H. Floris Cohen

STOCK AND BULK IN THE LATEST NEWTON SCHOLARSHIP

In his biography of Isaac Newton, which forms the most recent production in this flourishing *genre*, Niccolò Guicciardini states as his first point of departure that Newton's work arose, not from "attempts to answer questions that came to him spontaneously, but [from addressing] those posed by his contemporaries" (p. 20). Right he is to communicate to the larger audience for which he is writing this principal fruit of by now almost a century of professional history-of-science writing — a deep-seated awareness that every scientific view or finding, even if looking timeless in retrospect, has emerged from some given historical context that shows us where the scientist in question started and that helps explain how, and in what direction, they managed to venture beyond the original context. Indeed, the same truth (or rather truism) applies to every genuine, that is, in some way innovative and also worthwhile contribution to scholarship. And so it is, therefore, with the three books here under review, which I intend to examine with the following leading question in mind: what in each of them is new and what, in what turns out to be new indeed, has been worth learning?

To be sure, it is precisely with Guicciardini's biography that the wholesale application of this criterion of worthwhile novelty would be less than fully fair — as noted, the book is not primarily directed at us, professional historians of science, but at a wider audience, so that, obviously, its principal brief is to present Newton to the non-expert. If the book is considered in that particular respect, I can only express my hope that it will reach that audience, and reach it massively, for it strikes me as a very engaging, very well-written, very balanced vehicle for making every educated reader familiar with the main facts and circumstances of Newton's life, alternated all the time with a very sensible summing-up of his principal achievement, of how he got there, and of the significance of each of Newton's oh so varied endeavors.

Even so, a co-professional may be entitled to a few more-detailed comments; after all, the higher the professional quality of a broadly-accessible book on the history of science, the better it is for all of us. Take Guicciardini's other two starting points. He wishes, once again very sensibly, to refrain from jumping to any conclusions about some ultimate unity possibly underlying Newton the seemingly modern scientist *and* the 'other' Newton, the heretical theologian and chaser after the philosophers' stone. Nor should we think that the former Newton is "less remote to us" than the latter (p. 21). Unsurprisingly for the author of an innovative book on Newton's mathematics, he illustrates this final starting point most prominently when discussing whether Newton actually wrote his second law (or at least could have written it) as $F = ma$. Deep questions about the epistemic status attached at the time to algebra, to geometry, and to the calculus in particular are involved here, and Guicciardini treats the questions in an expert manner that enables the historian of science to benefit without chasing (or so I trust) his less specialized readers away. The same passage (p. 214-219) is further marked by Guicciardini's very sensible habit, throughout the book, to note just in passing that various topics are disputed among historians of science without claiming now to present the reader with the necessarily correct solution. It is also noteworthy that, for all their brevity, he renders these various disputes in a remarkably fair manner not always to be encountered in the Newton literature over recent decades.

These references to earlier or to now current disputes flow from a broader effort undertaken by

Guicciardini to situate his own book historiographically. He calls it (p. 19) a re-examination, carried out "with greater serenity", of "the issue of the two Newtons that emerged [from] the generation of great Newtonians" meanwhile gone — an issue that arose once the alchemical manuscripts were finally subjected to, and the theological manuscripts became publicly available for, historical scrutiny. What picture of Newton does emerge, then, once Guicciardini's serene re-examination of the outcomes of the deep differences between Whiteside, the Halls, and I. Bernard Cohen on the one hand, and Manuel, Dobbs, and ("to some extent") Westfall on the other, has been completed? His unassuming, yet scholarly thorough and reliable rendition of the achievement of both these Newtons behind him, Guicciardini seeks to resolve the disputes of an earlier generation of Newton scholars by insisting on Newton's lack of taste for metaphysical disputes, his "anti-philosophical stance" — a view that culminates in his conclusion that "mostly [Newton] was a problem-solver" (p. 228).

This is an astonishing assertion, and one that can arise only with an author who keeps himself far removed from any attempt at making historical comparisons. Please reconsider Guicciardini's first point of departure, the need to understand your main figure as 'addressing questions posed by his contemporaries'. No contemporaries of Newton (just 13 and 7 years older than he) were more given to seeking answers to questions in natural philosophy that Newton, too, sought to resolve than Christiaan Huygens and Robert Hooke. In *Never at Rest* of 1980, as also in *Force in Newton's Physics* of 1971, Richard S. Westfall was concerned time and again to arrive at an insight into what made Newton's achievement so ultra-special by comparing his answers and how he got there with those of these two men in particular, finding time and again that it was, precisely, their hypothetical and problem-solving attitude that made them halt where Newton kept pursuing by and large the same contentious issue down to its final consequences. The picture of Newton that Westfall arrived at in the end is, surely, that of a man solving problems with a piercing intellect and a most fertile imagination, but also as a man who, wholly unlike Huygens, was out all the time to speculate about what he used to call 'the frame of nature'. And what made Newton so different from Hooke, who also liked to speculate about the material/ spiritual constitution of the world, was that, unlike Hooke, Newton regarded his own irrepressible penchant for visionary speculation as a weakness, as something he could not stop himself from indulging in the privacy of his chambers but which he had to rein in all the time by an (in those decades) quite exceptional insistence on achieving *certainty* in natural philosophy, with the closest possible binding of mathematics and validating experiment as its only acceptable hallmark. The profound tension that runs through Newton's work and life in Westfall's still inspiring view is not so much between the rationally sober scientist and some magic-tinged and, as such, allegedly irrational chymist/theologian, but between a visionary ready to tackle the created world in a bold grab for the whole and an inspector who patiently runs over his calculations and checks his measurements to see whether even the seemingly most insignificant outcome of his visionary construction is really sound to the last detail, only then to regard it as fit for publication. It is this almost unbearable tension, then, that accounts to quite some extent for what made Newton's achievement so extraordinary, those portions of it that have stood the test of time included quite as well as those that have not.

