

IN SÜSSMAYER'S SPIRIT: ON THE PRACTICE OF EDITING IN TWO DISTINCT CASES

[unpublished piece, written for a collection of essays in honor of Annie Kuipers at the occasion of her retirement from Reidel / Kluwer publishers in Dordrecht – a collection that the book editors never brought to the press]

As Professor Smedley Force cogently reminded all of us more than 35 years ago, all critical interpretation of any text whatsoever “must be postponed until the text has been definitively established, the *lacunae* surrounded (but not replaced) with a sufficiently broad range of conjectured readings, the variorum footnotes, appendices, bibliographies, and concordances fully compiled.” And he went on to illustrate the point thus: “When we turn from the current stream of drivel on *Winnie-the-Pooh* and ask ourselves how much of this indispensable groundwork for useful study of the book has been laid, we discover – what we of course suspected merely by virtue of having lived on into this decadent age – that nothing of merit has even been begun!”

Luckily, we need not take this somewhat exalted conception of the burden an editor of texts takes upon him- or herself all too seriously, as Professor Smedley Force has never lived otherwise than as the author of the final essay in Frederick C. Crews' hilarious parody of a freshman course text *The Pooh Perplex. In Which It is Discovered that the True Meaning of the Pooh Stories is Not as Simple as is Usually Believed, But for Proper Elucidation Requires the Combined Efforts of Several Academicians of Varying Critical Persuasions*. New York: Dutton, 1965 (1<sup>st</sup> impr.: 1963).

Still, what Smedley Force's outburst *does* remind us of, is that criticism and interpretation of the work of an author no longer among us require a solid foundation in a text well-established. This ought to be a truism, but in practice it not always appears to be. In what follows, we discuss two samples of texts co-edited by us, in terms of the kind of obstacles one may face in the execution of a task freely adopted to fulfill as best as one can the reasonable core of Smedley Force's by itself somewhat outrageous proposition.

Among those obstacles to be surmounted we discuss in particular:

- (1) obstacles arising from the obvious impossibility, if one feels uncertain about the deceased author's original intentions with his text, still to consult him (or her; *passim*);
- (2) obstacles arising from different languages;
- (3) obstacles arising from the expertise required for grasping the substance of the text, and also, on a less technical but perhaps so much the more significant level:
- (4) obstacles arising from differing, even possibly clashing, intellectual frameworks.

Obstacle no. (1) is, of course, the rule in the business of text edition – the one advantage the text editor has over the creative author, that basically the text is already there and need not laboriously be put down on blank paper any more, is offset to quite some extent by the circumstance that a text has been entrusted to his or her care by (or on behalf of) an author no longer among us. In our own texts, we rely on our own wits and freely bear the responsibilities that ensue – if a critic takes us to task, we have only our own text to answer for. In the text of another, *whom the public at large will generally charge with responsibility for the text even if somebody else has edited it*, we are likewise thrown back upon our own resources, but now in a situation where the author is out of reach. The question then becomes to what extent we stand ready to go out of our way to reconstruct as best we can what decisions the author himself would have made under the circumstances. Clearly, we face here one more,

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formidable obstacle, one that is prior to the foursome we are to discuss, but which (but for a few passing remarks) we shall here leave untouched. This is the obstacle arising from interposed ego's. Raymond Chandler once made one of his characters observe: "Mozart is just music. No comment needed from the performer."<sup>1</sup> Such a summons to self-effacement on the part of the person who, for the purpose of rendering a work of art, puts himself between the author and his public cannot be maintained when the work itself still requires editing, like with Mozart's *Requiem*, in the establishment of the bare score of which some amount of 'comment' could not possibly be avoided. Still, in our view an editor should strive to the best of his capacity to become like the editor of that very *Requiem*, Franz Xaver Süssmayer, an otherwise scarcely known and wholly mediocre composer whom posterity nonetheless has the greatest difficulty distinguishing from the master as to who, in the uncompleted final parts of the *Requiem*, composed precisely what.

As much as we can in Süssmayer's spirit, then, we shall now address in medley fashion our four or five obstacles as we have sought to surmount these in two rather different editorial enterprises: H.A. Lorentz, *On the Theory of the Reflection and Refraction of Light*. Amsterdam: Rodopi, 1997 (translation, with an introduction, by Nancy J. Nersessian & H. Floris Cohen, of Lorentz' doctoral dissertation *Over de theorie der terugkaatsing en breking van het licht*. Leiden, 1875), and R. Hooykaas, *Fact, Faith and Fiction in the Development of Science. The Gifford Lectures Given in the University of St Andrews 1976* (edited, with an introduction, by J. Christiaan Boudri, H. Floris Cohen, and Valerie MacKay). Dordrecht: Kluwer Academic Publishers, 1999 (the latter book having been produced in pleasantly close collaboration, up to her retirement, with Annie Kuipers).<sup>2</sup>

## 1. Translators and translators

Translators come in sorts, and here are a few examples.

There is, first, the translator who is less at home in his own language than he thinks. Although this sorry state may on occasion be true of a professional translator, too, more often than not it is the 'native speaker' we are now speaking of. 'Beware of the native speaker!' is among the first lessons a professional translator of HFC's acquaintance sought to impress upon him when on the verge of writing his first piece in another than his mother tongue. He has since come across many a native speaker in the act of translating a foreign text or of commenting upon some foreigner's usage of their own native language; similarly and with a good deal of pleasure he has engaged in both these activities himself, and has never ceased to acknowledge the justness of his deceased friend's point. Beware, notably, of the *unchecked* native speaker! He may well be far too stern in his criticism, wrongly assuring his hapless interlocutor that such-or-such a construction is 'just impossible' in his own native (i.e., that interlocutor's second) language which however is far more liberal as a rule than, in his assumed role of general corrector, our native speaker cares to acknowledge. Or, the other way round, the native speaker may look with great satisfaction upon a text he has just translated which does not look so much as if it had originally been written in the target language, but rather betrays, in its general unreadability, its being approached from start to finish as words and sentence constructions *transposed*, rather than as a text *reconceived*, on its way from one language into another.

