientific work a quarter of a century before Franklin the foreign minister sought protection for Captain Cook.

Much of the correspondence among men of science during the seventeenth and eighteenth centuries dealt with the wonders of the New World. While the nations of western Europe contended for colonial empires and material wealth, the natural philosophers of those nations sought riches of an entirely different kind—information that would increase man's knowledge of the world in which he lived. Explorations and discoveries in the Western Hemisphere and in the South Sea opened vast new sources of raw materials for naturalists and astronomers who ignored international boundaries and transcended state politics in their quest for an explanation of the physical world.

From the time of Columbus' first voyage, explorers carried back to Europe descriptions and specimens of strange new plants and animals, and soon collectors started to assimilate cabinets of curiosities and gardens of living specimens. On his first trip to London, Franklin took a few curiosities, including an asbestos purse, which he offered for sale to Sir Hans Sloane, "a Lover of Curiosities," who had one of the finest collections of rarities in England.<sup>49</sup> Gradually, collect-

<sup>47</sup> Van Doren, 750-751.

<sup>48</sup> Franklin to Jared Eliot, Apr. 12, 1753, Smyth, III, 123-124.

<sup>49</sup> Franklin to Sloane, June 2, 1725, Smyth, II, 52-53. In his *Autobiography*, Franklin's memory contradicted the facts, for he then wrote that Sloane had made the overtures to acquire the asbestos purse and had paid Franklin handsomely for it. Van Doren, 247.

ing progressed from the mere desire to satisfy curiosity to a genuine and systematic interest in natural history, and in the eighteenth century scientists like Carl Linnaeus, John Ellis, and Bernard de Jussieu received from all parts of the world descriptions and specimens which enabled them to make their contributions to physical science. It was also during that century that colonial rivalry kept the leading European powers in almost constant warfare. Transportation for boxes of seeds, bulbs, plants, and dried specimens was difficult enough during peacetime; in times of war there was the added hazard of capture by the enemy. One such seizure, for instance, was reported by Franklin to Cadwallader Colden, October 16, 1746: "Dr. Mitchell was taken in his passage home, and plundered of all his learned observations. He got to London from France some time in May last, bravely recovered in his health."<sup>50</sup>

In a letter to Linnaeus, sent from London, August 10, 1748, the same Dr. John Mitchell described some of the early difficulties naturalists encountered:

I should have been happy to send you a few plants, if they had not been so much damaged by pirates, as well as injured by their sea voyage; so that, among more than a thousand specimens, I have scarcely a perfect flower. They came from Virginia to France, and thence to Hamburgh, Rotterdam, and London. I hope, however, to get a fresh supply, and to resume a study which I was by degrees obliged more and more to neglect.<sup>51</sup>

During the Seven Years' War, when England and France lost numerous ships, there was still a spirit of co-operation among the scientists. On January 3, 1756, Alexander Garden wrote to John Ellis: "I shall likewise by Capt. Chisman send some more seeds for you, in case that Capt. Ball should fall in with the French, for fear of which I have directed them to Jussieu . . . at Paris."<sup>52</sup> Writing to Linnaeus the following year, Ellis indicated the French botanists' willingness to co-operate: Dr. Alexander Garden of South Carolina "sent me this year great varieties of plants, but they have been all taken by the French; but Mons. Du Hamel has promised for the future to return Mr. Collinson and me whatever are taken."<sup>53</sup> That

<sup>50</sup> *Ibid.*, 50.

<sup>51</sup> *Correspondence of Linnaeus*, II, 445-446.

<sup>52</sup> *Ibid.*, I, 361. Cf. Garden to Ellis, July 6, 1757, *ibid.*, 411-412.

