

Koji Yamamoto, 'Reformation and the Distrust of the Projector', *Historical Journal*, 55 (2012), 375-397.

The following pages present a pre-press version.

For the final, published version, please contact the author at
koji4649[at]gmail.com or visit:

<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=8565560&fulltextType=RA&fileId=S0018246X12000064>

REFORMATION AND THE DISTRUST OF THE PROJECTOR IN THE HARTLIB CIRCLE*

KOJI YAMAMOTO
University of Edinburgh

ABSTRACT. *Case studies of the circle of Samuel Hartlib, one of the most prolific groups of reformers in post-Reformation Europe, are flourishing. The uncovering of rich details has, however, made it difficult to draw a meaningful generalization about the circle's bewilderingly wide range of activities. Focusing on the circle's promotion of 'useful knowledge' this article offers an analytical framework for building a new synthesis. The eclectic and seemingly chaotic pursuit of useful knowledge emerged, it will be shown, as differing responses to, and interpretations of, pervasive distrust and the pursuit of reformation. The article thus explores how loosely shared experience shaped the circle's practices of collaboration and exclusion. The study thereby contributes not only to studies of the Hartlib circle, but also to the historiography of post-Reformation culture and burgeoning studies of trust and credibility in the history of science and technology.*

'[N]owe wee are pullinge downe of suche monopolies', the Kentish parliamentarian Cheney Culpeper wrote excitedly to Samuel Hartlib in 1646, 'but the greate monopoly [of political authority by the crown] muste firste downe; & then the monopoly of trade the monopoly of Equity ... & the monopoly of matters of conscience & scripture (a very notable monopoly), all these & many more wee shall have in chace ... & thus will Babilon tumble, tumble, tumble, tumble'.¹ The so-called Hartlib circle, active especially during the

* *Contact:* 24(2f4) Meadowbank Terrace, Edinburgh, EH8 7AS; koji4649@gmail.com

* Earlier versions of this article were presented in London, Reading, St Andrews, and Tokyo. I thank audiences in these places, particularly those at the Public Understanding of Science Seminar and the Bridging History and Social Psychology Workshop in London. I am also grateful to Mark Greengrass, Jessica Ratcliff, and John Young for sharing their unpublished papers, to Helen Birkett, Jo Hepworth, Rab Houston, Vera Keller, Peter Lake, and Aurélien Ruellet for commenting on drafts, and especially to Mark Jenner for supervising the Ph. D thesis from which this is partly drawn. The greatest debt is to Sakiko Kaiga for feedback and moral support.

¹ M. J. Braddick and M. Greengrass, eds., 'The letters of Sir Cheney Culpeper (1641-1657)', *Camden Miscellany*, 33, 5th ser., 7 (1996), pp. 269-70, Culpeper to Hartlib, 4 Mar. 1646 (13/136-7), hereafter cited as 'Culpeper letters'. All letters cited below are from Culpeper to Hartlib unless otherwise stated. Dates are given in footnotes where relevant. References given in parentheses are to the Hartlib Paper cited below. In all quotations, contractions are silently expanded. All pre-1800 works were published in London unless otherwise stated.

1640s and 50s, was one of the most prolific groups of reformers in early modern Europe.² As Culpeper's letter suggests, the circle's reforming aspiration was multi-faceted, encompassing reforms in church and state, in law and economy. The underlying millenarian or 'pansophic' vision of the group has been well explored.³ Daniel 12:4 was read as the sign of the imminent arrival of the millennium and the restoration of knowledge, abundance and innocence that the mankind had lost after the Fall. Under the influence of international Calvinism, Christians, especially Protestants, were urged to unite in order to spread the Gospel to far corners of society, regions and the world. Francis Bacon's programme for developing experimental knowledge was adopted with enthusiasm, giving an impetus to the restoration of learning and the application of technology towards the increase of wealth and happiness. These sources of inspiration did not generate a single, well-defined movement, but stimulated a multitude of reforming initiatives, covering virtually every aspect of social life, including religious and lay education, medicine, alchemy, poor relief, and innovations in industry and agriculture. Drawing upon his extensive correspondence network, Hartlib set himself to become a 'conduit-pipe' to the public, circulating numerous manuscripts, editing and publishing some of them for wider audiences while applying for patents and petitioning Parliament to press for particular schemes. In this network we find close allies like Culpeper and the Scottish irenicist John Dury, but also a whole range of men and women from the relatively humble such as William Wheeler and Gabriel Plattes the author

² It is impossible to do adequate justice to the rich historiography. But see G.H. Turnbull, *Hartlib, Dury and Comenius: gleanings from Hartlib's Papers* (London, 1947); Charles Webster, *The great instauration: science, medicine and reform, 1626-1660* (London, 1975); Michael Leslie and Timothy Raylor, eds., *Culture and cultivation in early modern England: writing and the land* (London, 1992); Mark Greengrass, Michael Leslie, and Timothy Raylor, eds., *Samuel Hartlib and universal reformation* (Cambridge, 1994), hereafter cited as *UR*; Paul Slack, *From reformation to improvement: public welfare in early modern England* (Oxford, 1998), ch. 4.

³ Webster, *Great instauration*, ch. 1. See also Michael Walzer, *Revolution of the saints: a study in the origins of radical politics* (Cambridge, Mass., 1965), ch. 2, 5; H.R. Trevor-Roper, 'Three foreigners: the philosophers of the Puritan Revolution', in idem, *Religion, the reformation and social change and other essays* (New York, 1968), pp. 237-93.

of utopian tract *Macaria* (1641), to the wealthy Robert Boyle and Lady Katherine Ranelagh, from French Huguenot Peter Le Pruvost to Catholic Richard Weston and the royalist Anglican John Evelyn.

Historians are becoming increasingly cautious about portraying the Hartlib circle as a homogenous entity. Although Charles Webster once highlighted state-led reformation as a defining feature of this group, recent works have also found a more introspective conception of reformation that emphasized spiritual renewal of the self in the image of Christ.⁴ Historians of science have shown that the circle also drew upon a dazzling array of civic, metaphysical, alchemical and occult traditions in relation to the prospective reformation of knowledge and mankind. A series of case studies of Hartlib's allies including George Starkey, Johan Moriaen, Worsley, Petty, and Ranelagh alongside thematic studies of medicine, alchemy, linguistics, and silviculture continue to reveal a bewildering richness of the group's activities that seem to defy meaningful generalization.⁵ This interpretive move away from the group's coherence and unity has a wider resonance. As Alexandra Walsham put it, 'ambivalence and contradiction should not be regarded as anomalies but normalities' when studying post-Reformation European culture. 'Room must also be made for the general untidiness of the human mind, for the eclectic intermingling of

⁴ John T. Young, *Faith, medical alchemy and natural philosophy: Johan Moriaen, reformed intelligencer, and the Hartlib circle* (Aldershot, 1998), ch. 7; Howard Hotson, *Johann Heinrich Alsted, 1588-1638: between Renaissance, Reformation, and universal reform* (Oxford, 2000), pp. 66-74; Thomas Leng, *Benjamin Worsley (1618-1677): trade, interest and the spirit in revolutionary England* (Woodbridge, 2008), pp. 187, 189. But William Petty was less overtly religious. See Ted McCormick, *William Petty and the ambitions of political arithmetic* (Oxford, 2009), passim.

⁵ In addition to those cited above, see also Lindsay Sharp, 'Timber, science, and economic reform in the seventeenth century', *Forestry*, 48 (1975), pp. 51-79; William R. Newman, *Gehennical fire: the lives of George Starkey, an American alchemist in the Scientific Revolution* (Cambridge, Mass., 1994); William R. Newman and Lawrence M. Principe, *Alchemy tried in the fire: Starkey, Boyle, and the fate of Helmontian chymistry* (Chicago, 2002); Rhodri Lewis, *Language, mind and nature: artificial languages in England from Bacon to Locke* (Cambridge, 2007), ch. 2; Michelle DeMeo, 'Katherine Jones, Lady Ranelagh (1615-91): science and medicine in a seventeenth-century Englishwoman's writing' (Ph. D thesis, University of Warwick, 2009), ch. 2.

inconsistent opinions that is a perennial feature of individual and collective mentalities.'⁶ In this field, as elsewhere in the humanities, we are facing a distinct danger of complicating our picture until we lose sight of a larger perspective.