Next, there is the translator whose command of his *second* language leaves something to be desired – that is to say, just about every translator, for with very rare exceptions it is humanly impossible to be as completely at home in all nooks and crannies of an acquired as in one's first language. Luckily, dictionaries, grammars, and 'plain writing' books make up for a good deal, or at least begin to do so once a certain basic level has been

attained. Too often, it has not been attained. Let us abandon general exhortation and give chapter and verse. What, for example, is going on when E.J. Dijksterhuis discusses Simon Stevin's musical theories in connection with the one "snaar", i.e., 'string', of a monochord, but his Dutch translator consistently refers to this as a 'wire'?<sup>3</sup> Speaking of which, not only this abridged and rather thoroughly garbled, English version of Dijksterhuis' never-improved book on Stevin from 1943, but to a lesser extent likewise his masterpiece of 1950, *De mechanisering van het wereldbeeld*, loses a good deal in translation owing to both shortcomings here under discussion. Ordinarily, Dutchmen consult that book in the original only — why should they bother to look up the 1961 translation, however 'authorized'? But then, for the purpose of checking quotations, HFC once had to. Not only did he find that he could leave scarcely a line quoted as it stood, but he also began to understand why no foreigner had ever understood when he told them that Dijksterhuis had received the highest literary prize in the Netherlands for this very book.

The self-imposed task of checking quotations (particularly those rendered in translation) by looking up the original proved unsettling in many ways. First why did HCF find it necessary to go to such lengths of textual purism? This is because of the indelible impression stamped upon his mind in its youthfully malleable stage when R. Hooykaas told him about his discovery — first published by him in 1955 — that the well-known sentence in which John Calvin rejects Copernicus' heliocentric hypothesis for going against the Holy Spirit, that all the world knows from Andrew Dickson White's *History of the Warfare of Science with Theology in Christendom* (1896), p. 127, which sentence White had found in F.W. Farrar, *History of Interpretation* (1886), p. xviii, where the reference given by Farrar leads back in its turn to one definite place in Calvin's own work, is to be found neither in that place nor anywhere else in Calvin's numerous works.<sup>4</sup> 'Never again quote anything without tracing it back to the original, and if for some reason you cannot, let your reader know that you have not!' is the rule HFC has sought to stick to and imparted to others ever since (though it should be noted that he has *not* checked this story in either Farrar or Calvin, but does know that Hooykaas, though the first to find this out, was not the first to publish his find through no fault of his own but a certain naiveté in talking about it a little too freely).

We shall not bore the reader with an exhaustive listing of translation feats encountered over the years. Having already given some idea of what may happen in case of sheer deficient command of one or both languages involved, we pass on to the remaining categories: (3) lack of understanding of substantial issues in the text to be translated, and (4) stumblings of a, so to say, ideological kind with a translator in excellent command of all pertinent languages and of all scientific expertise required for his job.

Very generally speaking, the translation of a text from the humanities, or even from the social sciences, will be better than in the case of a scientific text, for the simple reason that the world of learning is very roughly divided into talkers, doers, and calculators and that the language-people generally feel ill at ease with the works and products of engineers and scientists. That it is not so easy to bridge that gap is testified by many a manual for a technical device you have just bought, written as a rule either by someone who does not really understand how it works or, if he does, does not very well know how to express it. In texts even by historians of science, often too much science is being done or at least implied to make translators generally comfortable, and the result often shows. With the author still alive, a wise partnership ideally ensues (as indeed it often does), but with the author deceased the translator is thrown back upon his own resources. Most readers will be familiar with the kind of text that then all too often ensues, of which the whole flavor seems more or less subtly wrong, with ideas and concepts either transposed literally or turned opaque, woolly and imprecise. More intricate and therefore

more interesting cases occur when the very meaning of a piece of text alters with translation. Minor examples of this — really situated close to the border with our preceding obstacle no. 2 — are to be met in a recent, remarkably well-selling, and overall admirable biography of Christiaan Huygens written in Dutch by the physicist/novelist Cees Andriessse.<sup>5</sup> Huygens in 1691 illustrated his expressed view that Descartes had failed to be animated by the spirit truly needed in the investigation of nature by means of his wonderful remark that with Descartes' laws of impact it was “comme s'il vouloit les prouver en faisant serment”.<sup>6</sup> Here Andriessse obscures Huygens' whole point, and thus causes those of his readers lacking access to the original to miss it as well, by rendering this as the Dutch equivalent of ‘as if he wanted to prove them by prayer’ rather than ‘as if he wanted to prove them by swearing an oath upon them’. Likewise, in his discussion of *De iis qui liquido supernatant* Andriessse proposes an emendation of the Latin term *moles* twice used by Huygens at a certain spot, in order to get one of his hypotheses right. Andriessse feels this ought to be replaced by a term meaning, not ‘weight’ but rather ‘volume’, which replacement might well seem superfluous to those aware that *moles*, among other things, *does* mean ‘volume’. Some awareness that those 17<sup>th</sup> century folks generally knew what they were doing so that any proposed emendation should be thought at least twice over may be called for rather than implying to one's readers that Huygens' command of either elementary fluid mechanics or the scholarly Latin of his day left a good deal to be desired.

At the other end of the spectrum, texts may vary hugely from one expert translator to the next owing to genuine disagreements over its basic thrust. Thus, there are very striking yet (as far as a layman can tell) altogether legitimate differences between three English translations of the *Chuang Tzu* — the other great classic of Taoism beside the *Tao Te Ching* by ‘Lao Tzu’. Burton Watson treats this text (which has a very complicated and uncertain origin and tradition) as one coherent whole, of a fundamentally mystical nature in its search for the Way, and with much effort put into rendering its literary beauty. In A.C. Graham's more analytical approach one rather finds the text cut up into a range of distinguishable, only internally coherent segments, with the mystical tenor by and large toned down to a radical critique of language and logic as vehicles for expressing the inexpressible, and with the stunning metaphors the various authors employed to phrase that critique shining in much less brilliant fashion (in other words, Graham's translation looks better reasoned but does not read nearly so well). Still, one can see that, for all their differences, both stick to standing, and also by and large complementary, conceptions of the search for the Way. By contrast, in Joseph Needham's rendition of a generous selection of passages the *Chuang Tzu* appears rather as an (at least in its core) scientific text, in line with Needham's accompanying argument that Taoism served as a prime source of inspiration for all that was most creative about the subsequent tradition in Chinese science, thus quite consciously setting himself against the long-standing inability of *literati* to recognize a scientific text when they have not been trained to see one.<sup>7</sup> Clearly, where apparently quite knowledgeable Sinologists can approach one and the same body of texts in so divergent a manner the outsider had better keep silent about their respective merits. The point of bringing up the divergence was rather to show that our obstacle no. 3 — a translator's understanding of the substance of a text — though most often a matter of sheer technical competence may on occasion go far beyond those technical boundaries and turn into an issue where entire world-views are legitimately at stake.

