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Boyling over: a commentary on the preceding papers

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When Michael Hunter first publicized the idea of ‘Psychoanalysing Robert Boyle’ I understood that his main aim was to test three competing psychoanalytical theories against the historical evidence provided by the life and work of Robert Boyle. Although this would have been a valuable exercise, and one that the British Society for the History of Science meeting partly engaged, the papers by Brett Kahr, John Clay and Karl Figlio published here raise some far more compelling issues which I shall explore in the ensuing discussion. Before turning to this discussion I offer a few introductory remarks.

Like many historians of science who have worked on biographical material, I recognize that the methods of analysis in which I was trained do not enable me to probe the ‘personality’ of the scientist. Thus when writing on Michael Faraday I became aware of some fundamental aspects of his personality that eluded me; in particular an aspect of his ‘self’ that provided a connection between his approach to science and his religious convictions. After many false starts I found a tentative answer in the writings of the American psychologist George Kelly, who articulated a theory of development in terms of the dynamic interaction of polar opposites. This seemed applicable to Faraday, who appears to have approached both his science and his religion with the need to make firm distinctions between opposites. Thus he stood for theism, order and (God-given) facts against atheism, chaos and hypotheses of human construction. Moreover, in line with Kelly’s theory he suffered severe mental anguish on certain occasions when he was unable to keep separate these opposing constructs.¹ While pursuing that research I became aware of several practical problems. First, how does the historian choose between the many different and incompatible theories of mind? In my work on Faraday I made some use of Kelly’s theory because Faraday’s view of the world involved the kind of conceptual oppositions which Kelly discusses in his account of psychological development. Second, when using any theory of mind, especially any theory of psychoanalysis, the historian or biographer is confronted by a ready-made ontology; thus Kahr, Clay and Figlio devote significant proportions of their articles to articulating the theories of Freud, Jung and Klein respectively. So does the historian have to accept the whole intellectual package or can these theories be used in a purely instrumental manner? Third, how intrusive should the

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1 G. A. Kelly, *The Psychology of Personal Constructs*, 2 vols., New York, 1975; G. Cantor, *Michael Faraday, Sandemanian and Scientist*, Basingstoke and London, 1991, 282–8. One of the attractions of Kelly’s work, for historians of science, arises from his philosophical stance which reflects his training in science and engineering.

use of psychoanalysis be? Should the historian present Newton as a case study in (say) Freudianism or can Freudian ideas be used in a subtle and unintrusive manner to illuminate Newton's life and work?

Armed with such questions I find the papers published here highly stimulating not so much because they answer these questions but because they raise a further set of issues that I shall attempt to convey. Particularly helpful is the contrast that emerges between Figlio's paper and the other two. In a strong sense Kahr and Clay are concerned primarily with the biography of the individual and seek causes in Boyle's early life that manifested themselves in his later life and work. Thus the death of his mother and the swaddling imposed by his Irish wet-nurse are each a significant explanans. Figlio, however, directs us to the psychological import of Boyle's theory of nature and particularly the putative psychological meaning of the corpuscularian philosophy.

At the outset it is worth noting that many historians of science are antipathetic to psychological and psychoanalytical approaches, and perceive that the social history of science is diametrically opposed to psychohistory. Another sizeable group of historians of science share the abhorrence of many physical scientists for psychology (and sociology) in general and for psychoanalysis in particular.² In the light of this, the composition of the audience at the BSHS meeting 'Psychoanalysing Robert Boyle' takes on some interest. There were far fewer historians of science than I had expected; indeed, several British historians who have written on Boyle were noticeably absent. Many of those who were present, however, including several health professionals, came from outside the history of science community.