The admission of untidiness, however, can be an exciting point of departure. Heterogeneity there certainly was, but it was not so much chaos as a structured complexity derived from a common set of experience. This article develops this perspective by integrating the analysis of binary concepts and how they helped the Hartlib circle to engage with complex societal, political and religious issues. Bob Scribner has told us that polemical visual satires for Protestant Reformation sought to forge unity by fashioning themselves as the promoters of light, purity, and godliness, depicting the enemy as the agent of darkness, sin, and the anti-Christ.⁷ Studies of witchcraft and 'popular culture' have also found 'a predisposition to see things in terms of binary opposition'.⁸ Peter Lake has shown that early Stuart politicians and courtiers were adept at legitimating their policies by exaggerating the impending threat of Catholic conspiracy or populist Puritanism, each drawing upon a stark dichotomy between popery and reformation, and between 'popularity' and disciplined monarchy.⁹

This mode of discourse exerted a profound impact during the Civil War period as well. Popery and other terms of abuse, as Mike Braddick puts it, 'gave a comforting

⁶ Alexandra Walsham, 'The reformation and "the disenchantment of the world" reassessed', *Historical Journal*, 51 (2008), pp. 497-528, at p. 527.

⁷ R.W. Scribner, *For the sake of simple folk: popular propaganda for the German Reformation* (Cambridge, 1981).

⁸ See Stuart Clark, 'Inversion, misrule and the meaning of witchcraft', *Past & Present*, 87 (1980), pp. 98-127, at p. 105; idem, *Thinking with demons: the idea of witchcraft in early modern Europe* (Oxford, 1997). Cf. Ethan Shagan, 'Beyond good and evil: thinking with moderates in early modern England', *Journal of British Studies* 49 (2010), pp. 488-513.

⁹ Peter Lake, 'Anti-popery: the structure of a prejudice', in Richard Cust and An Hughes, eds., *Conflict in early Stuart England: studies in religion and politics, 1603-1642* (London, 1989), pp. 72-106, at pp. 81-2, 90-2; idem, 'Anti-Puritanism: the structure of a prejudice', in Kenneth Fincham and Peter Lake, eds., *Religious politics in post-Reformation England* (Woodbridge, 2006), pp. 80-97.

polemical clarity when debating complex issues' in the run-up to, and during, the Civil Wars. Cooperation among parliamentarians, for example, was driven more 'on the basis of fear rather than hope', that is, 'more by anti-episcopal views than by a positive vision of the proper constitution of the church'.¹⁰ Culpeper's letter, quoted earlier, also reveals an implicit opposition between monopoly and reformation (presented as the imminent fall of Babylon). Many would have agreed that 'monopolies' – sometimes ridiculed as 'projects' – could be detrimental to reformation. Crucially, however, such broad agreement required little precision as to the specific measures that were to be taken to eradicate monopolies, or as to what exactly constituted proper reformation and what steps might be taken to achieve it.

Closer inspection reveals that the circle's seemingly inconsistent reforming activities owed much to the participants' different responses to 'a comforting polemical clarity' of notions such as godly reformation and the greedy projector. This article shows this by exploring the circle's promotion of 'useful knowledge': technical knacks and ingenuities, know-how, observations, and more 'scientific' hypotheses, all concerned with 'natural phenomena that potentially lend themselves to manipulation'.¹¹ Because many believed that the mankind had enjoyed complete knowledge of the world and the land unlimited fertility until the Fall, gathering what was deemed useful – including alchemy and perpetual motion – and putting them to productive ends carried religious overtones, and were at the heart of the circle's reforming ambitions.¹²

¹⁰ Michael Braddick, *God's fury, England's fire: A new history of the English Civil Wars* (London, 2008), pp. 177, 282 (see also pp. 9, 50, 53, 143-4, 152).

¹¹ I adopt the notion of 'useful knowledge' from Joel Mokyr to bridge the somewhat artificial gap between science and technology, something that hardly existed during the early modern period. See Joel Mokyr, *The gifts of Athena: historical origins of the knowledge economy* (Princeton, 2002), p. 3; Maxine Berg, 'The genesis of "useful knowledge"', *History of Science*, 45 (2007), pp. 123-33.

¹² The search for the philosopher's stone was very much integral to this pursuit.

After briefly surveying negative connotations of the terms 'project' and 'projector', the article will explore how Hartlib, his close allies, and a wider circle of collaborators tried to distance themselves from this negative image. They shared what those following Erving Goffman would call 'stigma consciousness' – awareness that their attempts at promoting useful knowledge could be discredited as unreliable, even nefarious, 'projects'.¹³ There was a degree of agreement in the reformers' response, for example, that one should avoid looking like early Stuart projectors who by procuring monopolies profited themselves at the expense of the public. Yet beyond that there was little agreement, especially whether or not, and how, collaborators in the noble pursuit of reformation may be rewarded without descending into profiteering. The well-known proposals for setting up an Office of Address will be examined in this context, alongside hitherto-neglected informal negotiations with William Wheeler. Many shared the pursuit of reformation as a slogan, and the distrust of the projector as a practical problem. As Hartlib and his allies took differing approaches to this common set of experience, however, their promotion of useful knowledge gave rise to strikingly ambivalent practices of collaboration and exclusion.

I

The terms 'project' and 'projector' came into circulation in response to a wave of technology transfer and economic improvements schemes that emerged in the later

¹³ Erving Goffman, *Stigma: notes on the management of spoiled identity* (Englewood Cliffs, NJ., 1963); Bruce G. Link and Jo C. Phelan, 'Conceptualizing stigma', *Annual Review of Sociology*, 27 (2001), pp. 363-85, esp. pp. 373-4. These sociological studies may help us to bring together historical scholarship that explore negative representations and their impact on the reality. See, for example, Patrick Collinson, 'Ben Jonson's *Bartholomew Fair*: the theatre constructs Puritanism', in David L. Smith, Richard Strier, and David Bevington, eds., *The Theatrical city: culture, theatre and politics in London, 1576-1649* (Cambridge, 1995), 157-69; Tara Nummedal, *Alchemy and authority in the Holy Roman Empire* (Chicago, 2007), ch. 2-3.

sixteenth century.¹⁴ Against the backdrop of imperial competition amidst population rise and inflation, statesmen, scholars, artisans, and merchants brought together power, money, and useful knowledge in areas such as construction, hydrostatics, mechanics, mining, manufacture and agriculture. Under the influence of humanism, their undertakings were promoted as public service, capable of developing national economy, improving welfare provisions and enhance public revenues at home, ultimately driving England's imperial ambitions abroad. Yet under Elizabeth and the early Stuarts, many spurious 'projects' emerged under the colour of serving the commonwealth, such as procuring royal privileges to monopolize whole industries or pressing for controversial 'improvements' of forests, rivers or fenland. While promising revenues to the Crown, they threatened to disrupt the local economy by imposing fines and confiscation. The 1624 Statute of Monopoly condemned a number of monopolies, but left many loopholes.¹⁵ The pursuit of economic improvement and innovation thus remained prone to perversion, not only by the self-interest of promoters, but also by the financial necessities of ambitious monarchs. At stake was not just the ancient problem of morality in the market but people's rights and liberty as well as social and political stability.¹⁶

The concept of projecting captured precisely these problems. In Latin *proiecere*

¹⁴ We do not have a systematic analysis of the concept of projecting. This will be rectified by my *Capitalism for the Public Good? Innovation, Distrust and the Culture of Projecting in Early Modern England* (forthcoming), ch. 1, on which this and the next paragraphs draw. Incidentally, Jessica Ratcliff has concurrently written on literary representations of the projector. Iadem, 'Sons of Machiavelli: Inventors, Projectors and Patentees in English Satire, c. 1630-70', *Technology and Culture* (forthcoming).

¹⁵ Joan Thirsk, *Economic policy and projects: the development of a consumer society in early modern England* (Oxford, 1978), ch. 2-4; iadem., 'The crown as projector on its own estates, from Elizabeth I to Charles I', in R.W. Hoyle, ed., *The estates of the English crown, 1558-1640* (Cambridge, 1992), pp. 297-352; John Cramsie, *Kingship and crown finance under James VI and I, 1603-1625* (Woodbridge, 2002); Christine MacLeod, *Inventing the Industrial Revolution: The English Patent System, 1660-1800* (Cambridge, 1988), ch. 1.

