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Premonishment to the Physical-Chemical Treatises

(1806)

Johann Wilhelm Ritter

Translated and introduced by Jocelyn Holland*

In 1806, Johann Wilhelm Ritter published a three-volume collection of what he referred to as his “physical-chemical writings.”¹ The publication appeared the same year as Ritter’s induction into the Royal Bavarian Academy of Sciences and the speech he gave in honor of that occasion, “Physics as Art.” At the beginning of the first volume, Ritter writes a short dedication to the Royal Academy and a somewhat longer “Vorerinnerung,” translated here for the first time, to his readers and the broader community of scientists.

“Vorerinnerung” is a temporally precarious word in a way that the English translation “Premonition” (the translation usually given in dictionaries around 1800) does not quite convey. It is doubly oriented toward the past (through the notion of a reminder, or remembrance – *Erinnerung*) and the future (through the spatiotemporal orientation of the prefix *vor-*). For present-day readers familiar with Ritter’s monumental *Fragments from the Estate of a Young Physicist*, published four years later in 1810, Ritter’s choice of a time-bending genre might not sound so strange, given the fiction of a doubled pre- and posthumous position Ritter occupies in the preface to the fragments.² And there are other connections to be observed as well between

* Professor, Division of the Humanities and Social Sciences, Caltech (California Institute of Technology), 1200 E California Blvd, Pasadena CA 91125, United States – jholland@caltech.edu

¹ *Physisch-Chemische Abhandlungen in chronologischer Folge* (Leipzig: C. H. Reclam, 1806).

² For a bilingual edition of Ritter’s fragment project, along with “Physics as Art” and his essay on the history of chemistry, including explanatory essays, see Jocelyn Holland, *Key Texts of Johann Wilhelm Ritter (1776-1810) on the Science and Art of Nature* (Leiden: Brill, 2010).

the two projects, such as the theme of writing a portion of one's own life, a *Selbstbiographie*. In the *Vorerinnerung*, Ritter writes that because he is presenting a chronologically complete record of his scientific works, readers will "in this manner receive a *literary self-biography*, and this is where the perfection of the present work primarily resides." The term *Selbstbiographie* already appears with reference to the *Physical-chemical Writings* in a letter from Ritter to Hans-Christian Ørsted dating from February 2nd, 1806,³ and the idea of a biography of the self appears again in correspondence relating to the preface to the fragment collection.⁴ It is also noteworthy that in the "Vorerinnerung," as in the preface to the fragments, Ritter states a significant component of his life story is to be told with reference to his teachers.

Not only does Ritter connect these two substantial projects under the auspices of a *Selbstbiographie*, they also share another common feature which, in retrospect, makes it seem as if the *Physical-chemical Writings* are a kind of literary-experimental testing ground for the fragment project: the use of fictional personas. This is a well-documented feature of the preface to the fragment project, where Ritter refers to "the physicist" throughout using the third person, along with other, more subtle sleights of hand which are left for the reader to decipher.⁵ In the earlier *Physical-chemical Writings*, Ritter barely finishes attesting to the chronological completeness his enterprise in containing *all* of his published works when he abruptly switches voices, heralded by the parenthetical remark: "(One will note that the author generally tries to speak in the name of the physical writer.)" This raises the question of who, exactly, is speaking in the next few paragraphs, which are set off from the rest of the *Vorerinnerung* by quotations. This "physical writer" uses both the first and third person pronouns and speaks in a notably different tone, reminiscent of the one Ritter uses in the *Physics as Art* speech, with its grand gestures and flowery language. For all of his lofty rhetoric, however the "physical writer" concludes his remarks on a decidedly pragmatic note by commenting on the upsurge in the number of scientific journals and praising their ability to disseminate scientific discoveries more rapidly than ever.

Aside from the various connections, the "Vorerinnerung" does differ from the preface to the fragment collection in at least one important regard. As it turns out, Ritter's introduction to the *Physical-chemical Writings* also has

³ See *Correspondance de H. C. Ørsted avec divers savants*, vol. 2, ed. M. C. Harding (Copenhagen: H. Aschehoug, 1920), p. 147.

⁴ *Ibid.*, p. 229.

