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HOW VERSATILE CAN A SCHOLAR BE? SOME REMARKS ABOUT MAX WEBER AND MUSIC

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“All harmonically rationalized music takes its point of departure in the octave (vibration ratio of 1:2), and divides it into the two intervals of the fifth (2:3) and the fourth (3:4); hence, through two fractions according to the $n/(n+1)$ schema – so-called superparticular fractions, which form likewise the foundation for all intervals underneath the fifth. If one now ascends or descends in ‘circles’, at first in octaves, then in fifths, fourths, or any other relations determined by superparticulars, then powers of these fractions can never again come together in one and the same tone, no matter how far one may continue the procedure. The twelfth perfect fifth, which equals $(2/3)^{12}$, is larger by the pythagorean comma than the seventh octave, which equals $(1/2)^7$. This unalterable state of affairs, and the further fact that the octave can be divided by superparticular fractions into two unequal intervals only, are the fundamental facts underlying all musical rationalization. We remind ourselves first of what appearance, given these fundamental facts, modern music has taken.”

Just conceivably, dear audience, you do not find this too thrilling an opening paragraph. Luckily, I didn’t write it. What I have just read to you is the opening paragraph of Max Weber’s essay on music, written in 1912, left untitled, and first published by his widow in 1921, one year after he passed away as a late victim of the Spanish ‘flu. Rarely has Weber, who is surely not known for particularly accessible writing, deemed it necessary to start an essay so utterly *in medias res*. In thus establishing at one stroke his credentials with perhaps a dozen contemporary experts in the mathematical side of music theory, he manages to lose, within the space of that one opening paragraph, just about everybody else who might in principle be open to hearing what the famous Professor Weber had to say on the topic.

The topic? What topic, then? The opening paragraph does not tell us what the essay it opens is aimed at; if we want to venture a guess nonetheless, we might pause at the one word “Musikrationalisierung” with which, so I hope you still recall, the penultimate sentence of the opening paragraph ends. But what could Weber possibly mean by, of all things, the rationalization of what is, after all, the most purely emotional of all arts – the art form that, in offering us very little by way of immediate recognition beyond the words it may be accompanying, appeals to our intellect (let alone to our reason) less than any other? I am not suggesting that what Weber meant his almost 30,000 words-long essay to be about, easily reveals itself when you decide, undiscouraged by how it starts, to read on and on till the very end. When, many decades ago, I first read it (in the original German which offers the proper entrance anyway because the English translation cannot be relied on) I simply failed to get it. Even so, on finally reaching the end I did have a powerful feeling that I had been reading something very special that remained worth pondering.

But why had I found it necessary in the first place to start (and then to keep) reading 30,000 words in, as a rule, quite lengthy German sentences of, most often, quite involved grammatical construction, all the while their very point kept eluding me?

The search for an answer to that question is to lead me, and you, to the point where the very *raison d’être* of our host today, the Society for the History of the Humanities (which is, of course, to demonstrate the manifold interconnectedness of the sciences over time), and the research question at the heart of my own

scholarly career come together in Weber's essay on music and in the use he has made of that essay in the research question at the heart of his scholarly career from the early 1910s onward. To get to that point, you have to bear with me over a little piece of hopefully not too self-indulgent autobiography. But let me reassure you at the outset that all the mathematics you are going to get has already been presented to you in those few, esoteric-sounding basics of the science of music with which Weber thought fit to open his essay (and let me just add for possibly useful elucidation about the intervals mentioned by Weber in his opening paragraph that one obvious example of the octave ('octaaf') is the chord C - c; of the fifth ('kwint') C - G, and of the fourth ('kwart') G - c).

OK, then; there we go. As second-year history students in the mid-1960s we were instructed by our professors to master, among numerous other textbooks, an in many ways excellent overview entitled *A History of the Modern World*. While dutifully getting us in some 900 pages from the discovery of America to the Cold War, the authors, Robert Palmer & Joel Colton, failed in my cocky student's view to do two things. They failed to explain properly what their very title seemed to promise they had set out to explain. How has the world got modern in the first place? What forces made that momentous event in human history possible? How could a world of near-universal poverty, of a life expectation of, on average, some 35 years, of unquestioned belief in some religious truths passed on unscathed over the generations, and so on and so forth, ever have managed to turn, in Europe first of all and increasingly elsewhere as well, into a world of mass prosperity, of decades added to the average duration of a human life, of an increasingly problematic relation with revealed religion, etc. etc.? How is it that this momentous change occurred in Europe first?