So much by way of an ultra-brief summing-up of Westfall's vision, which strikes me as a good deal more persuasive still than that of Newton as a problem-solver who, if considered in that quality alone, turns into

just a Huygens, only an even more gifted one. Already in 1980, then, Westfall's vision, attained while assiduously and meticulously working his way through all the Newton literature and all Newton's published works, letters, and manuscripts, came to replace that truly outdated, sterile *dichotomy* between two historiographical views he never fully subscribed to, with a *tension*, an immensely productive and also humanly touching tension uniquely running through Newton himself.

What has remained visible of that vision in the other two books to review here, Rob Iliffe's *The Priest of Nature* and the *Reading Newton in Early Modern Europe* collection?

Very little of it has remained visible, or present at all. A couple of times Westfall is dutifully being mentioned in passing as one among many who contributed to Newton scholarship, but (with one important exception) no more than that — if that. Is this so because Westfall's vision of Newton as it emerged in a 900 pages-long biography widely acclaimed at the time has in the past 38 years been surpassed, refuted, or proved untenable in view of either facts already known by then or newly come to light since?

Let me first address the one exception, William Newman's essay 'Newton's Reputation as an Alchemist and the Tradition of Chymiatria' in the Boran/Feingold collection of essays. Newman roundly acknowledges Dobbs and Westfall as the two great pioneers of investigating, and making sense of, Newton's alchemical pursuits. And he quite fairly reminds us that, in the treatment of both scholars, Newton's pursuit concerns exclusively all that went with the theory and experimental practice of metallic processes meant, in the end, to make gold. What Newman now adds is that, in so doing, both have overlooked Newton's considerable interest in another main aspect of alchemy. Newman sums it up in three points: Newton's interest in medicine in van Helmont's still recent tradition; Newton's deep acquaintance, through reading and excerpting, with "standard authors in the realm of chymical pharmacopoeia"(p. 316), and Newton's being attuned "to the medical possibilities of the philosophers' stone" — its principal ingredient, 'sophic mercury', definitely included. This is a major amendment to Westfall and Dobbs' mutually somewhat different interpretations of Newton's alchemy, and in the remainder of his essay Newman adduces plenty evidence to make his claim stick. As Westfall himself was well-capable of saying, he stands corrected, and what we have in Newman's essay is, indeed, the kind of worthwhile novelty that I announced I would take as my principal criterion in reviewing these books.

Can the same be said of the other essays in the collection? Let us consider first what is meant to hold it together. Usually the reader learns what the leading theme of conference proceedings should be taken to be in the editorial introduction, but this one displays some curious features. First and foremost, of the two scholars listed as editors on the book's cover and title page, Elizabethanne Boran and Mordechai Feingold, only the former is being mentioned as author of the Introduction. So what has Feingold's role been, over and above being the series editor and writing one of the book's twelve chapters? The question is the more urgent in that what (if any) editing has been done on the volume appears soon enough to have been more than a little sloppy. Certain phrases in these chapters are wholly incomprehensible ("the first reports due to world"; "since the process against the atheists had been concluded") or even more evident cases of mistranslation ("the invention of centripetal forces") or of uncorrected typo's ("some curved line described in a plan"). Some authors, when citing passages not originally in English, carefully quote the original texts in a footnote, whereas many others (apparently left without guidance by pertinent editorial instructions) do not. Of

Descartes (who died in 1650) it is being said that he criticized an aspect of the cosmology of Newton (born 1642); throughout the volume authors remain divided over whether Boerhaave's first name was Herman (as it was) or Hermann (as it would have been if he had been German rather than Dutch); a similar confusion reigns about the 'Bertoloni' in Domenico Bertoloni Meli's name: is this the first part of our esteemed colleague's family name or rather his second given name? The Index opts for the latter but, as Domenico's personal website confirms in just one Googling instant, wrongly so. True, these are details, although not negligible ones. What, for instance, does the last-mentioned mistake mean for an author's H-index if his name has been messed up so that the cited article is doomed to remain uncounted by the Science Citation Index? Should not, further, early career scholars enjoy some extra protection by their editors against blunders like the Descartes/Newton one reaching print stage? And, most significant of all, is not all too often sloppy writing and editing a fairly reliable pointer to sloppy scholarship?