We have thus come close already to our final obstacle no. 4. Here the case *par excellence* of a translation done by a man in superb command of both the original Italian and his own, English language, but also of all the science one needs to come to terms with Galileo Galilei's works, yet still doing occasionally very odd things with

at least one of those works, is the late Stillman Drake. In checking all Galileo passages HFC once wished to quote against the originals in the *Edizione Nazionale*, he readily found that virtually nothing in Drake's translation (*Two New Sciences*, 1974) of the 1638 *Discorsi* left anything to be desired. But in his widely read, 1953 translation of the *Dialogo* of 1632, which is the only place to go for most English speakers intent on making themselves acquainted with at least one hugely entertaining masterpiece in the history of science, there are some truly worrisome things to be encountered.

For instance, close to the end of the *Dialogo* one of the interlocutors, Sagredo, pronounces three arguments out of the plethora discussed thus far to be "assai concludenti". We are here at a very critical point in the book. On the one hand, Galileo was not free in the mode he chose to set forth arguments pro and con Copernicus' hypothesis that the Earth is a planet orbiting the sun in a year and rotating around its own axis every 24 hours. His hands had been bound by the Congregation of the Index, which in 1616 had declared the Earth to be stationary at the center of the world (how far exactly the binding went, has been an ongoing source of controversy ever since the 1633 trial that followed upon Galileo's transgression of whatever were the precise limits drawn by that somewhat opaque decree and a few corollaries of, in one case, very doubtful authenticity). Moreover, the chief exegete at the time, Cardinal Bellarmine, had one year previously declared discussion of heliocentrism unproblematic if carried out in the time-honored mode of 'mathematical fiction' but had required proof in case the church were invited to adapt its standing, literal interpretation of pertinent passages in the bible to an allegedly quite different, true state of celestial affairs. Had Galileo now, in his *Dialogo*, offered proof? He was well aware that such favorite arguments of his as the property of a stone to fall vertically down regardless of whether the Earth rotates or not went far to remove standing objections against the acceptance of heliocentrism as physically real, but were not such as to call for a positive commitment. What arguments could? Three could, Sagredo appears to be stating here at the critical point just mentioned, as they alone are 'very conclusive'. No serious doubt is possible that this is what Galileo makes Sagredo say, with 'assai' uncontroversially standing for 'very', and 'concludenti' unsurprisingly meaning 'conclusive', as Drake himself translates the term when it reappears no more than one page farther down. Here, however, at this most critical point of the book that was to give direct occasion to the infamous trial against its author, the unsuspecting reader of Galileo/Drake's *Dialogue* has found for almost half a century now those three arguments pronounced by one of the author's mouthpieces to be just 'very convincing'.<sup>8</sup>

As noted, no doubt is possible that Drake knew better. We do not wish to imply that he consciously softened Galileo's expression; it is more productive by far to inquire what motives, at whatever intermediary level of semi-awareness, may have driven Drake in the present case, as likewise in several somewhat less egregious ones. Those motives may readily be inferred from the sum total of Drake's books and articles, which virtually without exception were devoted to Galileo. The intensely frustrating thing about those publications is that in sheer magnitude Drake's knowledge of Galileo's science and life is not likely soon to be surpassed, so that one would be happy to avail oneself of his final Galileo synthesis without more ado, were it not for a range of flaws in his approach which make his results unreliable to an extent no one lacking similar expertise can assess with any degree of precision. Most prominent among these flaws is the way he sought to present Galileo as a faultless scientist according to present-day standards, thus turning him into an inherently unlikely man of the early 17<sup>th</sup> century, as if even the greatest genius were able at one stroke to get rid of all vestiges of an entire mode of thought he had been steeped in from his days of learning onward. Closely related to this is Drake's urge to

present Galileo as a modern scientist making a complete break with all previous, scientifically inherently worthless *philosophizing*. That Drake indeed felt little compunction in projecting his own distaste for philosophy upon his hero shines all-too-clearly through his readiness to render “quantunque si sodisfacesse alla parte dell’astronomo puro calcolatore, non però ci era la sodisfazione e quiete dell’astronomo filosofo” thus: ‘however well the astronomer might be satisfied merely as a calculator, there was no satisfaction and peace for the astronomer as a scientist’.<sup>9</sup> For in thus rendering ‘filosofo’ by ‘scientist’, Drake obscured the historically quite remarkably new distinction Galileo can be seen to insist upon here between, on the one hand, mathematical science done in traditionally Alexandrian fashion and therefore unconcerned with the reality of things, and, on the other, the paradoxical blend advocated by Galileo of a person concerned like a *philosopher* with reality yet unlike the customary philosopher of his time dealing with reality in a *mathematical way*.

Now any historian is entitled to his prejudices, against which all but the most innocent of readers is prepared in any case to arm himself by putting one interpretation beside another or, better still, by going back to the sources. But what if those very sources, or at least those very sources in more readily accessible translation, are shot through with the same prejudices? The unforgivable thing with Drake is not that his interpretation of Galileo is so one-dimensional and so presentist, but that he bent Galileo’s own words in the same direction. There really ought to be maintained a fundamental distinction between an interpretation, which by its very nature leaves quite some creative room for the interpreter, and a translation (or any edition generally), which requires in the first place a sense of Süßmayer-like, selfless *service*. One and the same text may of course be translated on different levels of quality, using good or not-so-good linguistic finds; a case can of course always be made for or against this or that solution to a translation puzzle, but its point of departure ought to be very simply and very straightforwardly that you *must translate the text*, not what the translator thinks that the text should have been, or would rather have wished it to be.<sup>10</sup> One of the first literary products to come out of Khrushchev’s first fit of deStalinizing ‘thaw’ in the late 1950’s was an interminably thick yet, at the time, rather sensational novel by Vladimir Dudintsev *Not By Bread Alone*. The Dutch translator many years after the fact confessed that at the time he had not been able on page four hundred so-and-so to resist the temptation to switch off a radio Dudintsev had inadvertently left blaring over at least the past hundred pages (once you realized it was still on you kept hearing it, so to say). Without doubt the translator was setting things right in this none-too-important respect. Still, one step on that slippery slope and you may end like Stillman Drake rendering Salviati’s fateful exclamation “mirabile e veramente angelica dottrina”, which was a fateful response to Simplicio’s fateful invocation of the current pope’s favorite argument about allegedly conclusive arguments (namely, that whatever we humans may think, God might still have arranged things in ways unfathomable to our limited intellects) as ‘an admirable and angelic doctrine’, rather than as ‘a wonderful and truly angelic doctrine’, thus once again softening Galileo’s exquisite but also very *risqué* irony in a matter central to the making of the trial that ensued.<sup>11</sup> To clear Galileo of all responsibility for the setup of that trial may be a defensible point of interpretation, but it should never be forced upon your unsuspecting readers by making them believe that that is what Galileo’s own text implies.