What was also wrong with the book, so I observed while preparing the oral examination, was the authors' failure to pay more than the most perfunctory attention to even utterly major discoveries made in the natural sciences from the 17th century Scientific Revolution onward. I had picked up from Dijksterhuis' classic *De mechanisering van het wereldbeeld* ('The Mechanization of the World Picture') that something utterly momentous had happened due to what, following others, he should have called 'The Scientific Revolution'. I also sensed, even more darkly in this case, that if our modern world runs on science-based technology, as indeed it does, then that world is most unlikely to have come into being without the help of a substantial dosage of, indeed, science-based technology. In other words – words that I was not to start using until much later – no modern world without the Industrial Revolution and no Industrial Revolution without a preceding Scientific Revolution! True, amidst all these premature musings I failed utterly to predict that every single term in the previous sentence would in due time come up for wholesale deconstruction – a deconstruction, by the way, that has proven rather unfavorable, at least so far, to the reception of just about everything I have ever written on these matters.

At any rate, it was these two major 'failures' of the authors of *A History of the Modern World* that, if I had had more self-confidence, I would have set out to pursue right after I completed my history study. The only thing that I did do at the time, however, was to take a minor with Prof. Hooykaas, the Utrecht historian of science. I now skip what happened next in my career until the point where, as a staff member of the 'Museum Boerhaave' in Leiden, I became involved in the organization of a conference to celebrate, 350 years after the fact, Christiaan Huygens' birth in 1629. At the time I used regularly to play the church organ as a tolerably advanced amateur, and I was vaguely aware that one volume in Huygens' 22-volume *Oeuvres*

Complètes contained some 200 pages about music theory. During one decisive meeting, our committee found itself busily distributing the various disciplines in which Huygens had been active and the editors of those *Oeuvres* had ordered them, parceling out ‘mathematics’, ‘mechanics’, ‘optics’, ‘time measurement’ and the like among some well-reputed historians of science both at home and abroad. But I could not help noticing that when finally ‘music’ came up a deadly silence set in. Albeit, in that august company, still a youngster I decided to grab my chance – I proposed, without any real idea of what music theory in Huygens’ time even looked like, that I would be happy to lift the burden onto my inexperienced shoulders. That is how I got involved in the mathematical science of music in the 17th century. My presentation at our Huygens-350 conference gave me a sufficient grasp of the basics of that science, which I went on to examine in the works of Kepler, Stevin, Galileo, Mersenne, Beeckman, and Descartes, thus giving me a chance to make myself familiar the direct, sources-based way with, in particular, the thinking style of some of the most eminent pioneers of the Scientific Revolution. Somehow, while at work on the book that grew out of the effort, I learned that Max Weber had written an essay about the history of music theory in its relation to musical practice. The unending debate about what was widely held to be the ‘Weber thesis’ on Calvinism and capitalism had never managed to capture my interest, but somehow I had picked up that Weber was nonetheless a figure to be taken into account.

When I set out to read the essay, its opening paragraph baffled me right away. Not because I couldn’t follow what he was saying there; to the contrary, it was the basic stuff that I had taught myself so as to enable myself to grasp what all my main figures, from Stevin to Huygens, were writing about when addressing music theory. I shall now ‘translate’ for you, in just two math-free sentences, how Weber, in his opening paragraph, is phrasing those basics: when we intone the very building-blocks of just about all music making, the consonant intervals, as pure as we can get them given some fundamental acoustical verities, then we find that it is impossible to produce a stable tonal scale. Consequently, the utterly basic question for every musician, which is, of course, ‘What notes actually to make music with?’, cannot be resolved without (whether deliberately or not) striking some compromise or other, for the simple reason that perfect musical purity cannot be attained.