¹⁶ The problem had been evident by the 1570. See David Harris Sacks, 'The countervailing of benefits: monopoly, liberty, and benevolence in Elizabethan England', in Dale Hoak, ed., *Tudor Political Culture* (Cambridge, 1995), pp. 272-91, at pp. 273-6.

could mean 'to throw forward' and 'to display', and *jactare* to 'discuss, to boast of' and to 'make an ostentatious display'. Thus the project was at best a vision of a future society and an audacious plan about realizing that vision through collective action.¹⁷ Yet, more specifically, in the alchemical tradition the 'powder of projection' meant the 'Philosopher's Stone', 'a Powder supposed to have the Virtue of changing any quantity of' base metals 'into a more perfect one, as Silver or Gold'.¹⁸ As literary works like Jonson's *Alchemist* and *Devil is an Ass* depicted, then, projects were at worst spurious 'arts', 'inventions', 'secrets', or 'mysteries' only seemingly capable of generating wealth. Between 1641 and 1642, following the collapse of press censorship, an unprecedented number of pamphlets attacked the early Stuart stereotype of the projector.¹⁹ While neutral usage of the term 'project' as a plan or a scheme did not completely disappear, the image of the projector had become something of an established literary stereotype. In the context of political economy, the projector came to stand for the rent-seeker who pretended public service to pursue their self-interest and that of the Crown at the expense of people's rights and properties. More generally, the figure stood for a deluded dreamer advancing wild and impossible schemes, or a relentless conman defrauding others through bogus schemes.

These stereotypes of the 'projector' were particularly problematic for Hartlib and his allies due to their association and desire for support from the Long Parliament, which had denounced Stuart projectors. But more importantly, the emphasis Hartlib and his allies

¹⁷ Frédéric Graber is proposing to develop a long-term history of the project based on this definition. See idem, 'Du faiseur de projet au projet régulier dans les Travaux Publics (XVIIIe-XIXe siècles) : pour une histoire des projets', *Revue d'histoire moderne et contemporaine*, 58, 3 (2011), pp. 7-33. His research complements mine on the English case.

¹⁸ *Oxford English Dictionary*, project, v., jactation, n.; Ephraim Chambers, *Cyclopaedia: or an universal dictionary of art and science* (2 vols, 1728), II, p. 887.

¹⁹ The *English Short Title Catalogue* reveals that during the 1640s the terms 'project', 'projector', and their derivatives appeared on fifty different publications, five times more than the average of 9.5 titles of the previous two decades. The surge was proportionally greater than the overall expansion of printing activity, and was due almost entirely to negative uses of the terms. Yamamoto, *Capitalism for the Public Good?*, ch. 1.

placed on public service threatened to expose them to the kind of criticism that had been aimed at projectors of the preceding decades:

Who can convert your meanings for the good
Oth' publike weale to bad? since what you would
Have bravely acted was to increase the store
Oth' kingdom, & your own wealth ten times more.²⁰

Hartlibians were acutely aware of such suspicion. As early as in 1634 John Dury complained that advocates of reform were all too often 'counted a subtile projector ... & inconsiderate & presumptuous foole.'²¹ As Mark Jenner points out, they too were 'in danger of collapsing under the weight of their own grandiloquent pretensions'.²² At stake was a serious question about credibility, as Adrian Johns puts it: 'Why should anyone have believed any of Hartlib's promises?'²³ Given the prominence of the projector stereotype and the important problems it captured, we can reformulate the question: Could projector-like promoters ever be trusted in the joint quest for reformation? How did Hartlib and his allies respond to the negative stereotypes, and to the underlying challenge of how to promote reformation without descending into profiteering or infringing upon others' liberty and property?

²⁰ Thomas Haywood, *Machiavel* (1641), sig. [A3v].

²¹ *The Hartlib papers: electronic edition* (2nd ed., Sheffield, 2002), 1/9/5A, hereafter cited as HP.

²² Mark Jenner, "'Another epocha'? Hartlib, John Lanyon and the improvement of London in the 1650s', in *UR*, pp. 343-56, at p. 353.

²³ Adrian Johns, 'Identity, practice, and trust in early modern natural philosophy', *Historical Journal*, 42 (1999), pp. 1125-45 at p. 1138; Mark Greengrass, 'The Projecting Culture of Samuel Hartlib and His Circle', (unpublished paper), no pagination.

II

One, perhaps predictable, response was to avoid seeking monopolistic patents and avoid imposing fines and confiscation – a violation characteristic of early Stuart monopolists and projectors. In this respect Hartlib and his allies displayed a degree of shared response.

When a London-trained barber-surgeon Benjamin Worsley promoted a scheme for producing saltpetre (potassium nitrate) in 1645, for example, he carefully trimmed its monopolistic elements. Saltpetre was a constituent of gunpowder, and, as Sir Edward Coke put it, its production was deemed vital 'for the necessary defence and safety of the realm'.²⁴ As the chemical process was not fully understood, domestic production depended on searching and digging the floors of stables and dovecots where saltpetre occurred naturally.²⁵ Under the royal authority, the licensees, so-called saltpetremen, were permitted this intrusion. Even Robert Boyle had to pay bribes to stop 'those undermining two-legged moles' from digging his cellar and stables. Indeed, the 1641 Grand Remonstrance highlighted their 'vexation and oppression' upon 'the liberties of the subjects in their habitation' alongside those of other monopolists and projectors.²⁶ Worsley was promoting his scheme at a time when the procurement of this material, urgently needed for the ongoing war efforts, had a problematic association with the imposition of royal authority of the previous decades.

His proposal was to set up workhouses for the poor in London in which residents would oversee the production using their own waste. Worsley wrote some draft proposals

²⁴ 12 Co. Rep. 14

²⁵ A.R. Williams, 'The production of saltpetre in the middle ages', *Ambix*, 22 (1975), pp. 125-33, at pp. 125-8.

²⁶ Michael Hunter, Antonio Clericuzio, and Lawrence M. Principe, eds., *The correspondence of Robert Boyle* (6 vols., London, 2001), [hereafter cited as *Boyle Correspondence*], I, p. 43; S.R. Gardinar, *The constitutional documents of the Puritan Revolution* (3rd ed. revised, Oxford, 1906), p. 212. For local grievances see J.P. Ferris, 'The saltpetremen in Dorset, 1635', *Proceedings of the Dorset Natural History and Archaeological Society*, 85 (1963), pp. 158-63.

anonymously. One of them asked that 'none' but he and his associates 'maie make [saltpetre] their waye or with their materials'. Another went even further, seeking a monopoly over the saltpetre production itself once the poor houses began to produce it sufficiently.²⁷ As these proposals resembled early Stuart monopolies, they were probably not well received by Hartlib and his associates, to whom Worsley had just been introduced.²⁸ As if these anonymous proposals were there to gauge responses without risking his own reputation, Worsley carefully dropped the requests for monopoly when submitting another version of the proposal to London aldermen. Unlike unscrupulous projectors, he now reassured, 'I goe not about to establish my owene good by injury, or with Carelesnesse to the good of others'. That is, 'by a new way of making ... Salt Peter, I will ... free the whole Common-wealth of the trouble or injury susteyned in haveing their Houses Cellers yards and other places digged up and spoiled by Salt-Peter-Men'. In all, he promised 'not to intrench upon the libertie or infringe the just priviledges of any subject whatsoever'.²⁹

Although Worsley went on to submit a petition to the Lords, his scheme ultimately did not materialize; it is alleged that Worsley did not have the technical knowledge he claimed to possess.³⁰ Importantly, however, avoiding imposition and thereby distancing himself from monopolistic projectors and saltpetremen enhanced the credence of the scheme. The committee of London aldermen reported that the scheme would advance 'the publique good' without being 'preiudiciall (in the least) vnto any, hee being neither desirous to debarr any to import the said Commodity, or to make it after *the* way that is now vsed'.³¹

²⁷ HP 53/26/2B, 3A.

²⁸ Leng, *Benjamin Worsley*, p. 23.

²⁹ HP 71/11/10A, 8A-B.

³⁰ *Lords journal*, VIII, p. 574; Newman and Principe, *Alchemy*, pp. 239-40.

³¹ HP 71/11/1A-1B. The same report was presented to the Lords. *Lords journal*, VIII, p.

Equally revealing is a case of William Petty, who obtained a patent in 1648 for what he called the 'double-writing' engine, an invention for producing 'two resembling copies of the same thing at once'.³² He had originally proposed 'to move the State to lay an additionall tax upon writing paper', appointing himself as a tax-collector who would take a fee as a reward for his invention. This ambitious proposal, Petty admitted, was dropped and a more conventional patent procured instead because imposing a new tax seemed to have 'cross[ed] too much the nature of the times, when men complain enough already of impositions.'³³

Promoters did not, however, always agree precisely what these 'impositions' were. A case in point is the promotion of the ambitious 'universal trade' scheme. First developed by a Huguenot, Hugh L'Amy, and later promoted by Le Pruvost, the scheme intended to introduce fishery and agricultural innovations in England in order to fund the state-led plantation of a Calvinist colony in North America.³⁴ Hartlib's allies were acutely aware of the need to avert comparison with the early Stuart projector. Culpeper suggested that the scheme might be tried by getting a patent for the inventions, although, he added, doing so would make it look 'eyther folly or knavery'.³⁵ Dury agreed. Patents were understood 'not to bee beneficiall to the public'; getting one would make the scheme 'seeme a project indeed and a kind of Monopolie'. It would bring 'soe much opposition of Envie & jeallousie against' the promoter that he 'hardly should be ever able to proceed'. Instead of a patent, Dury thus argued, Le Pruvost would need the state's full support via parliamentary

574. See also Boyle's favourable comment in *Boyle correspondence*, I, pp.42-3.

³² *Commons journal*, V, p. 481; William Petty, *The advice of W. P. to Mr. Samuel Hartlib for some particular parts of learning* (1647 [1648]), sig. A2.