⁵ See "The Workshop as Monument. Fragments from the Estate of a Young Physicist," in *Key Texts of Johann Wilhelm Ritter*, pp. 3-19.

an epistemological axe to grind: though he refers to the sustaining adulation of the public, he also takes a defensive stance with regard to those detractors who have accused him of errors in his scientific publications. This defense begins with a Baconian plea for the usefulness of errors in general (including at least one reference to a particular occasion – the development of phlogiston theory). It then extends to complaints against Ritter’s own theories (he mentions his work on conductivity, the charging of conductors and the decomposition and recomposition of water through different kinds of conductors, and the specific properties of quicksilver.⁶ So eager is he to right these assumed wrongs, he has to deliberately rein himself in so as not to turn the “Vorerinnerung” into a scientific treatise.

With regard to the translation: those who already know that Ritter’s writing style can pose certain challenges (and the occasional headache) will find their expectations have been met. The translator has attempted a delicate balance act of conveying the sentence structure without sacrificing comprehensibility. For readers who are up to the challenge, however, the “Vorerinnerung” offers ample reward. Although a short text, it encompasses the most important dynamics of Ritter’s thinking of the years between “Physics as Art” and the fragment project: the uninhibited and at times playful literary style; the dream of constructing far-reaching historical narratives reminiscent of one whom he admired greatly, Johann Herder; and the keen desire to be taken seriously as one of the foremost scientific thinkers and experimenters of his day in the fields of physics, chemistry, and galvanism.

⁶ See, for example, text number 30 in volume 3 of the *Physical-chemical Writings*, “Neue Versuche und Bemerkungen über den Galvanismus; -- in Briefen an L. W. Gilbert. Erster Brief; -- in Gilbert’s *Annalen der Physik*. Vol. 16, pp. 293-335.

Premonishment [*Vorerinnerung*]

What I hereby present in this work, to the public, is already partially known. Another, just as sizeable part of it, however, appears in print here for the first time, even though it is closely connected to already known material. Together, both parts encompass pretty much everything that I have up to this point treated in individually published essays, as opposed to being contained in specially edited writings. For also the part of it which has not yet been printed was not completed just now, but rather, in each case in tandem with my published work, which automatically determines its place in the series of the whole.

Such a collection of all my small labors within a single work has long been desired by the public, although for the most part people could only mean those essays scattered in the various journals. Because to possess or procure for oneself the journals to the extent necessary for the knowledge of all these published works can not be done by everybody, and least of all by someone who is entering into science for the first time. Beyond that, it was also convenient not to have to go first through however many volumes in order to finally bring *such* separate things together into the connection which, although it was always latent, was not always so visible that one could have guessed it without further help; whereby the connection I want to realize often went missing or, if not, could only be maintained with an effort most people did not possess.

I merely repeat here what I have not infrequently been told, and if from the beginning I had been able, or permitted, to presuppose the attention of the public, the kind and degree of which constantly exceeded my expectations (as to which degree, all along, was only that completely reserved feeling of my service of [the public], a feeling much inclined to moderation) then I would not have allowed the fragmentation [*Versplitterung*] of that which would have been much better off forming a whole.

But nevertheless, there was still another reason at hand to be pleased by [the public's attention]. To indicate this reason, the following passage, which I recently read somewhere, may be particularly useful, and one is certainly authorized to relate what one will of it back to me, as long as one, by the same token, only permits me to agree with *this* part, but certainly releases me from accountability for the rest, which, however, I cannot avoid because of its connection.

(One will note that the author generally tries to speak in the name of the physical writer.)

“In order to grant all our works” – says the physical writer – “the success and usefulness which the world, which turns its eyes to us, demands and expects, it is almost unavoidably necessary to be intimately familiar with what is continuously the most current state of things. For not only (what would be the very least) do we in this way avoid repetitions which would hardly have been worth their expense, subsequently, we are (what is much more important) in the position to connect our works to those of *our contemporaries*, and thereby to attract them to be interested in *ours*, to facilitate for them their judgement of us, just as our judgement of *them* must remain comprehensible to them as well; in short, only in this way do we have the capacity of building an authentic and prosperous whole with the rest of the natural-scientific world.”