By now the reader may well have inferred that the sum of these collected experiences in checking quotations has forced the conclusion that, indeed, translation and treason are as inevitably intertwined as the Italian pun has it. Luckily, this is not so. Amidst all this mostly dreary business it proved thrilling to put next to each other Ernst Mach’s *Science of Mechanics* as translated in 1893 by Th.J. McCormack and the original of 1883, or Hermann

Helmholtz' *Sensations of Tone* as translated in 1875 by A.J. Ellis and the original of 1863. Both books are written in excellent, accessible German; both were translated into an English from which (as far as non-native speakers can tell) no one not in the know can readily surmise its origin in another language. Both translators have proved flawless in their understanding of the pretty advanced scientific issues that come up in either book. There, in those enviably erudite men of late Victorian times, but also apparently men with no particular axes to grind, are to be found ideal translators of texts of importance in the history of science. With the knowledge of such shining exemplars, we took on the daunting task of translating the almost contemporaneous, scientific debut of one of the great men in the history of Dutch science. HFC, though with some experience in translating pieces in, and about, 16<sup>th</sup> and 17<sup>th</sup> century science, was not nearly skilled enough in mathematical physics to grasp the true meaning of Lorentz' hundreds of equations, or even much more than the gist of the argument that held them connected. NJN, though thoroughly knowledgeable about the scientific work, had far from mastered the language she had begun to study three years earlier in order to read Lorentz' works and had only translated short passages for publication. We both felt it important to make available to the English-speaking portion of the world this significant text that so far existed only in the original Dutch and in a fairly poor, French translation in the *Collected Works*. We saw no other way out than to insist on a collaborative effort from the start. The idea was that, though neither of us is an Ellis or a McCormack, together we might come a bit closer. She, after all, had been speaking and writing English all her life; had been living in the Netherlands and speaking the language for some years, and had been working on the history of electromagnetic field theories for many more. He, on the other hand, besides being a native Dutch speaker, had been speaking and writing in English for many years and had translated pieces from various languages into English.

Perhaps the most remarkable thing about our collaboration is how smoothly it went. Not only did the translators have the differences in background and experience noted above, but we came from significantly different intellectual frameworks, with HFC being a historian of science with training in history, and NJN being a philosopher of science with training in physics. However, from having read and commented on one another's work, we felt sufficiently intellectually compatible to undertake the project. That project stemmed from NJN's interest in the scientific work of Lorentz, which had been awakened upon noting Einstein's comments regarding the significant influence Lorentz had exerted on him and on the development of physics generally. Given that Einstein rarely acknowledged the work of other scientists, this struck her as remarkable and probably quite significant. Further, there was clearly a deep personal relationship, for at the occasion of the centennial of Lorentz' birth in 1953 Einstein stated that "H.A. Lorentz ... meant more to me personally than anybody else I have met in my lifetime".<sup>12</sup> At the time she encountered these words there was very little secondary literature on Lorentz. Having had the good fortune to partake in a National Endowment for the Humanities Summer Seminar with Martin Klein, she read Lorentz' important 1895 paper 'Versuch einer Theorie der electrischen und optischen Erscheinungen in bewegten Körpern',<sup>13</sup> and was encouraged by him to continue research on Lorentz in The Netherlands. The personal relationship between the two men came alive for NJN when she read their correspondence housed in the archival collections of the Museum Boerhaave, and, as Einstein had relayed, she saw that Lorentz' work on electrodynamics was crucial to the development of the theory of relativity.

In the work by Lorentz we undertook to translate, his 180-page doctoral dissertation, he took on one of the major unresolved problems of Maxwell's electromagnetic theory, the reflection and refraction of light. In it lie the geneses of several facets of Lorentz' future research program including a preliminary account of the

separation between aether and matter; the assumption that electrical motions take place within molecules of matter; and the idea that research into the optical properties of matter and the electromagnetic theory of light would lead to a better understanding of the structure of matter. Given his translation experience, we decided to start with HFC preparing a rough translation to be sent over the ocean (for now we were former colleagues) to be thoroughly reworked by NJN. Her task was to make the English flow better and provide the correct scientific terminology. The limitations in HFC's grasp of the scientific content proved not to be a significant obstacle, though, clearly, much of the translated terminology had to be replaced with the standard scientific forms, such as 'vertices' for 'angle points', 'partial derivatives' for 'differential quotients', 'capacitance' for 'capacity', and 'electrical equations of motion' for 'equations of electrical motion', some of which did require expert knowledge of what Lorentz was actually talking about.

The main issue to be negotiated between the translators was that of how to keep the flavor of Lorentz' style, which looks dated, while at the same time not producing an awkward English translation. In so doing, we also wished to preserve the way in which his style reflects his quietly balanced personality — an even flow, without any effort at gallery play; clear-cut and unassuming. As with translations of nonscientific works, many of the language flow problems had to do with differences in style between the languages *per se*, e.g., Lorentz all too often for English, but appropriate for Dutch, opened a sentence with a subordinate clause, and HFC followed him on this. Where Lorentz expressed himself oddly in Dutch, we tried to make the English comparably odd and where he employed quaint expressions, such as 'levende kracht' instead of 'kinetische energie' (which was available to him at the time), we translated with similarly quaint expressions, in this case 'living force'. One interesting issue — though not specific to the case at hand — concerns the changes that had occurred in the Dutch language since Lorentz was writing. NJN had studied contemporary Dutch (for which it proved important to put down her German in view of the numerous false cognates between Dutch and German and rather think more of Old English of the Chaucer type) and had found it quite odd when she started reading Lorentz that his Dutch resembled German much more than contemporary Dutch.

The big thing that makes Dutch texts from Lorentz' times look so different from Dutch as it is written nowadays is a range of spelling reforms, of which the major one to date was legislated in 1934. This was not strictly speaking a change in the language, as things like the gender of words did not disappear thereby so much but rather, as it were, went underground. Lorentz dedicated his dissertation 'aan mijne ouders' ('to my parents'), with the case ending 'e' after 'mijn' visibly indicating a plural (or feminine) word to follow; this may now be found only with a literary author deliberately in search of an antiquated effect. That this is so, has had a fairly devastating effect on any living Dutch literary tradition, which now in its entirety looks antiquated and as if authors not altogether inferior to Ben Jonson or Corneille or Schiller or the Brontë sisters could not possibly have had concerns that might still be of some pertinence to us at present. It would not be fair to hold the spelling reforms solely responsible for this general lack of interest in literature of the past — pride or lack of it in one's national traditions is surely at the root of these things.

