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NINETEENTH-CENTURY TEMPERAMENTS AND THE MUSIC OF CHOPIN

Article accepted for this publication through a double-blind review process.

Du même, la *marche funèbre* de la *Sonate* Op. 26 de Beethoven, qui est ordinairement en *la* bémol mineur, perd beaucoup de son caractère lugubre quand elle est transposée en *la* naturel.

Pourquoi? Je l'ignore; c'est un fait.

—Albert Lavignac (1895)[1]

I. Key Characteristics in the Second Half of the Nineteenth Century

'Similarly, the funeral march of Beethoven's Sonata Op. 26, which is usually in A♭ minor, loses much of its gloomy character when it is transposed into A natural. Why? I do not know; it's a fact.' When Lavignac (1846–1916), French music scholar and critic, made this observation, he actually had just offered an explanation:

> Before leaving these analytical exercises, I must point out, here, a fact strange enough to surprise and strongly attract the attention of observant minds; it is that, despite the uniformity inherent in the system of temperament, each tonality, major or minor, possesses particular characteristics. It is not by chance that Beethoven chose the key of E♭ for the 'Eroica' Symphony, and that of F for the 'Pastoral' Symphony; it is by virtue of this mysterious law which assigns to each tone its own physiognomy, a special colour.[2]

He then offered a list of the various tonalities and their governing moods, which may be found, with other contemporary lists and discussions, in APPENDIX I.

Lavignac was in agreement with quite a few others on this matter, especially pianists, and such tables of keys and their affects appeared even in introductory music texts. Theorists had written about what were considered to be intrinsic affective differences between the various keys since the late seventeenth century, and before that there had been similar discussions of the church modes – as understood in the late Renaissance – which followed in the tradition of Plato's discussions of the Greek modes in *The Republic.* By the turn of the twentieth century, a large (and evolving) literature on the subject had accumulated, and despite more than

1
Albert Lavignac, *La Musique et les Musiciens* [1895], rev. and enl. (Paris: Librairie Delagrave, 1950), 324.

2
Albert Lavignac, *Music and Musicians*, 4th edn rev., tr. William Marchand, ed. H[enry] E[Edward] Krehbiel (New York: Henry Holt and Co., 1903), 365.

a half-century of piano temperaments that were loosely referred to as 'equal' (cf. Lavignac's phrase 'the uniformity inherent in the system of temperament'), the entire concept of key characteristics was well established, and for many it was obvious. The essential reference work on the subject, which covers the period from the late Renaissance to the year 1848, is Rita Steblin's *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries*.[3] Steblin herself notes that there was some opposition to and de-emphasis of the concept of key characteristics in the nineteenth century, but written evidence of it is sparse. And further, she observes, the terminus point of 1848 'does not mean that the belief in key meanings suddenly suffered a decline. On the contrary, it was defended by some of the most important theorists, including A. B. Marx, Hermann von Helmholtz, and Hugo Riemann.' References to those (and several other sources) are provided in her endnotes, and she closes with 'But this is material for a separate study.'[4]

Steblin was right: quite a number of theorists and ordinary pedagogues after 1848 wrote in a very matter-of-fact way about the differences between the tonalities, often without even bothering to offer an explanation for the differences. Writing in 1858, the Scottish author James Currie (his position was 'Principal of the Church of Scotland Training College, Edinburgh') confidently explained to future schoolteachers:

> Reckoning from the key of **C**, which is without either sharps or flats, and which is bold and massive in effect, occupying in this respect a middle place between the keys with sharps and those with flats, we may recognize the key of **G** as animated, sprightly, and flexible; that of **D** as the strongest and boldest of all keys; that of **A** as bold, and with more admixture of beauty in it than the two preceding; that of **E** as bold, yet rich and clear. Among the flat keys, again, we may recognize that of **F** as rich and massive; **B**♭ as a key of less decided character than the others, from the balance between strength and richness which marks it; **E**♭ warm and beautiful, and **A**♭ as connecting tenderness with beauty.[5]

Writing originally in 1872, the Swiss theorist Mathis Lussy (1828–1910) disapproved of such lists of key characteristics and felt that distinguishing between enharmonic equivalents on 'equally' tempered keyboard instruments was impossible, yet still took for granted the differences between tonalities:

> It would be well if composers gave more attention to the *characteristic* qualities of the different keys or scales, a subject much neglected in France, and to which classical composers attach great importance. They seek as much as possible to choose a key which is in harmony with the sentiments they wish to express. No doubt an air may be sung in any key without losing its identity; and this is the basis of

3
Rita Steblin, *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries*, 2nd edn (Rochester, NY: University of Rochester Press, 2002).

4
Ibidem, 185.

5
James Currie, *The Elements of Musical Analysis* (Edinburgh: Thomas Constable and Co., 1858), 66. Currie's scheme was subsequently summarized (and cited) by Robert Sutton in *The Elements of the Theory of Music* (London: R. Cocks, 1900), 41. Because Currie is clearly discussing major mode, I have identified the keys with upper-case letters to conform with modern usage.

transposition, by means of which any air may be sung in any key, and thus be brought within the compass of all voices. But it is not the less true that the cultivated musical ear can recognize and distinguish one key from another, each being characterized by its particular quality of sonorousness, sweetness, harshness, or acuteness. On the piano the flat keys or scales are softer than the sharp keys. The cause lies in '*equal temperament*'; that is to say, in the compromise which the tuners adopt so as to replace by one single chromatic note the two enharmonic notes which theoretically and practically exist between the two notes forming a major second or tone.

[...]

The flats on the pianoforte have for some time past been correctly tuned. But the more correctly they are tuned, the falser will be the sharps, which are represented by the same keys. The result of this system of tuning is that the scales of **A**♭, **D**♭, and **G**♭ are sweet, almost effeminate, whilst those of **E** and **B** are hard and harsh. We shall, therefore, generally find that *genre* pieces, such as Nocturnes, Reveries, &c., are written in flats. Yet it would be very exaggerated, not to say absurd, if we were to follow certain theorists, and prescribe a given tonality for every sentiment. The fact is that the more flats there are in a scale the sweeter would be the sound, and the more sharps the harsher would be the sound. But on the piano the scales of **D**♭ and **G**♭, which have the most flats, consist of precisely the same keys as the scales of **C**♯ and **F**♯, which have the most sharps. It is, therefore, impossible that the same keys, or the same strings, can produce at one time a soft scale and at another a harsh one. Nevertheless, it would seem a little hazardous, if not doubtful, to write a piece of tender character in **E** major, that being one of the most brilliant and vigorous keys.[6]

One sympathizes with writers of the time who treated 'equal temperament' (and there were many different variants) as *truly* equal, yet were still forced to acknowledge that the different keys, to the 'cultivated musical ear,' nonetheless somehow had different characters and properties. And to bring our theoretical survey around to Chopin, an instructive passage by Lavignac's Polish contemporary Zygmunt Noskowski (1846–1916), writing in 1899, suggests that there was awareness in Poland of these inequalities, also. After using colours, climatic phenomena (snow, ice, sunlight), the changing seasons and so forth to characterize the mazurkas Op. 24 No. 4 and Op. 41 No 1, he continued:

> When I discussed above the feeling of a certain colour in connection with a certain key, I did not talk about a paradox, because musicians have agreed for a long time that every tonality has an analogous colour in painting and that the musical creator, in skilfully combining these

6
M. Mathis Lussy, *Musical Expression: Accents, Nuances, and Tempo in Vocal and Instrumental Music*, tr. Miss M. E. von Glehn (London: Novello and Company, 1892), 6–8; Fr. orig. *Traité de l'expression musicale – accents, nuances et mouvements* (Paris: Heugel, 1874). The English translation was made from the fourth edition of 1882.

> tonalities, works on the same effect as an eminent painter who selects harmonizing hues. A painter, by composing an image in a certain palette of colours, adjusts the painting to the subject that he intends to portray; only then does a painting make an impression when the palette of colours is in complete agreement with its content. Similarly, a musician only reaches the intended goal when the tonalities chosen are well suited to the idea, content, and mood of the piece.
>
> For this reason, musical creators usually utilize the strong keys of E♭ major and B♭ major for expressing triumph or heroism, while A♭, D♭, and G♭ only appear in their works for moments of dreaming or the delight of love. A pastoral mood is best represented with F and G major, longing and sorrow are best captured with G and F♯ minor, and complaint with A minor.
>
> The last few remarks are only very general and superficial – this subject demands a separate study, and I only included these observations because I wanted to prove Chopin's infinite sensitivity to the use of keys that are adequate to his marvellous ideas.[7]

So Steblin's call for 'a separate study,' quoted above, echoed that of Noskowski, many decades earlier. And although Noskowski was absent from her bibliography and thus probably not known to her, we can see that not only was there a good deal of agreement about the existence of individual key characteristics, there was also a general sense that a better explanation was needed for the paradoxical problem of the unique tonal colours found in 'equal' temperament. Noskowski's comment dates from a half-century after Chopin's death, and the other sources quoted above date from that same 50-year period, so his beloved pieces were contemporary with several of the writers Steblin quotes, with different unequal temperaments, and so on. There is probably no composer for whom the question of key characteristics and temperament is more pressing than for Chopin, whose music remains ubiquitous in all corners of the pianistic world.

It may just be that today's widespread disinterest in – and in some quarters resistance to – the relevance of key characteristics to Chopin's music is in part a consequence of his worldwide popularity. Since the mid-nineteenth century, Chopin's music has been the daily bread of pianists from the humblest students and amateurs to the greatest virtuosi. That inevitably means that as temperaments became ever more equal, Chopin's music continued to be played everywhere, but in (let us say) ever more colourless, bleached form. The harmonic environment of the later nineteenth century – Richard Wagner, Franz Liszt's radical Hungarian modernism, etc. – was changing in ways quite different and far less subtle than the kind of understated piquancy that interested Chopin; the entire tonal system was breaking down, so subtle refinements of the

7 Zygmunt Noskowski, 'The Essence of Chopin's Works', tr. Maja Trochimczyk and Anne Desler, in Trochimczyk, ed., *After Chopin: Essays in Polish Music* (Los Angeles: Polish Music Center at USC, 2000) 34–35; Pol. orig. 'Istota utworów Chopina', *Wędrowiec*, 1900/27–31.

various harmonic environments were not of real interest to many, as both composers and audiences were more interested in music drama, symphony and tone poem.

Another factor is the exponential growth of virtuosity. The second half of the nineteenth century saw a manifold increase in technical requirements for concert artists, and pianist-heroes were seen to conquer technical challenges and (thereby) ever-greater crowds. Chopin died in 1849; Liszt completed the final versions of his Paganini Études, Transcendental Études and Hungarian Rhapsodies in the 1850s, Brahms's Op. 33 Paganini Variations and Balakirev's *Islamey* came along in the 1860s, and the arms race continued unabated into the twentieth century, with (for example) Ravel's *Gaspard de la Nuit* appearing in 1908 and Stravinsky's *Three Scenes from Petrushka* in 1921.

Throughout this same period, there grew an uneasy tradition of masculinizing Chopin, 'rescuing' him from the old associations of dandyism and softness. Recalling his youth, Artur Rubinstein wrote of 'the generally accepted opinion of Chopin as the young, sick, romantic figure who wrote sentimental music for the piano' (characterizing Chopin as the 'talent of the sickroom' was first associated with John Field, 1782–1837), and the music critic and Chopin biographer James Huneker mused,

> When [Anton] Rubinstein, Tausig, and Liszt played Chopin in passional phrases, the public and critics were aghast. This was a transformed Chopin indeed, a Chopin transposed to the key of manliness. Yet it is the true Chopin. The young man's manners were a trifle feminine but his brain was masculine, electric, and his soul courageous.[8]

The disappearance of pianistic effects (and even the memory of them) was thus due to a confluence of several interrelated trends: the tendency of temperaments to become ever more equal (a period throughout which Chopin's music was played constantly, in private and public); the weakening and dissolution of the tonality in which Chopin's music was completely based; the increase in technical requirements for concert repertoire coupled with the growth of the pianist-as-conquering-hero image, which meant that his music was being performed in ever more public, extroverted circumstances; a growing discomfort with Chopin's dynamic restraint and subtlety at the keyboard and (later) his prevailing cultural image as delicate, sentimental, precious and essentially the opposite of robust masculinity – an image that, as we have seen, was by general agreement revised and rewritten.

One cannot imagine making the case to top pianists and tuners of the later nineteenth century that the prevailing musical trends, which pointed towards greater fame, commercial success and ever-increasing crowds, should be rejected in favour of late-night

8 Arthur Rubinstein, *My Young Years* (New York: Alfred A. Knopf, 1973), 86–87; James Gibbons Huneker, *Chopin: The Man and his Music* (New York: Charles Scribner's Sons, 1900), 19. Other such references are scattered throughout Huneker's biography. More on the subject may be found in Jonathan D. Bellman, 'Chopin in Mode Masculine', https://blogs.bard.edu/bmf/2017/07/28/chopin-in-mode-masculine/ (2017).

gatherings of musically sympathetic souls where the most refined musical effects would be appreciated. It is not at all surprising, then, that Chopin's own aesthetic disappeared virtually without a trace, to the point where later generations would doubt that it even existed. (The temperament historian Owen Jorgensen referred to nineteenth-century piano temperament as a 'lost art',[9] and indeed it is.) This is even more the case in the present day: to advocate a different approach to Chopin performance or to the tuning of instruments is to imply that modern pianism is insufficient for his music: this would include virtually all modern recordings, the relative competence and preparation of all modern piano tuners, and the validity of every Chopin competition and Chopin festival on the face of the earth. It is not difficult to understand why resistance to a historical-performance approach to Chopin's music is so strong.