So, if I understood perfectly well what Weber was saying in that opening paragraph of his, what did I find so baffling about it? Well, as faithful members of the Society for the History of the Humanities you have already guessed, but I at the time was astonished to find that degree of expertise, which I had just managed to conquer for myself in the frame of having become a historian of science, in a scholar served up to me so far as a historian of religion and capitalism and also one of the founding fathers of sociology; that is, of disciplines very far removed indeed from whatever might smack of the science of music. Even that level of multi-disciplinarity looked most impressive to me, the more so as his music essay was clearly not a case of airy hand-waving but a very thorough, empirically sustained exercise, meant to advance our insight into the history of music not only in Europe but all over the globe. Indeed, over dozens of pages Weber was referring to the outcomes of studies of music theory and practice in other civilizations, work done at the time by pioneers in ethnomusicology definitely included. But what was all that leading up to?

I now make another jump in time, and move up to when I began to study larger segments of Weber’s work, and soon enough arrived at a brief essay with the unremarkable title ‘Vorbemerkung’ (‘Prefatory

Remark'). Technically, this is just a 15-page long piece, written two years after the music essay and published in the penultimate year of his life by way of an introduction to the first tome of his 3-volume *Die Wirtschaftsethik der Weltreligionen* ('The Economic Ethics of the World Religions'). The two translations into English made of the piece are both incomplete, inaccurate, and hidden in somewhat arbitrarily composed collections of essays by Weber. Even so, this 'Prefatory Remark' tells us, not only what over the final decade of Weber's fairly short life had become the leading theme of his scholarly work, but also how his essay on music fits into it and helps give it substance. In other words, the 'Vorbemerkung', when I read it for maybe the third or fourth time, finally provided me with the key, sought in vain before, to the music essay.

In that 'Prefatory Remark' Weber makes it clear that he is playing for high stakes. He places the entire series under the aegis of what he regards as the in part unique development that, amidst the great civilizations, distinguishes the European variant. He lists several phenomena and historical processes that Europe definitely had or still has in common with her fellow civilizations, but also a number of pronounced forms thereof that are historically found in Europe alone. He holds the latter, uniquely European phenomena to be mutually connected by a specific form of rationality. I still leave aside for now this notion of rationality, which Weber often deploys in his work without always assigning the same meaning to it – a few examples of those 'uniquely European phenomena' first. In other civilizations, too, you find a quest to grasp through observation and studious reflection how the individual natural phenomena hang together, but only in Europe of the Renaissance did this quest begin to assume the pre-eminently rational guise of modern natural science. The striving for profit is a feature of every time and place, and so is capitalism in its diverse forms: predatory capitalism, adventurers' capitalism, speculators' capitalism. But only in 16th-century Europe do you find the onset of our modern capitalism, based as it is on the rational calculation of profit and loss and on free but at the same time disciplined and efficiently organized labour. All over the globe has religion served as a rational force in the sense of countering, and replacing, the everyday practice of magic, but only in 16th century Europe has its anti-magical stance taken shape as a wholesale effort at 'disenchantment of the world' ("Entzauberung der Welt"). In every civilization you encounter music, often refined and elaborated down to its most minute components, but only Europe saw the onset of a multiform development that eventually led to the rationally differentiated, modern chord harmony of a Bach, a Beethoven, a Wagner. Weber attributes two general characteristics to these and a few other specifically European developments: that rationality to which, yes, I am to return, and a certain universality in the sense of either general validity (as in modern natural science), or the elimination through competition of all other modes of production (as in modern capitalism), or a relentless process of 'disenchantment' (as in our overall view of the world), or the boundless expressive forms that reside in the triad (as in chord harmony) [incidentally, 'triad' is, in Dutch, 'drieklank', as in the chord C – E – G].

In short, to quote the opening sentence of the 'Prefatory Remark':

"It is both inevitable and right that someone who is himself the offspring of the modern world of European culture should approach problems in world history with the following question in mind: through what concatenation of circumstances did it come about that precisely, and only, in the Western world certain cultural phenomena emerged which stand – as at least we like to imagine – in a historical line of development of universal significance and validity?"

So Weber has two primary concerns. In certain cultural domains Europe has produced something that is not only very exceptionally its own (as all civilizations do) but also lies (as with no other civilization) in a 'historical line of development of universal significance and validity'; that is, of concern, at least in principle, to the whole of humanity. And the question is how this may have come about. Weber's answer, expressed here very vaguely yet meant a good deal more specifically, is: 'due to a concatenation of circumstances'. Time and again in the various essays that Weber has dedicated to the question, historical/sociological explanation takes shape as the pointing out of separate events and states of affairs, each of which unfolds with a certain inner logic and coherence of its own, and each of which forms as it were a separate link until at unforeseen and unforeseeable times and places they come together and link up to form a chain. That is, Weber regards the course of history as the more or less fortuitous coincidence and joint further development of two or more separate processes, each propelled by an inner logic of its own.