Or take Lorentz putting at some point "Een zeer eenvoudigen vorm neemt deze uitdrukking aan ...", so that the reader and, luckily, the translator sees at once that 'vorm' is object, not subject of the sentence to follow, whereas since 1934 this would become 'Een zeer eenvoudige vorm ...', with the solution to the question of whether 'form' is subject or object held in abeyance until the sentence develops further and only then resolvable through some understanding of its content. A gain in correspondence with the spoken language (for such case

endings formally abolished in 1934 were typical scholars' stuff to lay bare the grammar, not at all living speech) was thus offset at least to some extent by the loss of a ready-made insight in underlying structure, which is what made Lorentz' work more accessible to NJN with her knowledge of German, whereas, conversely, HFC had to take some (not too painful) pains to get used to what looks like an obsolete guise of his own language.

## 2. Just a Reformed-Christian message?

Obstacles of an in part different nature arose with Hooykaas' posthumous book. Hooykaas' inspired teaching had convinced HFC as a student that history of science is truly history, and strengthened his conviction that science over the last three centuries has been at the heart of historical change. HFC had been his student, and had been quite taken aback when invited to celebrate the successful outcome of the examination he had just been subjected to at Hooykaas' home by sharing a few drops of *oude jenever*. They stayed in touch, before and after his retirement; HFC became his colleague, though at another university, and continued to look him up in that spacious home where he had been living with his family for half a century, and where he told from time to time in bits and pieces about his ongoing effort to turn the sixteen Gifford Lectures delivered by him in 1976 at the University of St. Andrews into so many, much expanded and improved chapters of a book. By the mid-eighties a few were ready to be submitted to the care of his friend Donald MacKay, professor in physics at the University of Keele and a Gifford Lecturer himself, who had already smoothed many a piece written by Hooykaas in English. From his death in 1987 onward his widow, Valerie MacKay, who is likewise a physicist, took upon herself the task of spurring Hooykaas on. She commented upon draft chapters as these emerged from his study in barely legible handwriting and committed them to files on disk, as he gratefully related. Once, when she had fallen ill and it appeared that a printout he had corrected could not be processed for any length of time, he reluctantly (for he held a very lofty view of professorship) accepted the offer of HFC to type it for him. Would that he had been more insistent upon his ensuing proposal to do more!

A week or so after Hooykaas' death in 1994, his widow revealed what HFC had been vaguely suspecting for some time, that he had entrusted the care for his intellectual legacy to him. We leave out of account here his library and the personal notes and correspondence in his study not pertaining to those Gifford Lectures (which went to the Museum Boerhaave at Leyden, and the Rijksarchief North Holland at Haarlem, respectively). There remained to be collected in his study the files containing printouts of, and notes and letters about, chapters of the book of Gifford Lectures in a state HFC was already aware to be less than fully complete. To read those chapters was something of a revelation. Having been acquainted with a good deal of his published work and, for reasons to be set forth presently, having enormous respect for it, HFC was not surprised to find that these chapters were good. However, he was surprised indeed to find that they were that good. 'That good' means two things in particular here. Nowhere else in his vast, deeply-digging, and uniquely many-sided work dealing with just about all Western sciences of nature over all time periods up to the 1920's had Hooykaas ever expressed himself in so outspoken yet subtly reasoned and illustrated a manner about science as such and its history as such. For example, never before had he made it so clear that he held no crudely empiricist view of those 'facts of nature' so dear to him, and so central to his conception of what science is about. Everyone ever to encounter him knew indeed that there was something like a 'Hooykaas view' on science, history, discovery, truth, and here, finally, *was* that view, by and large *in toto*. Not by way of a system, to be sure; for there is little he detested more than systems, in the sense of intellectual constructions given comprehensively ordered shape in a purportedly

all-compassing manner, with ‘false windows for the sake of symmetry’ (as he loved to quote his favorite author, with whom he brought his book to an end, Pascal). Bits and pieces of that ‘Hooykaas view’ had of course found expression at many a place in his life’s work, but here we could now watch it in full operation over nearly the full range of the researches of a lifetime. This awesome range, then, provided the second respect in which the contents of those files were more than expectedly good. From alchemy to zoology, from atomism to witness accounts, the reader is taken through samples of all kinds of different forms in which scientists have found themselves struggling over time with what Hooykaas once strikingly called “the whimsical tricks of nature”.<sup>14</sup> There are surely passages in this posthumous book where few but fellow-specialists will be able to follow him in any detail – e.g., pages 259-260 on chemical ‘resonance theory’ – but he always gets you back quickly to a point from where anyone with a modicum of historical and scientific knowledge can follow the argument. Fundamental issues faced in an attractively erudite *and* accessible manner – such was the book for which HFC now had to find a publisher. Annie proved sympathetic the minute HFC approached her, and with her knack for finding able referees with critical yet generous mindsets we quickly got a report that enabled us happily to circumvent one potentially tough issue – owing to experiences like the one alluded to above in connection with Calvin, Hooykaas had very expressly forbidden Valerie MacKay and (by implication) HFC to put more than one trial chapter in the hands of a publisher prior to the latter’s commitment to publish the whole book. Now a succinct memo HFC had prepared in consultation with Valerie MacKay proved sufficient to convince that referee. Hooykaas’ posthumous book was indeed to see the light of day; but some editing still had to be done, and it is on the vicissitudes of this editing process that HFC will reflect a bit below, in alternation with JCB, a former student of both NJN and him, and whose Ph.D. thesis on ‘The concept of force between mechanics and metaphysics from Newton to Lagrange’ he had been privileged to supervise.<sup>15</sup>

It quickly became clear that some work still had to be done on the typescript before it could be called complete in the only sense still possible. There had been sixteen lectures, but there would be only ten (or, as it eventually happened, eleven) chapters. Since these chapters generally took the guise of case studies each illustrating in its own manner the broad thesis underlying the book as a whole, the inevitable absence of those six or five was regrettable yet in no way lethal to it. Still, available chapters had to be processed and rounded off in a variety of ways, and here HFC was fortunate in gaining funds from the Netherlands Organization for Scientific Research to invite JCB to complete that job in course of three months’ time.

JCB, on taking on the job, was not all that thoroughly acquainted with the work of the late Professor Hooykaas. He had read *Religion and the Rise of Modern Science*, to be sure, but as his interest in religious matters had never gone very deeply, and because he thought Hooykaas’ theory of knowledge to be somewhat naïvely empiricist, he had not bothered to read more of his work while preparing his dissertation. He only wondered at the back of his mind what his supervisor found so gripping about it. Though HFC’s discussion of Hooykaas’ work in his *The Scientific Revolution. A Historiographical Inquiry* had opened his eyes to some other points of Hooykaas, he still was not really familiar with his work at the time HFC came forward with an invitation to fix some loose ends of a posthumous book-to-be.