Back now to that one editor's, Boran's, Introduction. What does it reveal about the book's intended theme and how the various contributions are meant to fill it with scholarly life? The collection has been prepared at a conference held in Dublin in 2012 and dedicated to "shedding light on how Newtonian works were introduced to peripheral audiences — peripheral in both geographical and ideological senses — and to explore the often complex re-interpretations and re-readings of Newton which took place as a result" (p. 1-2). In the remainder of the introduction, remarks on the Newton reception in Dublin, where Boran is employed as a librarian, are interspersed with summaries of the essays that follow. It readily appears that the plural 'Newtonian works' is undeserved — wherever a work by Newton is being discussed in these essays, it is the *Principia* and its dissemination that stands central, whereas the *Opticks* remains a side-issue throughout. This is the more remarkable in that many decades ago I. Bernard Cohen demonstrated in a widely-read study that in the 18th century (the very period covered in the book) the *Opticks* was read, and commented on, far more often than the *Principia*. If that conclusion has meanwhile been shown to be inadequate, as of course it well may have, then perhaps the discovery and what has led to it could have found mention somewhere in the introduction?

No grounds are further given for the selection of those 'peripheral audiences', other than the Irish one that gave rise to the conference in the first place. For instance, why invite unknown and, frankly, not particularly well-prepared authors to address how Newton was read in 18th century Naples or in 18th century Spanish artillery schools, whereas J.B. Shank, the great expert on the Newton reception in 18th century France, is badly missing? Why, indeed, is France, Europe's cultural center at the time, left out altogether (but for the one, semi-French figure of Nicolaas Hartsoeker in one of the better essays, by Catherine Abou-Nemeh)? Why are the Spanish Netherlands (unlike what Boran oddly calls "the Dutch Netherlands", which gets two essays), or Russia, or Scandinavia? Indeed, the selection of topics, left unexplained in the introduction, looks quite arbitrary. I shall now comment on a few more essays, all the while omitting two that deal (as does the introduction itself) with Irish affairs: those by Anne-Marie Roos (on Bryan Robinson) and Luc Peterschmitt (on Berkeley, of whom the author maintains that in spite of his rejection of fluxions, forces, and several more, typical Newton conceptions it does make sense to regard him as a Newtonian).

Sarah Hutton addresses the translation made in 1739 by Elizabeth Carter of Algarotti's *Newtonianismo per*

le dame. In an essay filled for a very large part with citing book titles, the main question addressed is whether, as some contemporaries doubted, Carter's knowledge of science was really adequate to the task. The answer, one would think, could be found quite readily by comparing Carter's English translation with Algarotti's original Italian — surely if a translator doesn't get it this sad fact is on display throughout the translation itself. But Hutton does not seem to have felt the need to look up Algarotti's work itself, thus turning her own essay into a rare case of a text wholly dissolving, under her treatment, in its own context.

Steffen Ducheyne dedicates a lengthy argument to pointing out that two Dutchmen who were among the first Continental propagators of Newtonian science, Willem Jacob 's Gravesande and Petrus van Musschenbroek, were not really so Newtonian as has ordinarily been taken for granted. In order to make the point, he concentrates on the limited extent to which each was prepared in his own textbook of Newtonian science to take Newton's 'Regulae Philosophandi' on board. To my mind this does not go very far in dissociating the two from the master, but I take it that this piece is but one early instalment of a larger project. It is further curious to see two full pages (mid-p. 227 to mid-p. 229) dedicated to explaining the manner in which Books I and III of the *Principia* hang together without referring even in passing to I. Bernard Cohen's lengthy and, in his time, path-breaking disquisition about how uniquely close for his time that coherence was — a powerful coherence that Cohen identified as 'the Newtonian style'. What else, then, is new?

Catherine Abou-Nemeh argues innovatively, and persuasively, that there is good reason to take Hartsoeker's objections to Newton's treatment of comets in the *Principia* more seriously than has been done so far. She shows in how almost self-evident a manner two mutually related aspects of Newton's *Principia* that struck his contemporaries as particularly unheard-of, his claim to certainty and his willingness to leave his key concept of gravitational attraction unexplained by some underlying mechanism of moving corpuscles, were widely rejected as incompatible with any sound, that is, *hypothetical* conception of what natural philosophy really was about. In thus giving reasons (notably Hartsoeker's reasons) for what made certain major features of the *Principia* so problematic in many, mostly Continental eyes, Abou-Nemeh's essay stands in wholesale opposition to that by Marius Stan. His leading question is to explain what he literally calls the *delay* in acceptance of the *Principia* in German lands. Given that the book made such an enormous step forward, how, so he wants to know, is it possible that it failed to find universal assent at once? Note here the underlying presupposition that in the normal course of events the message of a book regarded nowadays as revolutionary is immediately recognized *and* embraced at any given place — a presupposition entirely taken for granted by the author. And however lucidly written Stan's essay surely is, it harbors another quite curious feature. For what is so new in his account of Leibniz's quite un-Newtonian concept of force (put forward in the frame of a metaphysics that had likewise very little in common with any Newtonian conception), as if not 47 years ago Westfall, in his *Force in Newton's Physics*, dedicated an entire chapter to the subject — a chapter in which he underlined the very features that Stan now lists as if these are fresh findings? Further, hasn't it been received knowledge that in German lands Leibniz's dynamics and its attendant metaphysics held sway for at least the first half of the 18th century, with Kant among the earliest Leibnizians to switch allegiance from the one to the other? Contradicting none but a few recent German authors who apparently think otherwise, Stan is now making exactly that point as if it were brand-new. Very

broadly speaking, in Great-Britain Newtonianism reigned supreme, in France a kind of neo-Cartesianism, and in German lands Leibniz's natural philosophy *cum* metaphysics as systematized by Christian Wolff and elaborated further by several more, likewise Leibnizian scholars — Stan's confirmation of that long-standing view does not strike me as a case of worthwhile innovation, or even of any innovation at all.