What we have here, then, is a quite outspoken conception of the course of history that Weber extensively defended in his methodological studies but that he went on to apply wherever an inquiry into those areas where Europe followed a 'Sonderweg' (a pathway all its own) led him. And let me repeat it right away, because the point is so often ignored or overlooked: in Weber's outspoken view, Europe was far from alone in seeking to explain how natural phenomena hang together, or in displaying a variety of capitalist ways of producing and exchanging commodities, or in sustaining a faith that sought to replace a magical with a religious conception of the world, or in making music of great depth and refinement. Only, and this is key, in each of these cases and in several more Europe provided these conceptions and these practices with a unique twist of its own – unique (to repeat) in its universal significance and in its rational character. And it is these unique twists in otherwise globally present patterns that Weber seeks to understand.

OK, let us bring this long detour to an end and return to Weber's music essay, but now armed with a clearer grasp of what he is trying to demonstrate there.

I note at the outset that Weber's music essay marks the very first time when he posed this problem of the how and what and why of Europe's 'Sonderweg' and began to probe answers to it. Not capitalism, not Calvinism or any other religious faith, but the universal and increasingly rational character that music acquired in Europe and nowhere else is what first set him on this line of inquiry. And what, or rather whom, did he encounter there as his inquiry proceeded to its final conclusion? I quote now from a belated birthday letter he sent on the 12th of August, 1912, to his sister Lili, in the only known piece of personal elucidation of how he came to write his music essay:

"I shall be writing something about music history; but only about certain social conditions from which it can be explained that only we have 'harmonic' music, even though other civilizations have a much finer 'ear' and display a much more intensive music culture. Extraordinary! – this is the work of the monastic clergy, as will become apparent."

So it all began with monks – early medieval monks in the Western, Benedictine *ora et labora* tradition. And what did these monks do? Without any awareness of what their musical probings would in the end lead to, they began in their daily chanting to pursue the division of the octave into two unequal parts, the fifth and the fourth, down to what, centuries down the line, was to culminate in our modern, equal temperament as

the most pronounced expression of the modern, harmonic-tonal system of Bach, of Beethoven, and even of Wagner.

So, with this arithmetical, unequal division of the octave into the fifth and the fourth we are back at where we started — at Weber's opening paragraph. Here, in brief, is how the full argument goes.

At the heart of the essay is a conception of the extraordinary development of Western music, from the early Middle Ages onward, in the world-historically unique direction of an ongoing subjection to rational rules of a particularly strict character. In Weber's view, the development of our diatonic tonal system, like so many other developments in the West, is due to an ongoing historical process of rationalization, with tonal material and the corresponding musical theory being stripped step by step of extra-musical elements, notably of idioms and specific qualities, which are to the maximum extent possible reduced to functional elements. The diatonic principles of a functional harmonic system overrule more and more the vast variety it displayed in earlier times — a development that, in spite of all the subtle losses incurred thereby, would in the end culminate in equal temperament as a rational foundation of modern Western music practices. As Weber insisted, ever-increasing rationalization is not a one-dimensional, unidirectional historical process — to the contrary, it is precisely in the 16th century that, by way of a fresh countermovement, an allegedly very old (but really quite new) rhetorical model arose that allowed the creation of novel, unheard-of outlets for musical expression. In Weber's view, it was specifically “the great musical experimenters of the Renaissance period [who] created [this novel form of expression] in their tempestuously-rational striving for discovery.”

According to Weber, during the 16th century music was subject to a relentless process of disenchantment. That is, the cultic melodies that had once enchanted the world were being modernized and turned into an efficient means of harmonic production. At the same time, so Weber insists, by the end of the 16th century new ideas and practices of tuning and temperament began to desensitize the ears of musicians and their audience with a “dulling effect” and shackled music in “dragging chains”.