The case is purposely overstated, but my argument stands: asking why virtually everyone involved in today's Chopin enterprise wilfully ignores the obvious point that Chopin's music should be played in an appropriate temperament is, unavoidably, taken as an affront. Pianos were tuned differently – unequally – in Chopin's lifetime and well after, and therefore his music was conceived for a temperament quite different from what we hear today, and therefore what we hear is incomplete. Whatever the causes and historical developments leading to our standard practice today, it seems unquestionable that our assumptions about Chopin's aesthetic, and our tacit acceptance that modern equal temperament is good enough to go unquestioned, are based on very little more than habit, convenience and investment. Chopin's music deserves better.

II. Of 'Equal' Temperament

Historical Performance Practices has flourished as a musicological subdiscipline for some decades now, and questions about historical temperaments and how different familiar repertoire would have sounded in its own time are not new. Answers, inconveniently enough, are elusive; the holy-grail idea of discovering and recreating, for the music of any composer or period, the precise 'right' historical temperament (as opposed to a host of wrong ones) is for a variety of reasons untenable. First and foremost, there is no guarantee that historical tuning instructions, minus a pair of historical technician's ears, will produce a consistent result. Consider the tuning instructions given at the end of the 1795 piano treatise by Ignaz Pleyel and Jan Ladislav Dussek; the second of the two temperaments provided is intended for occasions when a piano plays with wind instruments, and the various fifths are to be tuned 'weak' or 'strong' – with no further explanation. Johann Nepomuk Hummel's 1828

9
Owen Jorgensen, *Tuning: Containing the Perfection of Eighteenth-Century Temperament, The Lost Art of Nineteenth-Century Temperament, and The Science of Equal Temperament, Complete with Instructions for Aural and Electronic Tuning* (East Lansing, MI: Michigan State University Press, 1991).

treatise (*A Complete Theoretical and Practical Course of Instruction on the Art of Playing the Pianoforte*) likewise gives two different sets of temperament instructions, but Hummel cautions that 'Not a single fifth may be perfectly pure [...] instead, every fifth has to be scaled down a little from the purity of how it should actually sound and tuned a little lower.'[10] Again, nothing more specific than 'a little lower' is offered. One of the clearest explanations of the problem was laid out in 1824 by Stuttgart piano makers Carl Dieudonné and Johann Lorenz Schiedmayer, in a manual on the proper care of their own instruments:

> The *temperament* of the different keys should be made as *equal as possible.* How unfortunate is the tuner who does not possess a sufficiently good ear that enables him to produce this equal-as-possible temperament without the aid of artificial rules; he will also be unable to bring off a correct tuning reliably even when following the best instructions on tuning. [...] It is not possible to have a *perfect* tuning at all on the piano, as well as the organ, and on all other instruments on which the enharmonic scale cannot be constructed; one must either permit the tuner to allow somewhat greater purity and more satisfactory intervals in some keys and allow others to lack as much, or accept that with a *completely equal* temperament the deficiency (albeit only to a small extent) will affect *all keys* in the same manner, such that *each* will have certain intervals too narrow and others too wide. This lack of *completely pure* intervals is, however, so slightly felt that only a very experienced musical ear will notice it and can possibly be disturbed by it.* [*Added footnote by editor/translator Preethi de Silva: 'While some musicians still continued to use unequal temperaments at this time, most accepted the use of an 'equal-as-possible' or equal temperament in order to accommodate the harmonic language of contemporary compositions.'[11]]

Silva's gloss is both perceptive and significant to the question of research into period temperaments. The general pattern was to gravitate toward ever more equal temperaments, as the nineteenth-century harmonic palette broadened, and throughout the century that trend is reflected in the tuning guides. Her point about 'some musicians' acknowledges a contemporary plurality of opinion also noted by others such as the tuner Jean Jousse (1760–1837). In 1832 Jousse wrote, 'Respecting [...] the manner of distributing the temperament of the scale among different intervals, so as to render any note as fit for a key note [the tonic, or home key of a composition], theorists do not perfectly agree; some incline for the *equal* temperament, others prefer the *unequal* temperament.'[12]

Jousse was born and raised in France but had decamped to England in the wake of the Revolution, settling in London and later publishing a tuning treatise (1832) and other pedagogical works. The full title of this little book is *An Essay on Temperament, in Which*

10
Johann Nepomuk Hummel, *Ausführliche theoretisch-practische Anweisung zum Piano-forte-Spiel: vom ersten Elementar-Unterrichte an bis zur vollkommensten Ausbildung* (Vienna: Tobias Haslinger, 1828), 442–443.

11
Preethi de Silva, ed. and tr., *The Fortepiano Writings of Streicher, Dieudonné, and the Schiedmayers* (Lewiston, NY: The Edward Mellen Press, 2008), 301–303.

12
Jean Jousse, *An Essay on Temperament* (London: Cramer and Co., Collard and Co., Goulding and Co. et al., [1832]), 16.

the Theory and Practice of That Important Branch of Music are Clearly Established and Illustrated by Precepts and Examples, Calculated to Assist Young Students in Tuning, Correctly, the Pianoforte. I consider it a good point of departure for a Chopin-appropriate temperament for a number of reasons. First, because of his age, Jousse would initially have been trained in older, more unequal temperaments, and Chopin's taste clearly ran in that direction. The treatise appeared when Chopin was a recent arrival in Paris, just gearing up to make his mark, and it is entirely congruent with his music, taking interest in key characteristics, tonal subtleties, the differences between old-fashioned and more recent tastes in tuning, and above all the acknowledgment of more than one useful approach. The idea of 'correct tuning' is of great importance, as we read on p. 1:

> The finest piano forte, either when out of tune or when tuned according to an improper temperament, loses, even under the hands of a great performer, the power of producing those delightful sensations which this same instrument is capable of eliciting when correctly tuned; also the effects produced by the extraordinary yet classical enharmonic changes, so frequent in the compositions of Haydn, Mozart, Beethoven, &c, depend on a proper temperament.[13]

'Enharmonic' effects constitute a subject with which Chopin will later be associated, but Jousse is here talking about the ability of the Classical masters – not current figures – to produce such effects, depending on the way the piano was tuned. His preliminary explanation offers a marked contrast to what we would expect today:

> There are in music two sorts of temperament: the equal and the unequal.
>
> When the imperfection inevitable on keyed instruments is distributed equally amongst the twelve notes, which compose an octave, it will be scarcely perceptible: all the 5ths being tuned flat, the 3rds will be rather sharp and this will render the twelve keys equally imperfect, which is called *equal temperament.*
>
> The *unequal temperament* takes place when some of the 5ths and 3rds are more perfect than by the *equal temperament* and others are less perfect. So that each of the twelve scales is tempered differently from any other.
>
> Each of these temperaments has its advantages and disadvantages. The advantage obtained by the *equal temperament* is that every interval and chord is produced so near perfection that none of them sound perceptibly imperfect; but it has the following disadvantages: first, it cannot be obtained in a strict sense, as may be proved, not only mathematically, but also by daily experience; therefore the best *equally*

13
Ibidem, v.

tempered instruments are still *unequally tempered,* and what is worse, **oftentimes in the wrong places**. Secondly, if it was perfectly obtained, it would produce no interval or chord quite perfect, although they would be perceptibly imperfect. Thirdly, if the equal temperament could be obtained in perfection, the twelve diatonic major and minor scales would be reduced to two, as they would only differ in point of pitch, or gravity and acuteness, and not in effect.

The *unequal temperament* has two great advantages: first, it can be easily obtained in tuning, as is proved by daily practice. **Secondly, it gives to every one of the twelve major and minor scales a particular character**; but it has the disadvantage that it cannot be used in a large band, as it is impossible to make every performer temper his instrument in one and the same manner.[14] [Editorial emphases added in bold; the italics appear in the original.]

It is no easier to imagine a 'young student' – or anyone else – learning to tune from this guide any more than from the Pleyel/Dussek or Hummel treatises. Still, this was an age of publications aimed at autodidacts, and so Jousse offers both very elementary advice (a definition of the tuning fork, for example[15]) and the sort of advice that presupposes a trained ear and good experience. In the latter category would fall his direction that the ascending fifths C–G, G–D, D–A, A–E and E–B are to be tuned 'rather flat', but that the descending fifths C–F, F–B♭ and B♭ to E♭ are 'rather sharp'. Following this, 'From E♭, descend a fifth to A♭. Try the chord A♭, C, E♭: if your bearings are good, this A♭ must agree with G♯, already tuned.'[16] Five consecutive 'rather flat' fifths and three fifths that are 'rather sharp' – there is little more than this, because 'if your bearings are good' the job is effectively complete. That a novice might have success with this method strains credulity, especially since Jousse had just assured the reader that this temperament 'can be easily obtained in tuning, as is proved by daily practice.'

The instructional aspects of Jousse's guide are less important, for our purposes, than his references to individual key characteristics and his explanation that in unequal temperaments, 'each of the twelve scales is tempered differently from any other'. This is a somewhat different point from that made by tables of key characteristics found in APPENDIX 1, which are mostly to do with harmony. The harmonic environment associated with each key ('innocent', 'bright and cheerful', 'martial', 'pastoral', etc.) result primarily from the tonic triad, especially the width of the major or minor third above the prime. Melodically, though, the different widths of half-steps throughout an entire scale, and their location with respect to scale degrees and chromatic alterations, ensure the uniqueness of every scale – and therein lies the explanation for the way certain kinds of melodies and effects work better in some keys than in others, as observed by Lavignac and Lussy in the passages

14 Ibidem, 28–29.

15 Ibidem, 31, 37.

16 Ibidem, 32–33.

quoted earlier. The relative fitness of some keys, or certain intervals, versus others did not go entirely unnoticed at the time; for example, in 1839, the pianist Ignaz Moscheles (1794–1870) heard Chopin play and wrote, 'The harsh, amateurish modulations that I stumble over when playing his compositions no longer shock me, because his fingers glide over them with elfin lightness.'[17] Taking Moscheles at his word, appropriate temperaments would quite possibly *not* work for certain passages until the pianist figured out an effective touch and voicing. The idea that a pianist's touch could make the difference between rendering a tuning unusable or allowing it to produce a kaleidoscopic variety of hues may be one of the most important guideposts we have in the sparse written literature on this subject. Temperament, it seems, would explain a great deal about Chopin's music that we in the twenty-first century can barely remember, notice or discuss.

Jousse's admission that 'the best *equally tempered* instruments are still *unequally tempered*, and what is worse, oftentimes in wrong places' alerts us to another point: that there even *were* 'right' and 'wrong' places for inequalities, and that these would have been evident to at least some of Jousse's readers. Such things are long forgotten today, and so it is hard to imagine a modern pianist who would find the traditionalist argument for inequality persuasive. Jousse's cautionary observation that 'if the equal temperament could be obtained in perfection, the twelve diatonic major and minor scales would be reduced to two, as they would only differ in point of pitch, or gravity and acuteness, and not in effect', warns against something that has long since come to pass, which pianists now find desirable and, indeed, expect. The only real disadvantage of the more unequal 'equal' temperament, for Jousse, is that 'it cannot be used in a large band, as it is impossible to make every performer temper his instrument in one and the same manner'.[18] A 'large band' would be an ensemble given to 'public' musical utterance that a wide cross-section of listeners might enjoy, which is something very different from the intimate circumstances in which Chopin's music and performance style clearly spoke best.

The problem of temperament in Chopin is thus a bit of a Gordian knot. Virtually no argument can be persuasively made that he would have favoured modern equal temperament, but advocacy for the older, unequal varieties does not mean that a specific, viable alternative temperament can be identified. Primary sources of the time provide a variety of hints and anecdotes, clear statements that even the most equal temperaments at the time were only *nearly* equal (and could have distorted tonal hierarchies), and nineteenth-century tuning instructions that are too vague for literal use today. So while it would be easy to conclude that we are at an impasse, that would be both a mistake and a failure of creativity. It is already clear that virtually *all* temperaments were unequal, and that the more unequal, traditionally inflected temperaments continued

17
Quoted in Jean-Jacques Eigeldinger, *Chopin: Pianist and Teacher*, 3rd (English) edn, ed. Roy Howat, tr. Naomi Shohet et al. (Cambridge: Cambridge University Press, 1986), 272–273.

18
Jousse, *Essay on Temperament*, 29.

to be widely used and preferred by many nineteenth-century musicians (and much in Chopin's music suggests that he would have been in this group). Unequal temperaments often shared a kind of family resemblance, which resulted in similarities between the various lists of key characteristics, and – unsurprisingly – most of Chopin's more diatonic choices of tonic key are generally in keeping with the eighteenth-century usage. Moreover, his uses of the less common, more chromatic keys show a kind of consistency also, as do his choices of keys to which he modulates: the melodic material and affects of the harmonic destinations often remain consistent also. The way forward, then, lies in experimentation, the search for a temperament which not only more closely approximates those of the nineteenth century than anything with which we today are familiar, but also provides an appropriate – or, better, an unexpectedly revelatory – context for Chopin's music.