In the mid-1970s rumblings were heard, particularly in Edinburgh where members of the Science Studies Unit claimed that science should be explained by social causes. One of the key documents in the rise and widespread acceptance of sociological approaches to science was a highly propagandist article by Steven Shapin published in 1982. Here he compiled a list of 149 studies which, he maintained, exemplified these approaches.³ What is so striking is that while many historians now subscribe to the sociology of science and the social history of science, the psychology of science and psychohistory are in their infancy and have attracted little attention. Even today the number of works which try to understand science and scientists from psychological perspectives constitutes only a small percentage compared with those sociologically inspired works cited by Shapin. The field is certainly open to much wider exploration and until this is embarked upon we cannot fully appreciate its potential. Although I would not welcome an exclusive and strong programme in the psychology of science, historians of science – especially those writing biographies – should be better informed about both the strengths and the weaknesses of psychological perspectives. It is also important to note that any exploration of psychology

2 A memorable exchange took place at an earlier BSHS meeting (in May 1987) devoted to scientific biography. In response to a paper given by Caroline Garland, a trained psychoanalyst, the historian L. P. Williams asserted that in writing his biography of Ampère he could conceive of no possible role for psychoanalysis. In reply Garland pointed out that after Ampère had witnessed the guillotining of his father he lost the power of speech for many months. Surely, she claimed, this trauma provided a prima-facie case for bringing psychoanalytical tools to our understanding of Ampère. Most of the audience seemed to agree with her.

3 S. Shapin, 'History of science and its sociological reconstructions', *History of Science* (1982), 20, 157–211.

should not be limited to psychoanalysis since there are other branches of the subject, such as Kelly's theory of personal development, that may prove useful to historians and biographers.⁴

One further point should be made at the outset. Historians of science are trained principally to analyse the content of texts and the contexts in which scientific activity occurs. Interest in rhetoric and form is a very recent phenomenon, one aspect of which is particularly relevant to our present concerns – a person's 'passion' or lack of 'passion' for particular facets of science. The image of the cold, rational scientist is a frequently used trope. However, historians and particularly biographers appreciate the emotional charge often accompanying science. As Thomas Söderqvist has recently written, 'The passions embody the realization of the tension between the conditions of self-assertion: fear, despair, vanity, pride, jealousy and envy are the results of a failure to achieve empowerment; hope, faith and love are expressions of our success in this respect.'⁵ We need not only a vocabulary in which to describe emotions but also a fuller appreciation of their significance. This is surely one potential role for psychohistory.

DEVELOPMENTAL STUDIES OF BOYLE

Psychoanalysis demands that we should understand the adult Boyle in terms of events in his early life. Not surprisingly the evidence from his childhood is rather slim. As Hunter rightly insists, what has survived has been filtered by subsequent generations and much early, relevant material has either been lost or excised by editors with agendas of their own. But there is another, related, point. Owing to their high social standing the Boyle family generated much documentation, whereas scientists born into the lower social classes are unlikely to have inspired such material. Thus in comparison with Boyle little is known about the early lives of, say, Faraday or Davy. Yet given their relative density, the sources relating to Boyle's early life nevertheless remain problematic. While reading these papers I found myself constantly raising the question: how were these sources composed and what were their subsequent histories? Why was the autobiographical fragment 'An account of Philaretus' written? What was its purpose and its intended readership? Whose style was Boyle emulating? Again, the snippets that have come down to us about his wet-nurse or his relationship with his mother have been filtered by gatekeepers. Another such example concerns Boyle's pronounced stutter, which provokes comment from both Kahr and Clay. As I shall argue, since the documentary evidence is problematic we are in danger of building our psychoanalytical castles on sandy foundations.

The death of Boyle's mother when he was three years old constitutes an irrefutable historical fact, but its significance remains a matter for conjecture. The passage from

⁴ See, for example, F. E. Manuel, 'The use and abuse of psychology in history', *Daedalus* (1971), **100**, 187–213; W. M. Runyan (ed.), *Psychology and Historical Interpretation*, New York and London, 1988; S. H. Baron and C. Pletsch (eds.), *Introspection in Biography: The Biographer's Quest for Self-Awareness*, Hillsdale, NJ, 1985. This volume contains a fascinating reflection by R. S. Westfall on writing his biography of Newton.

⁵ T. Söderqvist, 'Existential projects and existential choice in science: science biography as an edifying genre', in *Telling Lives in Science: Essays in Scientific Biography* (ed. M. Shortland and R. Yeo), Cambridge, 1996, 24–84, 66.