Several more steps of major significance induced the process of the rationalization of musical materials. In each step, so Weber insisted, technology was the decisive element. He lists the following large-scale musical innovations that were made from the early Middle Ages onward, each of which reinforced (if not intentionally then at least in effect) the ongoing rationalization process: (1) music notation; (2) mensuration according to varied, non-metronomic rhythmical patterns; (3) polyphony governed throughout by harmonic considerations; (4) chromatic alteration applied by way of a refinement of these harmony-based musical structures; (5) musical instruments, notably string instruments and keyboard instruments, serving in effect as the principal carriers of the entire, unparalleled development.

Central to Weber's conception of the world history of music is the paradox that precisely the art form that more directly than any other may affect us to the core of our emotional being finds itself circumscribed by rigorous rules, imposed by elementary arithmetic, and on that very basis allows (yet does not require) the most thorough-going rationalization. The entire rationalization process, that quite inadvertently began with early medieval monks and then received boost after boost in later times, finally culminated in equal temperament. This seemingly natural yet really odd and artificial temperament is the ultimate, yet not at all inevitable outcome of the highly unusual method for selecting notes from the infinite multitude available undertaken for the first time in the early Middle Ages.

Not, as elsewhere, by means of a division of the fourth in view of their mutual distances, but of the fifth in terms of ratios is how Western harmony was in the end to come about. In ancient Greece as in other 'non-Western' civilizations, the space of the fourth was customarily filled with notes chosen in view of their respective distances from (for example) C on one side and F on the other, with melodic requirements serving as the supreme arbiter. Quite unlike this universal pattern, by means of these same ratios but greatly extending them in the process so as now to include the consonances with the number 5 in their numerical definition as well, music masters in medieval Europe uniquely opted for dividing the fifth 2:3, thus producing the major third 4:5 and the minor third 5:6. Undertaken for its own sake to be sure, this world-historically unique, arithmetical division of the fifth nonetheless proved in due time to be the decisive step toward a rationalized music governed in the first place by harmonic considerations and rooted in the triad – the chord harmony all of us in the West have become so thoroughly familiar with in our own musical upbringing.

Not that Weber was a one-sided supporter, or even a neutral chronicler, of the relentless rationalization process that he recognized in musical history. All kinds of considerations that governed and still govern 'non-Western' tonal systems came in every now and then to counteract, upset or at least disturb the drive, built into the music of the West, in the direction of ever-enhanced rationalization. They did so from the inside, in that the arithmetically determined, mutual incompatibility of the consonances makes for all kinds of inherent asymmetries (for instance, between the major scales and their minor counterparts) and irregularities (for instance, intervals that are marked by numerical ratios with 7). They did so, too, from the outside. The flow of the melody, primary in other musical traditions, is in Western harmony out all the time to regain a place of its own. Dissonances, elsewhere unproblematic from the outset, regain more and more territory in the guise of special effects, starting in the late 16th century with the dominant-seventh chord. The utter irrationality that centrally marks what music means in the life of a human being thus kept intruding time and again, at all kinds of spots in all kinds of ways, and doing so with unprecedented insistence during the Renaissance. Even so, the drive toward musical rationalization has over time proved relentless indeed, as notably in the development of equal temperament. Not that the flexibility that (unlike any other tuning system) equal temperament possesses in allowing unlimited transposition and unrestrained modulation inside the Western harmonic tonal structure made its final predominance easy or even inevitable. To the contrary, equal temperament comes with grave drawbacks of its own, which up to the early 19th century stood in the way of its final acceptance. In sum, then, the history of Western music is uniquely characterized by a drive towards ever enhanced rationalization that nonetheless is neither complete nor invariably positive in its unintended consequences – what you gain in one respect, you often stand to lose in another.

So much, then, for what Weber's first exercise in explaining the European 'Sonderweg' comes down to. I address now one final issue.

Some great person's greatness often rests, not only in what she or he has done, but also in what he or she has not done, by which in itself trivial observation I mean those many obvious things that he or she ignored, or skirted, or otherwise left undone – in again other words, what ready-made traps she or he took care not to fall into. Weber has been accused with depressing frequency of at least two deadly sins – of an undue sense of Western superiority, and of a teleological or even an evolutionary or, worst of all, a triumphalist

approach to the past. Both sins were surely rampant in his own time and place, as also at many other places and in many earlier and also later times. I shall not argue that Weber was wholly and fully and always and everywhere, in every subordinate clause of his endless sentences, free of them. But I shall now illustrate in what refreshing manner he was almost entirely free of them.