III. Of Patterns and Conventions

Typically, the choice of an appropriate historical temperament for Baroque and Classical repertories has involved as many as possible of the following elements: taking into account the time period and geographical area of a particular composer, perhaps examining some old organs in the area (if they haven't been thoroughly modernized), and consulting the available temperament treatises or instruction books with the most points of contact with the composer (location, contemporaneity, dissemination, perhaps biographical connection). So, for example, Enid Katahn's recording *Six Degrees of Tonality: A Well-Tempered Piano* (Gasparo Records GSCD 344 [2000]), made in collaboration with the piano technician and historical tuning specialist Edward Foote, includes a Mozart Fantasy in a 1731 temperament of Peter Prelleur, a Haydn sonata in Kirnberger III (1752), a Beethoven sonata in a Thomas Young temperament (1799), and so on. For these composers, Foote chose a plausible temperament in which Katahn would record the piece, and the discussion then began – with the understanding that with very few exceptions, there would be no definitive answer about which temperaments would be appropriate and which not. The Katahn/Foote recordings (there is also an earlier one called *Beethoven in the Temperaments*) are methodologically fairly typical, in that they conform to this practice. A variety of performances of piano repertoire in unequal temperaments may be found on youtube.com, and close examination of these – *always* with repeated listenings, to acclimatize the ear, and headphones are highly recommended – is a prerequisite for delving into this area more deeply.

Although there had been theoretical discussions of 'true' equal temperament, it did not really begin to gain dominance until around 1917.[19] Despite the number of people who believe that Jean-

19 Ross W. Duffin, *How Equal Temperament Ruined Harmony* (New York, W. W. Norton, 2007), 140.

Philippe Rameau was the progenitor of truly equal temperament, or that his contemporary J. S. Bach composed for it, the widespread use of equal temperament is a twentieth-century development that cannot plausibly be linked to Chopin or anyone before. Its bland regularity, negation of the traditional key characteristics, and voicing difficulties (owing to the clashing overtones) make it a most unlikely candidate for his music, and for that of those before him. And yet, the tuning question continues to hide in plain sight; despite (or because of) numerous Chopin competitions and festivals worldwide, the enduring popularity of his music in all corners of the piano world, and endless recordings of his 70-odd opuses, Chopin as he is usually played today is far less varied, far more predictable and stable, than music of this quality ought to be. The collective investment in what might be called the Chopin industry seems to be too great for us to risk questions that would potentially jeopardize the status quo.[20] Piano teachers and students tend to be so habituated to and invested in the familiar, tamed, equally tempered Chopin that the idea that his music might noticeably benefit from a temperament for which it was intended is prohibitively inconvenient, thus unthinkable, and thus ignored. The following passage from the physicist and temperament historian Reinhard Frosch exemplifies the counterintuitive justifications of the status quo. After devoting an entire book to the benefits of mean tone, he inexplicably observes:

> For live performances of piano music by Haydn, Mozart, Beethoven, Chopin, and by later composers, equal temperament is preferable [...] because that music often deviates strongly from the diatonic scales, for example by making use of chromatic scales or of diminished seventh chords.[21]

Very little music composed since the Renaissance is purely diatonic, so it is hard to follow Frosch's reasoning here, but there seems little point in trying; it is but a justification (an odd, illogical justification) of the familiar and accepted. In contrast, the counterargument to Frosch would be a basic premise of performance practices: since composers conceived their pieces in unequal temperaments, however subtle, we can learn from and understand the music a good deal better by hearing it anew that way. Frosch is by no means alone, however, and few modern authors take any serious interest in nineteenth-century temperament instructions or discussions of key characteristics.[22]

The first prerequisite for travelling down this road is simply to be open to the idea of individual key characteristics, which (as Jousse and others predicted) we today have flattened to a mere major/minor binarism, yet upon which the historical record insists. As mentioned at the beginning of this study, descriptions of the various key characteristics or tonalities – of which APPENDIX 1

20
I have read colloquies among piano technicians in which the subject, once raised, is met with defensiveness, dismissal and even palpable resentment of the questioner, especially if a scholarly disposition is betrayed. Reactions among pianists and piano teachers can be similarly dismissive, implying that the interlocutor is an upstart who somehow sets himself above the grand tradition.

21
Reinhart Frosch, *Meantone is Beautiful!* [1993] (Bern: Peter Lang, 2002), 19.

22
See, for example, Mark Lindley, 'Temperaments', *Grove Music Online* (last updated 15 May 2009; accessed 30 May 2021); Mark Evan Bonds, *A History of Music in Western Culture* (Upper Saddle River, NJ: Prentice-Hall, 2003), 268–269; Stuart Isacoff, *Temperament: The Idea That Solved Music's Greatest Riddle* (New York: Alfred A. Knopf, 2002), among many others.

provides a post-1848 sampling – survive from as far back as the seventeenth century, and cognate discussions of the church modes were sixteenth-century precursors. Even in our equally tempered age, there are inescapable correspondences and continuities; we can sense a kind of affective through-line that connects, say, J. S. Bach's C minor Toccata and Partita in the same key, both for keyboard (BWV 911 and BWV 826, respectively), Mozart's Piano Concerto in C Minor, K. 491, any of the many Beethoven works in that key (the Fifth Symphony and the Piano Concerto No. 3, Op. 37 are the most obvious examples) all the way to Chopin's First Piano Sonata, Op. 4 – a kind of Beethovenian tribute dedicated to his composition teacher, Józef Elsner – his C minor Prelude, Op. 28 No. 20, and the Nocturne Op. 48 No. 1. The old associations of gravity and seriousness (a musical frown, essentially) of this tonality were well remembered, and maintained. The tonality of D major was primarily associated with militarism, fanfare and triumph, and this affect is maintained in the early (1832) Mazurka, KKp 1224, while the rural, innocent playfulness and joy long associated with G major is found in both the Prelude Op. 28 No. 3 and the Mazurka Op. 67 No. 1. The key of F major, long associated with the purest pastoral serenity, retains precisely this association as the tonic key of the Nocturne, Op. 15 No. 1 and the Second Ballade, Op. 38. Chopin's choices of key agree with both historical uses of the tonalities and the natural results of the contemporary unequal temperaments. The list of such examples is longer, much longer.

It is well to remember, though, that there was always more to the choice of tonic key than temperament itself; an influential piece or aria often spawned later imitations that relied on the same key and character.[23] Further, there was more at play than simply minute differences between the half-steps, or major and minor thirds; tonalities also inherited the affects and associations of the instruments most associated with those keys: D major, for example, had already acquired martial associations via its identification with natural trumpets and drums; woodwinds (with their pastoral associations) sounded better in flat-side keys, especially F, B♭ and E♭ major, hence important associations of those keys; and stringed instruments sound best in keys of up to four sharps, because the instruments' resonance increases with the number of frequently used open strings, so a certain elegance and association of 'inside' music came to be associated with those keys. All of these considerations formed an important component of the conventional syntax of the Common Practice, from the Baroque to the late nineteenth century, as much as did the harmonic grammar and rules for voice-leading found in music theory textbooks.

Still, for Chopin especially, the choice of a tonic was only part of the story. When he modulated to another key for a section (or even short passage), key colour and affect were at least as important as the inherited conventions of musical form. Examples of this

23
An excellent point made by Steven M. Whiting, in conversation at the national meeting of the American Musicological Society in Los Angeles, 2–5 November 2006.

abound in his music, although they usually pass without notice under 'the expanded tonal palette of the Romantic era' or some other such clichéd label. In this context, consider his pairings of G minor and E♭ (as opposed to B♭) major, minor tonic and major submediant. In the Nocturne Op. 37 No. 1, a highly tragic operatic lament in G minor is contrasted, in the B section, by a rich, sublimely comforting chorale in E♭. In the Ballade No. 1 in G minor, Op. 23, the contrast is even stronger: the broken, indecisive first theme – presented in complete form only once, and composed of short-breathed, hesitant fragments, is contrasted with a noble, redemptive E♭ major theme that is long-breathed, stalwart and far more complete and coherent than the first; moreover, this theme is heard in complete form twice in its own key, and again in the middle section, very nearly complete, in A major as well.[24] One can only speculate on this harmonic relationship; James Currie, writing in 1858, identified B♭ major as a key 'of less decided character than the others, from the balance between strength and richness which marks it', and in both pieces the character of E♭ major provides more depth and nobility than the more conventional and expected B♭ would have done. A third example of the same pairing is the G minor Mazurka, Op. 24 No. 1, in which the hesitant, lamenting opening section is answered by an exultant, though brief, middle section in E♭ major, the only section of the piece that feels kinetic enough that someone might want to dance to it.

Chopin's uses of A minor make a similar case. His associations with this tonality are clear: three different etudes – in A minor, Op. 25 No. 11 (the 'Winter Wind'), the diabolical weak-finger passagework of Op. 10 No. 2, and the Paganinian leaps of Op. 25 No. 4 round out a picture of A minor as a stormy, blisteringly challenging key of etudes and, at slower tempi, a key of pain and lament, as with the Prelude Op. 28 No. 2 and the 'Émile Gaillard' mazurka. In the aforementioned Ballade No. 2 in F major, the placid opening section – F major tonality, siciliano topic, hints of musette – has barely receded into memory before the torrential, etude-like A minor passage descends, sweeping all before it.[25] Given what Chopin had already established as his associations of that particular key, in other words, no other key would have sufficed.

Many more such examples can be found throughout Chopin's works, reflecting both traditional associations and his own conceptions of more distant keys. Whether enharmonic exercises such as the juxtapositions of C♯ minor and D♭ major in the Nocturne Op. 9 No. 1, both Op. 27 Nocturnes (the implications of the E♮–F♮ half-step will be discussed shortly), the Nocturne, Op. 48 No. 2, the F minor cloudburst that serves to contrast the rich, pastoral lyricism of the Nocturne, Op. 15 No. 1, the radiantly consoling, organ-like C major B section that contrasts the funereal C minor tonic of the Nocturne Op. 48 No. 1 (setting the purest, most innocent key against the darker, more troubled C minor,

24
I see the Ballade No. 1 as closely reflective of Adam Mickiewicz's narrative poem *Konrad Wallenrod:* its relationship to the action of the story, and its primary themes to the two main characters, Konrad and Aldona, as discussed in Jonathan D. Bellman, *Chopin's Polish Ballade: Op. 38 as Narrative of National Martyrdom* (New York: Oxford University Press, 2010), chapter 3.

25
My view of the narrative of Op. 38 is the subject of *Chopin's Polish Ballade*.

associations with which were established in the Etudes Op. 10 No. 12 and Op. 25 No. 12), or even the angelic D♭ major *vox humana* solo in the B section of the funeral march third movement from his Sonata No. 2 in B♭ minor, Op. 35, Chopin's choices of key are rooted in traditional associations he inherited from earlier repertoire and a consistency of association and affect he himself evolved for the more chromatic keys, in which he seems to have preferred writing.

Practically speaking, though, it is more difficult to link Chopin's deployments of the various subtly different tonalities to a specific temperament, because hints about his own tuning preferences are virtually non-existent. Jean-Jacques Eigeldinger quotes a mundane note from the composer, likely to Édouard Herbault, technician and 'alpha personality of the [Pleyel] factory': 'My piano is so out of tune that I'm not able to give lessons.'[26] Chopin apparently didn't trouble himself with a detailed understanding of the tuning process; he had begun a section of his unfinished piano treatise (now called the 'Sketch for a Method') by saying 'Intonation being the tuner's task, the piano is free of one of the greatest difficulties encountered in the study of an instrument. One needs only to study [...] a certain positioning of the hand in relation to the keys to obtain with ease the most beautiful quality of sound, to know how to play long notes and short notes and [to attain] unlimited dexterity'.[27] Most pianists today would gratefully agree, since they have about as much experience with tuning pianos as they do with building them; the mysteries of temperament thus remain mysteries, 'the tuner's task'. Although pianists for the most part know whether or not they approve of the temperament they are hearing, they are not trained to reproduce it themselves. Another glancing remark about temperament is found in Chopin's letter of 18 August 1848 to his old friend and fellow Pole Julian Fontana; musing about the number of friends from his youth who no longer walked the earth, he continued sadly, 'Those with whom I was in closest harmony have also died; even Ennike, our best piano tuner, has drowned. And so now I don't have a well-tuned p[iano], tuned according to my desires, anywhere in the world.'[28] Of course, the composer who to this day is virtually synonymous with piano music would most likely have been *very* clear in his own mind whether or not he liked a tuning (Eigeldinger: 'we know how exacting Chopin was in that respect'[29]), but his comment is suggestive. During the composer's lifetime, Paris – 'Pianopolis', as it was ironically called – was a hub for pianists, teachers and the piano industry in general, so it is safe to assume there would have been a great number of piano tuners also. Chopin's wording suggests that his preferred mode of tuning died with the technician, which would in turn imply that it was an older, more traditional approach to temperament.

APPENDIX 2 offers what I hope is at least the beginning of a solution: my own temperament, BELLMAN I, conceived with Chopin's music in mind. My goal was to find a temperament that

26
Jean-Jacques Eigeldinger, *Chopin et Pleyel* (Paris: Fayard, 2010), 180.

27
Chopin's 'Sketch for a Method', in Eigeldinger, *Chopin: Pianist and Teacher*, 192. He phrased it slightly differently in another manuscript of the same work: 'Intonation being the tuner's task, this great difficulty no longer [exists] for the pianist', Ibidem, 194.

28
Fryderyk Chopin, *Chopin's Polish Letters,* ed. John Comber, tr. David Frick (Warsaw: National Fryderyk Chopin Institute, 2016), 259. 'Ennike' is the way Chopin's version of the name is transcribed, but Eigeldinger has suggested that Chopin was simply spelling the name phonetically, and offered 'Eunicke' and 'Hénique' as further options. No record of a tuner actually named 'Ennike' has yet come to light.