³³ William Petty, *A declaration concerning the newly invented art of double writing* (1648), p. 3. My account complements McCormick, *Petty*, pp. 58-60.

³⁴ Thomas Leng, "'A potent plantation well armed and policed': Huguenots, the Hartlib circle, and British Colonization in the 1640s", *William and Mary Quarterly*, 66 (2009), pp. 173-94.

³⁵ 'Culpeper letters', p. 239, n.d. [late 1645?] (13/279-83).

ordinance.³⁶

The debate continued among the reformers because Le Pruvost demanded the imposition of fines and confiscation of properties upon offenders so that 'none practise or cause to be practised' his ways of husbandry and fishing.³⁷ Dury argued parliamentarians could still be persuaded because discouraging free-riders was reasonable, and because the promoter neither drew upon 'any inventions, which looke like projects', nor 'demands any special priviledge as Monopolists or projectors use to doe' under the early Stuarts.³⁸ Note that the feasibility of the scheme was measured against the image of the 'projector' and the 'monopolist'. Culpeper claimed that the Frenchman would first have to 'quitte that resolution of takinge mens estates & disposing of them without their consente'. This, Culpeper wrote, was 'an inseparable companion of moste former monopolies.'³⁹ Dury and Hartlib later reiterated this point and revised a draft ordinance to drop draconian elements, but the French promoter rejected this, and the scheme reached a deadlock.⁴⁰ The reformers did not agree on what exactly made a proposal look like repressive early Stuart projects, especially whether stiff penalties could be permitted if judiciously administered. Nonetheless, the efforts of Worsley, Petty, Dury, and Culpeper reveal that encroachment upon people's rights and properties was an underlying concern when putting useful knowledge to public use, and that the image of the early Stuart monopolist and projector provided a benchmark for negotiation.

III

³⁶ 'Culpeper letters', pp. 235-6, Dury to Culpeper, n.d. [Autumn 1645] (55/10/11-14).

³⁷ HP 53/14/4B. Other versions are HP 55/10/18A, HP12/62B.

³⁸ HP 53/14/8A, 9B.

³⁹ 'Culpeper letters', pp. 307-8 (13/194-5).

⁴⁰ Leng, "'A potent plantation'", p. 188.

A promoter might well avoid breaching others' rights and liberties, but he could still resemble an unreliable projector profiting himself by airing impractical or fraudulent 'inventions' and 'secrets'. What strategies enabled such men to avoid comparison with the image of the projector as a fool or conman? One way was to renounce rewards for divulging useful knowledge, and to communicate them by publishing pamphlets so that the reader may try and adopt them for themselves. It was something of an opt-out strategy, to reject elements of the secrecy and profiteering associated with ostentatious projectors in favour of financial independence and open communication. Some promoters such as Plattes, the author of the 1641 utopian tract *Macaria*, adopted it.

His ambition in publishing mining and agricultural tracts in 1639 was no less than making 'this Countrey the Paradise of the World'.⁴¹ Yet, probably mindful of projectors' ostentatious claims, Plattes repeatedly stressed the limitations of his knowledge. '[N]o certaine rule can be given for so variable a worke' as husbandry he argued. Acknowledging that different environmental conditions, such as soil and weather conditions in agriculture, affected the success of these ventures, Plattes kept himself from requesting the investment of others as projectors would do. In his words, he chose to 'part with my money, rather than to suffer another to be oppressed with extreme want and miserie'. He therefore communicated his findings through print for the profit and use of many. Finally, rather than promising quick substantial returns as typical 'projectors' would do, Plattes issued repeated caution against taking his advice for granted and urged 'every man' first to 'trie the truth [of his relations] in a few Perches of Land ... then to goe to worke in greater quantities'.⁴²

⁴¹ Gabriel Plattes, *A discovery of infinite treasure hidden since the worlds beginning* (1639), sig. [A3v]-[A4].

⁴² Plattes, *Discovery of infinite treasure*, sig. D.

Similar caveats were issued repeatedly in his pamphlets.⁴³

The farmer and inventor Walter Blith positioned himself against the stereotype even more explicitly. The son of a Warwickshire yeoman recounted in 1652 that 'a naughty generation of men' had obtained patents with 'their pretences of great abilities in Enginereship' and thereby 'brought Ingenuity under the scandal of projects and new devices'.⁴⁴ Like Plattes, Blith emphasized the limitations of his knowledge and refrained from seeking investments, instead publishing books about improved cultivation methods. He was acutely aware that this would enhance his credibility. In a way that intriguingly anticipated the Boylean emphasis on 'disinterestedness', Blith argued that his cultivation techniques were 'Experimented at the onely and proper cost of the Author', and that they 'are therefore somewhat the more Credible'.⁴⁵ Thus, instead of asking money in return for revealing secrets, Plattes and Blith stressed their financial independence and commitment to open communication, while emphasising the potential limitation of the knowledge they possessed. These measures set them apart from what Plattes called men 'of indifferent vertuous dispositions' pursuing 'for very want of meanes ... actions which were not laudable' – an allusion to the spurious 'projects' that had been thriving under Charles's Personal Rule.⁴⁶

Not everyone could afford to opt out of profit and patronage, however. Worsley, for example, declared to 'discharge his Conscience and Duty to the publicke' by submitting his saltpetre scheme to the London aldermen.⁴⁷ Yet he never elaborated where exactly the

⁴³ See Plattes, *Discovery of subterraneall treasure*, sig. [B2v]-B3, pp. 47-49; Samuel Hartlib, ed., *Chymical, medicinal, and chirurgical addresses* (1655), esp. pp. 51, 65, 86.

⁴⁴ Walter Blith, *English improver improved* (1652), sig. [c4v], c2.

⁴⁵ Walter Blith, *English improver* (1649), sig. [a2v]-a. See also idem, *English improver improved*, sig. [c4v-c5].

⁴⁶ Plattes, *Discovery of subterraneall treasure*, sig. [Bv]. For background, see Thirsk, 'The Crown as Projector'.

⁴⁷ HP 71/11/9B.

knack of his new 'invention' lay. The promoter of the 'Universal trade', Le Pruvost, too, concealed particulars; he did little more than hint that his scheme would somehow unite subjects' 'owne advantages' and 'the Rules of Righteousnes for a public aime'.⁴⁸ Cressy Dymock, a landless inventor from a Lincolnshire family, also refused to reveal his secrets while at the same time confidently asserting to serve God and the public.⁴⁹ Although rarely noted in the secondary literature, even Plattes tacitly concealed his seed-setting engine. His 1639 agricultural tract made only passing references to the engine upon the pretext that the labour-saving invention 'might doe more hurt than good' by taking jobs away from the poor.⁵⁰ In reality, he had been applying for a patent for the engine and a handbill to advertise it.⁵¹ Having obtained the grant in February 1640, he defied his previous reservations about the invention, and declared in a handbill:

Those that love themselves or the common good, are invited and desired to learn the knowledge of this new invention for the expeditions setting of corne, against the time of dearth and scarcitie[.]⁵²

Neither technical details nor the intention to disclose them gratis were indicated, suggesting that Plattes probably expected some payment in return for imparting his ingenuity. Unlike monopolies and elements of 'imposition' such as taxation, confiscation, and fines, elements

⁴⁸ HP 53/14/24A-B.

⁴⁹ HP 58/9A; Samuel Hartlib [Cressy Dymock], *Reformed husband-man* (1651), pp. 6, 9, 10.

⁵⁰ Plattes, *Discovery of infinite treasure*, p. 76.

⁵¹ This has been overlooked in studies of the Hartlib circle. Bodleian Library, MS Bankes 11/39; T[he] N[ational] A[rchives], C66/2842/1.