Nor did the job itself provide much of an opportunity for catching up in this regard – it would be difficult enough to gain a sufficient grasp of the posthumous book itself, with both lack of time and Hooykaas’ enormous versatility standing in the way. Going through the heap of papers, partly typed out, partly in manuscript form, it soon became clear to JCB that Hooykaas as an author was almost an ‘uomo universale’ -- in the history of

science that is. Further, more than one version existed in many a case, with no dating and frequently without any clear indication of what should be regarded as the final version. Of some lectures no trace could be found beyond a few pictures Hooykaas had selected to be taken up at some point. Still, one more lecture of the six deemed lost turned up after all, in a state good enough to edit it to completion like the ten others. For all these eleven chapters, illustrations were mentioned either in the text itself or in the margin, and these could mostly be located in his files, albeit in many a case without any references which therefore had to be tracked down.

Problems of such a kind are surely the common fate of those charged with editing a posthumous text. More specific for Hooykaas' book was the timescale over which he had worked on it. Hooykaas had not, when delivering the lectures, felt satisfied with the degree of unity he had developed in them, and therefore hesitated for quite some time to prepare them for publication, although one of the terms set to a Gifford Lecturer is to do precisely that. Not until about 1985, upon completion of some smaller projects that seemed easier to dispose of, had he embarked on a process of revising and expanding his original lecture material.

Thus he kept polishing, rephrasing, expanding, but also here and there deleting passages until a few weeks before he died in January 1994. The text he left behind was in a rather uneven state of completion, with particularly the final chapter, on Pascal, in a very unclear state as to what parts Hooykaas wanted to have in and which ones to leave out. The problem he in effect left to his editors, then, was this: If Hooykaas himself had felt so unsure about the best way to present his own text and bring more unity to the rather diverse material covered in it, how could we do it for him in those specific cases where he had left the issue undecided till the end?

Most important for JCB in this regard proved a fortnight's stay at Valerie MacKay's. She was acquainted with Hooykaas' thinking over many years, and had also the intellectual background and the interest to follow most of the numerous topics he treated. She had never restricted herself to merely typing out his manuscripts, but offered reflection and feedback on matters of consistency and comprehensibility, too. She even checked whether his chemical vocabulary was still up-to-date.

The stay at her house made JCB acquainted with Hooykaas' intentions on a rather personal level. Besides things of human interest (like listening to a tape with Hooykaas reading in his captivating manner a story by W. Audry about 'Henry the Green Engine' to one of the little MacKay's), Valerie's account of the many discussions and conversations she had with Hooykaas on the progress of the book were often quite illuminating with respect to what had inspired him in course of his career and what his intentions were with the Gifford Lectures.

It increasingly dawned on JCB how strong Hooykaas's religious conviction was, and that this conviction had never ceased somehow to be close to the heart of his historical research. Hooykaas shared this religious dimension with the MacKay's, and he had talked with them about these things for a period of more than twenty years. Not by chance HFC had invited Valerie right away to stay involved in the editing process, and had insisted that JCB visit her for an extended period, in hopes of having her clarify certain dilemma's Hooykaas had faced in writing and rewriting and also in view of both JCB's and HFC's lack of familiarity with this particular source of inspiration.

The above is not to ignore that Hooykaas was a professional historian of science – to derive his intentions with the book solely or in any straightforward manner from his religious experience would have led us astray. An example may illustrate this. Hooykaas once wrote to Valerie: "I want [the chapter on Pascal] to be 'convincing': it is the real 'message' of the book ('mere Christianity')." <sup>16</sup> But this did not mean what it

superficially seemed to mean — that the message of the book was merely a Christian one. It appeared that Hooykaas, in a conversation with Valerie she noted down at once, had explained Pascal to be “my darling” in that Pascal “comes nearest to getting the balance right between facts, faith and fiction”. Since the ever-shifting balance scientists have struck over time between (1) their being guided by leading ideas like order or simplicity (‘faith’), (2) their creative imagination (‘fictions’), and (3) the facts of nature as they appear to them, provides the basic theme of the book, his treatment of Pascal clearly embodied at least part of Hooykaas’ intended message. Further, in course of his stay JCB learned that ‘mere Christianity’ is the title of a book by C.S. Lewis, originally published in 1952 and known to this day for the way in which Lewis managed to bring to the fore many central problems of Christian belief and conduct. What Hooykaas meant when using the expression, then, remains ultimately opaque. What was clear is Hooykaas’ conviction that a balance had to be struck — this time one between his scholarship and the things he found most important on a personal level. He gave a good deal of thought to the problem of scholarly subjectivity, of which historians have their fair share (in view quite possibly of their inevitable lack of methodological rules as clear-cut and unambiguous as those wielded by the scientist), and his preferences in this regard may be surmised from a remark he once made to HFC that what pleased him most in a certain book was its being “objective without becoming colorless”.

It is in line with this that the reason Hooykaas wished to cut out certain sections in the chapter on Pascal was not fear of any kind that his interpretation and his convictions might not be accepted by the public out of sheer prejudice. His difficulties are more likely to have concerned the methodological question of how to distinguish personal conviction and historical interpretation. To use his own metaphor: He was aware that he was engaged in walking a tightrope, between his personal religious faith on the one hand and, on the other, his interpretation of what, over time, religion had meant for science and science for religion. Also in line with this was his decision, during his stay as a Gifford Lecturer, to turn down a request to serve as a visiting preacher in the university chapel, curtly declaring himself “unable to do what [the chaplain] ask[ed]”.<sup>17</sup> Apparently he found it important to stay a historian and look like one rather than become a missionary.

Considerations like these, which had caused Hooykaas to draw up a variety of schemes for his final chapter and to present them to a variety of sympathetic commentators yet to keep hesitating all along, now had to issue into a definitive decision to be made by others. In the end we decided that his worries over whether or not to keep in a range of sections dealing in quite some detail with Pascal’s theological concerns took his scruples one step too far in that these pieces were clearly functional to his argument about Pascal’s ‘realism’ as a whole, so that we restricted our deletions to two sections on C.S. Lewis and A.E. Taylor and for the rest stuck to the chapter’s original order.