<sup>53</sup> May 31, 1757, *ibid.*, 86.

the French scientists did co-operate is apparent from Garden's letter to Ellis, January 26, 1771: "What shall I say to this horrid war that is approaching? . . . I hope you will make some provision in case of French capture, as you did in the last war, when you may remember you desired your parcels to be directed to Mons. Du Hamel."<sup>54</sup>

The French were not the only captors of scientific materials, for English frigates were also taking prizes on the seas. But like the French scientists, the English recognized the universal importance of such collections and took steps to send them on to the naturalists. It is significant that, as the conflict between England and France intensified in the 1790's, the feeling of brotherhood grew even stronger among scientists, who showed a remarkable inclination to circumvent the naval blockades imposed by the two powers. Chief among these scientists was Sir Joseph Banks, who accompanied Cook around the world (1768-1771) and who corresponded with Franklin.<sup>55</sup>

Failure to enforce the blockade effectively preserved much important scientific material. The French Directory sent Nicholas Baudin to the Antilles "pour faire des recherches sur l'histoire naturelle," and when he returned to France he found the port of Havre blockaded by an English squadron. Unable to permit the ship to enter Havre, the English commander directed Baudin to go to the nearest free port in the Channel; consequently, the botanist was able to present the Directory "the richest collection of living exotic plants ever brought into Europe."<sup>56</sup>

The return of La Billardière's collection is another good example of the transcendent spirit which had developed by the end of the eighteenth century. La Billardière was the botanist for an expedition which the French National Assembly sent out in 1791 to search for Jean François de la Pérouse, lost on an earlier voyage of exploration. An English frigate seized La Billardière's ship as a prize of war and took the botanical collection to England where it was offered as a present to the Queen; but when Bernard de Jussieu interceded on

<sup>54</sup> *Ibid.*, 587-588.

<sup>55</sup> One biographer asserts that Franklin's orders to the American navy in favor of Capt. Cook won the admiration of Banks and made him determined to do everything possible to prevent interference between warfare and scientific work. Hector C. Cameron, *Sir Joseph Banks* (London, 1952), 209.

<sup>56</sup> *Nouvelle Biographie Universelle* (Paris, 1853), IV, 771; *Gentleman's Magazine*, LXVIII (1798), 716.

behalf of the French Directory, English officials forwarded the collection to France. With reference to the action, Sir Joseph Banks wrote to Major William Price, on August 4, 1796:

His Majesty's Ministers have thought it necessary, for the honour of the British Nation and for the advancement of Science, that the right of the captors to the collection should on this occasion be waived; and that the whole should be returned to M. de La Billardière, in order that he may be enabled to publish his observations on Natural History in a complete manner.<sup>57</sup>

Banks stated his personal feelings in a letter to Jussieu: "I confess I wished much to have from his specimens some of those discoveries in the natural order of plants which he must have made; but it seemed to my feelings dishonourable to avail myself even of the opportunity I had of examining them."<sup>58</sup>

Because of his great personal wealth, his influence in the English Court, and his position as president of the Royal Society, Banks was able to do a great deal toward helping the cause of science during the Napoleonic Wars. On probably as many as ten occasions he forwarded to the Jardins des Plantes collections which English cruisers had captured.<sup>59</sup> Banks's actions may have been prompted by Benjamin Franklin's orders for the protection of Captain Cook, but it seems more likely that he was motivated by a genuine love of science at a time when the cosmopolitan attitude prevailed.

Botanists were by no means the only ones who profited from the discovery and exploration of the New World; geographers and astronomers likewise made discoveries which improved their knowledge of the earth and its relation to the celestial bodies. While promoters backed the early voyages of discovery and exploration chiefly for the possibility of economic gain, in the first part of the eighteenth century governments supported expeditions for the specific purpose of gathering scientific data, and by the end of the century such voyages had become well-organized and regular state undertakings which laid the foundations for modern geodetic and hydrographic work of international significance. Because the early expeditions, such as Edmund Halley's voyage into the South Atlantic to observe magnetic

<sup>57</sup> Quoted in Edward Smith, *The Life of Sir Joseph Banks* (London, 1911), 195-196.

<sup>58</sup> Quoted, *ibid.*, 197.

<sup>59</sup> *Dictionary of National Biography*, III, 132.



variations (1699–1700) and the French Academy's two expeditions to Lapland and Peru during the 1730's to obtain data for determining the configuration of the earth, were made in times of peace, they were not endangered by the threat of enemy capture.