⁵² Gabriel Plattes, *Certaine new inventions and profitable experiments* (1640), non-paginated handbill.

of concealment and private gain were more readily reconciled with public service.⁵³

Accordingly, just like parliamentary military officers Ann Hughes has studied, many promoters continued to attach 'their personal ambitions to particular versions of the public interest'.⁵⁴

Here then was a profound challenge to Hartlib and his close allies. Few promoters would have been unaware of the detrimental effects of being compared to early Stuart projectors. Yet relatively few could escape the damaging comparison because there was little clear-cut distinction between profiteering under the veneer of public service and receiving just reward for divulging useful knowledge.⁵⁵ To that extent, then, even after distancing oneself from monopolistic grants, Hartlib and others still had to face the question of how to collaborate with projector-like schemers in the noble pursuit of reformation.

IV

Perhaps surprisingly, the Bacon-inspired proposals for encouraging ingenuity and the 'Advancement of Learning', for which the circle is perhaps best known, reveal a tortuous process of negotiation with projector-like promoters seeking rewards. When the scheme was first proposed in print by Dury in May 1647, the aspiration to open communication was featured prominently. The so-called Office of Address had two branches, 'One for Bodily, the Other for Spirituall Matters'.⁵⁶ The bodily part was to give jobs to the poor by

⁵³ Cf. Pamela O. Long, *Openness, secrecy, authorship: technical arts and the culture of knowledge from antiquity to the Renaissance* (Baltimore, 2001), pp. 90, 95, 101, 141.

⁵⁴ Ann Hughes, 'Men, the "public" and the "private" in the English Revolution', in Peter Lake and Steve Pincus, *Politics of public spheres in early modern England* (Manchester, 2007), pp. 191-212, at p. 194.

⁵⁵ See also Kevin Dunn, 'Milton among the monopolist: *Areopagitica*, intellectual property and the Hartlib circle', in *UR*, pp. 177-92, at p. 178.

⁵⁶ [John Dury], *Considerations tending to the happy accomplishment of Englands*

gathering information concerning demands for, and supplies of, labourers. The branch was named the Office of Address for *Accommodation*. The spiritual branch was to handle 'matters of Religion, of Learning, and', crucially, of 'all Ingenuities' as well. It was to become 'a Center and Meeting-place of Advices, of Proposals, of Treaties ... *freely to be given and received*, ... by and for all such as may think themselves concerned' with 'the most Profitable Undertakings, Discoveries, and Occurrences'. Designed to serve as a 'communion' of noble minds, this upper branch was named the Office of *Communication*, and was deemed 'far beyond that of Accommodations in Usefulness'.⁵⁷

This aspiration to free and open communication is the image most commonly associated with the Office of Address.⁵⁸ Yet a more complex picture begins to emerge if we consider how well Hartlib and his close allies managed to put this ideal into practice. An underexplored case of the obscure inventor William Wheeler (? – 1653) is particularly revealing as the circle sought to bring him into collaboration at a time when the idea about the Office of Address was taking shape.⁵⁹

Little is known about Wheeler. He seems to have moved to the Netherland in the 1630s, working on a broad range of inventions, but especially on fen drainage and related inventions under the auspice of the English ambassador to Hague, Sir William Boswell.⁶⁰ Wheeler obtained a patent there for his draining engine in 1639, and an English one in 1642

reformation in Church and State (1647), p. 42.

⁵⁷ Ibid, pp. 42, 48, 45-6.

⁵⁸ Webster, *Great instauration*, pp. 32, 70, 422-4; William Eamon, *Science and the secrets of nature: books of secrets in medieval and early modern culture* (Princeton, 1994), 327-8; Dunn, 'Milton', p 186; Mark Greengrass, 'Samuel Hartlib and the commonwealth of learning', in John Barnard, D.F. McKenzie, eds., *The Cambridge history of the book in Britain IV, 1557-1695* (Cambridge, 2002), pp. 315-16, 318. An exception is Michelle DiMeo, 'Openness vs Secrecy in the Hartlib Circle: Revisiting "Democratic Baconianism" in Interregnum England', in Elaine Leong and Alisha Rankin, eds., *Secrets and Knowledge in Medicine and Science, 1500-1800* (Surry, 2011), pp. 105-21, at pp. 119-20.

⁵⁹ What follows complements existing accounts of the Office which pay more attention to its sources of inspiration such as Bacon, Comenius, and Théophraste Renaudot.

⁶⁰ Webster, *Great instauration*, pp. 372-3.

covering multiple inventions including his water raising engine – an invention useful not only for Dutch lowlands but also for English fens and mines. He had become known to Hartlib and his associates by 1644, and Culpeper was soon asked to arrange a meeting with Wheeler's associate in England.⁶¹ In October 1645, Culpeper commented on Wheeler's patent for his draining engine, which conferred him 'the full preiveledge of either sellenge the use of this invention to others or of using it himselfe'.⁶²

It seems that Wheeler asked for a rather exorbitant compensation for 'selling' his patented inventions. Yet Culpeper initially expected Wheeler to be a like-minded Christian willing to impart useful knowledge voluntarily and freely. He proposed that Wheeler should surrender his invention to trustees so that the trustees could first invest in building a model of the mill, and subsequently utilize the invention more widely for the public's benefit.⁶³ Culpeper acknowledged the need to reward inventors and investors who would initially 'undergoe that disbursemente & hazarde', but only by granting them 'concurrent use' of the invention for 'particular under takings of their owne'. Hartlib's editorial intervention suggests that he preferred to permit private use only after public interests were first met;⁶⁴ Worsley reportedly proposed to induce disclosure by paying the inventor.⁶⁵

Culpeper's and others' responses were therefore not monolithic. Importantly, however, the 'official' line presented in the first printed proposal for the Office of 1647 indicated little about the need for rewards. When Culpeper commented on a draft proposal of the

⁶¹ 'Culpeper letters', p. 246 (13/114). We do not know whether the meeting took place. A summary of the inventions and schemes Wheeler could offer survives in the Hartlib Papers. The full list is HP 67/6/3A-10B.

⁶² HP 13/119A.

⁶³ HP 13/119A; 'Culpeper letters', pp. 247, 31 Oct. 1645 (13/115-16); *ibid*, p. 249, 12 Nov. 1645 (13/121-2). It is unclear whether Wheeler was meant to reveal his secrets to the trustees.

⁶⁴ 'Culpeper letters', p. 248 (13/117-18). Hartlib's preference is revealed in another copy of the letter with his editorial intervention. See HP 13/119A.

⁶⁵ 'Culpeper letters', p. 248-9 (13/121-2).

Office in 1646, he in fact made no mention of Wheeler, with whom the circle was negotiating at that time. At this point his concern was simply that no one but Hartlib would have 'such a stocke of forreine relation, intelligence & ingenuities'.⁶⁶

Culpeper had been too optimistic. By February 1646, it emerged that a trial of Wheeler's engine would not take place in England. Culpeper accordingly told Hartlib that he 'did not open' himself to a call for investment – a reluctance he repeated in October 1647, just five months after the publication of the first printed proposal for the Office of Address.⁶⁷ Wheeler probably remained unwilling to agree to the terms of cooperation. If the overblown narrative in *Mr William Wheeler's case* (1645) is to be believed, he feared that patrons such as Boswell were plotting to deprive him of god-given secrets. His expertise, Wheeler alleged, 'drew upon me infinite enmities, and oppositions', but 'the mercy of God most admirably fortified me: so that I did conceal my chief skill'.⁶⁸ Meanwhile, in December 1647, Petty performed his 'double-writing' engine before witnesses and soon began seeking a patent for it.⁶⁹ He did not reveal the secret to the circle. Having given up the idea of introducing a new tax on writing paper (as we have seen earlier), Petty went on proposing to take fees of seven shillings two pence for licensing, asking parliament to pay one thousand pounds for fully revealing the technology behind the invention.⁷⁰

Culpeper's view began to change. In January next year, Culpeper called for a parliamentary committee for purchasing inventions. He admitted that he had been 'exceedingly taken with Mr Petit & Mr Wheelers' inventions. Yet because 'they cannot parte with them without some rewarde, & that noe private purse' or public authorities as

⁶⁶ Ibid, p. 264, 17 Feb. 1646 (13/127-8).

⁶⁷ Ibid, pp. 263, 309.

⁶⁸ William Wheeler, *Mr William Wheeler's case from his own relation* (1645), pp. 3, 10.

⁶⁹ HP 71/7/3A. See also 'Culpeper letters', p. 320 (fn. 12).