At the same time another, even tougher issue made itself felt: No epilogue worthy of that name was available. All we thought we had were a few paragraphs about a favorite theme of his — that “the humanities and the sciences are not separate islands but peninsulae of the same mainland”. We felt that this ‘epilogue’ had been written at a fairly early stage, when Hooykaas was still unsure about how to give greater unity to the lectures. A better-fitting place would be at the end of the Introduction, where indeed it is now (p. 15-16). Such a move was allowed only, so we thought, if we could come up with another epilogue, better fit to serve Hooykaas’ inferred intentions. Through sheer coincidence we found a sheet in another file, with a caption ‘The Epilogue’, which might or might not be intended as the final epilogue or part of it. All we had to go by in this regard was a remark Hooykaas made in his letter to Valerie MacKay quoted above, that “as to ‘Pascal’, you will

remember that the last pages are vague and unfinished. I must have trusted that I could speak the end ‘*ex tempore*’. At any rate I have now added several pages on the similarity of his methods in science and in apologetics, and, of course, also on the difference between them.” Although this does not look like the piece of the epilogue we had meanwhile found, it showed at least that Hooykaas had been working on, and therefore obviously had wished to add, an epilogue different from the original one.

Of the passage now found only the last two or three sentences had to be left out, as not even Valerie Mackay could unambiguously make out what his scribbles were meant to convey. For the rest, the general meaning was clear, and also well in line with a few sentences noted down by Valerie during a conversation with Hooykaas in 1988 about the ‘message’ of the book, and which sounded familiar to HFC as well. We therefore decided to combine the two. Still we did not feel wholly satisfied. Not only was the resulting epilogue rather brief, but it also failed to convey that captivating sense of joy over doing history of science so often expressed by Hooykaas orally and in writing. Therefore we added, in translation, the concluding passage of Hooykaas’s booklet, *L’Histoire des sciences, ses problèmes, sa méthode, son but* (Coimbra 1963). Thus the epilogue was constructed, without possible certainty over the author’s exact intentions, by blending luck, knowledge of his work overall, a determination to account for all our editorial actions in an addendum to the main text of the book (p. 429-431), and, above all, an urge to keep Hooykaas in balance on his personal tightrope.

What had meanwhile to be done, was the preparation of an Editors’ Foreword, to be agreed upon and signed by the three of us – Valerie MacKay, JCB, and HFC – but drafted and then rewritten where necessary by the latter. Briefly, my (now HFC) problem was this.

As in every cultural product of more than ephemeral value, in Hooykaas’ work, too, one encounters a mix of specialized, or ‘local’, and of universal elements, only in his case the local element has been very much predominant in the way his work has been received so far. In unremarkable part this has to do with academic specialization – what he wrote about the impact of the Portuguese Voyages of Discovery upon the culture of Portuguese humanism has appealed primarily to Portuguese readers; so has his work on the history of Dutch science to a Dutch audience, or his work on uniformitarianism vs. catastrophism to historians of geology, and so on and so forth. To readers in a more general vein, the imprint of his work has largely been in the much-debated issue of science and religion and their intertwinement over time. Precisely because to the average historian of science to whom the name ‘Hooykaas’ means anything at all this particular topic provides the primary association, I have often wondered why, beyond my student’s enthrallment with a wonderfully erudite, captivating teacher, I have ever since continued to feel so drawn to his work without sharing in the least Hooykaas’ own fundamental source of inspiration, which undoubtedly was the bible in a specifically orthodox Protestant reading. On a more personal level, too, although I always felt privileged to be exposed to his more charming rather than to his harsher ways, and also admired him for his clearly apparent uprightness and spine, I did not find the formality of his conduct or a variety of other modes typical of the population group from which he quite visibly stemmed (like enjoying little glasses of *oude jenever*) particularly familiar. Certainly I felt more freely at ease with many other people both in and outside the profession, or with the work of his co-founder of serious history of science in the Netherlands, E.J. Dijksterhuis, whom I was too young ever to have met. Whence, then, my very outspoken sense that this particular man’s work had failed so far to impress too many people who, if their eyes were properly opened, might see more of what is really and truly there?

Just as there are circles in the Netherlands and Great Britain where his work has been well-received owing primarily to an immediate sense of shared Christianity, so also there are many who have dismissed his work as just Protestant apologetics, to the point of taking Hooykaas for the Reformed counterpart to a Catholic apologist dealing in something superficially like history of science, Stanley Jaki. ‘How come there are otherwise quite sensible people who manage to overlook the chasm between the two?’ I have kept wondering. Besides just wondering, I have also tried to do something about it, for example, when preparing a series of translated ‘Dutch classics’ for an English-language yearbook *Tractrix* on Dutch history of science I purposely selected Hooykaas’ 1939 article on Pascal – an Augustinian Catholic, to be sure, yet a Catholic all the same. Now this was a choice which not only Hooykaas appeared quite content to endorse, but which had other roots as well, in that I simply found it among the best things he had ever written. Again, why?

Because I have always felt that besides the ‘local’ element in Hooykaas’ work, which here and there is rather pronounced or at least appears to strike his readers as quite pronounced, there is a universal element that transcends all that is local about it and gives it its particular value. His entire personality already displayed that fusion of the local and the universal. It was quite clear from his conversation that he felt he had a special message to teach about Christian science. But it was no less clear that he had a wider message that went far beyond it, and (at least in my experience) he never sought to impose the former upon those intent primarily upon the latter. For example, in my book *The Scientific Revolution. A Historiographical Inquiry* I assembled and critically discussed a range of causal theses (such as Merton’s, Needham’s, or Yates’) on the origins of modern science, leading to a perhaps unsurprising general conclusion that very many of these bold and imaginative theses tend to overshoot their mark in that they can be seen to be most pertinent to one identifiable portion of that truly complex event rather than to the event as a whole upon which in most cases they had been targeted. In these discussions of historical theses on the Scientific Revolution several by Hooykaas found treatment alongside a range of others, with my conclusion being likewise that one gets into considerable difficulties if one overapplies them but that they contain very useful kernels of productive explanation if judiciously cut down to somewhat smaller size. In this respect, then, I found no significant difference between Hooykaas’ and most others’ theses. Let me become a little more precise on this point. In the first place, Hooykaas’ thesis on *Religion and the Rise of Modern Science* (to confine myself for now to the most widely-read among his various theses on the subject; also the only one to appear as such in book form) was quite expressly *not* set up by its author as a claim that all there is to the Scientific Revolution is the stimulus it identifiably (through a particular historical mechanism he located in the Lutheran/Calvinist emphasis on ‘the general priesthood of believers’) received from the Reformation. It has often been argued against him that Galileo was a Catholic, and, once again, this neither came as news to Hooykaas nor did it go against his thesis. There is a problem there, to be sure, but it is a subtler one. If I may quote myself from earlier work,

In all this Hooykaas takes care to qualify. In the first place, he does not assert that the new respect for the empirical came *solely* from the biblical world-view as expressed in the Protestant idea of the priesthood of all believers. Hooykaas thinks that 14<sup>th</sup>-century nominalism, the Voyages of Discovery, and a Christian-inspired, heightened respect for manual labor had already begun to turn European minds in the same direction.