Philaretus's account displays some emotional ambivalence: 'one [great disaster] was the Decease of his Mother; whose Death would questionless have excessively afflicted him, had but his Age permitted him to know the Value of his Losse'. If this account is to be believed, her death had little immediate impact on Boyle, although, as he goes on to relate, he later grieved deeply for her.⁶ In his contribution Kahr immediately adduces that in this passage Boyle is trying to conceal his pain. However, since in his infancy Boyle was surrounded by the wet-nurse, to whom he was farmed out for some months, and by many other retainers, he may, like many children of the landed class, have had little contact with his mother.⁷ From his 'Account of Philaretus' it is very difficult to determine Boyle's feelings towards his mother or the context in which he was writing about her. Any psychobiography that portrays his mother's death as a source of great trauma must likewise be subject to considerable uncertainty.

At this point a number of questions assail me. To what extent are twentieth-century studies of familial relationships relevant to understanding son–mother bonding (or lack thereof) in a British aristocratic family of the seventeenth century? Again, what are we to make of the swaddling that young Boyle experienced in infancy? We find it contrary to our notions of humane child-rearing and cleanliness. Yet it was widely practised in the seventeenth century. Should we expect large numbers of people in that century to have been rendered psychologically malfunctioning by this practice? Swaddling is portrayed by Kahr as such a traumatic practice that it seems difficult to avoid that conclusion.

The evidence for Boyle's stammer is also subject to some uncertainty. Both Kahr and Clay quote Lorenzo Magalotti's evocative description of Boyle 'swallow[ing] his words'. Yet Clay also cites John Evelyn's recollection that Boyle 'did sometimes hesitate, rather than stammer'⁸. My inclination is not to question whether Evelyn's memory failed him but rather to raise more questions about Boyle's speech impediment than the historical record seems able to provide. In particular, in what situations did his stammer become pronounced? Did he stammer when talking to his sister Katherine? In the company of (other) women? In his laboratory? In the presence of fellow philosophers whom he met at the Royal Society? For an adequately refined analysis of the significance of his stammer we need more information.

One aspect of Kahr's analysis is both appealing and problematic. It is clear that Boyle devoted a vast amount of his life to the pursuit of science. At one level his commitment to science was directed to determining how God had created the world but, as Hunter rightly notes, we also need to ask why Boyle pursued science so wholeheartedly when he could have followed the norms of his family and engaged in the conventional pleasures of his social class. Kahr suggests that Boyle was drawn to writing and experimenting because of pathological aspects of his personality; that he exhibited 'a preference for manuscripts over people' and 'felt safe and protected in the predominantly non-human environment of the

⁶ R. Boyle, 'An Account of Philaretus during his Minority', in *Robert Boyle by Himself and his Friends* (ed. Michael Hunter), London, 1994, 1–22, 3.

⁷ L. Stone, *The Family, Sex and Marriage in England, 1500–1800*, London, 1977, 114. Stone also claims (168) that Boyle's father had 'a perfect aversion for fondness' towards his children.

⁸ Hunter, *op. cit.* (6), p. lxxvii; John Evelyn's letter to William Wotton, 29 March 1696, *ibid.*, 84–90, 89. Stuttering was the second of the 'two greate Disasters' that befell young Boyle. In his 'Account of Philaretus' (*ibid.*, 3) he claims that the source of the stutter was imitating other children.

laboratory'. Boyle can certainly be portrayed as sublimating his sexual energies and directing them to areas where he did not have to confront difficult human relationships. This hypothesis is applicable to many scientists (among others). My difficulty here is that 'the laboratory' is taken as a shorthand for the isolated pursuit of science. However, Boyle was rarely alone in his laboratory; an amanuensis was on hand and there were frequent visitors. His laboratory was more a social space than a closet in which he could hide from the world. Again, the other major *locus* for Boyle's science was not his private laboratory but the meeting rooms of the Royal Society of London in which he was an active participant. In the first decade of the Society's existence he played a major role; he served on Council and proposed a dozen prospective members. In this he was not fleeing contact with people.⁹ Also, science was less safe than Kahr implies. As the young Newton discovered to his cost, publishing new theories and discoveries could stir up a hornet's nest. Boyle was not so close to the epicentre of any controversy, yet his scientific and theological writings were liable to result in attacks from critics.