⁷⁰ William Petty, *Double writing* [1648], handbill with no pagination; TNA, SP 18/2, fos. 156-9.

they stood would answer their demands, Culpeper suggested that parliament 'appoint a Committee for the examininge & rewardinge of Ingenuities & purchasinge them for publike use'. The Office of Address was envisaged to serve this committee.⁷¹

The promotion of useful knowledge began to look more like the trade in marketable goods. Culpeper argued that men like Wheeler had shown just 'howe many ingenuities ar[e] loste & buried because Selfe cannot be advanced'. The 'exchange and merchandiz of it is & will be between mechanic disposition' who would 'not forgoe their commodities of ingenuity but by way of barter'.⁷² The Office of Address had to be modified accordingly. Commenting on the 1647 proposal, Culpeper argued that 'the care of rationall ingenuities shoulde be annexed to that parte which you call the office of Accommodation'.⁷³

These considerations were echoed in the second publication on the Office, *A further discoverie of the Office of Publick Adresse for Accommodations* (1648). This striking, yet hitherto underused, pamphlet explicitly relegated the status of useful knowledge to the ranks of 'Outward Things concerning this present life' to be handled by the lower Office of Accommodation.⁷⁴ Allusions to the possibility of remuneration must have been unmistakable to contemporary readers. The Office was to offer 'sensible Inducements towards all Enterprises'; those who had such things as 'a new discovery of a Truth, or an Experiment in Physick, Mathematicks, or Mechanicks ... shall be able to receive satisfaction therein so far as it is attainable.'⁷⁵ This was because 'most men will not intend

⁷¹ 'Culpeper letters', p. 318-19, 18 Jan. 1648 (13/180-1).

⁷² 'Culpeper letters', p. 287, n.d. [Jan. 1648?] (13/284/5). This dating is based on Culpeper's paying his Michaelmas rent which is also mentioned at *ibid*, p. 297.

⁷³ *Ibid*, p. 287.

⁷⁴ [Samuel Hartlib], *A further discoverie of the office of publick adresse for accommodations* (1648); *Considerations*, p. 42 (quotation).

⁷⁵ *Further discoverie*, pp. 3, 24.

any Publick Ayme till they can secure their own Interests'.⁷⁶ Spiritual aspirations did not disappear, of course. In *Further discoverie*, the purchasing of useful secrets was characterized as a 'momentary' means for achieving the 'Work of Communication ... towards the Advancement of Pietie, Vertue, and Learning'.⁷⁷ As an editorial intervention of Hartlib (or his secretary) suggests, the reformer wished to see such remuneration as 'accommodation *in this present*', something to be adopted temporarily until individual spiritual reformation fully took root among collaborators.⁷⁸ Yet the pamphlet does reveal reformers' grudging effort to 'accommodate' those who could not abandon worldly needs for compensation. Subsequent publications on the subject adopted this line.⁷⁹

More broadly speaking, the desire to offer reward and thereby expand the ring of collaborators was probably rooted in the advent of international Calvinism itself. Based on the doctrine of election, hot Calvinists in the Netherland for example saw themselves as the chose few, or 'the children of God'. Yet there was also a desire to cast 'the "evangelical net" to catch as many as possible' for the propagation of the gospel.⁸⁰ Like a comprehensive church, then, the Office of Address was to open its door widely. No longer just for public-spirited individuals, the proposal came to look more like a means for accommodating unreformed brethren into the pursuit of useful knowledge and reformation.

The tension between parliamentarians and royalists remained high, and the state-backed system of testing and purchasing inventions never materialized. Hartlib probably

⁷⁶ Ibid, p. 2.

⁷⁷ Ibid, sig. [D4]. See also John Dury, *A seasonable discourse written by Mr John Dury* (1649), sig. [D2v], [D4v].

⁷⁸ Culpeper had originally depicted the parliament committee as 'an Accommodation *in this point*' (HP 13/180). A copy of this with the intervention, quoted above, is HP 53/35/1A. Italics are mine.

⁷⁹ Dury, *Seasonable discourse*, sig. [Dv], [D3v]; [Cressy Dymock], *An essay for advancement of husbandry-learning* (1651), pp. 6, 10.

⁸⁰ Alastair Duke, 'The ambivalent face of Calvinism in the Netherlands, 1561-1618', in Menna Prestwich, ed., *International Calvinism, 1541-1715* (Oxford, 1985), pp. 109-34, at p. 132.

understood this to be God's redirection. As Culpeper once praised, he had a 'resolution to persiste in your office of address' and 'ever to labor with those materials which God affords & to leave the successee to him'.⁸¹ 'Men must adjust to God's will, not prescribe to it' by their own devices, as Blair Worden has put it.⁸² Hartlib thus started the Office of Address as an unofficial institution drawing on the money parliament had granted him.⁸³ Unfortunately, however, imitators soon began to set up their own offices of address, and Hartlib argued for suppressing them – an action to be approved by Parliament for the public good. This must have made him look like former monopolists encroaching upon other people's rights and liberties.⁸⁴ Neither introspective nor the state-led reform proved forthcoming in the end. Hartlib and his close allies had to keep negotiating informally. The problem of distrust remained, and the would-be reformers took a strikingly wide range of actions under the slogan of reformation. It is to this that the final section turns.

V

In the absence of a state-backed office of address, Culpeper grew increasingly unsympathetic to projector-like promoters unwilling to share knowledge without monetary rewards. In April 1648, for example, he warned Hartlib against meddling with the Cambridge-educated Robert Child should he turn out to be 'not ... of a communicative disposition'.⁸⁵ In July, in reference to Wheeler, Culpeper declared that he would not 'deceive my selfe, in valewinge what lyes buried in another mans bosome'; in November,

⁸¹ 'Culpeper letters', p. 269, 4 Mar. 1646 (13/136-7).

⁸² Blair Worden, 'Providence and politics in Cromwellian England', *Past & Present*, 109 (1985), pp. 55-99, at p. 93.

⁸³ Hartlib was granted a parliamentary fund of three hundred pounds in March 1647, two months before the first publication on the Office. He also was to receive an annuity of about £100, but the payment proved irregular. *Commons journal*, V, p. 131; Charles Webster, *Samuel Hartlib and the advancement of learning* (Cambridge, 1970), p. 49.

⁸⁴ Webster, *Great instauration*, p. 74; Turnbull, *Hartlib, Dury and Comenius*, pp. 83-4.

⁸⁵ 'Culpeper letters', p. 331 (13/215-6).

he further lamented that Petty and the German alchemist inventor Johann Glauber were likely 'to turne a Wheeler'. He now resolved 'not to trowble my thowghts any farther' with them, because their 'ingenuity consistes in other mens purses and their owne interestes'.⁸⁶ Culpeper learned in March next year that Wheeler had run away from the United Provinces 'without sending or writing after, to any of his Creditors'.⁸⁷ He declared in response:

till every particular person be wrowght on by Gods Spirite, to knowe, & to
acknowledge, that the talentes he hath received ... are not given, but entrusted onely
... not to our owne onely, but to others good[,] till this (I say) be woorekte into the
Spirites of men, the divell will hinder the worlde, of a greate parte of the happiness, ...
of that abundance which more communication of ingenuities wowl produce, & of
what innocence, which abundance of all thinges wowl bringe into the worlde[.]⁸⁸

For Culpeper the sins of unreformed brethren now seemed a profound obstacle to the arrival of the Second Coming. Speaking unfavourably of 'Mr Pettys zeal for experiments', Henry More also declared that 'great projectes' were nothing but the wasteful 'building of Babell against a second expected deluge' unless accompanied by 'sincerity, and untainted morality'.⁸⁹ Where prospective collaborators appeared covetous or unscrupulous, the need for spiritual renewal could be invoked to reject them as unreformed brethren who were wasting God-given talents.

Paradoxically, however, the Calvinist doctrine that underlay the pursuit of reformation

⁸⁶ Ibid, p. 338-9 (13/231-2); ibid, p. 348 (13/246-7). For subsequent negative comments on Wheeler, see ibid, pp. 355, 358.

⁸⁷ HP 36/8/3A-4A.

⁸⁸ 'Culpeper letters', p. 324 (13/209-11).

⁸⁹ HP 18/1/2B-3A. See also McCormick, *Petty*, p. 59.

simultaneously enjoined to give the benefit of doubt. For example, by alluding to Ecclesiastes 11: 6, Dury advised Culpeper not to be too sceptical about Le Pruvost's scheme: 'wee are bid sow our seed in the morning, and not [to] withhold our hand in the Evening, because wee know not whither shall prosper whether this or that, or both.' It was important 'to resign ourselves up to God by depending upon his providence for a blessing, and not trusting to much to our owne prudence to doe thinges'.⁹⁰ Receiving the letter Culpeper agreed and confessed his 'hopes ... to enlarge my thowghts' and depend on God's providence and guidance.⁹¹ The success of certain enterprises was to be entrusted to divine, rather than human, judgement.

