

# van Helmont's proposal for a randomised comparison of treating fevers with or without bloodletting and purging

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**ABSTRACT** Around the year 1643, Joan Baptista van Helmont, a Flemish chemist, alchemist and physician who had devised what he claimed to be a new form of medicine, proposed a 'challenge' to traditional Galenic physicians to compare treatment of fever by traditional methods and by a regime which did not involve bloodletting and purging. Two groups of patients were to be treated and 'casting of lots' was to be used – in some way not specified in detail – to decide who received which treatment. This 'challenge' has been regarded as the first proposal for the use of randomisation in a clinical trial.

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This paper explains the background to the challenge and discusses what can be deduced from Helmont's text about the details of how he proposed that the 'trial' was to be carried out. It concludes that internal evidence in Helmont's writings makes it certain that no such 'trial' was ever conducted. It seems that the 'challenge' was probably a rhetorical device to support Helmont's vehement criticism of traditional Galenic medicine and its practitioners, and, in particular, to emphasise his absolute opposition to the use of bloodletting as a medical treatment. An appendix includes a short summary of Helmont's theories of the origins of disease and transcriptions of the passages of Helmont's Latin text translated in the article.

**KEYWORDS** bloodletting, casting lots, Galenism, history of clinical trials, iatrochemist, randomisation

**DECLARATION OF INTERESTS** No conflict of interest declared

## A CHALLENGE TO GALENIC MEDICAL THEORY AND PRACTICE

Galenic medicine still held sway in the 17th century, sanctioned by authority, hallowed by centuries of practice and universally taught in the European Medical Schools. Galenic medicine provided a theoretical system to explain the origin of disease, and logical argument – Reason – deduced the required treatment. Disease was due to disturbance of the temperaments of the four humours and its cure had to be sought by rebalancing them, thus relieving the distemper. Since individuals differed in the natural balance of their humours, some being choleric, some melancholic and so on, the correct balance to be achieved for their cure also differed from one patient to the next – not because their diseases might differ but because they differed. Diseases were not different entities – indeed there was 'disease' rather than diseases; there were no varieties of sickness, only varieties of sick patients.

The physician's skill lay in rightly recognising the disorder and allocating it to its humour or humours of

origin, thus determining which humours were disturbed and in what way. Sound reasoning then led to the prescription of the correct treatment to rebalance the patient's constitution. Fever was not a disease *sui generis* but the result of an imbalance, often induced by an accumulation of putrid matter, in which the hot humour was in excessive supply. Reason thus dictated that the excess heat should be reduced by removal of some of the hottest humour – blood – and that the putrid matter should be expelled. Thus the mainstay of treatment was bleeding and purging.

Molière's caricature of a final examination in medicine in an entr'acte in *Le Malade imaginaire* (1673) is, one suspects, uncomfortably close to some truths of practice at that time. In the doggiest of Latin doggerel the bachelor aspiring to the Doctorate in Medicine is questioned by five physicians. The candidate has but one answer about to how treat dropsy, then asthma, then fever with pleurisy. It is:

*Clysterium donare*  
*Postea seignare*  
*Ensuitta purgare*

*Give him an enema*  
*After that bleed,*  
*Then purge him.*

And if the irritating patient refuses to get better? Do it all again. Loudly applauded by the assembled company as worthy to join the learned, he is licensed by the President to be a physician:

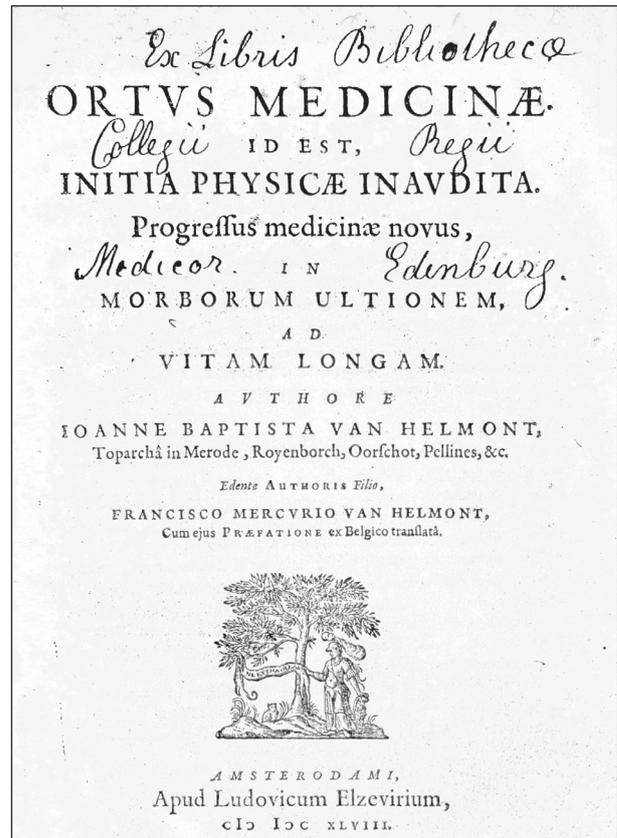
To drug, to purge, to bleed, to cut and pierce and kill with impunity throughout the land.

