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QUAKERS AND SCIENCE: AN OVERVIEW

GEOFFREY CANTOR

In his analysis of Quaker contributions to science and industry during the seventeenth and eighteenth centuries, Arthur Raistrick claimed that “Friends have secured something like forty times their due proportion of Fellows of the Royal Society during its long history.” This claim is easily refuted by the evidence, which indicates that until about 1850 the proportion of Quaker Fellows in the Royal Society was approximately the same as the proportion of Quakers in the overall British population. Only after that date do we find significant numbers of Quakers in the now reformed Royal Society—a point to which I shall return.

Raistrick and several other writers have also asserted that Quakers have been more scientifically productive than their non-Quaker neighbors. Although there have been a number of eminent Quaker scientists, we should only accept this claim in the light of compelling evidence. Membership of the Royal Society cannot furnish that evidence. Moreover, even if we did discover a positive correlation between Quakerism and science, it would not explain why Quakers were particularly pro-science. In this paper I want to sidestep Raistrick’s assertion and instead concentrate on Quaker attitudes to science in the period to the end of the nineteenth century.

I should also make clear at the outset that my comments refer only to Britain and may not apply to America or other locations.

1. PRAGMATICS OF DISSERT

My initial strategy is to explore the closely-linked issues of education and careers. Faced with Anglican-dominated schools and non-Quaker teachers, early Quakers soon established their own schools in order to ensure that Friends’ children were not only taught acceptable religious doctrines and values but were also provided with a means of earning a living in a manner that was both socially useful and “innocent.” In their comments on education many early Quakers encouraged the teaching of science. For example, George Fox advised a
Friend that he should found a school for teaching languages, “together with the nature of herbs, roots, plants and trees.” He also suggested that another school should be located in the middle of a garden, so that nature study would pervade its curriculum. Likewise, in his *Some Fruits of Solitude* (1693), William Penn provided three hundred aphorisms, several of which encourage the reader—particularly the young reader—to appreciate nature. “The World,” he wrote, “is certainly a great and stately Volume of natural Things....This ought to be the Subject of the Education of our Youth.”

The study of “natural Things”—i.e. science—was recommended for several reasons. First, it was a serious activity suitable for sober Quakers. Unlike such proscribed activities as dancing and card-playing, many Quakers pursued science as a legitimate form of recreation. Second, the study of nature encouraged Quakers to walk in awareness of the Creator—a theme to which I shall return shortly. Third, some branches of science, especially botany, prepared Quakers for acceptable careers. These three reasons for studying science were not unique to Quakers, but in each case the Quaker approach was marked by their specific beliefs and values.

Career choices can be analyzed in two ways. The “default” argument is that Quakers congregated in science and medicine because the clergy, army and (most types of) law were closed to them. Again, we might argue that in avoiding morally disreputable occupations they simply turned to “innocent” careers in science and medicine. However, there were also “positive” reasons. Medicine, for example, was deemed socially useful and a significant number of Quakers became physicians, surgeons and pharmacists. More relevant to our discussion is the pursuit of careers in science, especially botany. Thus we find a number of Quakers engaged in horticulture (Peter Collinson, members of the Miller family of Edinburgh and Thomas and James Backhouse of York), botanical publishing (William Curtis), botanical illustration (Sydney Parkinson, the artist on Cook’s ship *Endeavour*) and in writing science texts for children (Priscilla Wakefield and Maria Hack). In contrast to the “default” argument, it is important to notice that such “innocent” careers were endowed with positive moral connotations, since, as we shall see, certain aspects of nature study were deemed commensurable with Quaker values.

Only around 1830 did a further factor become important. Quaker schools, especially Bootham School in York where John Ford was head teacher, strongly encouraged science. A cohort of students edu-
cated at these schools subsequently held science posts in the newly-founded universities and colleges that did not discriminate against dissenters. Several Quakers, including Daniel Oliver, Silvanus Phillips Thompson and the Brady brothers from Newcastle, entered scientific careers by this route. This group in turn swelled the ranks of the Royal Society, so that during the closing decades of the nineteenth century we do indeed find a large number of Quaker Fellows.

2. QUAKER VALUES AND SCIENCE

Several Quakerly values conspired to make science not just acceptable but highly appropriate. As one Quaker commented, “[W]hat a fund of innocent enjoyment does this contemplation of Nature’s works afford!” The familiar emphasis on honesty and truth-seeking were likewise applicable to science, which centered on the searching for truths about the natural world. Indeed, since these values were widely shared among the scientific community, Quakers could readily participate in science and many of them found scientific organizations that propounded these values particularly congenial, such as the British Association for the Advancement of Science.