More than religion was at work as well. Hartlib had been interested in the patent system from the 1630s, and later helped various inventors and technologists home and abroad to obtain patents for specific inventions (i.e. not monopolistic patents).⁹² In order to help his wife to earn a living, Dury solicited from Worsley recipe for cordials and ciders; Worsley replied with 'the most lucriferous secrett' that was to be 'kept privatt'.⁹³ Culpeper was probably interested in using others' inventions in his estate or elsewhere.⁹⁴ Though aspiring to holiness, these reformers were therefore never all together removed from monetary concerns that they occasionally censured. After all, Hartlib and his close allies could not promote useful knowledge without drawing on a wider ring of collaborators. Too readily dismissing them as base and unreformed would thus have been untenable, and also presumptuous, for those aspiring to become weak instruments of God's providence.

The aspiration to follow divine will, bound up with more pragmatic concerns, helps us

⁹⁰ 'Culpeper letters', p. 235, Dury to Culpeper, n.d. [autumn 1645] (55/10/11-14).

⁹¹ 'Culpeper letters', p. 244 (13/294-5).

⁹² Greengrass, 'Projecting Culture'; John T. Young, 'Utopian Artificers: Hartlib's Promotion of German Technology in the English Commonwealth' (unpublished paper).

⁹³ HP 33/2/19A, 26/33/1B.

⁹⁴ 'Culpeper letters', p. 335ff.

understand the otherwise puzzling fluctuation of reformers' attitudes towards collaborators.⁹⁵ Culpeper, who had once accused Glauber and Petty of their mercenary attitudes, for example, came to 'wonderfully approve' Glauber while arranging to pay for Petty's agricultural inventions, only to become dismissive of them again later. Even then, Culpeper wished that somehow Hartlib might 'give a change to these my thoughts' on them.⁹⁶ It is therefore hardly surprising that Hartlib and his allies went on extending support to otherwise dubious inventors such as Dymock. Although details of his experiments in arable cultivation were kept secret, Boyle, Culpeper and others invested in them the total of fifty pounds in May 1649.⁹⁷ In March the following year, Hartlib and one Alexander Tracye of London paid Dymock a 'competent sum of money' so that under their direction Dymock would build the mills that he claimed approached a perpetual motion engine.⁹⁸ Some of Dymock's letters and manuscripts were subsequently printed in order to call for more investment.⁹⁹ Support was not unconditional. It seems that by 1654, a year after his three-year contract with Hartlib and Tracye on the perpetual motion engines had expired, Dymock had come to fall out of favour. In February that year, Hartlib wrote to Boyle: 'Mr. *Dymock* [. . .] is forsaken, in a manner, by all'. 'Honest Mr. *Dymock* is blamed almost by every body', Hartlib added three months later. Even he admitted that 'I cannot any longer assist either his person, family, or inventions'.¹⁰⁰

Aspiration to reformation, however, did not allow the reformer completely to ignore

⁹⁵ See Charles Webster, 'Benjamin Worsley: engineering for universal reform from the Invisible College to the Navigation Act', in *UR*, pp. 213-46, at p. 223, fn. 26; Young, *Moriaen*, p. 202.

⁹⁶ 'Culpeper letters', pp. 340-1, 344, 347, 348. For details of Glauber's reception among reformers in England, see Young, *Moriaen*, ch. 6.

⁹⁷ HP 62/48/1B. This corrects 'Culpeper letter's', p. 134.

⁹⁸ HP 58/8A, While a 'model' of this engine had been erected in Lambeth, the access to the engine's mechanical details was tightly controlled (HP 58/8B-9A).

⁹⁹ Cressy Dymock, *The reformed husbandman* (1651), p. 10. See also idem, *An invention of engines of motion lately brought to perfection* (1651), p. 2, sig. [A2v].

¹⁰⁰ Boyle correspondence, I, pp. 159, 178.

dubious promoters like Dymock. As Howard Hotson has shown, Hartlib, Comenius and his teacher Johann Heinrich Alsted aspired to regain the extent of knowledge mankind had lost after the Fall. As Alsted put it, 'man approaches God as closely as possible when he knows Him and His works and when he forms and conforms all his works and deeds to goodness and virtue'.¹⁰¹ This was not a purely intellectual concern. For, argued Hartlib, 'it is nothing but the Narrownes of our Spirits that makes us miserable'; mankind would indeed obtain 'infinite Meanes of Reliefe and Comfort' if 'that which God hath given them' was put to use 'to serve the Glory of his Goodness'.¹⁰² Despite his frustration, Hartlib in fact never completely dismissed Dymock, urging Boyle that Dymock's 'publick and private usefulness' be reappraised and some of his schemes be further 'supported, than hither it hath been'.¹⁰³ Even after a correspondent concluded that Wheeler was no less than a charlatan,¹⁰⁴ Hartlib kept noting in his work diary *Ephemerides* Wheeler's numerous inventions until the inventor's death in 1652.¹⁰⁵ Hartlib took a similar approach to Glauber, stressing the need to 'note whatever was true and good in all his writings' even if the inventor was by some 'count[ed] no better than a mountebank, one that continues to cheat all sorts of people by his specious artifices'.¹⁰⁶ '[Y]our rule is goode', acknowledged Culpeper, 'to passe by the woorste of every man soe as the infirmities hinder not the use of what good is him'.¹⁰⁷ Even where collaboration proved untenable, therefore, the impulse towards collecting God-ordained knowledge prompted to gather information even from the

¹⁰¹ J.H. Alsted, *Cursus philosophici encyclopaedia* (2 vols., 1620), I. 20. 3, quoted in Hotson, *Alsted*, p. 70. The tradition of cataloguing divine wisdom and judgement goes well beyond Hartlib's immediate predecessors. See Matthew McLean, *The Cosmographia of Sebastian Munster: describing the world in the Reformation* (Aldershot, 2007), pp. 105-26, 332; Alexandara Walsham, *Providence in early modern England* (Cambridge, 2001), ch. 2-3.

¹⁰² [Dymock], *Husbandry-learning*, sig. 2A, [2Av], preface by Hartlib.

¹⁰³ Boyle correspondence, I, pp. 160, 178.

¹⁰⁴ HP 62/17/1B, W. Rand to Hartlib, 14 Feb. 1652.

¹⁰⁵ HP 28/2/2A, 14B, 35B, 39B, 45A, 46B, 50A, 52B, 53A.

¹⁰⁶ HP 7/7/3B, Hartlib to Winthrop, 16 Mar. 1660.

¹⁰⁷ 'Culpeper letters', p. 312 (13/202-3).

excluded.

If different facets of the reforming ideal prevented the Hartlib circle from pursuing a coherent method of promoting useful knowledge, the persistent distrust of the projector led collaborators to take diverging courses of action. In September 1649, when Dymock was busy promoting his schemes for agriculture and perpetual motion, he complained of 'the exceeding antipathy that almost all men have in them against engenuitye which causes them to reject all new inventions ... under the name & notion of projects'.¹⁰⁸ This explains why Dymock carefully played to the sensibilities of his prospective patrons. Unlike Wheeler who did not build mills in England, Dymock set up a 'model' of his engine in Lambeth to prove his technical competence. Although he could drop pious language and highlight forthcoming profits when occasions suited,¹⁰⁹ Dymock's letters to Hartlib constantly emphasized his desire to serve 'ever Gracious God' and 'the universall good of Mankind' by perfecting god-ordained inventions.¹¹⁰ Alluding to the very passage from Ecclesiastes that Dury mentioned, Dymock even assured Hartlib that 'of this seed you will reap abundant Harvest in due time' – a superb metaphor for promoting engines to be used in agriculture.¹¹¹ Even though he did not abandon proprietary attitudes as Plattes and Blith did, in this way Dymock managed to solicit a degree of support from Hartlib and his associates.

Others in the circle stopped promoting schemes to private backers. Worsley provides the most striking example. In 1649, while staying in the United Provinces, he declared 'the vanity of proposing' new schemes:

¹⁰⁸ HP 62/50/5A, Dymock to Hartlib, 29 Sept. 1649.

¹⁰⁹ Dymock's letter to Worsley, transcribed in Royal Society Archives, Boyle Letters 7/1, 18 May 1649, Worsley to Hartlib ('nothing is wanting to make you ... rich').

¹¹⁰ HP 62/60/9A *passim*.