Feingold, in the final chapter (for there is no concluding essay to wrap up the collection), introduces two mutually related views about Newton, which he calls "entrenched" and "accepted", respectively, and goes on to confront these with what counter-evidence he has dug up in some writings of early 18th century British theologians. Thus he tackles "the entrenched reluctance to grant Newtonianism a vital role in bringing about modernity" (p. 329), with Jonathan Israel (very far from a Newtonian scholar or even a historian of science at all) as the chief culprit, and further "the accepted view of an entrenched anti-Newtonianism, based on a widespread perception [at the time] of Newton's religious heterodoxy" (p. 345); here we find Larry Stewart and, above all, Scott Mandelbrote in the dock. At issue is whether or not Newton succeeded in keeping his heretical views by and large successfully secret. I am not qualified to pass judgment on the merits of Feingold's treatment of the evidence, which seems to hinge mostly on how to interpret certain rather ambiguous-looking passages in the works of those theologians of the early and mid-18th century. But to me at least it comes as news that the views he disputes are 'entrenched' or 'accepted' much farther than the pertinent publications of the (to judge by Feingold's own footnotes) very few scholars who have put them forward. What comes as news to me even more is the penultimate line in Feingold's essay: "Considerable additional research is needed for establishing the precise nature of Newton's own anti-Trinitarianism" (p. 345). Can this mean anything else than that all previous students of Newton's anti-Trinitarian heresy and, really, of his entire theology, first Manuel (to some limited extent) and Westfall, and then most prominently Mandelbrote, Snobelen, and Iliffe, have managed to miss what it was all about, so that serious investigation of that particular subject is, at best, still at the opening stage?

It is true that the third book here to be reviewed, Rob Iliffe's long-awaited and in many ways very commendable *Priest of Nature*, was not yet out when the conference proceedings of which Feingold was or was not co-editor went to press. But Iliffe had written earlier about the subject (e.g., in 2007 in his *Newton. A Very Short Introduction*), as indeed had Westfall from 1980, Mandelbrote from 1993, and Snobelen from 1999 onward. So on all counts Feingold's parting shot is about as unfair a comment as to be found anywhere in the collection. But let us move on now to, indeed, Iliffe's *Priest of Nature*. Is he perhaps more generous toward his predecessors?

Well, yes, or at least as far as his long-time colleague at the Newton Project, Scott Mandelbrote, is concerned. That I mention the Project is not by chance — in the opening pages of his book Iliffe states in almost so many words that it is only thanks to it that Newton's theological manuscripts have become available for study, and he touchingly contrasts his own struggles, decades earlier, with the microfiches that reproduced many of those manuscripts with the ease with which, nowadays, everybody can find perfectly rendered versions thereof ready for consumption and study on the internet. All that is true, and yet in pre-internet days Richard S. Westfall did exactly that — to work his way through them all (but for a few in one Geneva library that refused everybody access), be it the originals in a large variety of libraries or, indeed, hard-to read microfiche reproductions thereof.

If by any chance the reader might think that my calling attention, time and again, to this wide-spread (not to say entrenched) habit of failing to refer back to Westfall's work is just a matter of bibliographical purism, or perhaps rather of misplaced hero worship, I hasten to make myself more fully clear. My concern throughout this essay review is the attainment of scholarly novelty. Are new publications offering us something new and worthwhile, or are things that we already knew being reiterated and are already available, significant insights being unjustly ignored? Tristram Shandy has posed the question exceedingly well: "Tell me, ye learned, shall we for ever be adding so much to the *bulk*, – so little to the *stock*?"[1] And it is in regard of this stock/bulk dialectic that Westfall's work on Newton (as also, to a smaller extent, that of I. Bernard Cohen) happens to appear, time and again, to serve as its most pertinent illustration.