Among at least some physicians there was undoubtedly dissatisfaction with the frequent ineffectiveness of treatment devised according to even the best of the learned tradition of the Schools of Medicine. But what else was to be done?

An alternative was available. In the 16th century, the Swiss itinerant 'doctor' Theophrastus Bombastus von Hohenheim, self-styled Paracelsus, rejected the Galenic system and preached an 'alchemical' alternative. In the later years of the 16th century and throughout much of the 17th, the Galenists – especially those in Paris which had become the citadel of the 'new' Galenism since the 1530s – did battle with the new chemical doctors, the *iatrochemists*.<sup>1</sup> They were often labelled Paracelsians – though by no means all of them accepted the theories of Paracelsus, who prescribed remedies derived largely from metals and other minerals. Some physicians relied entirely on the 'chemical' remedies, others used both the Galenic and iatrochemical *materia medica*. Not the least distinguished of these dual therapists was Theodore de Mayerne, diplomat and spy, and physician to princes (including Henri IV of France and James I of England). Trevor-Roper<sup>2</sup> has provided a magisterial account of Mayerne's life and times.

Another 17th century physician influenced by Paracelsian thinking and practice was Joan Baptista van Helmont. He was born in Brussels in 1579 into the Flemish gentry and acquired by marriage the overlordship of a number of districts. He was thus of independent means and not dependent on practising a profession for his livelihood – a point to be remembered when he scorns those who practise medicine for the gain it brings. He studied various disciplines at the University of Louvain, including medicine, found them all completely unsatisfactory and came to regard their doctrines as empty verbiage and their teachers as empty-headed. Having read all the extant great medical works – some 600 or so – he found them wanting and devoid of any certain knowledge of truth. He writes:

Thus I read the works of Galen twice and also Hippocrates (whose aphorisms I could almost recite by heart) and all of Avicenna and the Greeks and Arabs as well as the moderns to a number of perhaps six hundred; and I read them diligently and marked passages in them noting all that struck me as unusual and worthy of quotation...[and finally found] nothing solid, nothing confirming knowledge of the truth or the truth of knowledge (*Ortus*, *Studia authoris* sections 14–16) See Appendix for the original Latin text.



**FIGURE 1** Title page of the Sibbald Library's copy of *Ortus medicinæ* by Joan van Helmont published posthumously by his son Franciscus in 1648.

Helmont was undoubtedly influenced in developing his new system of medicine by the ineffectiveness of Galenic practice – though by no means only by this consideration. His aim was, indeed, a new medicine, not a return to, nor perfection of, the medicine of some previous golden age. The title of the *Ortus medicinæ*<sup>3</sup> translates as: 'The rise of Medicine. That is, the beginning of a physic never before known. The advance of a new medicine to be revenged on diseases and for a long life...'

Helmont considered Aristotelian philosophy to be invalid and he regarded Galen's teachings as a perversion of the works of Hippocrates, the true founder of the art of medicine. He was a deeply pious man who toyed with, but rejected, a career in the Church, but remained strongly influenced by his Christian mystical beliefs throughout his life. A quarrel with the Jesuits, whom he had once admired, led to his prosecution by the ecclesiastical courts and denunciation to the Inquisition (the Netherlands were then under Spanish rule), and he spent many years under house arrest though he was eventually cleared of charges. For a summary of Helmont's life and beliefs and discoveries in science see Pagel.<sup>4</sup>

A summary of some of the complex web of Helmont's theories, part alchemical, part mystical, partly depending on observation of physical properties, and partly on

belief in psychic powers distributed throughout inanimate as well as animate nature, is included in the Appendix. His important contributions to what would become chemistry have not been mentioned. They include the 'discovery' of gases – though Helmont meant something rather different by the term 'gas' than does modern usage. His medical writings were widely influential. According to Page<sup>5, p20</sup> 'Van Helmont's work touched off a landslide reaction on the literary, scientific and medical scene in Puritan and Restoration England'. Certainly his work was very widely influential on medicine and medical practice, see particularly Debus.<sup>1,6</sup>