¹¹¹ A now lost letter to Hartlib on 10 Mar. 1652, printed in Cressy Dymock, *An invention of engines of motion lately brought to perfection* (1651), p. 2-3.

vnlesse I may have a place or settled imployment in England, I shall have no heart at
 all to come over, for I am much convinced of the vanity of proposing any invention
 to the world of any kind[.]¹¹²

This was a clear change from 1646. He had then hoped that schemes like his own,
 'propounded even but by strangers' like him, would be capable of winning 'favour and
 acceptance' of parliament and elsewhere.¹¹³ His interest in saltpetre remained, and Worsley
 continued to propose ways to achieve the better 'Imploiment of the poor', the 'bringing in
 of Bullion' from abroad, or 'the augmenting of the Revenue to the State' for the
 'Commonwealth's service'.¹¹⁴ But his activities were increasingly channelled into the
 government, for example, the commission for the parliamentary settlement in Virginia, and
 the Council of Trade set up in 1650.¹¹⁵ Petty pursued a similar path. During 1648, he was
 busy publicizing the double-writing engine and dabbling in agricultural inventions
 including a corn-setting engine, perhaps in an attempt to improve the engine patented by
 Plattes. Yet after a brief foray into the University of Oxford, he started serving as a
 government official in Cromwellian Ireland for the famous Down Survey.¹¹⁶ If Plattes and
 Blith adopted open communication of experimental results in response to prevailing distrust
 of the projector, Worsley and Petty opted to pursue careers in government to exploit their
 talents in what must have appeared a more favourable environment. If anything, the

¹¹² HP 26/33 2B, Worsley to Hartlib, 22 June 1649.

¹¹³ HP 71/11/9A.

¹¹⁴ Benjamin Worsley, *Free ports, the nature and necessitie of them stated* (1652), p. 4;
 [Benjamin Worsley], *The advocate: or, a narrative of the state and condition of things between the
 English and Dutch nation, in relation to trade* (1651), sig. B2v. For backgrounds, see Leng,
Worsley, pp. 77-79.

¹¹⁵ Leng, *Worsley*, pp. 55-70.

¹¹⁶ 'Culpeper letters', pp. 335-48; McCormick, *Petty*, pp. 73-4, ch. 3.

unresolved problem of distrust and the ambivalence of reforming ideals fragmented the circle's pursuit of useful knowledge.

VI

This article has not offered an exhaustive survey of the Hartlib circle's promotion of useful knowledge, but examined why it seems so untidy and inconsistent. Distrust was at the root of the problem, a distrust created by criticism of earlier projectors and monopolists which reached a climax in the 1640s. 'Projectors' had acquired such a bad reputation as being contrary to the public interest that the circle's strategy was constantly affected by the need to incur such criticisms. We have found that the problem of distrust divided the circle over two fundamental questions. First, there was a delicate question of political economy: how to promote useful knowledge and economic improvement without depriving others of their properties and rights to trade. As the case studies of Worsley and Petty have shown, there was an emerging agreement that one should avoid behaving like early Stuart projectors, imposing authority purported for the public good. Yet, equally importantly, Dury and Culpeper disagreed as to whether Le Pruvost might be permitted to use the state authority to impose stiff penalties to deter free riders. The second point raised by the distrust of the projector was the question of money and credibility. There was a deep-seated fear that the promotion of useful knowledge may be undermined by elements of profit. Plattes and Blith distanced themselves from monetary rewards and the search for investors in order to lend credibility to themselves and the knowledge they claimed to possess. Yet because many promoters did not adopt such an opt-out strategy, the Office of Address had eventually to allow for the remuneration of men like Wheeler.

The loosely shared concept of reformation proved an inadequate guide for action.

When discussing the Office of Address proposals, the reformers initially had different views as to what forms of reward should be offered to the inventor, and only reluctantly 'accommodated' what they called men of 'mechanic' dispositions. In the absence of an official Office of Address, men like Culpeper and More disparaged men like Petty and Wheeler for mercenary attitudes and for lacking inward reformation. Yet avid reformers like Dury was quick to point out that they ought not fully trust their own judgement lest God's will might manifest through seemingly dubious collaborators. Even if financial support proved untenable (as in the cases of Dymock and Wheeler), Hartlib felt obliged to gather information from them in order to restore the knowledge lost after the Fall. These varying positions were probably not mutually exclusive. Religiously affected reformers such as Hartlib, Culpeper, and Dury seem to have embraced these reforming impulses, each taking diverging actions drawing differently upon their loosely shared ideals. The circle's untidy pursuit of useful knowledge emerged, in short, as differing responses to, and interpretations of, a shared frame of reference: the distrust of the projector and the pursuit of reformation.

The findings of this article enable us to do more than develop a conceptual framework for synthesizing studies of the Hartlib circle. First, the analysis of binary discourse that have hitherto focused on post-Reformation politics and religion could be fruitfully extended to incorporate economic and technological themes. Historians of early Stuart and Civil War England could, for example, explore how the pro-reform and anti-projector rhetoric influenced the debate about parliamentary taxation in the same way in which reformation and anti-popery did the debate about church settlement.

The article simultaneously contributes to history of science and technology. Studies of the rise of experimental philosophy have tended to suggest that philosophical objections

derived from Aristotelianism and Scholasticism presented chief obstacles to the use of experiments.¹¹⁷ When it came to the application of useful knowledge, however, another important constraint emerged from a more political context, the collapse of Charles's Personal Rule and the ensuing denunciation of the early Stuart projector through various media. Given the degree to which Hartlibians were alive to the danger of distrust, we should do well to integrate the analysis of political culture more fully into studies of knowledge making.

More fundamentally, by surveying how shared stigma consciousness gave rise to conflicting strategies for negotiating credibility and collaboration, the article highlights distrust as a useful category for exploring early modern knowledge-making practices. Under the influence of Steven Shapin and Simon Schaffer, the analysis of trust in the history of science and technology has dwelt greatly on the question of 'whom to trust'. This has led to a series of case studies investigating practitioners' identity and self-presentation that enabled them to be deemed credible.¹¹⁸ An emerging consensus is that even those who 'lacked the [formal] learning and demeanour of a natural philosopher' could attract a degree of attention and even support.¹¹⁹ The findings of this article not only support this specific consensus, but urge us to ponder how far the negotiation of trust and credibility might have been driven not so much by a set of well-defined personal attributes as by a shared stigma

¹¹⁷ Peter Dear, *Discipline and experience: the mathematical way in the scientific revolution* (Chicago, 1995), passim; Shapin, *Social history of truth*, p. 124. But see Ratcliff, 'Sons of Machiavelli'.

¹¹⁸ The literature is too vast to do justice to here. But see important works reviewed in Johns, 'Identity, practice, and trust'; Stephen Johnston, 'Making mathematical practice: gentlemen, practitioners and artisans in Elizabethan England' (Ph. D thesis, University of Cambridge, 1994); Barbara Shapiro, *A culture of fact: England 1550-1720* (Ithaca, 2000); Lisa T. Sarasohn, 'Who was then the gentleman? Samuel Sorbière, Thomas Hobbes, and the Royal Society', *History of Science*, 42 (2004), 211-232; Marika Koblusek, "'Keeping It secret": the identity and status of an early-modern inventor', *History of Science*, 43 (2005), 37-56; J. R. Ratcliff, 'Samuel Morland and his calculating machines c. 1666: the early career of a courtier-inventor in Restoration England', *British Journal for History of Science*, 40 (2007).

¹¹⁹ The phrase is taken from Koblusek, "'Keeping It Secret'", p. 49.

consciousness prompting a multitude of coping strategies. Did the distrust of the projector shape Hartlibean reform in other spheres such as medicine and taxation? Was Boyle's insistence upon 'disinterestedness' an implicit response to the accusation of nefarious 'projecting', something similar to Platts's and Blith's strategy to highlight their financial independence as a source of credibility? Were Fellows' activities not affected by 'longstanding wariness of projectors', as Larry Stewart suggested?¹²⁰ Can bodies such as the Royal Society (established in 1660), and the Royal Society for the Encouragement of Arts, Manufactures and Commerce (founded in 1754) be studied as institutional solutions to distrust?

This article thus opens new avenues for research. By explicitly engaging with studies of post-Reformation culture, by exploring the ways in which opposing concepts such as the projector and the pursuit of reformation shaped reforming initiatives, we can begin to bring together the burgeoning case studies of practitioners of science and technology in general and the Hartlib circle in particular towards more fruitful synthesis.

¹²⁰ Larry Stewart, *The rise of public science: rhetoric, technology, and natural philosophy in Newtonian Britain, 1660-1750* (Cambridge, 1992), p. 15.