Yet the greatest difficulty confronting these psychobiographies is how to make sense of what Hunter calls Boyle's 'religiosity'. This is an unfortunate term and one that sets the tone of the ensuing three papers since it implies that Boyle's interest in religion bordered on the unhealthy and medically pathological. Unlike Jung, who took great interest in religious experience, Freud considered religion to be a delusion that the psychologist should explain – or, more exactly, explain away. Whatever our personal views about religion, it is difficult to underestimate the deep-seated religious feelings that abounded in late seventeenth-century England.¹⁰ It may be true that even judged by the norms of that period Boyle was considered – and widely admired – for his outstanding piety. Good works were at the top of his agenda. Moreover, his piety extended to helping all Christians irrespective of their affiliations. Not only did he leave money in the codicil to his will for a series of annual lectures 'for proving the Christian Religion against Atheists and Theists descending no lower to any Controversies that are among Christians', but the Trustees he appointed to administer the lectures were drawn from both Anglican and dissenting denominations.¹¹ Likewise, we must be careful not to load the term 'scrupulosity' with too much modern baggage but consider how it was used by Boyle's contemporaries. Did they mean simply that he was careful to follow the dictates of his conscience?¹² Was there any implication of obsessive behaviour? By Hunter's use of the terms 'religiosity' and 'scrupulosity' Boyle appears abnormal and becomes all too easy a subject for the psychoanalyst's couch.

At first sight the highly religious Boyle appears strikingly similar to the equally religious Newton. Although the intense religious feelings of both may be susceptible to

9 Michael Hunter, *The Royal Society and its Fellows 1660–1700: the Morphology of an Early Scientific Institution*, 2nd edn., Oxford, 1994, 134–5. Hunter notes that Boyle withdrew from active participation in the Royal Society after c. 1670. It is not clear why he did so, although the stroke he suffered in 1670 may have made public appearances difficult.

10 See, for example, P. Mack, *Visionary Women. Ecstatic Prophecy in Seventeenth-Century England*, Berkeley and Los Angeles, 1992, for a sophisticated attempt at engaging this problem.

11 C. Kenny, 'Theology and natural philosophy in late seventeenth and early eighteenth-century Britain', Ph.D. dissertation, University of Leeds, 1996.

12 The *OED* dates this usage from 1545. I am grateful to Chris Kenny for discussions on this issue.

psychoanalysis, there are important differences between them which are masked by calling them both religiose. For all his attention to religion Newton was sometimes considered a heretic because of his pronounced anti-Trinitarian views.¹³ He was also intolerant of Christians with whom he disagreed, in contrast to Boyle whose overriding concern was to prevent those whose religious commitment was wavering from falling by the wayside.

Some of the terms used to describe Boyle, such as ‘fastidious’ and ‘obsessive’, have been applied to a number of scientists, Faraday included. For example, we are told that Joseph Black (who like Boyle never married) died

without convulsion, shock, or stupor... Being at table, with his usual fare, some bread, a few prunes, and a measured quantity of milk, diluted with water, and having the cup in his hand when the last stroke of his pulse was to be given, he had set it down on his knees... and kept it steady with his hand, in the manner of a person perfectly at ease; and in this attitude expired, without spilling a drop...¹⁴

Is it appropriate to posit a cluster of personality traits which crop up in a significant proportion of scientists (but by no means all)? People with these mental characteristics may be particularly attracted to science, especially to careful experimental investigations.

One other theme which recurs in the biographies of a not insignificant proportion of natural philosophers is a lack of ‘overt sexual activity’. Boyle’s outward asexuality and the importance of Lady Ranelagh – herself disappointed in marriage – as his companion are rightly emphasized by both Kahr and Clay. They also argue that through sublimation Boyle redirected his energies to literary and laboratory activities. If that part of the argument is granted, a stronger case is needed to explain why Boyle (and perhaps Newton and others) turned specifically to the investigation of nature. What was there about science that attracted him emotionally? To what particular aspects of science did he direct this sublimated energy; and what was their psychological significance? Kahr’s answer is that Boyle preferred ‘the readily controllable world of books and chemicals to the world of interpersonal interactions’. This is a legitimate but somewhat uninformative interpretation. It tells us little about how Boyle engaged and controlled the ‘world of books and chemicals’. Boyle’s science was far richer than this phrase indicates.