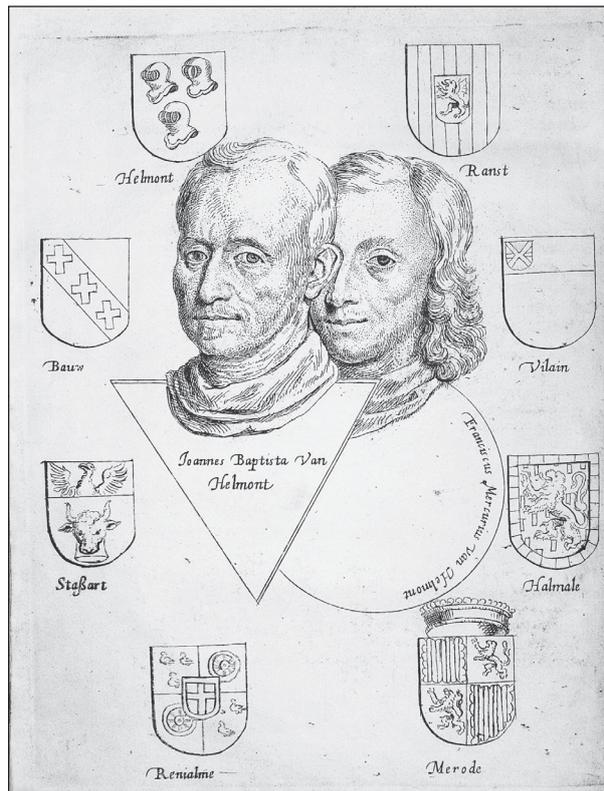
### THE CHALLENGE IN HELMONT'S *ORTUS* TO 'ORTHODOX' MEDICINE'S USE OF BLEEDING AND PURGING

The work containing the challenge to a 'trial' which has led to its inclusion in the James Lind Library was published posthumously in 1648<sup>3</sup> (Helmont, *Ortus medicinae...* 1648) by Franciscus Mercurius van Helmont, Joan Baptista's son, who incorporated a Latin translation of the preface his father had written for his projected Dutch edition of his works, which was eventually published, incomplete, in 1659 (as *Dageraad oft nieuwe opkomst...*,<sup>7</sup> see Page<sup>5</sup>).

#### A Childish Vindication of the Humorists

The first (66) of the two relevant chapters is labelled *Puerilis Humoristarum vindicta* – translated as *A Childish Vindication of the Humorists*, in the 17th century English translation of Helmont's book (Helmont, *Oriatrike...* 1662<sup>8</sup>). Helmont first says that he has previously published a number of works – *On Fountains*, *On Fevers*, *On the Stone* and *On Plague*. The publication dates of these works enable us to suggest a date for the composition of the *Childish Vindication*. Though the first of them – *On Fountains* – was published in 1624, the first edition of the work on fevers did not appear till 1642; and the *Opuscula* containing the latter three works appeared in the year of Helmont's death, 1644. The preface to the second edition of *On Fevers* contained in the *Opuscula* is dated October 1643. The *Ortus* was published posthumously in 1648, edited by Helmont's son (Francis Mercurius van Helmont), and no doubt contains works written at various times. But the strong probability must be that the *Childish Vindication* was written between 1642 and Helmont's death on 30 December 1644 (Helmont, *Oriatrike*,<sup>8</sup> see also Page<sup>5</sup>), since Helmont refers to the reactions of his antagonists to the published books (*edideram...opuscula*).

In these works Helmont attacked the traditional doctrine about fevers and their treatment. But, far from being grateful for his efforts to help them see the error of their ways: '...the greater number hath despised those



**FIGURE 2** Engraved plate with portraits of busts of Joan (left), and Franciscus (right), van Helmont which forms a frontispiece to the *Ortus medicinae* of 1648. The coats of arms are of districts of which Joan van Helmont was overlord.