Despite this general appreciation of science, it is important to notice that prior to the twentieth century British Quakers turned principally to more empirical aspects of natural history, astronomy and meteorology. Although a few practiced chemistry and anthropology, hardly any Quakers worked in physics, the only significant exception being Silvanus P. Thompson. Thus Quakers worked almost exclusively in the observational sciences, rather than in those areas requiring mathematical models and hypotheses. Why, then, did Quakers congregate in these sciences and not in others? Much of the ensuing discussion is directed to this problem. (We should, however, note that this pattern does not apply to the twentieth century.)

One reason Quakers did not enter physics was because the subject’s main institutional base was the Anglican-dominated University of Cambridge. However, exclusion from Cambridge does not provide a particularly strong explanation of the Quaker preference for botany over physics, since some autodidacts (self-taught figures such as the ex-Quaker Benjamin Robins) contributed to mathematical physics. More important than exclusion from Cambridge was the doctrine of the “Light Within,” which possesses important implications for the Quaker practice of science. It places a premium on direct experience,
not only spiritual experience but also the experience of observing plants, pigeons and planets. Indeed, observation of God’s creation was often portrayed as a spiritual experience. Thus, I suggest, the more empirical aspects of botany and astronomy were particularly congenial to Quakers.

We can also appreciate the relevance of the “Light Within” in the Quaker deployment of design arguments. These arguments typically begin by identifying observable signs of design in the physical world, such as the well-adjusted structure of the eye or the beautiful and symmetrical structure of flowers. From these observations is inferred the operation of a divine designer. Although historians have tended to view these arguments as conventional and therefore uninteresting, they deserve close attention since they are susceptible to many subtle variants. In contrast to most Anglican writers, Quakers did not appeal to the power of reason in inferring the existence of a designer. Instead they favored a form of design argument that cohered with their understanding of the “Light Within.”

All experience is illuminated, as it were, by an expectation of continuing revelation. Thus when a flower is seen, observation is not restricted to the physical qualities of the flower but the observer also appreciates its beauty and its Creator and His attributes. The connection between observed object and the Designer is forged by a lively understanding of the “Light Within,” thus raising the experience of a physical object to a spiritual plane. An example of this process occurs in a letter written by Peter Collinson. As an importer of exotic plants from America, Collinson acknowledged that when he examined such impressive botanical specimens: “my Soul is fil[le]d with Adoration to our Great Creator for his Goodness[,] Mercy & Blessings to Mankind.” Collinson, like many other Quakers, was led from experience to a religious emotion and appreciation of divine design. Note that he did not appeal to his power of reason.

This attraction to the empirical sciences cohered with another aspect of Quaker thought. A recurrent theme in Quaker writing has been the rejection of any ready-made religious system, especially any creed imposed by the Anglican Church—such as the thirty-nine articles of faith. This anti-creedal attitude manifested itself in science as a deep-rooted scepticism toward speculative hypotheses which purported to provide systemic accounts of natural phenomena. As seekers—not systematizers—early Quakers rejected both Aristotelian physics and the cabbalistic theories of the iatrochemist Francis
Mercury van Helmont. Likewise in his *Essay on Instinct* (1824), Thomas Hancock, an Edinburgh-trained physician, drew a strong contrast between his attitude toward empiricism and the use of hypotheses in science. Drawing on arguments developed by the Scottish school of common-sense philosophy about the limits of knowledge, he asserted that we should follow “the plain and simple path of observation, which may lead to profitable results...[but we should] avoid the giddy heights of speculation, where the mind is too much disposed to look down upon the laborious inquirer, and to indulge in vain conceits of superior intelligence.” Empiricism was the scientific method of the humble Quaker.

Parallel to the emphasis on the “Light” within each individual was a deep resentment of authority, especially as wielded by the established churches. Quaker scientists likewise repudiated authoritarianism in science. Thus Henry Doubleday, the Epping lepidopterist, wrote to a correspondent: “Every person has clearly a right to his own opinions, and I think nothing does more injury to science than one person assuming a kind of dictatorship and expecting everyone to bow to his decision.” If we substitute the word “religion” for “science,” this quotation reads like an entry in a Quaker book of “advices.”

One point on which Quakers differed among themselves was over the role of reason, with evangelicals often allowing reason a very limited domain since it could easily become a source of worldly attachment and intellectual pride. Thus while Hancock acknowledged that reason had enabled humankind to discover the laws of the physical universe, he emphasised the imperfections and limitations of the reasoning faculty, which he described as “fluctuating, weak and fallible.” Even those Quakers who accepted a far more substantial role for reason nevertheless insisted that its power is limited, so that reason cannot be applied to certain aspects of nature which instead remain a source of fascination and convince us of the mystery of Creation. This position was articulated by Silvanus P. Thompson, writing in *Friends’ Quarterly Examiner* in 1875. While fully acknowledging that the march of the intellect had enabled many of nature’s secrets to be understood, Thompson insisted that the scientist is continually assailed by “wonder and mystery.” Taking examples from the histories of optics, atomism and evolutionary biology, he argued that with each progressive step further problems arise which, in turn, require solution. Thus, far from scientific progress putting an end to mystery,
new depths are encountered which fill the scientist with a sense of awe. Moreover, although we can never “find out God,” “true reverence...grows ever as our knowledge [of nature] grows.” Here Thompson successfully combined two traditional but somewhat antithetical attitudes by insisting that reason is a crucial tool for understanding nature, but one that is never sufficient since it must be complemented by the “Light Within.”