Indeed, just as Westfall came out of his assiduous, all-encompassing researches of at least two decades with that 'tension' vision of the man and the scholar that I summarized above, just so he came out of his examination of the theological manuscripts with a clear-cut vision of Newton's heretical views and their broader significance. Here is a summing-up of that vision, undertaken with a view to enabling us to assess what is new and worthwhile in Iliffe's *Priest of Nature* and what not — what it adds to the stock and what to the bulk. According to Westfall, then, the self-evident Anglicanism in which Newton had been reared gave way to a critical examination thereof, inspired by the obligation that went with his Fellowship in Trinity College to take holy orders within seven years of accepting it. Never one to undertake a project superficially, in the early 1670s Newton began to devour in his usual systematic and thorough-going fashion just about the entire patristic literature, and concluded soon enough that the Holy and Undivided Trinity he would have to take a solemn oath on in the presence of the entire college was a monstrous fraud. In a period of persistent doctrinal struggle in the late Roman Empire the Alexandrian priest Athanasius had managed to smuggle his favorite conception that God the Father, God the Son and the Holy Ghost were of one substance ('homoousios'; 'consubstantialis') into some specific biblical passages. Rejecting the Trinity being an unforgivable heresy, public knowledge of which would have cost Newton his Fellowship and his professorship and made him a social outcast, he kept silent about it over the entire remainder of his life. Consequently, the brief, carefully expurgated theological passages in his published work (a passage in the *Principia*'s 'Scholium Generale'; a few paragraphs in Query 31 of the *Opticks*; a few more) are but the rare manifestations, carefully trimmed for public consumption, of the more than a million words Newton was to dedicate to the subject. Following his private discovery of the fraud, Newton went on to expand his consequent heresy in several directions, most radically so in the many versions of his incompleted manuscript 'Theologiae gentilis origines philosophicae' ('The philosophical origins of gentile theology'; c. 1684). There he took several unprecedented stances, some of which were to be independently adopted in later decades by some early deists. The outcome of Newton's private heresy was a conception of nothing less than a *rational Ur-religion* that started with Noah. And he went on to argue that the further world history of religion displays, up to and including Newton's own time, a clear-cut pattern of the rational core being corrupted, time and again, by the Jewish, Egyptian, Babylonian, Greek, Roman, and still later peoples — an ongoing corruption that was halted no more than temporarily by the successive, exalted messengers (such as

[1] Lawrence Sterne, *The Life and Opinions of Tristram Shandy, Gentleman*; book 5, chapter 1, third paragraph (passage found in David Hackett Fischer, *Historians' Fallacies. Toward a Logic of Historical Thought*. New York (Harper), 1970, p. 303).

Moses and Jesus) God was in the habit of sending to humanity to cure it, although soon enough in vain, of its sinking all over again into the primordial vice of idolatry. Together with this conception went Newton's recognition of no more than two bible books, Daniel and the Apocalypse, as of greater, because prophetic, significance than just providing an historical account of the Jewish people in the Old, and of Christ's life and death in the New Testament. These two prophetic books, then, give us an insight, *if properly deciphered*, into God's plan with humanity, just as the book of nature, properly deciphered, reveals to us the laws with which He has fitted out the natural world. To the deciphering of, in particular, Revelation Newton brought both his formidable knowledge of the bible and three methodological prescriptions meant to guard him against the 'fancy' from which too many earlier exegeses of these prophecies were still suffering. All this pertains to Newton's period as a solitary rebel in Cambridge. Once settled in London, with his years of true creativity behind him, he began a second life, no longer a rebel of any kind but now an esteemed member of the establishment and, as such, well-prepared to make concessions that would have been unacceptable to him in his fiery youth. Returning in London to his theological studies, he was now chiefly concerned to tame down the radical conclusions of 'Theologiae gentilis ...', taking care with great success to make the egregious theological views that had originally given rise to his subsequent researches just about unrecognizable. This led in the end to two vast, immensely learned but also almost entirely pointless treatises, one on the prophecies in Daniel, the other a study of comparative chronology, with the original heretical message effectively hidden from sight.

So much for Westfall's vision of Newton the theologian, as put down by him in three lengthy and five much briefer passages of *Never at Rest*; 79 pages altogether. On, now, to Iliffe's 522-pages long book on the same subject: what have I learned from it?

The problem is, the account at the heart of Iliffe's book is hardly new at all. I have surely learned a great deal from this well-written and thoroughly researched book, yet not about Newton's heretical views in and of themselves — there is very little in it that I had not already encountered, more briefly to be sure yet otherwise by and large the same, in Westfall's biography when I reviewed it in a Dutch journal. What *Priest of Nature* does, beside confirming Westfall's interpretation in almost every respect without even mentioning it on more than a few secondary points, is to fill in lots of interesting and at times important *details* and provide lots and lots of very useful *context* for those views of Newton's. Westfall found that Newton as a heretic was, in many ways, uniquely radical at the time when he came to those views and began to work out in the privacy of his Trinity chambers their vast consequences as he saw them. Iliffe has arrived at really the same (still somewhat amplified) conclusion, as he announces right away on p. 11:

> Newton's extensive writings on the Trinitarian corruption of Christianity are among the most daring works of any writer in the early modern period ... what marks out Newton's writings are [sic] the independence of thought they display ... If they had been unveiled to the Republic of Letters when he wrote them, and his authorship revealed, he would now be part of an elite pantheon of original thinkers who are lauded as part of a Radical Reformation or Radical Enlightenment.

As to those details and that context, among the discussions I found most revealing in Iliffe's book are the religious situation in England during the Protectorate and by the early years of the Restoration, or later at Trinity College specifically. Equally informative are further all kinds of details regarding the Church Fathers' so widely diverging views on the true nature of Christ, and of the views and approaches of those

Apocalyptical exegetes (all listed by Westfall albeit on much smaller scale) from whom Newton learned the tricks of the trade before, as always during his Cambridge years, radicalizing their views beyond the limits of still barely acceptable Anglicanism.