things which I have taught presuming to know all things knowable...'. (*Oriatrike*, 1662<sup>8</sup>, p522). When, in 1602, he had cured some hopeless cases, the 'Arch-physitians' had the patients taken to them and got the remedies from them '...that they might imitate and exceed me' (*ut me imitarentur, et superarent*). Counterfeits of his remedies were then circulated. For these reasons he decided that 'whatsoever of the more rare Philosophy is to be divulged that it is altogether to be performed under the Heroglyphicks or Mysticall Figures of the more skilful' (*Oriatrike*, 1662). In short, Helmont will keep his remedies secret and everyone else must find his own answers by his own labour as far as God permits him. He ends by setting out ten reproaches and insults that he says he has received from 'the reproachful and more unlearned' (*Oriatrike*,<sup>8</sup> p523). Of these, Number 8 is relevant to this discussion, since the challenge to put treatment to the test of a formal trial is contained in his reply to this reproach in the following chapter (*The Author Answers*).

I have not quoted the English translation from the *Oriatrike* because, though it is accurate enough, this is one of the instances in which its charming Restoration language is rather less than clear to the modern reader. Here is my translation of the Latin text from the *Ortus*.

8. We, also, cure the sick as often as we wish without bleeding. But we are afraid of relapses to a worse state when noxious humour is left in place while we

deceive the sick with soporifics and sedatives. So we do not practise according to the prescription of boastful peddlers of mirages; for we have the health of our patients at heart and so distance ourselves from such empirics by rational methods. For Helmont alone knew all things and until now we have been blockheads. (Helmont *Ortus* 1648, p 524).

The purpose of bleeding in fever was, of course, to remove the excess of 'hot' blood. The reference to the noxious humour left in place is to what would happen, on the traditional view, if the patient were not given purgatives, since the purgatives removed the putrid material thought to engender some types of fever. Lack of purging would, therefore, leave this toxin behind to provoke a later relapse that the traditionalists feared would be worse than the first state; also the patient would be lulled into a false sense of security by the palliative remedies that, presumably, they attribute to Helmont's regime. Notice the insistence on reason as the basis for treatment as opposed to reliance on empirical observation. One supposes that the last sentence is intended as pure irony; that aside, passage 8 is the kind of criticism that might well have been made by a Galenic practitioner.

But we must realise that these ten 'reproaches and insults' were written by Helmont himself and it is soon apparent from the following Chapter, *The Author Answers*, that they are 'Aunt Sallys' he has set up in order to attack, defeat and dismiss the claims of the traditionalists. They are the chosen grounds on which he has decided to fight.

### The Author Answers

The last chapter (67) of the first section of the *Ortus medicinae* is entitled *Respondet Author*. The text of section 9, listed at the head of the chapter as *Author provocat Humoristas, totius mundi, in certamen actuale* (The author challenges the Humorists of the whole world to a practical contest) is the section of the text in which Helmont issues the challenge to the traditionalists to pit their methods against his in a comparative trial.

Preceding sections of the chapter summarise some aspects of the basis of the quarrel which is, of course, a disagreement about the nature of Nature itself and the manner in which disease arises; the argument centres on the treatment of fevers as an exemplar of general principles and Helmont's attack continues after the challenge has been issued. The attack is very bitter: as well as being incompetent so that they kill their patients, the Humorists believe that their opinions are unassailable because of their antiquity and they resent any disagreement that might reduce their gain from their practice. They operate a closed fraternity. So

much is the latter true that it is impossible for a Prince ever to have a competent physician because each recommends his successor; thus Princes are 'not to be numbered among those that are endowed with long Life' (*Oriatrike*, 1662,<sup>8</sup> p528). It is little wonder that Helmont was as unloved by the Schools of Medicine as he himself claims.

## THE TEXT OF HELMONT'S PROPOSAL FOR A RANDOMISED TRIAL

With this background in mind let us turn to the description of the proposed trial of two opposing methods of treating fever. The Latin text about the trial is identical in the editions of the *Ortus medicinae* that I have checked (first, 1648; third, 1652; and fourth, 1655). This is not surprising since Helmont died in 1644. The passage translated below is from the chapter *Respondet Author* in the first edition of van Helmont's *Ortus* (Amsterdam 1648), in the copy in the Sibbald Library of the Royal College of Physicians of Edinburgh, on pages 526–7. The annotations, marginal comments, and presumably the underlining of parts of the printed text, are almost certainly in the hand of the physician George Hepburn who bought the book in September 1652 (see Donaldson<sup>9</sup> for more details of this copy of the *Ortus*). The list of contents of this chapter has:

*Author provocat Humoristas, totius mundi, in certamen actuale.*

The author challenges the Humorists (i.e. the Galenists) of the whole world to a practical contest.