Astronomers who set out to observe the transit of Venus in 1761 found a different situation, for then neither England nor France was willing to recognize the neutrality of a scientific expedition. The Académie des Sciences sent Le Gentil to observe the transit at Pondicherry in the East Indies, but when he arrived he found that the port had been taken by the English and he could make only unsatisfactory observations from the decks of the rolling frigate.<sup>60</sup>

English astronomers fared somewhat better, but they, too, met interference. The Royal Society, supported by the Crown and the Admiralty, proposed to send Nevil Maskelyne with an assistant to St. Helena and Charles Mason and Jeremiah Dixon to Bencoolen on the Island of Sumatra. Maskelyne, who sailed on an East Indiaman, encountered only the obstacle of cloudy skies, but Mason and Dixon embarked on the man-of-war *Seahorse* which ran afoul of a French frigate soon after leaving England. Sailing again after the *Seahorse* had been repaired, the astronomers reached the Cape of Good Hope in time to make their observations there. Had they reached their original destination as scheduled, they would have suffered Le Gentil's fate, for the French had taken Bencoolen.<sup>71</sup>

Fortunately, when the next transit of Venus occurred in 1769 England and France were enjoying a respite from war, and Joseph Banks, the Royal Society, and the Admiralty were able to combine their forces and send an expedition to Tahiti for the observation without fear of molestation from the French. That voyage, 1768–1771, was the first of three scientific expeditions commanded by Captain James Cook. The second voyage, 1772–1775, also occurred during a period of peace, but Cook began his third one on the eve of the American Revolution. Since he made his explorations in the relatively unknown North Pacific, he was out of enemy range, and

<sup>60</sup> *Nouvelle Biographie Universelle*, XXX, 390. Ironically, Le Gentil remained in the East Indies to await the next transit on June 6, 1769, only to be thwarted by cloudy weather.

<sup>61</sup> Cf. R. Heathcote Heindel, "An Early Episode in the Career of Mason and Dixon," *Pennsylvania History*, VI (1939), 20–24; and Thomas D. Cope, "The First Scientific Expedition of Charles Mason and Jeremiah Dixon," *ibid.*, XII (1945), 24–33.

only his expected return to England in 1779 led Franklin and Sartine to draft their orders to American and French cruisers for his protection.

It was entirely natural that Franklin should have issued such a letter. Not only had he shown a cosmopolitan attitude toward science in his relations with the learned societies and in his correspondence, but he had also taken an active part in promoting voyages of exploration and had manifested a keen interest in the expeditions sponsored by other countries. While he was working with electricity, he was also helping a group of fellow Philadelphians outfit a ship to explore arctic regions and search for the Northwest Passage. Franklin and his friends had accumulated maps and books concerning arctic explorations, and Franklin continued to receive publications from England, especially those related to the theory of a Northwest Passage. In 1752 a group of Philadelphia merchants formed a Northwest Company to raise money for their undertaking, and in 1753 Captain Charles Swaine sailed the *Argo* from Philadelphia to explore the Labrador region for trade possibilities and to search for the passage to the Far East. Although Swaine accomplished almost nothing, the Philadelphia group repeated the undertaking in 1754.<sup>62</sup>

Franklin did not actively support any more voyages of discovery and exploration, but only a month after Captain Cook returned with his report of discoveries in New Zealand, Franklin collaborated with John Dalrymple in drafting a "Plan for Benefiting Distant Unprovided Countries." Franklin, while emphasizing the advantages England had gained from her intercourse with foreign lands, pointed out the exploitative nature of many of the previous expeditions. "But a voyage is now proposed," he wrote, "to visit a distant people on the other side of the globe; not to cheat them, not to rob them, not to seize their lands, or enslave their persons; but merely to do them good, and make them, as far as in our power lies, to live as comfortably as ourselves."<sup>63</sup> He felt called by Providence to do something for the common good of mankind.

Franklin's correspondence shows that he remained fully aware of the benefits to be derived from such expeditions. In 1768, while the

<sup>62</sup> Cf. Bertha Solis-Cohen, "Philadelphia's Expedition to Labrador," *ibid.*, XIX (1952), 148-162.