“The time for the science of nature [*Naturwissenschaft*] seems to have passed, where every truth, whatever its status may be, and from whatever distance it has been presented to the public, would thusly always already be recognized, and with lively force assimilated to the whole, simply *because* it is truth. *This* talent for knowing and connecting presupposes much more by far than what is to be found at the present time, generally speaking, and perhaps that time has never been, -- at least, it went by precisely in the same pace in which science spread extensively. The *passions* of man are that to which [science] for a while now has owed almost everything; one must honor *them* if one will promise oneself more of it. The slightest gift must be taken as equal to the greatest, not a single one can be left unattended; only thusly may one hope with reason to stoke the sparks into flame. Also, it is almost of no consequence, *how* science comes to be, *as long as* it just comes to be – altogether, even if it were just as possible that passions only appeared as such as they are idly pursued natural drives, which, if exercised as they demand to be, completely lose that name and become what is most noble and worthy of respect in mankind, and are even prior to this ennoblement capable of advancing it and are to be treated as such. The most excellent rule, however, which emerges from the above every time, is not to want to effect change by leaps, but rather here as well to remain true to nature, which allows for all subsequent things to follow strictly from earlier ones and, just as the future always comes from the present, so too allows the fruit only to appear after the blossom, and never before it.”

“I have mentioned the necessity for us to be familiar with the present and lingered for a long time by the reasons for this. From the same reasons, however, something else has followed, namely the *way* in which up until now,

and primarily in recent times, the natural sciences and their progress, particularly physics and chemistry, have been brought to the notice of the public. *Journals* are what these sciences have poured themselves into, and within which they live almost exclusively. *Curiosity* has *produced* them; for it is nice to be certain of learning something new regularly every month. *Narcissism* [*Eigenliebe*] helps *sustain* them; for it is not less nice to know that what one discovered today may be spread through the whole world in thirty days, yes – one even *discovers* for this very reason. – Yet both [curiosity and narcissism] are once again of no matter, particularly if it at the present time it were really the only possible way; the truth is: that, in order to keep oneself actively connected with our sciences, step by step, according to their respective circumstances, *attention to the journals which contain them is indispensable.*” –

Very often, thus all too often, one will have noticed how I too have had to conform myself to this necessity and acknowledge its reasons. Even beyond them I was compelled to follow this necessity. The work in which for five years I took it upon myself to be the most serious and complete, my *Contributions* [*Beyträge*], even these should lend themselves to the form of a journal, and I gladly admit that this printing and its unavoidable consequences, so contrary to the purpose of the whole, were almost solely the reason that neither the experiment itself succeeded, nor that in general I later, only when with the final pieces the form again became irrelevant, dedicated myself to the work with the same love with which I began it, and with which I should have stayed with it. Not less often was I shamed by the indulgence with which the public still tended to honor me, and I will long have reason to express my gratitude toward it.

I therefore rejoice now to have received the opportunity to right, somewhat, this mistake as well as those others forced by time, and one will not mistake my effort to do this to the greatest possible degree I am able to. I have already said how that which I presently accomplish has long been a wish of many. For it did not escape their notice that what the *Contributions* really seemed to them and to me initially to be did not survive, and could not linger on for the reasons indicated above; a fleeting, general survey of this work betrayed the intention just as truly as it betrayed the failure that soon followed. Coherence, whose friend I had declared myself already in the *Proof* [*Beweis*], was damaged; that I had not relinquished this coherence one must also believe according to the insight of such a confession; the cohesive part was therefore to be sought *elsewhere*. But how to encompass it in its fragmentary state? – How to successfully realign the part, which is still

incomplete, to the first one which is present? – Only a strict, chronologically organized sequence was capable of conveying this, a sequence in which what was unprinted was also incorporated, and this [previously unincorporated material], just like that which was really already printed, would consistently be placed before or after the material published as an individual piece of writing or within one (here just listed according to title); -- and such a chronological sequence is what I above all had the intention of pursuing in the present work. Thus the disadvantage which arose for me and the reader, and above all for science, would be removed from the above named, unavoidable evils as far as circumstances were able to allow. At the same time, one will in this manner receive a *literary self-biography*, and this is where the perfection of the present work primarily resides, that I posit the whole that should emerge in that way, and also in which way it should be posited by all those who know that science, as well as life, completely emerge from and are comprised, where they should be as one, like here, only from its history.