For Medicine is no empty word, no fool's boast, no vain speech: after the word is said the work remains to be done. In this matter I scorn abuse, the boasts of the ambitious and pitiful vanities. Come, let us return to the argument. If you speak the truth, you Schoolmen, that you are able to cure any kind of fever without purging but that you are not willing to do so for fear of a worse relapse, come down to a contest, you believers in the Humours. Let us take from the itinerants' hospitals, from the camps or from elsewhere 200 or 500 poor people with fevers, pleurisy etc. and divide them in two: let us cast lots so that one half of them fall to me and the other half to you. I shall cure them without blood-letting or perceptible purging, you will do so according to your knowledge (nor do I even hold you to your boast of abstaining from phlebotomy or purging) and we shall see how many funerals each of us will have: the outcome of the contest shall be the reward of 300 florins deposited by each of us. Thus shall your business be concluded. O Magistrates to whose hearts the health of your people is dear; let the trial be made for the public good, in order to know the

truth, for the sake of your life and soul and for the health of all the people, sons, widows and orphans. Let there be a real debate to find the means of cure. Rather than giving honours use your office to add a reward for its finding. Compel those who resist either to enter the contest or to concede the field in silence. Let them demonstrate what they now bawl about. Thus are credentials to be established. Let words and quarrelling cease; let us act in friendship and from our shared experiences; let it be known hereafter which is the true method. For when there is contradiction, of the two proposals only one is true.

[next column, section 12]

For if you are moved by charity, or the care of your souls vexes you, let us proceed to the challenged contest! For I swear that if you win I shall happily abandon my evil opinions and hereafter enter fully into your doctrine. (Helmont 1648<sup>3</sup> *Ortus*, pp 526–7).

## AN ANALYSIS OF THE PROPOSED TRIAL

We may now ask what it is possible to say about how the trial was to be conducted and how the outcome would be judged.

There is a clear and unequivocal, though partial, answer to the second question: ‘we shall see how many funerals each of us will have’ (*videbimus quot funera uterque nostrum habiturus*). Will have, but by when? There is no information about how long is to pass before the funerals are counted so we do not know at what survival time a patient is to be considered to be cured.

Just how the trial was to be performed is much less clear. We would like to know just how the ‘lots’ were to be employed so let us consider the one sentence that the text presents on this. The relevant Latin is:

Sumamus e Xenodochiis, e castris, vel aliunde 200 aut 500 pauperes febrientes, pleuriticos &c. **partiamur illos per medium: mittamus sortes, ut mihi illorum una medietas cedat, & altera vobis.** (my emphasis).

My translation follows the text fairly closely. Beginning at *partiamur* and translating as literally as will make sense, the text says:

Let us divide them through the middle: let us cast lots in order that of them one half may fall to me and the other to you.

The most obvious interpretation of the colon after the Latin ‘*medium*’ suggests that the division into two precedes the drawing of lots so that the sentence describes events in the temporal order in which they are to occur. There is no doubt at all that *medietas*, the portion, or half, is

singular as, of course, is the verb whose subject it is (*cedat*). So it is the **half** which is to ‘fall to me or to you’. But this does not help in deciding whether the lots were to be used to create the groups or to allocate the already divided groups. My English text reflects the same ambiguity.

If this, the obvious interpretation if one simply considers the order of the words in the text, is correct we must suppose that the proposal was to divide the 200 or 500 into two equal groups, by means unspecified, then to draw lots to decide which group would be assigned to Helmont and which to his opponents. But is it possible that there might be another interpretation?

I am not quite persuaded that the second clause might not describe the process of division itself, not actions subsequent to the division; thus the clause ‘*ut...cedat*’ would signify that the division is to be carried out, using lots, *in such a way that* the result shall be that half will fall to me etc. In that case the clauses do not represent a temporal order of events; the first is a general statement that there is to be a partition, and the second describes how that partition shall be achieved: lots are to be cast in such a way that the end result will be that ‘we each get half’. Presumably this would mean ‘casting a lot’ – however that was to be done – in respect of each of the 200 or 500 patients. This interpretation does raise difficulties; for instance, how would they ensure the groups were of equal size if they drew lots for each patient? This question cannot be answered since there is nothing to tell us just what ‘casting lots’ would entail. There are, of course, ways of making a (nearly) random allocation of successive individuals to two groups that could have been used in the 17th century, but whether Helmont could have worked out such a procedure – had he wanted to – is quite unknown. But it is also very likely that this is an unwarrantable attempt to over-interpret the text from the standpoint of the 21st century, to force from it a distinction between alternatives whose existence would not have occurred to its author.