Yes, he states that the entire development he has been analyzing in his music essay culminates in equal temperament. But he is well aware, as frankly few music historians prior to the rise of the early music movement in the 1970s were, that equal temperament is a compromise solution that, for all the harmonic freedom it has on offer, comes with some grave, inherent defects, the most serious of which is that it dulls our capacity to pick up all kinds of subtle tonal distinctions. I add parenthetically that precisely this is why Christiaan Huygens wanted to have none of equal temperament, as it destroys the purity of, in particular, the major and minor third preserved to a large extent in another, in his time widely used temperament.

Yes, Weber speaks of primitive music traditions, naturally doing so without the inhibitions regarding that term meanwhile instilled in each of us, living as we do over a century later. But he is very well aware that other music traditions than the European one, with their preference for leaving the vast tonal space inside the fourth undetermined by any continuation of a 'rational' division, have thereby acquired melodic, rhythmic, and many other merits of their own that the Western 'Sonderweg' has precluded more and more as the triad acquired more and more complete dominance. So some given musical tradition is not, in Weber's manner of dealing with them, inherently superior to any other – making different choices, each arrives at different ways of indulging our apparently inborn urge to express ourselves in singing and in other forms of music making. Over Weber's music essay hangs at least the suggestion, though not the certainty, that Weber actually listened, in 1912 in a Berlin library, to the first systematically catalogued audio recordings of non-Western music then in existence. But even if he did not, so much is certain that in his essay he went into great, at times exasperating detail on what the pioneering ethnomusicologists of his day were busily reporting in their writings about these far-away music traditions.

Yes, Weber speaks, repeatedly, of development. But that is a neutral term, and really nowhere in his essay does he even give the impression that he regards that development as foreordained in the sense of working toward some preset goal. Surely there is an inherent logic in the entire development, and he takes it as his very job in the essay to detect and unravel it. But he never ceases to display a lively awareness that there were always counterforces and countermovements, and that at any point things might, up to a point, have gone differently. Surely, certain things are simply impossible in any music tradition that has not turned the triad into its major organizing principle; even more fundamentally, certain things are simply ruled out *a priori* due to certain natural realities governed by the very laws of acoustics. But, given that in the Western tradition the triad has over time acquired that position as one way to come to terms with the constraints that these acoustical regularities impose on all music making, this still does not determine fully what, in any case and at any moment in time, happened next.

Yes, Weber speaks, repeatedly, and not by chance because it is at the heart of his scholarly concern, of the Western Sonderweg. In so doing he uses terms that, the way his contemporaries used them, often carried (and at times still do so today) highly evaluative connotations as, notably, with the 'Abendland' – that untranslatable phrase that we tend to associate with a dark foreboding of our superior Western culture being

on the verge of being overrun by the barbarians both inside and outside. But Weber sees it differently. When near the end of his life Oswald Spengler stole the limelight of historians given to large-scale, cross-culturally comparison, Weber was not at all convinced by Spengler's message of the imminent *Untergang* (downfall) of Western civ. Nor did he think that the modern world we live in, initiated as (for well-explicable reasons) it was in the 'Abendland', *ipso facto* embodied humanity's highest achievement. When, on completion of his essay on the world history of music, Weber turned to the world history of religion, the sense of personal involvement is even more tangible than with music, which he loved as a listener but which he played only in private behind the Steinway piano he had given to his wife as a birthday present. Weber once expressed his religious sentiments, or rather their presumed absence, by calling himself "unmusical in religious matters" (how wonderful an expression!). He even called himself "a religious cripple". That is, he just does not have the gift, and – that is the point – he regards this as a regrettable lack. We may perhaps wish that we could return to the time of unbroken belief, but those who, with Weber, feel themselves to be above make-belief cannot return.

Yes (my final 'yes'), Weber analyzes at rarely if ever surpassed depth major aspects of how our modern world has come into being. Yet he is far from believing that to live in that modern world, as is our inescapable destiny, is also an unmitigated boon. For perhaps the largest truth about what advances human history has to show is that whatever we gain at one point, we lose at another, be it in music or in science or in any other human endeavor.