I have also been true in the presentation of the whole, and have had to be, once there was any talk at all of its history. At no point have I mixed up the time, that is, I have at no point included notes from a later time, least of all from the present time; I have neither changed nor omitted anything, even what is obviously a mistake, or seems to be one. In the case of the still unpublished essays this would have been particularly easy, but I left those as they were as well, whereby the proofs will certainly sufficiently be found in them. With such good will as mine, I will never hesitate to admit that I have made a mistake, and certainly, its unconcealed admission will even become a duty if, as indeed in the empirical sciences (—and have we any other?—), the path to truth is just as instructive as the final truth itself. For few paths to truth do not go through error, and were this not already in itself a law, to which even nature is generally required to subject itself, then we would, regarding its validity for us, already have less to complain about, because the example would likely still be lacking where error did not lead to new knowledge which, without it, would have been put aside. It could even comprise the technique of the scholar, to confront error with resolution because in that way it would reveal itself earlier than otherwise; -- and it can brashly be said that more truth rests in the mistakes of humans than all that has been accounted for up to now. For example, if the anti-phlogisticians had taken a sharp look even once as to how it really came about that *Priestley*, a man who could so little deny them their *facts* because he provided most of them himself, nevertheless could make *phlogiston* the conviction of his life,

and even in its famous *burning* could only find an efficient proof of its existence: — they would have been the founders of a chemistry, compared to which their current one is truly only a shadow play. No one who converted to their side has gained without losing, and nothing is more pernicious than completely ignoring the mistakes one has made.

I had in mind to send out in advance already of this first volume of essays a kind of critique of all my works up to date, as far as I was first able to deliver them myself immediately, and really most of them have already gone through for this purpose. To be able to do this, however, presupposed that the reader had the initial essays here [in this first volume] all together in front of him, as was initially intended. Soon, however, the latest war produced disruptions, as did other more recent articles that are yet to be completed, which did not allow for more than the first volume to be published by the time of the book fair [*Messe*]. The same circumstances were also to blame that the critique could not be completed. Certainly, however, the other volumes are already being printed, and they can be sent to Johannes the Younger. Still, in any case I have to send them afterwards instead of in advance, and this should occur as soon as it is possible.

I will also, in such a way, take notice of the complaints made against me regarding this and that, as long as their recognition is of advantage for science. And consequentially, all the more regarding those complaints, which are only to be removed by complete refutation, as the one mentioned above, and, concerning subjects whose affirmation is of particular importance, have come to me from various directions. Above all belongs here the electrical capacity [*Ladungsfähigkeit*] of conductors, as it has been studied by *Volta* and recently, in a different way, by *Brugnatelli*. For if these men were correct, then galvanism would be denied one of its greatest results, namely that of having paved the way upon which soon all bodies are subjected to the fate of water, that is, just like water, that they may be dissolved into nothing but oxygen and hydrogen, and what is more, with the loss of all particular form of them, that cannot be corrected through any composition, — somewhat in the same manner that chemistry has managed, from the most glorious and varied organic forms still little more than to pull hydrogen, carbon, nitrogen [*Azot*] and oxygen into scarcely different relations without on the other hand to be in a position of being able to successfully put back together even the simplest broken form. In my next experiments to be set up at the soonest possibility, — since *strong* batteries will be required for it, — I will start with metals, and certainly with fluid ones, and among these again with *quicksilver*, and in order to not leave the question which has arisen among many concerning the *how* of its dissolution completely without a preliminary answer, I note that I won't