Perhaps the simpler interpretation, that the lots decided the allocation of the already-created groups, is the more probable; however, the only safe conclusion is that one cannot be sure how Helmont was suggesting the division was to be made and at what stage the lots were to be used. Since there is good reason to believe that no such trial ever took place – see below – it is not unlikely that Helmont himself simply had not worked out these details.

## DID VAN HELMONT EVER CARRY OUT THE TRIAL HE PROPOSED?

To attempt to answer this question we need to consider the context of the passage that describes the trial and

some of the background to his quarrel with the 'Humorists'. The relevant text is in the last two chapters of the first section of the *Ortus medicinae*.

Since the challenge was issued in a work that was first published in 1648, when Helmont had been dead for more than three years, he could not have taken part in any trial resulting from the publication. It is not impossible, however, that some writing of his containing the challenge might have circulated during his lifetime, though if this were so, one might expect him to have mentioned it in the *Ortus* in the way he describes previous brushes with the Humorists when, as we have seen, they apparently stole his remedies. But there is another reason that indicates there never was such a trial.

Buried within the assaults on his adversaries are the two sentences at section 12 (numbered thus in both the *Ortus* and the *Oriatrike*) translated above. In them, after repeating the challenge, Helmont offers his adversaries a greater prize than the wager of money. If the trial goes against him he will renounce all his opinions and henceforward will join their camp. He was not a man who could possibly have resisted reporting in triumph the results of the trial had it gone in his favour; but he makes no such report. On the other hand, had it gone against him he could not have maintained any shred of credibility had he published the arguments and assaults against the Humorists, the challenge and his promise to recant, and then, though he had lost, made no recantation. The fact that he did publish these assaults and challenges unrepentantly must mean that he did not lose. So, if he neither lost nor won, there can have been no trial in reality. One must also not forget that these chapters seem to have been written very late in Helmont's life, perhaps in his last year, so there would have been little time for him to take part in such a trial had any of his opponents, having somehow heard of it before the publication of the *Ortus*, accepted the challenge – itself very unlikely since their whole philosophy was opposed to acceptance of any doctrine based on empirical observation.

So, was the challenge to a trial merely a rhetorical device? I suspect that this was exactly what it was and that this is one reason why the description of how a trial would be carried out is so incomplete. For all that, the proposal makes it abundantly clear that Helmont regarded an empirical trial of treatments as the means that he would wish to use to demonstrate the validity of one rather than another regimen of treatment. Even if the challenge was 'just' a rhetorical device, its terms are of great interest because they show that, imperfectly as we can now discern the details, Helmont had some notion of 'fairness' that should be employed in a test to decide between alternative treatments, and believed that some means should be used to ensure that neither side was allowed to choose the patients that it would treat.

He also wished to rely on quantitative evidence – a count of deaths – to decide the result.

It would have been fascinating to have had evidence of how Helmont believed that the result of 'drawing lots' came about; for example of whether he had any notion of what one would now call random processes though, of course, this terminology would have quite foreign to him. The interpretation that he was invoking what we would now call a random process to avoid bias in the choice – which he would probably have thought of as avoiding giving either side an advantage in the contest – is, of course, what we would prefer to believe...and it may well be Helmont did mean something of this kind. But this is not the only possibility. Might Helmont's 'casting of lots' be interpreted in its ancient sense of a means of divination – that is, of ascertaining the Divine will or judgment, that is, the 'Truth'? Or did he believe that Divine Providence, to which he ascribed the ultimate role in the regulation of the Universe and of Man's knowledge of it, would manipulate the lots so that Truth would emerge? This comes to rather the same thing, at least for our purposes (see also Silverman and Chalmers<sup>10</sup>). If so, his motive in casting lots was not 'modern' in wishing to avoid bias, it was mediæval in remitting the issue to Divine judgment, to a trial of another sort more analogous to trial by combat than trial by experiment. Pursuing this a little further, some of Helmont's phraseology, *ad luctam descendite* – 'come down to the wrestling bout'; *intrate in certamen* – 'take part in the fight' – does suggest some sort of duel or trial by combat – the words could mean either a physical or an intellectual struggle. And the 300 florins could be seen as a wager on the outcome placed by each side. But the use of these belligerent phrases may be no more than Helmont exercising his habitual aggressive style.