Also, Hooykaas is well aware that there certainly existed a narrow-minded antisecularism among leading Protestant theologians. On this score a large part of his pertinent argument is directed toward showing that the theme of their literalist clinging to the Bible has greatly been overdone in the literature, to the point even of historians’ invoking wholly spurious quotations. Furthermore, even where biblical literalism or antisecularism indeed prevailed, this did not prevent the healthy ingredients of the biblical world-view from doing their work in the minds of a great number of Protestant scientists, who were not constrained by Church authorities as their Roman Catholic colleagues were.

Finally, and most importantly, Hooykaas does not of course claim that the Scientific Revolution was exclusively the work of Protestant scholars. The road toward the new respect for nature was trodden by Catholics and Protestants alike.

Nevertheless, there remains a question here. Nowhere does Hooykaas face squarely the issue of how, if indeed the biblical world-view provided a key ingredient to early modern science, this new ingredient began to affect Catholic scientists in the 16<sup>th</sup>/17<sup>th</sup> centuries, after rather consistently having failed to do so during the reign of scholasticism. At this point two paths seem open, both in fact taken by Hooykaas. One is to stress the relative nature of the thesis by pointing out that the biblical world-view was only one among a variety of historical factors contributing to the new respect for the facts of nature. Another is to shift the argument from direct causation to statistical regularity. ...<sup>18</sup>

Let me extend my point, and make it more general. In academia generally, with historians of science in no way excepted, there is a tendency to read things, so to say, locally. I do not despise that point of view at all, it is indispensable for providing us with a framework in which to learn to look at things at all productively. The problem is rather with confining oneself to one's framework. This is a huge problem of our time, with rapidly increasing Balkanization taking place all around us. I have my difficulties with Karl Popper's work, more and more in fact, but his nail-on-the-head castigation of what he quite properly dubbed 'the myth of the framework', i.e., the idea that we are necessarily locked up inside our own, continues to invoke my undiluted admiration. To return now to my proper subject, I would maintain that what public Hooykaas drew so far has tended to lock him up a good deal more than he deserves in a particular framework that was surely neither foreign to him nor shunned by him but which Hooykaas at his frequent best knew well how to transcend. His work like any cultural product of more than ephemeral value is made up of a mixture of local and universal, and it seemed to me that it was about time to put into the limelight what is of universal significance about it, in the sense intended here throughout not of forever enduring validity (that only science at its best has in store for us) but of significance larger than fits into any one particular framework. That is the spirit with which I wished to infuse the Editors' Foreword to the very book of Hooykaas' in which, more than in any earlier one, he managed to give full rein to everything in his life's work that transcends the boundaries of any particular framework. It does so through its ongoing search for those features that, over the centuries and through disciplines, mark the endlessly captivating, endlessly varied story of how (to use an expression of Hooykaas' he in the end rejected for usage as a title) humanity has over time tried out one key after another that may in the end appear to fit the lock of nature.

## NOTES

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- <sup>1</sup> Raymond Chandler, *The Little Sister* (1949), ch. 30.
- <sup>2</sup> It is a pleasure to record with gratitude that from then on Annie's successor, Stephanie Harmon, put a good deal of thoughtful energy into the completion of the job.
- <sup>3</sup> E.J. Dijksterhuis, *Simon Stevin. Science in the Netherlands Around 1600*. Den Haag: Nijhoff, 1970; p. 121.
- <sup>4</sup> For a succinct account of this story, see R. Hooykaas, *Religion and the Rise of Modern Science*. Edinburgh (Scottish Academic Press), 1973 (1<sup>st</sup> edition: idem, 1972), pages 121 and 154.
- <sup>5</sup> C.D. Andriessse, *Titan kan niet slapen. Een biografie van Christiaan Huygens..* Amsterdam: Contact, 1993; reviewed by HFC in 'Maar wordt de lezer wakker?' in: *Ons erfdeel. Algemeen-Nederlands tweemaandelijks cultureel tijdschrift* **37**, 4, September-October 1994, p. 626-628. The two passages discussed in the main text are on p. 364 and p. 90, respectively.
- <sup>6</sup> *Oeuvres Complètes* **10**, p. 405.
- <sup>7</sup> *The Complete Works of Chuang Tzu* (translated with an introduction by Burton Watson). New York: Columbia UP, 1968; *Chuang-Tzu: The Inner Chapters* (translated with an introduction by A.C. Graham). London: Allen & Unwin, 1981. Joseph Needham's comments on selected passages in the *Chuang Tzu* are in vol. 2 of his *Science and Civilisation in China*. Cambridge UP, 1954 - .
- <sup>8</sup> *Opere* 7, p. 487; *Dialogue*, p. 462 [NB All materials and comments pertaining to Drake as a Galileo translator and commentator are lifted from the Galileo chapters in HFC's book-in-progress, 'How Modern Science Came Into the World'].
- <sup>9</sup> *Opere* 7, p. 369; *Dialogue*, p. 341.
- <sup>10</sup> HFC would like to acknowledge how much his views on the process of translation have benefited from conversations with Rob Wentholt and with the late Jop Spiekerman, and from pertinent pieces by the Dutch essayist Karel van het Reve.
- <sup>11</sup> *Opere* 7, p. 489; *Dialogue*, p. 464.
- <sup>12</sup> Albert Einstein, *Ideas and Opinions*. New York: Bonanza Books, 1954; p. 75 ('H.A. Lorentz, Creator and Personality').
- <sup>13</sup> Reprinted in Lorentz' *Collected Papers* **5**, pp. 1-137.
- <sup>14</sup> R. Hooykaas: 'The Rise of Modern Science: When and Why?'. *British Journal for History of Science* **20**, 4, 1987, p. 453-473; p. 470.
- <sup>15</sup> J.C. Boudri, *Het mechanische van de mechanica. Het krachtbegrip tussen mechanica en metafysica van Newton tot Lagrange*. Delft: Eburon, 1996 (Ph.D. thesis, University of Twente; soon to appear in English translation with Kluwer Academic Publishers).
- <sup>16</sup> In a letter dated 7 March 1988.
- <sup>17</sup> From a letter by R. Hooykaas to M. Urch, 9 June 1976.
- <sup>18</sup> H.F. Cohen, *The Scientific Revolution. A Historiographical Inquiry*. Chicago: University of Chicago Press, 1994; p. 313/4.