have to do anything except build that great battery such that the quicksilver, in relation to the battery's own body, conducts more poorly in approximately the same degree as is generally already the case for water (and watery fluid) with batteries of usual size, where it is dissolved by the battery into hydrogen and oxygen. For the charging [*Ladung*] of the conductor discussed above, as has also only been first known from my earlier essays about it, (and I have added much since that time), in fact is already *partially*, what here should be made *totally*; that is, it [*die Ladung*] too merely occurs through such an only *partial* dissolution of the body into oxygen and hydrogen, through which meanwhile these two, after their separation, in order to still remain in connection with the body providing them, oxygen with its one part or end, hydrogen with its other part or end, and precisely to carry out its charges in these connections, are still capable, even under these circumstances, of a reunion or evening out which does not have water as its product, but rather a part like its previous body, a part coming back together with it again. Also *water* has to first make it through this stage of its partial dissolution into oxygen and hydrogen before it delivers such dissolution completely such that they are completely separated from each other and itself; but water's ability to join with oxygen on the one hand and hydrogen on the other (its capacity) is, according to already known experiments, so slight that it can soon come to pass that it releases both, either as gas or to other bodies, completely separate from it [water]. As soon as quicksilver, for example, is being exposed to such a strong action, such that it, in a given time, is separated into more oxygen and hydrogen than its sides or ends, according to their capacity, can keep attached, and oxygen's and hydrogen's ability to join together again [i.e., when detached from quicksilver] is always in the position to lead back to quicksilver, then the excess of oxygen and hydrogen that thereby emerges will completely detach itself from quicksilver, or be pushed away by it and thus appear as gas, or enter into new connections with other bodies than the same oxygen and hydrogen delivered by the water. Both, quicksilver and water, are then to be compared very appropriately, because, in the end, they can be compared literally with a Leidener flask, which would maintain the charge constantly in a degree which they would not be in a position to encompass nor through discharge towards the inside consistently and properly to reduce, [and] they consequently would be required to let the excess electricities from both sides proceed through continuously, as an outflow, in what with the battery are these opposed electricities, in the case of water and quicksilver, under similar circumstances, are oxygen and hydrogen. Still, I have to break off if I don't want to get into a formal treatise, where one least belongs.

I have still to supply a few more remarks on the style of editing of the essays appearing in the next volumes of this work.

I have avoided repetitions as much as possible. For that reason, entire essays are occasionally lacking. But I have always noted where their contents can be found again. This occurs in the *comments*, which, marked by this word, and printed with larger letters than those notes belonging to the text itself, come before or after the removed essay. In the case where individual *parts* of essays appearing in the volume have appeared before or after somewhere else, then notes incorporated into the text itself provide the required documentation. Examples of this are found on pages 46, 53, 90, 200, etc.

The previously mentioned *comments* serve further, and above all, to place in chronological order that which has been printed in the volume with that which is not contained within it. Similarly, the comments to number I and to numbers IV, VIII-X, XII, and XIII belong to this category.

That the articles themselves are ordered with their numbers according to the time of their preparation, I do not need to mention.

In the case of all previously published essays, as are numbers IV, V, VII, IX, X, and XII-XVI of the first volume, I have not only indicated every time in the title where they were previously located, but also allowed the page numbers of the journal in question to be incorporated into the text itself. Such numbers are, for example, those found in volume I, page 93, lines 3 and 24; page 94, line 24; page 95, line 23 etc. In each case they stand at the beginning or end of that line with (or, more often, within which) the new page began in the earlier printing, and the number itself indicates the new page that begins here. I also applied this to the notes; compare for example volume I, pages 108, 112 and 113, 115 and following. In this way I achieved a dual purpose: first, prevented from undertaking the revision myself because of the distance from the place of publication, and thus prevented from introducing anything additional in the subsequent sheet of paper, which was often provided by the one just before it, simply taking the reference from one essay and placing it into the other one, and not according to this current printing, but rather according to the prior initial one in the particular journal, to be able to leave them the way they were, without thereby confusing the reader, who can easily find the provided page number of the original; secondly: in this way all quotations appearing in these writings [*Abhandlungen*], and individual passages within them, remained in my particular works, though likely not in the works of so many others, complete and in their original usefulness, and even what is still being cited, not according to this [latter] printing [in the collected works], but rather according to the first printing in the journal is to be found again with the

same ease, without needing to possess the journal. And finally, in order to facilitate all cross-referencing of this kind to the utmost, I will, at the end of the third or fourth volume of this work, have an index follow all of those places which return again here so that one is immediately in the position of knowing whether or not the given citation can find its parallel.

I have also added in parentheses [] the page number and table of the *figures* belonging to the writings [*Abhandlungen*] to the page number which they would have in the engraved table [*Kupfertafel*] of the present work the first time they appear again so that their citation retains its usefulness. Thus, for example, the addendum to figure 12 in volume I, page 197, means that this figure is the same as table V, figure 1, in *Voigt's* magazine, volume V. In time, a similar index of these figures will follow, as I have promised for the journals and their page numbers.