3. DANGERS POSED BY SCIENCE

While many Quaker values appear to imply a positive attitude toward certain aspects of science, it is also important to recognize that Quakers were critical of specific scientific practices. We have already encountered their opposition to scientific “creeds” and to the exercise of authority wielded by dogmatic leaders of the scientific community. As they often stressed Quakers should be in this world, not of this world. Thus while the pursuit of science was encouraged, they also insisted that science should not be viewed as their ultimate goal. A Quaker’s religious fidelity could be compromised if he became too involved in science. As with other mundane activities—business included—Quakers insisted that science should not become such a preoccupation as to displace religious practices and duties. Quakers were therefore advised to constrain science to its rightful place—that is, subordinate to religion. Thus one of the few scientifically able early Quakers, the botanist Thomas Lawson, insisted that “Sound knowledge relates primarily to God, secondarily to the knowledge of the Creation, and of the useful and necessary employments.” By placing natural knowledge below the divine and insisting that it should be preserved in that subsidiary role, Lawson expressed a view that was to recur many times over the next two and a half centuries.

An extreme example comes from John Rutty, a mid-eighteenth-century quietist who was continually tormented by his worry that his scientific activities would undermine his spiritual quest. Since science is a worldly activity it must not, he insisted, usurp the place of religion in one’s life. “[N]atural knowledge,” he asserted, “is but dung, compared to the spiritual,” and science was therefore a form of vanity. Moreover, unlike spiritual truths, scientific knowledge was necessarily imperfect. Such severe self-chastisement would seem to require Rutty to forsake science altogether. However, far from wishing to reject science he sought ways of pursuing it that would strengthen, not undermine, his state of grace. For Rutty science was a form of
labor and thus could not be avoided; it had to be pursued, but in the appropriate frame of mind. Hence in one diary entry he dwelt on the “strong allurements of natural science” that provide a source of grace when pursued without “spiritual pride and ostentation.” Only if practised with simplicity and humility could science be acceptable to this pious Quaker.

Science could also occasionally infringe other Quaker norms and even the relatively peaceful pursuit of natural history possessed unquakerly features. Most Quakers repudiated field sports—much beloved by the social and ecclesiastical establishment—and some even urged that living creatures should not be killed in the pursuit of science. James Hack Tuke recalled his youthful enthusiasm for ornithology but also his father’s earnest warning—“Only observe though!”—forbidding him either to shoot birds or to take their eggs. Ecological issues were likewise broached by George Stewardson Brady in his presidential address to members of the Tyneside Naturalists’ Field Club in 1871. Cautioning his audience against engaging in the wanton destruction of plants and animals, he urged them not to take more specimens than they required, otherwise the naturalist “is acting to the detriment of Science, and trespassing on the enjoyment of his fellow-naturalists, not only now, but possibly to future generations. There is really more pleasure to be gained from the quiet contemplation of natural objects in their proper haunts than from obtaining forcible possession of them.” For Brady and many other scientific Friends, the pursuit of science was circumscribed by Quakerly norms.

4. CONCLUDING COMMENTS

In the limited time available I have indicated some of the factors—both pragmatic and ideological—that drew Quakers to science and also some of the caveats they accepted. Whether Quakers were therefore more inclined to science than were members of other religious groups remains a problem and one that can only be resolved by an extensive comparative study.

As a historian I am an anti-essentialist and therefore wish to emphasise the importance of historically contingent factors in accounting for the ways in which Quakers engaged science. For example, the considerable emphasis on science in Quaker schools
helped raise the standing of Quakers in the scientific community during the latter half of the nineteenth century.

Let me end by alerting you to two general issues. First, Raistrick and others have only attended to those aspects of Quakerism that were potentially pro-science. This has biased their discussion and I have therefore tried to correct the balance by alluding to certain norms and beliefs that constrained Quaker participation in science.

I shall conclude with a further worry arising from the arguments put forward by Raistrick et al. Science has never attracted more than a small proportion of any religious community, and while we may know a great deal about a few eminent Quaker scientists, we are largely ignorant of the views of the (apparently non-scientific) majority. What did the “average Quaker” think about science? And what about Quaker women?—very few of whom published their views on this subject. We should not be making bold claims about Quakers being pro-science until we know what these awkward silences conceal.