Clay offers explanations of two specific facets of Boyle’s science. First, he suggests that Boyle’s scientific investigation of airs needs to be seen as a transformation of his early exposure to healthy fresh air. That is an interesting suggestion, but it requires further development if it is to be convincing. Second, he provides an account of Jung’s fascinating theory of the psychological significance of alchemy, which Betty Jo Dobbs also articulated in her analysis of Newton’s alchemical writings.¹⁵ Yet, unlike Dobbs, Clay does not confront the specific details of Boyle’s ‘alchemical’ investigations, merely noting that alchemy offered ‘some sort of bridge between the natural and supernatural worlds’. To label Boyle’s work ‘alchemical’ is both inadequate and incorrect. Psychohistory needs

13 S. Snobelen, ‘Caution, conscience and the Newtonian reformation: the public and private heresies of Newton, Clarke and Whiston’, *Enlightenment and Dissent* (1997), 16, 151–84.

14 J. Robison, *Lectures on the Elements of Chemistry, delivered in the University of Edinburgh; by the late Joseph Black*, 2 vols., Edinburgh, i, p. lxxiv.

15 B. J. T. Dobbs, *The Foundations of Newton’s Alchemy, or ‘the Hunting of the Greene Lyon’*, Cambridge, 1975. On Boyle’s alchemy, see now L. M. Principe, *The Aspiring Adept: Robert Boyle and his Alchemical Quest*, Princeton, 1998, though he has little time for Jung.

rather stronger teeth if it is to tell us anything useful about why certain individuals not only turned to science but also invested considerable emotional energy in specific scientific problems and projects. However, Figlio's approach, to which I now turn, offers interesting possibilities.

RELATIONS BETWEEN THE INNER AND OUTER WORLDS

Most historians of science are familiar with Carl Jung's writings on alchemy in which he conceived that alchemical processes are projections of mental processes involved in individuation. This may seem not unreasonable particularly if we view alchemy as possessing little basis in physical reality. Less well known is the following passage by Jung which opens fresh possibilities:

[The] notion [of atoms] had its origin in archetypal ideas, that is, in primordial images which were never reflections of physical events but are spontaneous products of the psychic factor.¹⁶

The Greek atomists, he suggests, did not possess strong evidence that the physical universe is composed of atoms but were instead projecting onto the world archetypal images from within their own minds. Elsewhere he claimed that such archetypes 'even appear in the exact sciences, as the foundations of certain indispensable auxiliary concepts such as energy, ether, and the atom'.¹⁷ For Jung, the conceptual basis of our scientific understanding comes not simply from the external world but begins with outward projection from the mind. In the second quotation particularly he indicates that even in later historical periods certain scientific concepts continued to retain some of their psychical significance. In a similar vein Freud wrote, 'Words were originally magic and to this day words have retained much of their ancient magical power.'¹⁸

I am not sure where to direct these insights of Jung and Freud. They may help us to understand how scientists come to articulate assumptions about the world which they cannot fully justify by rational arguments. Might we look for psychological explanations for Aristotle's use of the circle or Descartes's insistence that there is no void? Although both Aristotle and Descartes offered arguments to justify such assumptions, Jung urges us to look elsewhere for the sources of these apparently indubitable truths. Likewise, we might seek psychological (as well as sociological) underpinnings to the dispute running through the eighteenth century between the followers of Newton, who accepted action at a distance, and the Hutchinsonians, who allowed only contact action and the motion of particles forming a plenum in a closed loop.¹⁹

Returning to Boyle we find him arguing in his *About the Excellency and Grounds of the Mechanical Philosophy* (1674) that the mechanical philosophy was supported by 'the intelligibleness or clearness of [its] Mechanical principles and explanations'. Expanding on this point he asserted that when discussing