29
Eigeldinger, *Chopin: Pianist and Teacher,* 93 n. 11.

maintained the traditional key characteristics, emphasizing the differences in tonality as much as possible rather than minimizing them, while not openly contradicting anything in Chopin's works. (Balancing these different aspects, struggling to tame a rebellious major third or two via touch and register so as to retain desirable effects without producing an unacceptable dissonance, led me to empathize with Moscheles.) The obvious caveat is that there can be no single *right* methodology for arriving at such a tuning when there are so many variables, from choice of starting temperament to vagueness of written instructions.

For this task – as mentioned earlier – a good beginning was the more old-fashioned, unequal temperament of Jean Jousse, using the offsets for it prescribed by Owen Jorgensen, rounded to the nearest half-cent.[30] The vagueness of contemporary instructions means that today, someone with no tuning experience needs to approach a historical temperament through a mediator, and since Jorgensen provided offsets that could be entered into an electronic tuner or synthesizer, his recension of Jousse became my initial home base. Once in a synthesizer, the pitches could be adjusted by ear, and I eventually came up with a tuning octave (C4–C5, with A4 at 440 Hz) that seemed to reflect the general descriptive characteristics given by Chopin's contemporaries. From this point forward, I worked with (human) piano tuners to refine my temperament, and the result appearing in APPENDIX 2 is my current best guess, a temperament that illuminates much in Chopin's music that I had never previously suspected. I offer it as an initial idea, in the hope that others will continue to experiment; BELLMAN I is a tuning that others are free to use, if desired, for performance and recording.[31]

The collection of later nineteenth-century descriptions of tonal characteristics found in APPENDIX 1 is certainly not a complete list. For example, I opted not to include sources such as François-August Gevaert's *Treatise on Instrumentation*; the tonality discussion in that work concentrates on key characteristics resulting from the different instruments associated with the keys rather than temperament. The number of such discussions, though, indicates that many nineteenth-century writers considered the entire idea of key characteristics self-evident and thus worthy of explanation, and – based on these commentaries, on historical key associations, and on Chopin's entire output – there is no indication whatsoever that true equal temperament would have been Chopin's preference. Quite the contrary; all relevant material considered, it seems clear that a more unequal temperament would have provided far more of what he sought.

30
Jorgensen, *Tuning*, 422.

31
As an example, one realization of this tuning can be found on the recording of the complete Chopin Etudes – Con Brio Recordings CBR21752 – by Jocelyn Swigger, Professor of Piano at the Sunderman Conservatory of Music at Gettysburg College. For future uses, I ask only acknowledgment in the notes to the programme or recording.

IV. Projected Results

It is apparent by now that even if a document by Ennike were to surface, provocatively titled 'Instructions for Chopin's Temperament', the instructions would be less than helpful to the twenty-first century reader; individual fifths would be 'slightly flat', 'rather sharp', and so on, which in our literal age would be open to interpretation and for that reason non-definitive. Since, however, we choose not to give up and settle for equal temperament, we need not only posit an appropriate temperament, but also provide guidance for evaluating it. Here Chopin himself offers some help; since his uses of traditional tonalities share a good deal with earlier composers, it follows that his preferred tuning would have shared a certain amount with other unequal temperaments, especially given Jousse's professional observation about some temperaments resulting in inequalities 'in the wrong places'. So the character distinctions between keys should be audible and noticeable (and we recall the warnings of Pauer, Lussy and Lavignac about transposed pieces losing much of their vividness and effectiveness when played in the wrong keys), and – it follows – modulations to distant keys, or even just juxtapositions of various harmonies, should produce a rich spectrum of coloristic effects unavailable in equal temperament. In sum, a temperament appropriate to Chopin's music ought to produce surprising and beautiful effects that we *have not* expected, so accustomed are we to equal temperament.

All this said, a couple of caveats are necessary. First, 'character' is not the sole consideration in choice of key; 'public' works like the concertos tend to use harmonic effects very different from those found in the nocturnes and other, more intimate kinds of writing, so genre can affect the relative importance of key character. The same is true of keyboard topography; it is hard to find the traditional innocence of C major in the Etude Op. 10 No. 7, or the Arcadian sweetness of F major in the Prelude Op. 28 No. 23, but it is harder still to imagine either in another key. Idiomatic writing for the instrument, which after all has a very particular kind of keyboard topography, is not always completely compatible with subtle differences of tonal character.

So as we (finally) approach an unequally tempered piano, it is fair to ask what we might expect to hear, which properties (or hindrances) of equal temperament will no longer obtain, and which effects will appear instead. Several general premises, I think, can be considered safe:

1. Building on points made earlier: the tonic triad of any key will exemplify the character of that key. Certainly, the complete scale has a lot to do with general harmonic environment, but the pitches of the tonic triad are the most often heard, in any key, and the character of the major or minor third above the tonic is most definitive.

2. Following from No. 1, from the contemporary discussions and from my own synthesizer experiments:
a. In major keys, the narrower the major third (within limits, of course), the sweeter, gentler and more naïve and pastoral the affect of the key. The wider the interval, the more bold, militaristic, triumphant and ultimately harsh the affect.
b. In minor keys, the narrower the third, the more bleak, horrific and otherworldly the affect of the key. The wider the third, the more noble, public and grandiose the grief.
3. In addition to the variety of harmonic environments introduced in an unequal temperament, there will be linear implications also. Unavoidably, certain half-steps are far wider than others; for example, in BELLMAN 1, the half-step from E to F is eight cents wider than it would be in equal temperament, which makes both melodic traversal of that half-step and modal interchange over a D♭ tonic much more significant sound events than they would be in standard equal temperament – or for that matter in other keys in the same temperament. This gives transposition, as for different vocal ranges, the potential to do real violence to the affect a composer has chosen for his piece – a point already made by contemporary commentators, as we have seen. In sum: the variety of vertical sonorities and widths involved in various melodies mean that composers of sufficient subtlety and sensitivity could find what seemed to be 'the good notes' on a piano when for others all pitches and combinations might be higher or lower, but still basically equal.
4. The diatonic keys will seem clearer and more resonant than the more chromatic keys, and more obvious in their essential nature. There is no surprise here; the further inequality approaches mean tone, the fewer keys are usable at all. The chromatic tonalities seem mistier and more indefinite; indeed – perhaps because in Chopin's time they were only more relatively recently available for use at all – they seem to have confused some of the theorists, who just omitted them from their lists of key characteristics. Chopin, however, was drawn to them, probably for reasons of both sonority and keyboard topography.
5. Historical repertoire played on historical tunings often has surprising timbral implications, such as when a dissonant chord has a lively, beat-filled sonic surface that resolves to a smooth-as-glass consonance. This effect may be heard on Enid Katahn's aforementioned *Six Degrees of Tonality*, on which she recorded Mozart's D minor Fantasia (K. 397) three separate times: once in equal temperament and also in two different historical temperaments. The piece sounds plausible and familiar in equal temperament (if bland), exaggerated and distorted in quarter-comma meantone, but lively and polychromatic in the temperament of Peter Prelleur (1705–1741); dissonances resolve both tonally and timbrally, and the harmonic changes are more

striking and piquant. In general, the piano (a modern grand) gives the impression of suddenly being able to do things for which one always hoped but could never quite produce in one's own playing. Another such case is found on the same recording, in the middle section of Chopin's Fantasy-Impromptu, Op. 66; the long-held melodic F5 pitches, when they occur over D♭2 in the bass, have a slow beat that approximates a gentle vocal vibrato.[32] Contemporary sources are in agreement that Chopin especially enjoyed discovering such seemingly impossible effects on the piano. All this is to say that it is reasonable to expect there to occur timbral surprises on an unequally tempered piano, because there are so many more variables, from half-steps of different widths to differing overtone relationships for each key. This element of unexpected discoveries extends to all aspects of the experience.