<sup>63</sup> Sparks, II, 379.

whole scientific world talked of the impending transit of Venus (June 3, 1769), Franklin wrote to Professor John Winthrop at Harvard that Nevil Maskelyne, the Astronomer Royal, wanted some of the American colonies to send observers to Lake Superior. In the same letter, he commented on Winthrop's expedition to St. John's, Newfoundland, in 1761: "The fitting you out to observe the former transit, was a public act for the benefit of science, that did your province great honour."<sup>64</sup> Later, on April 20, 1772, he wrote from London to Jean Baptiste Le Roy:

I am glad to hear that a voyage is intended from France to the North Pole. The world owes much to the noble spirit with which your nation pursues the improvement of knowledge, and to the liberality with which you communicate what you acquire to the rest of mankind. I hope your philosophers on this voyage will be able to discover more clearly the cause of the Aurora Borealis, and a passage round the North of America.<sup>65</sup>

And on September 30, 1773, he wrote to Jan Ingenhousz: "It has been a Fashion to decry Hawkesworth's Book [*the official account of Cook's first voyage*]; but it does not deserve the Treatment it has met with. It acquaints us with new People having new Customs, and teaches us a good Deal of new Knowledge."<sup>66</sup>

Other than his interest in all voyages, Franklin had a special regard for what Captain Cook undertook. As early as July 27, 1771, Richard Jackson wrote to him concerning Cook's expedition to Tahiti: "I wish much to hear from you a few of the Particulars you have heard of the Voyage of the Endeavour & of the Passengers."<sup>67</sup> From Passy, July 26, 1784, Franklin sent a nostalgic note to Benjamin Vaughan: "I have receiv'd Cook's *Voyages*. . . . If there is a good Print of Cook, I should be glad to have it, being personally acquainted with him."<sup>68</sup>

The age which produced such astonishing diffusion of knowledge and unexampled progress was also the period spanned by the life of Benjamin Franklin. A self-made individual in the strictest sense of

<sup>64</sup> Smyth, V, 137.

<sup>65</sup> Sparks, VI, 341-342.

<sup>66</sup> Smyth, VI, 143.

<sup>67</sup> Carl Van Doren, *Letters and Papers of Benjamin Franklin and Richard Jackson, 1753-1785* (Philadelphia, 1947), 41.

<sup>68</sup> Smyth, IX, 241.

the term, Franklin became an embodiment of the American dream, a practical man who achieved a high degree of personal success but who never lost sight of an idealistic desire to turn the practical to the benefit of all. In 1728 he encouraged fellow members of the Junto to seek that which "may be serviceable to *mankind*," and in 1743 he proposed the promotion of useful knowledge "to the advantage of some or all of the British plantations, or to the benefit of mankind in general." During the early days of the American Revolution before he went to France, he sat beside Thomas Jefferson in congressional session and agreed that their nonimportation measures should not apply to books and science, "even coming from an enemy."<sup>69</sup> From Passy, at the height of the Revolution, he recommended that Captain Cook and his men be treated "with all Civility and Kindness . . . as common Friends to Mankind." After the end of hostilities but before the signing of the treaty, he wrote to Sir Joseph Banks about the possibilities for human progress in time of peace:

Furnished as all Europe now is with academies of science, with nice instruments and the spirit of experiment, the progress of human knowledge will be rapid, and discoveries made, of which we have at present no conception. I begin to be almost sorry I was born so soon, since I cannot have the happiness of knowing what will be known one hundred years hence.<sup>70</sup>

A man of Franklin's curiosity, temperament, and intelligence could not have lived through the eighteenth century without being influenced by the remarkable achievements of the time; nor could an individual with Franklin's extraordinary attributes have lived as a part of that age without leaving his stamp upon it. Undoubtedly, the universal spirit of the scientists would have motivated the granting of passports to scientific expeditions even if there had never been a Benjamin Franklin, for that idea of world citizenship was in the atmosphere. But there remains the fact that he did exist, and as a very active force in his age Franklin helped to create the climate of opinion.

*Pan American College*

GLEN M. RODGERS

<sup>69</sup> Paul Leicester Ford, ed., *The Writings of Thomas Jefferson* (New York, 1899), X, 118.

<sup>70</sup> Sparks, IX, 547.