Beside all this useful 'context' to Newton's 'text' there is in Iliffe's book one aspect of Newton's achievement itself that came as worthwhile news to me. All of us are aware of Newton's "Hypotheses non fingo" (in Abou-Nemeh's contribution to the Boran/Feingold collection still translated on p. 183 as 'I *frame* (rather than as 'I *feign*') no hypotheses'). Many of us have also encountered at some point Newton's exasperated comment to Halley about "Philosophy [being] such an impertinently litigious lady that a man has as good be engaged in Law suits as have to do with her." But Iliffe has gone ahead, revealingly so, to lay bare the profound connection in Newton's mind between the sentiments expressed in these two curt pronouncements. As demonstrated in particular in his chapter on Newton's ongoing dispute, in the mid- to late 1670s, with three successive Liège Jesuits about his famous 'crucial experiment', Newton regarded the ceaseless advancing of one hypothesis after another as a veritable invitation to get involved in interminable disputations. Later, Newton proved a master of disputation himself (at his most ignoble in his disputes with Leibniz over priority and with Flamsteed over command of the latter's lunar observations), yet there is surely a close connection between his sense that natural science is not a proper subject for what has all the bearings of litigation and his ideal of attaining in science not just hypothetical probability but certainty — a certainty that (so he hoped, albeit most often in vain) enabled him in his published work to soar, over the heads of the infighting multitude, into the non-ethereal realm of knowledge validated once and for all by means of rigorous mathematics, careful experimentation, and ultra-precise measurement.

What is missing from Iliffe's book, though, is treatment of the London period. The London period is when, in Westfall's rendition at least, Newton was busily hiding even from his own sight the sting of his 'Theologiae Gentilis ...' views. What is so curious about *Priest of Nature* coming to an end by the early 1690s is that Iliffe gives no explanation whatever of why he has left out of account that surely less creative and less spectacular period in Newton's theological concerns, that is nonetheless of great interest because it was, after all, Newton whose years of decline (although certainly not of senility) are at issue here. There may well be good reasons for the omission, and of course it is up to the author to define his own subject matter; only, leaving out the London period is not without its consequences. These come in with two of the three historiographically very relevant topics regarding Newton's heresy that still remain to complete this essay review: what about the matter of ordination? what about Newton's 'deism'? and what about the larger meaning of his heresy, notably his remarkable conception of Noah's rational Ur-religion?

I have discussed all three at some length in a piece 'Whose Myth-Making? Newton's Theology, Richard S. Westfall, and Westfall's Critics' (2015).[2] I sum up the conclusions at which I arrived then, so as now to compare them with those drawn by Iliffe on the exact same issues.

Ordination first. In Westfall's telling, Newton is inspired by the standard obligation of taking holy orders within seven years of assuming a Trinity fellowship, i.e., in his case in 1675 at the latest, to begin in or around 1672 to deepen his so far no more than standard knowledge regarding the theological truths on

[2] I contributed the piece to the e-published proceedings of a conference on 'Science and Religion' held in Athens in September, 2015 (http://narses.hpdst.gr/proceedings; pp. 305-312). Below, I quote one passage from that piece literally.

which he is solemnly to swear a solemn oath in the solemn presence of the entire college. He then quickly finds out the Trinity fraud and keeps expanding on it in full awareness that he has to maintain life-long silence about his heresy. But now he faces a harrowing dilemma: take a solemn oath on the Trinity in the very college named after that abominable doctrine, or not; but if not, how to explain that he cannot? Take holy orders and live the rest of his life with a profoundly gnawing conscience, or refuse ordination, but (given the vast yet inevitable consequences of the anti-Trinitarian heresy if known in public) on what possible grounds? The outcome is: last minute royal dispensation for Newton and every successive Regius Professor of Mathematics. Westfall considers two possible mediators between Newton and Charles II's court. And he advances two quite specific pieces of evidence for his tentative (as Westfall does not neglect to acknowledge) reconstruction of when and how Newton fell into heresy and what the ordination question had to do with it. Beside, of course, the kind of tentative chronology enabled by examining the life-long development of Newton's handwriting, one piece of specific evidence is a January 1675 letter to Oldenburg in which Newton announces in passing that he expects to relinquish his fellowship on short notice. The other is a story handed over through the generations in the Uvedale family that Newton had sought to acquire a recently vacated fellowship in law — a fellowship, gained by the more senior Robert Uvedale, that was exceptionally exempt from ordination (*Never at Rest*, p. 330-333).

Westfall's effort at plausible reconstruction comes in for quick dismissal in Buchwald and Feingold's widely praised and (in its mathematics-oriented portions) truly enlightening *Newton and the Origin of Civilization* (2013). On its p. 127 Feingold curtly asserts that Newton's heresy started much later, in the 1680s, and that the matter of ordination had nothing at all to do with it. What, then, about Westfall's account of the matter? Feingold needs only eight dismissive words to get rid of it: "No specific evidence exists to substantiate this claim." Alright, then, let us henceforth treat pages 330-333 of *Never at Rest* as if they have never been written.