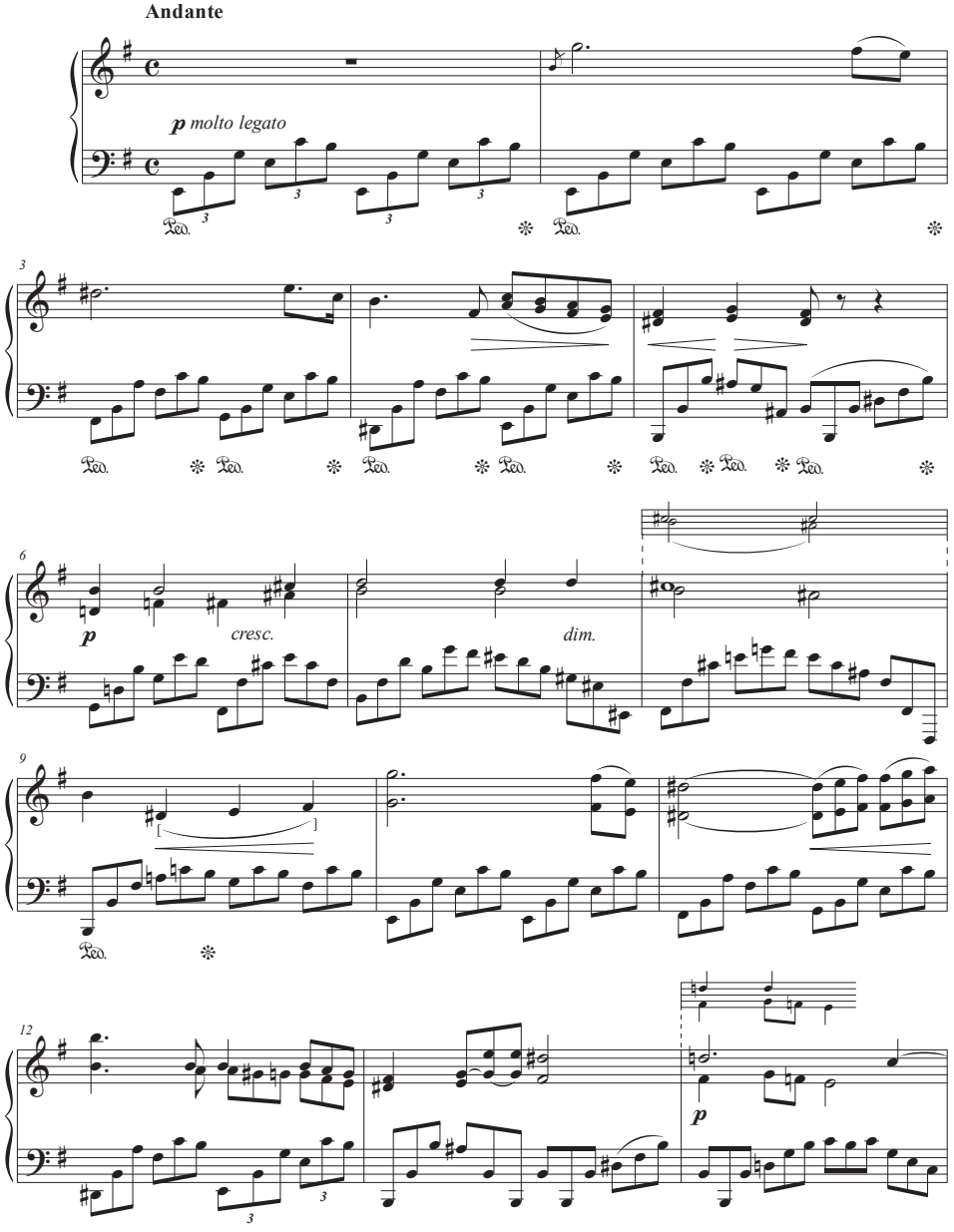
V. A Distant Echo

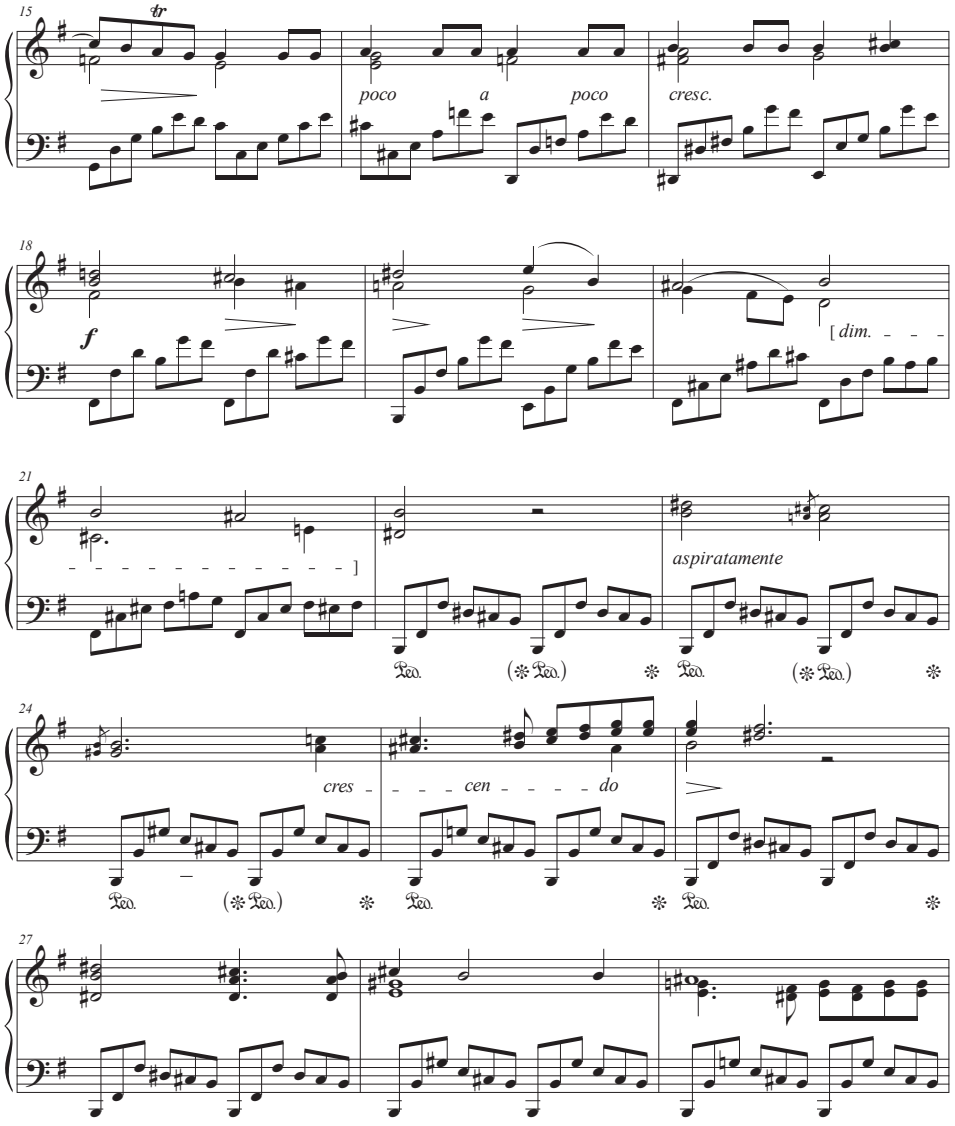
The earliest recording of anything took place after Chopin's death (see http://www.firstsounds.org/), and interest in recording musical performances only began in earnest in the 1890s. The decades after Chopin's death had seen concert music grow ever more chromatic: Liszt, Wagner, Bruckner, even early Debussy. In a sense, it is frustrating that there were so many different temperaments, equal and unequal, conservative and forward-looking, during the period right before recording technology became available. Much of interest was never recorded, obviously, so we find ourselves having to theorize and reconstruct. Moreover, many aspects of the early musical recordings were dictated in order for the sound simply to be captured: pedalling, dynamics and (we have to assume) all other considerations, including tuning. It is thus more than likely that since harmonic and timbral subtleties barely register on modern recording equipment, the general preference would have been for more equal temperaments (which would reduce a range of variables), and so a great deal of crucially important sonic information is lost to us. When all Chopin recordings are either on equally tempered instruments, or those so close that it doesn't matter, we have little guidance in imagining another approach.

Still, at least one striking recording hints at the lost sonic world. On 3 November 1927, the Chopin specialist Vladimir de Pachmann held his last recording session, on his own Baldwin piano, in London, Small Queen's Hall, 'C' Studio. His repertoire for this session included a Prelude by Felix Mendelssohn (from the C minor Prelude and Fugue, Op. 35 No. 1) and two Chopin pieces: the Etude in G♭ major, Op. 10 No. 5 ('Black Key') and the early Nocturne in E minor, published after the composer's death as Op. 72 No. 1. Of these, the recording of the Nocturne is the most interesting, and

32
The vibrato magically appears when the piano is tuned to an 1843 temperament proposed by one Augustus DeMorgan, a temperament about which technician Edward Foote wrote in the CD notes: 'A rare deviation from the norm, the De Morgan tuning reverses the centuries-old order of tonal "colours" so that the more remote keys enjoy the best harmony. Composers wrote virtually nothing about temperament, so the DeMorgan is offered here only as a possible avant-garde perspective on Chopin's choice of key, not a historically supported tuning for widespread use'. Mr Foote glossed this further in a private communication with me: 'Yes, I knew when we selected temperaments that the DeMorgan was an outlier, but it seemed to me that it would be worth putting out there as a unique example. If we are to question historical indications, I felt we should have some real artifact upon which to form opinions on the sensual nature of what we are hearing, rather than surmising from written papers. There are numerous recordings of Chopin's music, so having one that is on a completely different tuning might, at least, offer an additional perspective.' (personal e-mail of 24 January 2019).

it was released in the US as RCA Victor 6879-A. It has appeared on reissues, and it is widely available on the internet, as for example at <https://www.youtube.com/watch?v=kQVESHtMjwQ>. The reader is urged, at this point, to listen to this four-minute recording on the best playback equipment available – again, with good headphones – preferably two or three consecutive times.





Example 1. **Fryderyk Chopin, Nocturne in E minor, Op. 72 No. 1, bars 1–30.**

Close listening reveals the following elements:

1. In bar 5, the difference between the very narrow minor third D♯–F♯ and the very wide one E–G is *timbrally* apparent. Even though the former makes a major triad over the B pitches in the bass and the latter a diminished chord with the A♯s beneath, the B triad glitters and twinkles while the E minor dyad over the A♯ on the second beat is quite smooth. After beat 4, bar 6 begins with a pivot on B♮ to G major, III of E minor and a much smoother, more diatonic sonority. For comparison's sake, in BELLMAN I, the D♯–F♯ minor third is narrower than an equally tempered minor third by 4.5 cents, and the E–G wider than an ET one by 7.5 cents; these are major differences that – with a minimum of practice – one can hear and recognize, and while the width of Pachmann's thirds is unknown, this is precisely the kind of effect one would expect to hear.
2. In bars 6–7, the timbral journey from G major through an F♯ dominant seventh harmony to B minor presents three entirely different aural colours.
3. The modal interchange from the B major sonority that closes bar 13 to B minor in bar 14 is shocking: the warm, vibrating B major changes to a stark, icy-smooth B minor. D♯ to D♮ in BELLMAN I is 3.5 cents wider than an ET half-step. And the sudden clarity of harmony will go unnoticed unless one listens for it, but it will certainly be registered subconsciously. If one takes seriously the idea of 'right places' and 'wrong places' for temperament inequalities, one would be hard put to find a composer beside Chopin who so exploited unequal temperament with this kind of subtlety.
4. The dyads that start the B sections (B–D♯ in bar 23 and E–G♯ in bar 47) are painfully wide (making allowances for the approximations in BELLMAN I), 5.5 cents and 5 cents respectively. Perhaps it is now becoming clear that there seems to be a certain family resemblance between Pachmann's temperament and BELLMAN I; both reinforce the traditional key characteristics and therefore produce similar effects. But to sit down to such a temperament and poke out a *forte* B major or E major dyad is to play an ugly, rough, unusable interval, perhaps redolent of the 'harsh, amateurish' modulations acknowledged by Moscheles. Here, in both cases. Chopin maintains a pianissimo dynamic and separates the hands by three octaves, which mitigates any harshness caused by the temperament.

The Pachmann recording also, I will parenthetically add, exemplifies Chopin's famous soloistic, contrametric rubato; it is not that the hands are decoupled or unsynchronized, it's that each is completely independent, coherent and confident in its part. This independence allows the listener to focus differently, *hearing* contrametrically as the playing is contrametric, and to have melodic

and harmonic phenomena be heard independently, even if only to a small extent. It is quite some distance between the equally tempered, difficult to voice, monochromatic lockstep Chopin and the full spectrum of effects that an unequal temperament makes available, especially when combined with the Chopinesque rubato and other aspects of his pianism. To my knowledge, the identity of Pachmann's tuner is unknown, but a Chopin specialist of his reputation would have, one assumes, exacting tastes; this recording enables us to (over)hear Chopin's piano aesthetic at its most intimate, and identify harmonic, melodic and timbral effects that are entirely lacking from renderings of this piece in equal temperament.

VI. Envoi, in Lieu of Conclusions

It is difficult to imagine the traditional 'conclusions' – a triumphant summary of the new knowledge 'proven' in a foregoing study, in other words – that would be appropriate here, even though the initial goals were clear and unproblematic. The first of these was a demonstration that theorists were not only aware of but also discussed the different characteristics of the various tonalities throughout Chopin's lifetime and indeed at least half a century after his death; this establishes the unsuitability of modern equal temperament, the usual compromise, for historically informed performance of his music. (APPENDIX 1 offers proof, taken from contemporary writers.) The second goal was to explain and illustrate the possibilities of an unequal temperament, a task with which the Pachmann rendering of Chopin's Nocturne, Op. 72 No. 1 helps immeasurably. The effects heard there – discernible even on a 90-year-old recording – demonstrate that much is lost in modern performance; how much we don't even know, and still awaits rediscovery. From a performance practice perspective, equal temperament provides something like a homogenized Chopin, a Chopin with preservatives and chemical additives to maximize shelf-life and 'product stability', but which in the process sacrifices much that is interesting and noteworthy. A good deal of beauty survives the processing, yes, but we might consider seeking *all* the magic rather than settling for far less.

Given the disparity between today's note-perfect, consistent, equally tempered, 'international' Chopin style and the incredulous accounts of his own playing, the general disinterest of the pianistic world regarding this issue is puzzling. Performance practice issues such as rubato, articulation, pedalling and temperament have indeed been raised in connection with Chopin, but habit, convenience and familiarity have had, to this point, more gravitational pull, and even relatively obvious questions go uninvestigated. Chopin's piano music is hardly a minority interest,

and the existence of even this Pachmann recording of a single piece, given the rest of the composer's oeuvre, shines a bright light in a dark corner.[33] To tease out these possibilities, though, requires patient experimentation, and so the closing portion of my study should be considered an invitation to the world's pianists to proceed along these lines, discovering the long-forgotten Chopin that was known to his contemporaries but effectively erased by his successors. With that in mind, I will end with a brief discussion of the unforeseen results I myself encountered at the keyboard.

The single clearest demonstration of Chopin's awareness of the different coloristic environments of the keys is, I believe, the E major Prelude, Op. 28 No. 9. In only twelve bars, Chopin begins each of three different sequences of chords on a closely voiced E major chord (one of those requiring the greatest care in balance and voicing). Each sequence visits a different harmonic neighbourhood: the first remains, without modulating, around E; the second uses the B in the dominant to pivot to G major in bar 5 – a much cleaner and uncluttered sonority – then through increasingly tension-filled chords to A♭, before settling back to E; and the third visits the flat side: E goes to A minor, giving access to F, C and B♭. Bar 11 reverses the pivot in bar 5 (G major back to the key of B via their common tone) in order to return to E, and that moment is the biggest harmonic and coloristic shock in the entire piece.

Certain recurring patterns, or devices, in Chopin's music now have an explanation. The exceptionally wide half-step between E and F has already been noted, but his return to worry at it in several different pieces suggests that he was well aware of its effect, whether or not he was aware of the cause.[34] That same half-step assumes a prominent melodic role in the F minor *Nouvelle Étude* (note the final two pitches at the end of the repeated RH figure that begins the work) and the Nocturne in C♯ minor, Op. 27 No. 1, where the main theme flickers between the parallel major and minor tonalities; because of the width of the half-step, the effect is much different than that of a narrow one would be. The structural implications of this same half-step can be found in the 'Raindrop' Prelude in D♭, Op. 28 No. 15, the Waltz in C♯ minor, Op. 64 No. 2 and the Fantasy-Impromptu, Op. 66; each of those pieces is in ABA form and depends on the interchange of mode to an enharmonic equivalent, rather than a full modulation, for the radical change of mood in the middle section, and the width of that particular half-step emphasizes the weight of the sound event it precipitates.

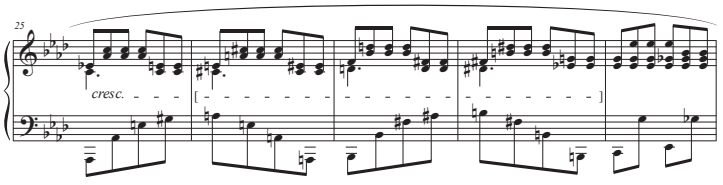
Even more subtle, though, is the use of this same half-step in the Nocturnes Op. 9 No. 1 (bars 19–26, with a repeat) and Op. 27 No. 2 (33–46). In both cases, the single pitch (on the piano) E/F♭ – together with D♭/C♯ – is used to pivot, enharmonically, from the five flats of D♭ major to the two sharps of D major or the three sharps of A major. The nineteenth-century pianist and lecturer Johanna Kinkel realized perhaps better than others what the

33
Of course, I do not know every last early recording of Chopin's music, and would welcome learning of any other such demonstration of the possibilities inherent in unequal temperaments.

34
It may seem presumptuous to assume that he wouldn't have been aware of the various interval sizes, but his rare comments about tuning, quoted earlier – 'Intonation being the tuner's task', from his 'Sketch for a Method', and the sad comment from 1848 about not having a satisfactory tuning since his one favourite tuner drowned – suggest that with respect to temperament, he knew what he liked but didn't worry too much about understanding the causes.

operative principles of such writing were, and considered Chopin an enharmonic composer: 'Chopin strives to free the quarter-tones which flit between the enharmonics like ghostly shadows', she wrote, noting the way his melodies 'creep through the semitones, groping for the finer materials and more spiritual shades of colour.'[35] Kinkel may have been among the closest of all contemporaries to understanding this aspect of Chopin's musical language, and nowhere is that clearer than when he is in D♭ major or C♯ minor.