16 C. G. Jung, *The Archetypes and the Collective Unconscious*, New York, 1959, 57.

17 C. G. Jung, *The Structure and Dynamics of the Psyche*, New York, 1960, 137.

18 S. Freud, *Introductory Lectures on Psychoanalysis*, Harmondsworth, 1973, 41.

19 Cf. C. Wilde, 'Matter and spirit as natural symbols in eighteenth-century British natural philosophy', *BJHS* (1982), 15, 99–131; D. C. Lindberg and G. Cantor, *The Discourse of Light from the Middle Ages to the Enlightenment*, Los Angeles, 1985.

the *Corpuscular* philosophy, men do so easily understand one another's meaning, when they talk of *local motion, rest, bigness, shape, order, situation, and contexture* of material substances ...

By contrast, Aristotelians and 'chymists' employ terms lacking in clarity:

even in some of the more ingenious and subtle of the Peripatetic discourses upon their superficial and narrow theories, methinks the authors have better played the part of *painters* than *philosophers*; and have only had the skill, like drawers of landscapes, to make men fancy they see castles and towns, and other structures that appear solid and magnificent ..., when the whole piece is superficial, and made up of colours and art ...²⁰

Although Boyle offers an argument for the mechanical philosophy being based on clearer ideas than alternative philosophies, an opponent could equally well charge Boyle with acting more like a painter than a philosopher and of making 'men fancy they see castles and towns, and other structures'. Boyle's appeal to intelligibility seems to involve more than he makes explicit in this argument. Here we might turn to psychoanalysis for assistance by asking whether it can help to explain why Boyle found the mechanical philosophy more intelligible than the principles of the Aristotelians and the alchemists.

Figlio goes some way to answering just such a question. Like Jung, he conceives an intense 'relationship between the internal world and the external world' and seeks to specify that relationship. Instead of deploying Jung's theories he articulates Melanie Klein's views about the role of the mother. I am not sure I can comment sensibly on Klein's theories but some of the implications that Figlio draws from them are of interest to the historian of science.

The most important is Figlio's insistence that science provided a means by which Boyle could quell his internal anxieties. He could project them onto the world and seek to counteract their influence by imposing order. Figlio thus provides a reason why Boyle directed his attentions not just to science but to a particular type of scientific theory. Moreover, the same explanation engages such aspects of his personality as his 'scrupulosity' and such activities as his close attention to casuistry. While Figlio's argument is not reductionist, it does encompass otherwise disparate aspects of Boyle's life and work.

Some aspects of Figlio's account of the corpuscular philosophy are more appealing to me than others. If I understand him correctly he is claiming that corpuscularism was particularly therapeutic because it was potentially reductive and all-encompassing. Like a soothing melody the particles of matter and their law-like motions replace the harsh clash of diverse phenomena. However, I do not subscribe to Figlio's claim that corpuscularism 'sets up a dualism between cause and effect ... lead[ing] inevitably to an invisible realm, to the idea of the mind of God, and to science as an exploration of the mind of God'. One of the recurrent concerns of Walter Charleton, Boyle and other early British corpuscularians was Greek atomism, with its dangerous implication that atoms have existed from eternity and do not require a Creator. Thus the corpuscularianism of Democritus led to atheism. Far from accepting corpuscularianism *per se* Boyle had to reformulate it with God as creator of the particles, their properties and the laws they obey. Moreover, for Boyle

²⁰ R. Boyle, *About the Excellency and Grounds of the Mechanical Philosophy, Selected Philosophical Papers of Robert Boyle* (ed. M. A. Stewart), Indianapolis, 1991, 138–54, 139–40. I have followed Stewart's use of italics.

science was not ‘the exploration of the mind of God’, since the physical world is His creation. Thus it is incorrect to portray Boyle’s theology as dependent on his corpuscularianism in this simplistic manner.

The final point about Figlio’s argument is his interesting claim that we should not see Boyle as a unique individual but as representing a newly emerging *mentalité*. Clearly the emergence of this ‘new culture of scientific naturalism’ needs more extensive exploration, but it is one of the many problem areas in which the psychology of science might be profitably developed.