Now for Iliffe's reconstruction. In ch. 4 of *Priest of Nature* we recognize exactly the account first told by Westfall (chronology and all), excepted one aspect only, the matter of the royal dispensation. Iliffe thinks that Newton sought it for another reason, namely, to gain room for freedom to pursue his research. But that is rather a strange remark, given that from Newton's student days onward no one had ever stood in his way to pursue his studies in whatever direction he wished. Iliffe further advances against Westfall's reconstruction that Newton's anti-Trinitarianism and, hence, the risk of having to live with a gnawing conscience was behind his seeking dispensation, that later in life, in London, Newton at many an occasion kept up appearances and proved willing to act in public as any orthodox Anglican would. Underlying that argument is, of course, a tacit assumption that throughout our lives we human beings behave in fully consistent ways. Recall here Westfall's overall picture of Newton's life: the Cambridge recluse and rebel turning in London, well past his prime, into a very capable administrator and well-settled member of the London establishment. What the rebel could not stomach might very well have looked to the settled administrator like an, in the grand scheme of things, relatively harmless concession. Surely Westfall's reconstruction of Newton's grounds for seeking royal dispensation remains no more than plausible, yet not only Feingold in a particularly blatant way but also Iliffe have made it a little too easy for themselves to try to refute it.

Then there is the question of whether Newton was a deist. Several scholars have gone on record contradicting what they take Westfall to have stated on the matter. Both Edward Davis in an otherwise delightful collection *Galileo Goes to Jail*,[3] and Steven Snobelen at various places,[4] first declare that Westfall regarded Newton as a deist and then go on to maintain that that is, of course, in no way the case. In so doing they seem to have missed that Westfall, not in *Never at Rest* where the issue of deism does not yet come up, but in an essay written slightly later, sought to make a more subtle point. In that essay, 'Isaac Newton's *Theologiae Gentilis Origines Philosophicae*' of 1982, he briefly compared the theological vision that Newton unfolded in that most radical of all his theological writings, with the deism of one of its well-known early proponents, Matthew Tindal, concluding that Newton shared some basic, yet certainly not all, typically deist notions with those later, full-scale deists. All this is part of Westfall's overall view of Newton as time and again radicalizing in the 1670s and 1680s views of some learned contemporaries of his to the point where what, with them, still remained within the outer bounds of accepted theology albeit barely, now decisively crosses that line.

Once again without mentioning Westfall, Iliffe agrees completely — yes, Newton was uniquely radical in his evolving theological views, and yes, he was in many respects quite close, intellectually, to what the early deists were to argue several decades after Newton came to some of the same conclusions in the secrecy of his Trinity chambers.

In short, Iliffe disagrees with all those polemical side-remarks about Westfall just listed, and reinstates Westfall's interpretation of Newton's theology almost to the full, without however even mentioning by name his disagreement with the former and his effective agreement with the latter, i.e., with the historian who came to that interpretation first.

Why am I so bent on insisting on these points?

For two reasons.

One is my seemingly so trivial criterion of worthwhile novelty. What does it tell us that I have found so little of it in the books here reviewed? How is it that I have encountered so much that adds to the bulk, so little to the stock? I have already said that Guicciardini's book, not primarily directed to us professionals but to a wider audience, need not offer novelty (even though here and there it does) but only need to be worthwhile (as I certainly think it is). But what about the Boran/Feingold collection, where only a few contributions, Newman's demonstration of the significant incompleteness of Westfall's and Dobbs' accounts of Newton's alchemy in the first place, offer unalloyed, worthwhile novelty? And what about Iliffe's book — a fine book as far as it goes, and worthwhile, too, yet not novel at all in the account at its very heart? What, then, about the apparent circumstance that the work of one of the finest scholars of a previous generation, whose broadly conceived, inspiring visions sprang from meticulous scholarship in the sense of taking all previous researches of any importance into account, of weighing his evidence carefully, and of maintaining throughout a careful proportionality between evidence provided and claims made on behalf of it, can so

---

[3] Edward B. Davis, 'That Isaac Newton's Mechanistic Cosmology Eliminated the Need for God'. In: Ronald L. Numbers (ed.), *Galileo Goes to Jail and Other Myths About Science and Religion*. Harvard UP, p. 118.

[4] For example, in Stephen D. Snobelen, 'The Myth of the Clockwork Universe: Newton, Newtonianism, and the Enlightenment'. In: C.L. Firestone & N. Jacobs, *The Persistence of the Sacred in Modern Thought* (University of Notre Dame Press, 2012); pp. 149-184; in particular p. 162-163.

easily be misrepresented, denigrated, or treated as non-existent? Why is it that what added in no small measure to the stock in the 1970s to the early 1990s has meanwhile been sent underground, thus in effect adding it to the bulk that may safely be neglected? I find these observations worrisome, or rather, deeply disturbing, for everyone who cares for genuine scholarship and, even more, for genuine *advance* in scholarship. Yet at this point it may be wisest to leave it to my readers to consider at their ease what this apparent state of affairs has to tell us. (Just parenthetically: I myself suspect that what we have here is the effect of a generation of scholars being taught, or having come to persuade themselves in the teaching, the widely-spread founding myth of our profession as if serious, non-triumphalist and non-presentist history of science only started on the day in 1985 when *Leviathan and the Air-pump* came out).