In the end the text simply does not tell us just what the 'lots' were or how they were to be used.

This part of Helmont's text contains the phrase *Eia mecum ad rhombum* which has proved extraordinarily tricky to interpret. In the end it adds little to our understanding of the text and my translation 'Come, let us return to the argument' will suffice for understanding Helmont's text. But, for anyone who might be interested in the problems of translating a text from a previous age when a writer could take for granted a literary background quite alien to ours, the deciphering of this phrase makes an interesting little story which I shall tell elsewhere.

But, as we must avoid wishing our philosophies on Helmont – and so concluding that he must have had in mind some random process to avoid bias in his 'trial' – equally we must eschew burdening him with those of times that long preceded him. We do not, and probably cannot, know why Helmont proposed 'casting lots' to select the groups.

## APPENDIX

### HELMONT'S THEORIES ABOUT THE ORIGINS OF DISEASE

The alchemical doctrines of Paracelsus influenced Helmont deeply, though he did not follow all Paracelsus's beliefs. He denied the fundamental tenet of Aristotelian physics that all bodies are made up of the four elements fire, air, earth and water. For Helmont the only 'element' was water, and upon this its *Archeus* or governor (see below) imposed organisation peculiar to each body or substance. However, Helmont did follow Aristotle in believing that inanimate objects as well as living creatures have a 'soul'. Likewise he also denied the Galenic doctrines universally accepted by the Schools of Medicine – of contraries, temperaments and intemperaments, and of Humours whose disturbance caused disease. For example he writes:

Let Beginners take note here that, by their ingrained doltishness they beg the question after I have made it abundantly clear that there are in Nature no contraries, no temperament of the Elements and much less any intemperament of them: nor are there any Humours which deserve the title of the controllers of health and, in consequence, of disease. (Helmont 1648,<sup>3</sup> *Ortus; Respondet Author* p525)

According to Helmont, the body is controlled by an innate ruling principle, the *Archeus influus*, which governs all the organism and is co-located with, but distinct from, the exogenous and divinely-provided 'Soul'. Together with the 'Soul', the *Archeus* resides between the stomach and the spleen; these, and this region, he calls the *Duumvirate*; that is, the two rulers. Each organ also has a subsidiary *Archeus insitus* which regulates the assimilation and processing of its nutriment. Though it is psychic in nature, the *Archeus* is indissolubly linked to the body's material. The *Archeus* regulates bodily function according to a normal plan of action. Disease is produced by disturbance of the *Archeus*, which then reacts by producing disordered functional plans and thus disordered function. This happens in the following way. Only through the *Archeus* can any noxious agent act, and the disturbance arises through the body's *Archeus* generating a 'morbid seed', which becomes fertile by conceiving an image based on the *Archeus* of the disturbing agent. These partially-psychic, partially-material complexes are possessed not only by Man and animals, but also by plants, minerals and other matter. The result of the process of communication between the *Archei* is the conception, by the body's *Archeus influus*, of disease seeds (*semina morbida*) that, in turn, produce the local changes of disease. Readers who wish to have more details of this complex and often confusing series of concepts will find them presented by Pagel<sup>4,5,11</sup> and, somewhat more accessibly, by Debus<sup>1</sup> (Ch 4 pp 102–55).

To treat disease successfully according to Helmont's principles it is necessary to persuade the *Archeus* to abandon the morbid image and to return to its normal plans of action and thus to normal regulation of the body. Treatment serves both to 'calm' the 'outraged' *Archeus* and also to expel the morbid seed. When this has been done, Nature herself provides the cure. The best remedies to 'calm the *Archeus*' were, according to Helmont, chemical or alchemical, though for less severe cases of fever simple herbs might be effective. However, he is unwilling to describe his remedies clearly because of his previous experiences that, when he had disclosed his treatments, they were stolen or imitated with adulterated material. Instead, he advises that others should find them as he did, by carrying out experiments 'by fire', that is perform alchemical procedures. These usually involved distillation, calcining, refining and so on, which required heat, hence 'by fire'. In an edition of selected parts of Helmont's works – really a collection of summaries and paraphrases rather than a translation – Jean le Conte<sup>12</sup> tries to be a little more helpful to the non-adept by stating that fevers can be cured only by one, alchemical, remedy which he ascribes to Paracelsus:

Ce remede n'est ni vomatif, ni purgatif; mais sudorifique, qui incise, extenuë, resoût, liquifie, détache & deterge la matiere occasionelle en quelle part qu'elle puisse être. (Helmont, translated by Le Conte, 1670).