EPILOGUE TO THE EPILOGUE

My initial response to the papers presented at the BSHS conference was very positive. I found the papers of Kahr and Clay refreshing because they offered insights into what made Boyle ‘tick’. As with all biographical studies these psychobiographies are necessarily speculative – some will think overly speculative – but they try to account for otherwise disparate aspects of Boyle’s life and work and provide ways of analysing his personality. In particular, they aid the historian/biographer in engaging the affective aspects of Boyle’s life, which are so often ignored in accounts of science. On further reflection, and particularly after rereading the papers on several occasions, I have been less convinced by the projects of Kahr and Clay and more aware of the problems identified above. In particular, their analyses are disappointing particularly where they seek to explain Boyle’s scientific activity.

In his introductory paper Hunter points out that we have all imbibed psychoanalytic ideas. However, while there is a prima-facie argument for turning such insights into historical explanation, the papers by the three analysts show how difficult it is to transform those insights into convincing historical arguments. Had Kahr and Clay been more attuned to the history of the period they might have produced an integration of Boyle’s intellectual development and his social life more firmly rooted in the historical nuances of the seventeenth century. Yet few scholars can combine skills in these two areas. In the discussion session at the conclusion of the BSHS meeting Thomas Söderqvist raised the intriguing possibility of a historian working closely with an analyst, citing the example of the experiments of George Moraitis and others reported in the volume *Introspection in Biography* (1985).²¹ Such a collaboration might overcome the problems arising from the papers of Kahr and Clay, who acted as subcontractors to Hunter’s Boyle. Kahr and Clay are certainly to be commended for attempting a very difficult task and the weaknesses of their papers should not be used to justify the ‘Luddite’ response that Hunter rightly castigates. Given the relatively small amount of work on the psychobiography of scientists I will keep an open mind and see if improvements can be made.

It is interesting that Figlio, one of the few to possess expertise in these two areas, repudiates the form of psychobiography articulated by Kahr and Clay. Instead, by concentrating on the interrelations between the internal and the external, he seeks the psychological meaning of scientific theories (in a broad sense). This approach can all too easily become ahistorical: if, for example, a single meaning is attached to atomism in all

²¹ See Baron and Pletsch, op. cit (4).

periods. However, just as the more sophisticated sociologists of science have stressed the historical contingency of social factors, Figlio's programme could be developed in non-reductive and historically sensitive ways. There seems to be considerable potential in his approach, not least because he is also skilled in the social history of science and may be able to integrate the social and the psychological.

Although psychoanalysts from three schools sought to interpret a historical subject, it is worth remembering that other schools of psychology, such as Kelly's personality psychology which I mentioned earlier, may also have much to contribute.²² It would have been instructive to see how representatives of these other (non-psychoanalytic) approaches fare in analysing Boyle. For example, given the increasing emphasis on scientific practice by historians and sociologists of science, there is certainly room for psychodynamical factors in accounting for the ways in which particular scientists engage the 'natural' world. Again, there are many psychological theories (beside the psychoanalytical ones discussed at the meeting) that can shed considerable light on the affective side of science.

Although this special issue of *BJHS* is justified in concentrating on a single historical subject, it would be interesting at some future date to compare psychobiographies of Boyle with those of contemporary natural philosophers from a range of social, political, religious and scientific backgrounds. Rather than viewing Boyle in isolation we might learn much from comparing and contrasting his personality with those of, say, Newton, Hooke, Locke, Digby and Cavendish. What aspects of their personalities attracted them to science? Again, there is much scope for asking the same question of biographies of scientists in other periods. Although there are many further directions to be explored, the preceding papers provide a highly stimulating engagement with psychohistory and one on which historians may wish to build.

22 See, for example, W. M. Runyan, *Life Histories and Psychobiography. Explorations in Theory and Method*, New York, 1982; idem., 'Psychobiography and the conceptual structure of personality psychology', in *Handbook of Personality Psychology* (ed. R. Hogan, J. Johnson and S. Briggs), San Diego, 1997, 41–69.