For expounding my second reason I return to the qualification 'broadly conceived, inspiring visions' in the previous paragraph. I already cited Westfall's vision of the deep tension running through Newton's scholarly persona; his vision of the contrast between the Cambridge rebel and the settled London establishment figure; his vision of how unprecedentedly radical Newton's heretical theology really was. What, then, was, to Westfall, the wider meaning of, in particular, the 'deism' issue? Transcending any 'was Newton a card-carrying deist or was he not?' dichotomy, Westfall's all-too-short Newton / Tindal comparison was really part of an argument of far wider scope. On the one hand Westfall was perfectly well aware of the "manifest piety" that separated Newton from later, wholesale deists. But he also could not help noticing the absence, in Newton's mature views, of certain vital elements of traditional Christianity: "Nowhere did [Newton] approach the Bible as the revelation of truths above human reason unto life eternal."[5] All the while making an important distinction between what was tradition-bound in Newton's theological views (such as, likewise, his ready adoption of the argument of design) and what was novel in it, Westfall saw radical novelty in Newton's response to a subterranean current that Newton, *like most other 17th century pioneers of modern science*, was painfully and urgently aware of. Here is how he phrased his principal thesis on the subject:

> Like Boyle, Newton was aware that the ground was shifting under the traditional foundations of Christianity. *The central thrust of his lifelong religious quest was the effort to save Christianity by purging it of irrationalities* (my italics. HFC).[6]

This view of what Newton was up to in his Arianism and even more so in the 'Origines' where he radicalized his Arianism further, is in its turn part and parcel of Westfall's vision of the fundamental significance of the Scientific Revolution:

> The story of Newton and Christianity constitutes, in my perception of things, one chapter in the central drama of European civilization: the conversion of an originally Christian civilization into a scientific one.

Even in the compass of one short book chapter Westfall does not leave this grand generalization without some empirical evidence:

> When we read only one or two of their refutations of atheism, we may find them impressive testimony, but by the time we read the tenth repetition of the same argument, we begin to sense some uneasiness behind it. Boyle offers a prime example. After a lifetime devoted to the refutation of atheism, he left provision in his will to endow a series of public lectures. What were the lectures supposed to do? Refute atheism some more. *When during the*

---

[5] R.S. Westfall, 'Newton and Christianity'; in: I. Bernard Cohen & R.S. Westfall (eds.), *Newton. Texts, Background, Commentaries* (New York: Norton, 1995); pp. 356-370; p. 368.
[6] idem, p. 370.

> *previous fifteen hundred years had that appeared necessary?* (my italics. HFC)[7]

And then follows Westfall's point that both Boyle and Newton felt "the ground shifting under the traditional foundations of Christianity", with Newton responding in a different manner than Boyle:

> Instead of trying to shore up the established foundations, Newton attempted to make the central structure secure by abandoning its faulty members. Lest I be misunderstood, let me dispense with the figure of speech and state my proposition in more direct terms. I mean to say that Newton questioned orthodox theology and rejected some of its teaching that he found contrary to reason.[8]

What we have here, then, is a vision of Newton seeking in his conception of Noah's rational Ur-religion a bulwark against the many ways in which the upcoming science to which he himself contributed in so profound ways was turning into a threat to traditional religiosity. Whether ultimately tenable or not: how is it that a vision of so wide scope on so vital an aspect of Newton's time has been so completely lost sight of that neither it, *nor any effort to seek a viable alternative for it*, is to be found anywhere in the books here reviewed, or even anywhere else in post-Westfall scholarship on Newton's theology?

I seek the answer in two significant shortcomings of the current state of our profession, however healthy it unquestionably is in many other ways.

One is that ever increasing specialization appears to leave little attention for whatever bigger picture one's own researches and one's own specialist results may be found to fit. In the case of Newton, Westfall oversaw all the literature and all the sources in a way that not even Iliffe, the long-term Director of the Newton Project, appears to do. Between then and now, Newton the theologian has become food for specialists, who no longer seek to connect that one Newton to the many Newtons otherwise engaged, so as to come up with an integrated vision of the kind that Westfall produced.

The other shortcoming is the gradual phasing out, starting in the 1980s, of the concept of the Scientific Revolution. The concept has been held responsible for an astonishing number of scholarly and even social evils, from alleged presentism and lack of proper context to legitimizing the Cold War, and, given the still reigning fashion, efforts at reconceptualization have so far led nowhere. It is here, in the current state of what Westfall once felicitously called 'the Newton industry', that we encounter one hugely significant victim — a comprehensive conception being shoved aside that, whatever its shortcomings, allowed us to bring larger vista's to the history of science than just some given local state of affairs considered in its equally local context.

> H. Floris Cohen, the current editor of *Isis*, synthesized Westfall's and a few others' views on Newton and on 17th century thinking about the concept of force in a chapter and several sections of his *How Modern Science Came Into the World. Four Civilizations, One 17th Century Breakthrough* (2010). He turned these passages, much expanded and rendered well-accessible to a broad audience, into a book about Newton's achievement, *Isaac Newton en het ware weten*, that he wrote in Dutch and that likewise came out in 2010.

[7] idem, p. 359-360.
[8] ibidem.