This remedy induces neither vomiting nor purging but causes sweating; it cuts away, thins out, resolves, liquefies, detaches and cleans the causative material wherever it may be.

These remedies, however, did not in any way combine or react with the body or its constituents; they 'confronted' the disease, and by this confrontation, caused a change in its behaviour. 'In this lies its magic and arcanum, its infinite and miraculous effectiveness...' says Pagel.<sup>7</sup>

For a fuller discussion of the origins of Helmont's philosophy and system of medicine see the extensive analyses of its complexities and ramifications by Pagel<sup>4,7,11</sup> and the more succinct account by Debus.<sup>1</sup>

### LATIN TEXT OF PASSAGES TRANSLATED

(Helmont 1648;<sup>3</sup> *Ortus*, Studia authoris sections 14–16).  
Itaque legi opera Galeni bis, semel Hippocratem (cuius Aphorismos paene memoriter didici) totumque Avicennam & tam Graecos, Arabes, quam modernos forte sexcentos ferio, & attente perlegi, ac per locos communes annotans, quidquid singulare mihi in iis, & calamo dignum videretur...solidi nihil, nihil quod scientiam veritatis, aut veritatem scientiae sponderet

[In this and all the other transcriptions of Helmont's Latin text I have replaced consonantal j and u by i and v respectively].

(Helmont 1648;<sup>3</sup> *Ortus*, p. 524).

8. Sanamus & nos morbos quoslibet absque phlebotomo, quoties volumus. Sed timemus recidivas peiores dum intus relictu humore nocuo, imponeremus aegris, per soporifera & sedativa. Ideoque non procedimus ex praescripto iactantiarum fumivendulorum : dum salus infirmorum nobis cordi, perque rationalem methodum ab hisce empyricis nos separamus. Solus enim Helmont cuncta novit, nosque stipites fuimus hucusque.

(Helmont 1648;<sup>3</sup> *Ortus*, pp. 526–7).

Medicina enim non est nudum verbum, inanis iactantia, aut sermo vanus: post se namque opus relinquit. Quocirca sperno contumelias, iactantias ambitionis, & vanitates miseras. Eia mecum ad rhombum. Si verum dicitis, Scholae, quod possitis sanare quaslibet febres citra evacuationem: sed nolle, prae metu deterioris recidivae. Ad luctam descendite, Humoristae. Sumamus e Xenodochiis, e castris, vel aliunde 200 aut 500 pauperes febrientes, pluriticos, &c. partiamur illos per medium: mittamus sortes, ut mihi illorum una medietas cedat, & altera vobis. Ego illos curabo citra phlebotomiam, & evacuationem sensibilem; vos vero facite ut scitis (nec enim vos adstringo ad iactantiam phlebotomi, vel solutivi abstinentiam) videbimus quot funera uterque nostrum habiturus: praemium autem certaminis sint 300 floreni, utrimque depositi. Hic vestrum agitur negotium. O Magistratus, quibus cordi est salus populi! Pro bono publico certabitur, pro veritatis cognitione, pro vita & anima vestra, filiorum, viduarum, pupillorum totiusque sanitate populi. Ac tandem pro methodo curativa, in actuali contradictorio disputata. Superaddite praemium, honorarii loco, ex officio. Compellite nolentes intrare in certamen, vel palaestra obmutescentes cedere. Ostendant tum, quod modo oblatrando stentantur. Sic namque diplomata ostendenda sunt. Cedant verba, & iurgia, agamus amice, & per experientias mutuas: sciatur posthac, ultra methodus sit vera. Siquidem in contradictoriis, non ambae quidem propositiones; at tantum altera, vera est.

[next column, section 12]

Nam si vos charitas, aut vestrarum cura angit, eamus ad provocatum certamen! Promitto enim, si viceritis, quod lubens meo malo, postmodum in vestram totus vero doctrinam.

(Helmont 1648;<sup>3</sup> *Respondet Author* p. 525)

Notent hoc loco Tyrones, quod pro consueta soliditate petant principium, postquam iam abunde

constare fecerim, non esse contraria in natura, non temperiem elementorum, multoque minus qualitatum elementalium intemperiem: nec item humores, quibus sanitas, & per consequens infirmitas, iusto titulo patrationem debeant.

**Note** This paper has also been published in the James Lind Library (<http://www.jameslindlibrary.org>)

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