Another unexpected yet striking kind of gesture is the chromatic sequence effected without the use of dominant harmonies, enabling the unique characteristics of each chord to be heard and savoured without erasing the affect or colour of the previous one. In unequal temperament, chromatic motion highlights the differences between functionally distant chords, while the insertion of dominants would nullify the effect. One clear example occurs in the middle section of the *Nouvelle Étude* in A♭ (seen in Example 2).



Example 2. **Fryderyk Chopin, *Nouvelle Étude* in A♭, bars 25–29.**

Here, the composer effects a chromatic ascent of major triads from A♭ to C minor using a novel device: he raises the fifth degree of each major chord by a half-step, resulting in an augmented triad, and on the next chord the root and third degree follow. The augmented triad is essentially colourless, as no tonal hierarchy results from uniform intervallic content, so the subtleties of the different major triads can more easily be detected and appreciated. A related sort of passage appears in the cadenza of the C sharp minor Prelude, Op. 45: a descending chromatic series of dominant-seventh chords goes from A to D, but in this case the chord serving to cleanse the aural palate between dominant sevenths is more complex – a minor triad with an added sixth, which because of its complexity does not threaten the cleaner colours of the dominant sevenths. The principle is the same in both passages – a chromatic succession of intervallically identical chords is fashioned so as to highlight the subtle colour differences of each chord, unsullied by obtrusive dominants. It is clear from most recordings of these two pieces that pianists do not understand how such passages work; generally, they rush through them without any sense of the effects that Chopin's own temperament would have produced on each successive triad.

35
Discussion and translation of this line: Linda Siegel, 'Johanna Kinkel's "Chopin als Komponist" and Other Musical Writings: Untapped Source Readings in the History of Romantic Music', *College Music Symposium* 43 (2003), 111. In this section, Siegel translates and contextualizes passages from Kinkel, *Acht Briefe an eine Freundin über Klavierunterricht* (Stuttgart & Tübingen: Cotta, 1852; repr. Straubenhardt: Zimmerman, 1989). Eng. versions: *Piano Playing, Letters to a Friend,* tr. and ed. Winifred Glass and Hans Rosenwald (Chicago IL: Publishers Development Co., 1943); "Eight Letters on instruction on the Piano," incomplete, tr. unknown, 76–79. Monika Klaus, *Johanna Kinkel: Romantik und Revolution* (Cologne: Böhlau, 2008), 340n.652: 'das englische Manuskript erschien gleichzeitig [1852] in London: *Eight Letters to a friend giving instructions on the Piano*'.

In my own experiments, I also discovered passages that became less complicated and problematic in this temperament. One such is the whole of the Prelude in A minor, Op. 28 No. 2, which is often considered incomprehensible; indeed, the pianist Jean Kleczynski, who studied with three of Chopin's students and wrote two books on the composer, stated simply, 'Prelude 2 ought not to be played, because it is bizarre.'[36] The dissonances in the left hand are extremely difficult to balance in equal temperament, owing to the clashing overtones, but in BELLMAN I (and, one assumes, in earlier unequal temperaments) the problem disappears – that is, the overtones clash far less – and one is left with an understated but nagging psychological disturbance, unresolved, but not without beauty, in contrast to the difficulties of the piece as played in equal temperament.

Finally, there are the glimpses of Chopin the timbrallist. In the return section of the Nocturne in F♯ minor, Op. 48 No. 2, Chopin twice (bars 119–22 and 123–27) writes a melodic *passus durusculus*, a descending chromatic fourth (a sign of profound grief and lament since at least the Baroque) in the treble, in long note values, from C♯ to G♯. The mostly unornamented melody sounds over a chromatic accompaniment that stretches over a rather wide range. The changes of texture, from one melody note to the next, are bewitching: because of changes in harmony and therefore overtones, a note with a still surface may be followed by one with a misty quality, or one that twinkles. These effects depend on a delicate balance of factors, and without a tuning that can produce these complex sounds their existence will never be suspected by either performer or listener; at that point a quintessentially Chopinesque passage – wherein the piano seems to become a living, breathing thing – disappears forever.

All of these effects – and, I am sure, many more – await rediscovery by patient pianists willing to experiment with unequal temperaments, carefully allowing the music to emerge, to explain itself in this older but unfamiliar sonic environment, to truly be heard. Unequal temperament speaks best at lower dynamic levels, in intimate circumstances; in this context we recall Chopin's comment to his student Maria von Grewingk: 'Concerts are never real music; you have to give up the idea of hearing in them the most beautiful things of art.'[37]

Admittedly, it takes a certain hubris to suggest that 170+ years of Chopin reception have overlooked or ignored a crucial element in the composer's magic. This is, however, part of a larger pattern; both Chopin's celebrated Polish rubato and the soloistic 'contrametric' rubato are but infrequently attempted by modern players, and rarely heard. The varieties of articulation noted by Kleczynski and others are no longer heard, and Chopin's use of the pedals in a way that enabled the piano to seem to breathe is likewise gone. In his time, Chopin's playing produced many ecstatic responses but few clear

36
Jean Kleczynski, *Chopin's Greater Works: How They Should Be Understood*, tr. Natalie Janotha (New York: Charles Scribner's Sons, 1900), 47.

37
Quoted in Eigeldinger, *Chopin: Pianist and Teacher*, 5.

explanations of just what he was doing; we need to find explanations that are both compatible with the effusive contemporary descriptions yet bring us further toward understanding what he was really doing than those accounts, for all their passion, can do. My suspicion is that our primary goal in doing so is less likely to be met within the current practices of the Chopin 'industry.'

It is clear that the question of equal versus unequal temperament is a major part of this discussion, and it differs from the other aspects in that once a piano is tuned, the pianist is powerless, whereas with pedalling, articulations, rubato and so on, the pianist is still in control. Clearly, there needs to be far more experimentation with unequal temperaments, whether mine or others, because we have forgotten far too much. The next steps, then, belong to the world's pianists, and it is my hope that ultimately the magic will prove not to have been permanently lost, after all.

Bibliography

Bellman, Jonathan. "Toward a Well-Tempered Chopin." In *Chopin in Performance: History, Theory, Practice.* Ed. Artur Szklener. Warsaw: Narodowy Instytut Fryderyka Chopina, 2005. 27–40.

Billeter, Bernhard. "Do Compositions Reveal Information About Historical Tuning?" In *The Music Practitioner: Research for the Music Perfomer, Teacher, and Listener,* 91–100. Edited by Jane W. Davidson. Aldershot, Hants, UK: Ashgate, 2003.

Chechlińska, Zofia. *Chopin 1810–2010: Ideas, Interpretations, and Influence.* Warsaw: Narodowy Instytut Fryderyka Chopina, 2017. 345–52.

Currie, James. *The Elements of Musical Analysis.* Edinburgh: Thomas Constable and Co., 1858.

Duffin, Ross W. *How Equal Temperament Ruined Harmony.* New York, W. W. Norton, 2007.

Eigeldinger, Jean-Jacques. *Chopin et Pleyel.* Paris: Fayard, 2010.

_____. *Chopin: Pianist and Teacher* [1970], 3rd edition. Edited by Roy Howat. Translated by Naomi Shohet with Krysia Osostowicz and Roy Howat. Cambridge: Cambridge University Press, 1986.

_____. "Twenty-Four Preludes Op. 28: Genre, Structure, Significance." Jim Samson, ed., *Chopin Studies.* Cambridge: Cambridge University Press, 1988. 167–93.

Frosch, Reinhart. *Meantone is Beautiful!* [1993] Bern: Peter Lang, 2002.

Gevaert, François-Auguste]. *Traité Général d'Instrumentation.* Ghent: N.P., 1863.

Gide, André. *Notes on Chopin,* trans. Bernard Frechtman. New York: Philosophical Library, 1949.

Hummel, Johann Nepomuk. *Méthode Complète Théorique et Pratique pour le Piano-Forte* [1838]. Geneva: Minkoff Reprint, 1981.

Isacoff, Stuart. *Temperament: The Idea That Solved Music's Greatest Riddle.* New York: Alfred A. Knopf, 2002.

Jorgensen, Owen. *Tuning: Containing The Perfection of Eighteenth-Century Temperament, The Lost Art of Nineteenth-Century Temperament, and the Science of Equal Temperament, Complete With Instructions for Aural and Electronic Tuning.* East Lansing, MI: Michigan State University Press, 1991.

Jousse, Jean. *An Essay on Temperament.* London: Privately Printed, 1832.

Kinkel, Johanna. "Friedrich Chopin als Komponist." *Deutsche Revue* xxvii/1 (1902), 93–106, 209–23, 338–60.

Kleczynski, Jean. *Chopin's Greater Works: How They Should Be Understood.* Translated, and with Additions by Natalie Janotha. London: William Reeves, 1884.

Lehman, Bradley. "Bach's Extraordinary Temperament: Our Rosetta Stone," parts I and II. *Early Music* 33/1 (February 2005) 3–24; 33/2 (May 2005), 211–32.

Lavignac, Albert. *Music and Musicians* [1895]. Trans. William Marchand. Fourth Edition rev. and ed. H[enry] E[Edward] Krehbiel. New York: Henry Holt and Co., 1903. (Pp. 365–67.)

Lindley, Mark. "Temperament §8." *The New Grove Dictionary of Music and Musicians,* 2nd ed., ed. Stanley Sadie (London: Macmillan: 2001), vol. 25.

Lussy, M. Mathis. *Musical Expression: Accents, Nuances, and Tempo in Vocal and Instrumental Music* [1874; 4th ed. 1882]. 4th ed. translated by Miss M. E. von Glehn. London: Novello and Company, 1892.

McKay, Elizabeth Norman. *Schubert: The Piano and Dark Keys.* Tutzing: Hans Schneider, 2009.

Montal, Claude. *L'Art d'accorder soi-même son piano* [1836]. Geneva: Minkoff, 1976.

Moody, Ron. "Early Equal Temperament—An Aural Perspective: Claude Montal in 1836." <http://72.14.203.104/search?q=cache:J3ZC3pkRAk0J:www.pnotec.com/user/MontalJournart.doc+montal+%2B+%22equal+temperament%22&hl=en&gl=us&ct=clnk&cd=1> (accessed 28 November 2006).

Noskowski, Zygmunt. "The Essence of Chopin's Works" [1899]. Trans. Maja Trochimczyk and Anne Desler. In Trochimczyk, Ed. *After Chopin: Essays in Polish Music.* Los Angeles: Polish Music Center at USC, 2000. 23–45.

Pauer, Ernst. *The Elements of the Beautiful in Music.* London: Novello and Company, 1877.

Steblin, Rita. *A History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries* [1983], 2nd ed. Rochester, NY: University of Rochester Press, 2002.

Sutton, Robert. *The Elements of Music Theory,* 2nd ed. London: Robert Cocks and Co., 1867. (P. 41)

Recordings.

Katahn, Enid (in consultation with **Edward Foote**). *Beethoven in the Temperaments* (Gasparo CD GSCD-332; 2003).

_____. *Six Degrees of Tonality* (Gasparo GSCD-344; 2009).

Pachmann, Vladimir. Chopin Nocturne in E Minor, Op. 72, RCA Victor 6879-a; rec. 3 November 1927; (Cc11757-1[though there is disagreement among discographers]) DB 1106.
Stephenson, Trevor. *Music of Chopin.* (Light and Shadow LS-296).
Swigger, Jocelyn. *The Complete Chopin Études* (2017). Con Brio CBR 21752.

APPENDIX I
Later-Nineteenth-Century Writings on Temperament

Note: The purpose of this selection of source readings is to demonstrate that for many nineteenth-century theorists, affective and coloristic differences between the various major and minor scales and tonalities were a matter of plain fact. Explanations varied; even when admitting to an imperfect understanding of the phenomenon, experience won out and they had to acknowledge what their ears told them. Occasionally an author mentions 'equal temperament'; that term was often used for temperaments that accommodated playing in all keys but were subtly unequal (today they are sometimes called 'Victorian temperaments') and should not be confused with modern, truly equal temperament.

These later-nineteenth-century writings on piano temperament and key characteristics complement those in Rita Steblin's volume, which is a compendium of as many such writings as may be found, ranging from late-Renaissance discussions of modes to 1848, encompassing most of the Common Practice period. The selection below was considered to be of greatest relevance to Chopin, for which reason I have opted to exclude discussions of key characteristics that focus more on the physical properties of the orchestral instruments—wind instrument construction, open versus stopped strings and so on. They are relevant to the wider subject but not particularly useful for the present study.

Currie, James. *The Elements of Musical Analysis*, Edinburgh: Thomas Constable and Co., 1858. (pp. 66–67)

The effects of the same melody in two different keys, though very similar, are yet not identical. If they were so, it would be a matter of indifference what key is selected for a melody, which it is far from being. The cultivated ear recognizes difference of character in the different keys. From the sameness of relative pitch amongst the notes, the mere musical effect is the same; but the emotional effect is different. Thus the keys with sharps have a generic character of decision and boldness about them; by which they are distinguished from those with flats, which have a generic character of mellow beauty. Again, there are individual differences amongst the keys with sharps, and amongst the keys with flats. Reckoning from the key of C major, which is without either sharps or flats, and which is bold and massive in effect, occupying in this respect a middle place between the keys with sharps and those with flats,

we may recognize the key of G major as animated, sprightly, and flexible; that of D major as the strongest and boldest of all keys; that of A major as bold and with more admixture of beauty in it than the two preceding, that of E major as bold, yet rich and clear. Amongst the flat keys, again, we may recognize that of F major as rich and massive; B♭ major as a key of less decided character than the others, from the balance between strength and richness which marks it; E♭ major warm and beautiful; and A♭ major as connecting tenderness with beauty. Whilst, therefore, short melodies, in which there is no room or intention to work out a particular effect, may be transposed for convenience, it should be borne in mind that in artistic compositions, where different keys are employed, it may be presumed that there is a decided adaptation between the several keys and the effect to be produced, and consequently that we are not at liberty to alter them.