Before every essay I have placed a particular specification of its contents. I know from personal experience how gladly one has such a thing; it also takes the place of a register to some degree, when one is not included.

Up until now I have merely spoken of that which, as it has already occurred, should be contained in the present work, and within just a few months it also really will be found there. Yet my purpose would be only halfway met were I to leave it at this – I would only have set down in it the first decade of my scientific life, and certainly the most incomplete one; as little, however, as I consider my life's path to be thereby completed, to the contrary, that I see it in every regard as only just begun, and during [this decade] I see myself only first beginning to orient myself upon and especially with a perspective above it, do I dare hope for a long continuation of it: so greatly emerges from it also my duty, to offer to the public the ever riper fruits of this future in its history, according to which I here, with its permission, encouraged by its recent attentiveness regarding the earlier, certainly less ripened fruits of the past, already these fruits do I dare present to the public, most confident of a good reception.

For indeed, I take into my second decade relations which the first one could only enjoy at its conclusion, and I would certainly like to add here, for my own recollection, that from now on I will have fewer excuses at my disposal than previously, – should I have wanted to take advantage of them – only too often! Up until now I set aside many things with hope of a better future for them, and if I thereby came to owe a debt to the public, I did it only with the hope of at some time being able to pay it back all the more. Let

it happen from this point onward; – and should one notice that I pursue new initiatives to less of a degree than long-since undertaken earlier ones: then may the history of my race in general serve as a justification, since it only repeats in the individual and knows to maintain eternal youth in the eternal renewal of this history, the most beautiful use of the gift of recollection.

What I thus think to complete above all, apart from that which the time in which I live will unavoidably demand and keep from me, will be a history of my *teachers*. I will therefore make an effort to depict, in its integrity, the best ones of the past century. I will also honor with gratitude those who survived it, and who, in their old age, the force of youth strengthened me with their living word. And to this belongs a careful critique of everything that *Winterl* lectured on. Not in order to pay tribute to the fashion of the time, according to which he is spoken of, irrespective of *how?* – *if* he can be spoken of (and to that purpose there is certainly no shortage of material at the present moment), but rather clearly and as determined as possible, to let him extract from himself what he has wanted, has done, and has yet to do, because it has already occurred: this will be the object of my work. I know that many people do not desire such a work from me; by the same token, however, I know that – once completed – it will be something which, even if it does not please, at least appeases not only them, but also the author who desired it in the first place. For that will remain true for a while, that for a long time, no single person has spurred on physics and chemistry to new self-contemplation to such a degree as he has.

Finally, as far as my own efforts are concerned, I have recently dedicated myself to giving a strict accounting of them and their results, in that I first published part of these results on almost the same day upon which, ten years earlier, I first of all began to free myself from the compulsion of nature and instead freely subjugate myself to her law. These results appeared under the title: *Physics as Art; or an Attempt to Interpret the Tendency of Physics from its History*; – (for the institutional celebration of the Royal Bavarian Academy of the Sciences on March 28, 1806); -- and the dissatisfaction with which people for the most part observed the results gives me pleasure, because it most strongly attests to the desire to become familiar with that to which they must lead. And disregarding the latter, which was nothing new, but rather was witnessed and proclaimed by many, and already at the most different times: thus do I still believe in a repeated satisfaction of that desire, as the language of contemporary physics now allows it to sufficiently honor itself, science, and me, in order for that reason to be moved to spare no effort to complete that which I have set out to do in any case with its incitement.

What could better gild the work of the week than to worthily prove Sunday's consecration and not – merely to be a Copernican in astronomy!

Whatever now, after this speech that was conceived as a commentary, and then after the remainder of what has been promised, the further continuation of these writings [*Abhandlungen*] can or should still contain, I must set aside for future consideration, due to time and its demand, when, as one in general will be able to accept the manner with which I speak of myself (longer than I am accustomed to, or will be for a long time) until then, when that point in time excuses the speech and promptly me as well, and will have better explained than has been accorded to me at this time of my life.

Finally I will still mention that of from the present work, after its early advancement to this year, in every following year at least one volume, perhaps even two, will certainly be published.

Munich

On the 4th of May, 1806.

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