Sutton, Robert. *The Elements of Music Theory*, 2nd edn, London: Robert Cocks and Co., 1867. (Sutton, p. 41, presents only a condensed version of **Currie**.)

Pauer, Ernst. *The Elements of the Beautiful in Music*, London: Novello and Company, 1877. (pp. 20–26)

If we turn to the intervals, we shall find that the fifth may be regarded as the centre, although it does not possess any characteristic expression except when associated with the third. The third is certainly the most important interval with respect to characteristic expression;—it decides the expression, and renders it either cheerful or melancholy. The major third expresses power, quietness, and grandeur, concord and contentment; the minor third, on the other hand, gives an idea of tenderness, grief, and romantic feeling. Although both thirds, major and minor, are full of expression, a frequent repetition of them, or parallel sequences, will result in monotony. [...]

It would lead us too far, in a work like the present, to attempt to point out the characteristic expression of every chord; but it is certainly necessary to remark on the different character or expression apparent in the various keys.

The key is in music what colour is in painting. The key furnishes the tone to the piece; and if we desire to be impartial and conscientious judges, we ought always, particularly in the [>21] case of songs, which for the convenience of singers are so often transposed, to inquire what was the original key in which the composer wrote his work. To give only one short example,—Mendelssohn's celebrated song 'Auf Flügeln des Gesanges' ('On Song's bright pinions'), originally written in the key of A flat for a mezzo-soprano, loses its

characteristic expression by being sung in F major, as adapted for a contralto. The different character of the various keys was already recognized by Plato and Aristotle, who both speak of keys which act in an enervating way, and of others which exert an awakening and invigorating influence on the human mind. We may take it for granted that every key has, to a certain extent, its particular domain, in which it reigns with a decided supremacy, and in which it satisfactorily expresses its individual character.

The proper choice of the key is of the utmost importance for the success of a musical work; and we find that our great composers acted in this matter with consummate prudence and with careful circumspection. It would not be hypercritical, were we to recognize in the greater frequence of the use of a certain key a predilection or idiosyncrasy of the composer. Thus we find that Beethoven was undoubtedly partial to the key of C; for when we look in the catalogue of his works and count his sonatas, duet-sonatas, quartets, quintets, overtures, symphonies, we find that he wrote twenty-five of his works in the key of C, fifteen in that of E flat, thirteen in that of F, thirteen in that of G, eleven in the key of D and A flat, nine in A, eight in B flat, five in E, three in C sharp, and only a solitary one in F sharp. In examining the thematic catalogue of Mozart's works, we find that most of his compositions are written in the keys of C, G, F, D, and B flat. Again, an examination of the keys used for slow movements will show us that Beethoven, more particularly in his first compositions, had a predilection for the key of A flat, and Mozart for that of F major.

Major keys express chiefly joy, power, brightness of feeling; but they are also able to portray, in a highly effective manner, a quiet and melancholy expression; and lend themselves readily to depict seriousness, dignity, and grandeur. Examples: the aria 'Dove sono' in *Le Nozze di Figaro*, Donna Anna's great scena and aria in F major in *Don Giovanni*, and the great air of Agatha, 'Softly sighs' in *Der Freischütz*.

[>22] The expression of the minor keys is of an indefinite and suggestive character. Minor keys are chosen for expressing intense seriousness, soft melancholy, longing, sadness, and passionate grief; their colour may be called sombre, and when compared with that of the major keys, appears somewhat pale. The minor keys appeal directly to the feelings, but after some time, have a somewhat debilitating effect; after a lengthened minor, we rejoice once again to hear the major, which brings with it renewed vigour and freshness. The songs of the Northern nations, even the most joyous ones, are set in the minor keys. In one respect this seems to be an anomaly; and yet it can easily be explained. Partly it is the expression of sadness, of a people held in political serfdom; partly

it emanates from the grave and melancholy character of the scenes amid which their lot is cast.

When a composer has chosen his key, he will be careful to handle it in such a manner that it does not attain too great a prominence, which would result in monotony, and cause fatigue and lack of interest in the listener; but he will manage to suffuse his work with the special characteristics of the key, which is thus made to glimmer or shine through the piece without asserting itself with undue strength. No better examples of such absolutely perfect and artistic treatment of the key could be found than that which we admire in Mozart's Symphony in G minor, in Beethoven's Symphony in C minor, and in the 'Overture to the Hebrides' by Mendelssohn.

The task of marshalling different keys in a certain order, according to their characteristic qualities, is not only a matter of great difficulty but almost of impossibility, inasmuch as it cannot be denied that one composer detects in a certain key qualities which have remained entirely hidden from another. Mozart's symphony in E flat is in no other way related to Beethoven's Eroica Symphony than that both are set in the key of E flat. And yet it cannot be denied that each key possesses distinctive characteristic qualities. If we maintain, for instance, that the 'sharp' keys have a brighter, a more lively, and a fresher expression than those in flats, we lay down a rule which admits of many exceptions. All that we can safely do is to name the characteristic qualities of the keys as we deduce their characteristic expression from universally admired and accepted [>23] masterpieces: and thus we need not fear to misstate or to misapprehend the bearings of the subject.

C major expresses feeling in a pure, certain, and decisive manner. It is furthermore expressive of innocence, of a powerful resolve, of manly earnestness, and deep religious feeling. Examples: Mozart's aria 'Dove sono' is redolent of pure feeling; his aria 'Vedrai carino' is full of innocence; so is the 'Chorus of the Maidens' in Weber's 'Der Freischütz.' Beethoven's Quintet (Op. 29) is full of manly earnestness, and Mendelssohn's air 'Oh rest in the Lord' is expressive of the deepest religious feeling. Powerful resolve and manly earnestness shine forth in every note of the finale of Beethoven's Fifth Symphony, in Haydn's 'The heavens are telling,' and in Mendelssohn's 'Lauda Sion.'

C minor is expressive of softness, longing, and sadness; also of earnestness and a passionate intensity. At the same time C minor lends itself most effectively to the portraiture of the supernatural, as Weber has shown in the famous Incantation scene in 'Der Freischütz.' Examples: Schubert's 'The Maiden's Lament' expresses a soft longing; the first movement of Beethoven's Symphony in

C minor, and his Overture to 'Coriolanus,' convey through the key the impression of intensity and passion; the Funeral March of the Eroica Symphony impresses the listener by the solemnity and the dignified earnestness of the sombre key.

G major, that favourite key of youth, expresses sincerity of faith, quiet love, calm meditation, simple grace, pastoral life, and a certain humour and brightness. Examples: the well-known air 'But the Lord,' from Mendelssohn's 'St. Paul,' breathes true sincerity of faith; Don Ottavio's second air in 'Don Giovanni' is expressive of quiet and devoted love; Mozart's Andante in six-eight time, from his Symphony in D major, is entirely characteristic of a calm and peaceful meditation; the same master's Finale from his celebrated String Quintet in G minor is a model of unadorned, genuine gracefulness; Rossini's 'Ranz des Vaches,' in his Overture to 'Guillaume Tell,' and Haydn's first chorus in the 'Spring' of his 'Seasons' give us splendid instances of faithful portraiture of pastoral life; the Finale of Beethoven's Fourth Concerto for the Piano affords an illustration of quaint humour, and as an unrivalled example [>24] of brightness we have Handel's chorus 'See the conquering hero comes.'

G minor expresses sometimes sadness, sometimes, on the other hand, quiet and sedate joy—a gentle grace with a slight touch of dreamy melancholy—and occasionally it rises to a romantic elevation. It effectively portrays the sentimental; and when used for expressing passionate feelings the sweetness of its character will deprive the passion of all harshness and fierceness. Examples: Mozart's Symphony in G minor, Mendelssohn's sweet barcarole in the first book of his 'Songs without Words,' and Spohr's beautiful air 'Onori militari,' in his opera 'Jessonda.' This process of enumeration would result in a somewhat lengthy and confusing catalogue; therefore I will merely state the qualities of the remaining keys, without supplementing them by examples.

D major expresses majesty, grandeur, and pomp, and adapts itself well to triumphal processions, festival marches, and pieces in which stateliness is the prevailing feature.

D minor expresses a subdued feeling of melancholy, grief, anxiety, and solemnity.

A major, full of confidence and hope, radiant with love, and redolent of simple genuine cheerfulness, excels all the other keys in portraying sincerity of feeling. Almost every composer of note has breathed his sincerest and sweetest thoughts in that favourite key.

A minor is expressive of tender, womanly feeling; it is at the same time most effective for exhibiting the quiet melancholy sentiment of Northern nations, and, curiously enough, lends itself very readily to the description of *Oriental* character, as shown in Boleros and Mauresque serenades. But A minor also expresses sentiments of devotion mingled with pious resignation.

E major, the brightest and most powerful key, expresses joy, magnificence, splendour, and the highest brilliancy.

E minor represents grief, mournfulness, and restlessness of spirit.

B major, a key but seldom used, expresses in fortissimo boldness and pride; in pianissimo purity and the most perfect clearness.

B minor, that very melancholy key, tells of a quiet expectation and patient hope. It has often been observed that nervous persons will sooner be affected by that key than by any other.

[>25] *F sharp major* sounds brilliant and exceedingly clear; as *G flat major* it expresses softness coupled with richness.

C sharp major is scarcely ever used; as *D flat major* it is remarkable for its fullness of tone, and its sonorousness and euphony. It is the favourite key for Notturnos.

D flat minor, only used as *C sharp minor*, is undoubtedly the most intensely melancholy key.

A flat major is full of feeling, and replete with a dreamy expression.

A flat minor adapts itself well to funeral marches, and is full of a sad and almost heart-rending expression; in it we seem to hear the wailing of an oppressed and sorrowing heart.

E flat major is the key which boasts the greatest variety of expression. At once serious and solemn, it is the exponent of courage and determination, and gives to the piece a brilliant, firm, and dignified character. It may be designated as eminently a masculine key.

E flat minor is the darkest, most sombre key of all. It is but rarely used.

B flat major, the favourite key of our classical composers, has an open, frank, clear, and bright character, which also admits the expression of quiet contemplation.

B flat minor, a key full of gloomy and sombre feeling, like *E flat minor*, is but seldom used.

F major is at once full of peace and joy, but also expresses effectively a light, passing regret—a mournful, but not a deeply sorrowful feeling. It is, moreover, available for the expression of religious sentiment.

F minor, a harrowing key, is especially full of melancholy, at times rising into passion.

Some persons may have remarked the fact that our older masters wrote in a few keys only, and abstained from using keys with many sharps or flats. The reason for this abstinence was a mechanical one, and resulted from the imperfect state of the instruments in their time; the pieces also had to be adapted to the very imperfect technical execution of the orchestral performers. To thoroughly appreciate the true relation of the different keys with their various sentiments and feelings, no [>26] better example for study could be named than Beethoven's series of songs, 'An die entfernte [*sic*] Geliebte.' In this marvellous work Beethoven has bequeathed to us a true psychological study expressed in sounds. Nothing is here left to chance; the sense of the words finds its truest expression in the well-selected character of the keys. Another study much to be recommended is the practice of transposing any favourite piece from its original key into another, to discover the difference of the effect. Another interesting study is that of different settings of the same words by various composers. We shall often find that the general character of a key may be changed by peculiarities and idiosyncrasies of the composer; and thus a key may appear to possess a cheerful character in the hands of one writer, whilst another composer infuses into it a melancholy expression; all depends on the treatment, on the individual feeling of the composer, and on his acute understanding of all the different characteristic qualities of the key he employs. The modulations from one key into another depend very much upon the intensity of feeling in the composer. In this respect composers may be compared with painters, some of whom require brighter, some quieter colours, to portray their subject with perfect truth. In national songs, for example, we perceive but a limited use of modulations; and even the most gifted composers, whose command over all the artistic means and resources is absolutely supreme, will, if they write in the mode of national songs, limit themselves to the most simple harmonies, and to a sparing use of modulations, so as truly and faithfully to preserve the national tone.

Lussy, M. Mathis. *Musical Expression: Accents, Nuances, and Tempo in Vocal and Instrumental Music*, tr. Miss M. E. von Glehn. London: Novello and Company, 1892 (pp. 6–8); Fr. orig. *Traité de l'expression musicale – accents, nuances et mouvements* (Paris: Heugel, 1874). The English translation was made from the fourth edition of 1882.

It would be well if composers gave more attention to the *characteristic* qualities of the different keys or scales, a subject much neglected in France, and to which classical composers attach great importance. They seek as much as possible to choose a key which is in harmony with the sentiments they wish to express. No doubt an air may be sung in any key without losing its identity; and this is the basis of transposition, by means of which any air may be sung in any key, and thus be brought within the compass of all voices. [>7] But it is not the less true that the cultivated musical ear can recognize and distinguish one key from another, each being characterized by its particular quality of sonorousness, sweetness, harshness, or acuteness. On the piano the flat keys or scales are softer than the sharp keys. The cause lies in '*equal temperament*'; that is to say, in the compromise which the tuners adopt so as to replace by one single chromatic note the two enharmonic notes which theoretically and practically exist between the two notes forming a major second or tone. On the violin it can easily be proved that C♯ does not produce the same sound as D♭—is, in fact, higher than D♭, the small interval by which the two are separated being called a comma.[1] Now on all keyed instruments, instead of two keys between C and D, or D and E &c., we have only a single key, which is neither C♯ nor D♭, but an intermediate sound. The flats on the pianoforte have for some time past been correctly tuned. But the more correctly they are tuned, the falser will be the sharps, which are represented by the same keys. The result of this system of tuning is that the scales of A♭, D♭, and G♭ are sweet, almost effeminate, whilst those of E and B are hard and harsh. We shall, therefore, generally find that *genre* pieces, such as Nocturnes, Reveries, &c., are written in flats. Yet it would be very exaggerated, not to say absurd, if we were to follow certain theorists, and prescribe a given tonality for every sentiment. The fact is that the more flats there are in a scale the sweeter would be the sound, and the more sharps the harsher would be the sound. But on the piano the scales of D♭ and G♭, which have the most flats, consist of precisely the same keys as the scales of C♯ and F♯, which have the most sharps. It is, therefore, impossible that the same keys, or the same strings, can produce at one time a soft scale and at another a harsh one. Nevertheless, it would seem a little hazardous, if not doubtful, to write a piece of tender character in E major, that being one of the most brilliant and vigorous keys. An anomaly of this sort is useful to make a pupil feel the characteristic difference between these two keys of E and E♭, and to familiarize him with transposition. When he has played Ravina's 'Douce Pensée' in its original key of E, he should be made to transpose it suddenly to E♭, mentally exchanging the four sharps of the signature for three flats, he will find that the piece gains in sweetness in certain parts, but loses in energy in others. But in either case the ear and sentiment of the pupil are benefited. This experiment, repeated with different pieces, helps greatly to give the pupil the feeling for

1
This 'expressive intonation', where leading tones and other raised pitches lean up toward their resolutions and flats lean down to theirs is in some ways directly opposed to harmonic intonation, in which D flat would actually be higher than C sharp. This is explained in *How Equal Temperament Killed Harmony, and Why You Should Care,* by Ross Duffin, listed in the bibliography. [JB]

tonality, which is the faculty of recognizing, on the simply hearing of an air: (1.) What each note represents, whether it be the tonic (the first note of the scale in which the air is written), whether it be the dominant (fifth note of the scale), the leading note (or seventh); (2.) To feel the attraction or supremacy which the tonic exercises over the other notes; (3.) To feel the relationship which exists between the various notes of the scale; and (4.) To be able to tell, by the ear, in what key a piece is written. This last faculty is one of the rarest, most essentially spontaneous and artistic; it is difficult to acquire, even with the most persevering and methodical practice. The explanation is very simple: the number of tonalities is infinite, though by adopting the tuning-fork and [>8] equal temperament in tuning instruments with fixed strings they have been reduced to twelve. The faculty does, however, exist. There are many people who not only can tell the key of a piece heard on any piano tuned to any pitch, but even the name of any note struck either by itself or with other heterogeneous notes.

Albert Lavignac, *Music and Musicians*, 4th edn rev., tr. William Marchand, ed. H[enry] E[Edward] Krehbiel, New York: Henry Holt and Co., 1903 (pp. 365–67); Fr. orig. *La Musique et les Musiciens* [1895], rev. and enl. (Paris: Librairie Delagrave, 1950).

I have to mention a fact singular enough to surprise and strongly attract the attention of observing minds; it is that, notwithstanding the uniformity inherent in our system of temperament, each key, major or minor, has peculiar characteristics. It was not by chance that Beethoven selected the key of E flat for the Heroic Symphony, and that of F for the Pastoral; it was in obedience to that mysterious law which assigns to each key a peculiar aspect, a special colour.

I do not assume to say that each key can express only the sentiments which I attribute to it, but merely that here it excels, it has its mastery, that its aptitude for their expression is peculiar.

Each person will regard this aspect according to his own personal temperament; to characterize it in any absolute way would probably be going too far; but, to my own mind, these are the preponderating shades of the different keys, major or minor.

C♯ Major: ?
F♯ Major: rugged.
B Major: energetic.
E Major: radiant, warm, joyous.
A Major: frank, sonorous.
D Major: gay, brilliant, alert.
G Major: rural, merry.
C Major: simple, naive, frank, or flat and commonplace.

F Major: pastoral, rustic.
B♭ Major: noble and elegant, graceful.
E♭ Major: sonorous, vigorous, chivalrous.
A♭ Major: gentle, caressing, or pompous.
D♭ Major: charming, suave, placid.
G♭ Major: gentle and calm.
C♭ Major: ?

A♯ Minor: ?
D♯ Minor: ?
G♯ Minor: very sombre.
C♯ Minor: brutal, sinister or very sombre.
F♯ Minor: rough, or light, aerial.
B Minor: savage or sombre, but vigorous.
E Minor: sad, agitated.
A Minor: simple, naive, sad, rustic.

D Minor: serious, concentrated.
G Minor: melancholy, shy.
C Minor: gloomy, dramatic, violent.
F Minor: morose, surly, or energetic.
B♭ Minor: funereal or mysterious.
E♭ Minor: profoundly sad.
A♭ Minor: doleful, anxious.

Gevaert, in the first edition of his treatise on orchestration, has given a similar table; I have not consulted it, but it has many points of similarity with the above. [In a footnote, Lavignac mentions that Berlioz's instrumentation treatise has such a table as well.]

If this curious fact were true only in relation to orchestral music, we should unhesitatingly account for it by the structure and fingering of the different instruments, the keys more or less sharped or flatted suiting each in different degrees; but where this thing becomes really marvellous is when it no less clearly appears in piano and organ music, and even in choral music, where it would seem that the tonalities must resemble each other exactly, being all mere transpositions of each other. But, if you play in C the *Berceuse* of Chopin, which is written in D flat, its beautiful poetic sonority would become crude and flat, almost common. In the same way, the *Funeral March* of the Sonata, op. 26 of Beethoven, which is originally in A flat minor, loses much of its dolefulness when it is transposed into A minor.

It is impossible to say why this is so; but the fact remains. From it results the necessity of attaching importance in the first place to the selection of the principal key and making a choice in accordance

with the general character of the proposed work; later, like considerations will influence the direction of the modulations, so that every episode may have its appropriate colouring. At the same time, this is not the only guide to follow, for the composer should never lose sight of the logic of musical architecture resulting from the relationship of tones, as established so magnificently by the grand structure of the fugue. I have said that the composer *should never lose sight of* this model of solid construction, and not that he must invariably conform to it; indeed there are occasions when he should intentionally desert it,—in a mad scene, for instance, where the wandering of the mind would be best depicted by the incoherence of tonalities the most dissimilar, combinations the most strange; or, in representing violent and opposing passions, passing from love to hate, from the mystic to the grotesque. But then it is genius itself, and not the coolly considered plan, which will suitably represent exceptional situations and psychological conditions.

Nor is this all. The special technique must also have its influence upon the choice of the tonality, the individual character of the instrument or instruments for who which one writes, the compass of the voice or voices to which such or such a design is to be entrusted, whose character may be changed, completely according to the region, treble, alto, or bass,—brilliant, dull, or feeble,—of the interpreting agent, which also has its own colouring, peculiar to itself.

Plainly, then, this is a question of by no means secondary importance, and merits the most careful attention.

In reading a work for analytical purposes, it is wise to take great care to understand the reasons which influenced the author's choice of this or that key, either for the ensemble, or for the various episodes.

Noskowski, Zygmunt. 'The Essence of Chopin's Works', tr. Maja Trochimczyk and Anne Desler, in Trochimczyk, ed., *After Chopin: Essays in Polish Music*, Los Angeles: Polish Music Center at USC, 2000 (pp. 23–45 at 34–35); Pol. orig. 'Istota utworów Chopina', *Wędrowiec*, 1900/27–31.

Does the famous Mazurka in B flat minor, Op. 24 No. 4 not evoke the beginning of fall, this all-pervading melancholy mood, result of the increasingly pale rays of the September sun? The leaves on the trees begin to turn red, the plains grow grey and the fields become empty; all foretells the imminent demise of nature. And when finally, at the end of the mazurka, the melody in B flat major resounds, does one not, inevitably without a conscious effort, imagine a shepherd playing a farewell song to summer on his pipe?

How different is the sorrow gushing out in the Mazurka in C sharp minor, Op. 41 No. 1! The key itself captivates us and makes us dream of winter, and the beginning of the melody, in which the lowered supertonic (from D sharp to D) is reiterated obstinately, seems to paint not only the sombre sight of the snow-covered earth with clouds above, but simultaneously it expresses a longing for spring and its green meadows. The sudden change of mood from minor to major is like a surge of hope that God's little sun will return to revive the petrified nature. Before this may come true, however, the ending of the mazurka again recalls the presence [of winter]—the sorrow returns and the soul is immersed in gloomy reflections [...] about snow and ice.

When I discussed above the feeling of a certain colour in connection with a certain key, I did not talk about a paradox, because musicians have agreed for a long time that every tonality has an analogous colour in painting and that the musical creator, in skilfully combining these tonalities, works on the same effect as an eminent painter who selects harmonizing hues. A painter, by com-[>35]posing an image in a certain palette of colours, adjusts the painting to the subject that he intends to portray; only then does a painting make an impression when the palette of colours is in complete agreement with its content. Similarly, a musician only reaches the intended goal when the tonalities chosen are well suited to the idea, content, and mood of the piece.

For this reason, musical creators usually utilize the strong keys of E flat major and B flat major for expressing triumph or heroism, while A flat, D flat, and G flat only appear in their works for moments of dreaming or the delight of love. A pastoral mood is best represented with F and G major, longing and sorrow are best captured with G and F sharp minor, and complaint with A minor.

The last few remarks are only very general and superficial—this subject demands a separate study, and I only included these observations because I wanted to prove Chopin's infinite sensitivity to the use of keys that are adequate to his marvellous ideas. In this respect, i.e., as a painter, Chopin stands on a par with Mickiewicz, who represents even small scenes with such distinctiveness that one can see everything as though it were real. The feature of Chopin's music most closely related to this accuracy of colouring by means of tonality is the rhythm of the melody, which is full of subtleties and differentiation and always applied to perfection in every piece.

APPENDIX 2
Bellman I Temperament

It may be helpful, first, to insert a strip of felt so that one string per pitch is initially tuned. An electronic tuner should be used, on a neutral setting where there is no automatic adjustment for stretch or piano dimensions, to set the tuning octave, which for this temperament is middle C to the C above (C4–C5). The following numbers are the numbers of **cents** that each pitch should be above or below the equal-tempered pitch, and the electronic tuner will be able to produce them, Once the tuning octave is set, the octaves throughout the rest of the piano's range should be tuned out by ear.

C4 (Middle C): +4	**E4**: –4	**G♯4**: +1
C♯4: +2	**F4**: +4	**A 440**: 0
D4: +1	**F♯4**: 0	**A♯4**: +5
D♯4: +4.5	**G4**: +3.5	**B4**: –1

Setting the tuning octave should be followed by unisons and octaves over the whole of the keyboard, by ear.

EXPLANATION: I offer the **BELLMAN I** temperament as a speculative proposal or starting point. My reasoning is as follows:

1. It is unimaginable, given nineteenth-century temperament practice, that Chopin's preferred temperament could have been equivalent to modern equal temperament. He treated the tonalities very differently, one from another, which indicates that he was sensitive to the subtlest harmonic and even enharmonic variance.
2. Virtually no solid information about Chopin's preferred temperament survives, and in 1848 he bemoaned the death of the one tuner capable of replicating it.
3. The 'right' temperament being unavailable, investigating the kinds of effects produced by subtly unequal temperaments will broaden our understanding of his music by making audible this long-forgotten element, discernible only to the most sensitive ears.

Note on the character descriptions of each tonality: key characteristics are, unavoidably, a highly subjective matter. The capsule descriptions provided below were gleaned from Rita Steblin's *History of Key Characteristics in the Eighteenth and Early Nineteenth Centuries* [1983], 2nd edn (Rochester, NY: University of Rochester Press, 2002). They come from a variety of theorists writing during or close to Chopin's lifetime, among whom there is a good deal of general agreement, but they are only included as an approximation

so as to give an initial idea of the patterns that emerge as the defining thirds narrow and widen. Chopin's own music suggests that he heard the tonalities in a similar (not identical) way.

To quote or cite these ideas, it is necessary to consult Steblin's book, where the sources are given both in their original languages and in English translation.

Triads in Bellman I Temperament

Triad	Root	3rd	5th	Vs. eq. temp (cents)	Descriptions, early-to-mid 19th c.
C major	+4	–4	+3.5	3rd–7; 5th–0.5	Innocence, simplicity, naturalness
C minor	+4	+4.5	+3.5	3rd+0.5; 5th–0.5	Unhappy love, grandiose grief
D♭ major	+2	+4	+1	3rd+2; 5th–1	Sublimity, heavenly transfiguration
C♯ minor	+2	–4	+1	3rd–6; 5th–1	Despair; longing, lament, desire
D major	+1	0	0	3rd–1; 5th–1	Cheerfulness, rejoicing and triumph
D minor	+1	+4	0	3rd+3; 5th–1	Melancholy; sorrow and pain
E♭ major	+4.5	+3.5	+5	3rd–1; 5th+0.5	Solemn, noble, dignified, splendid
E♭ minor	+4.5	0	+5	3rd–4.5; 5th+0.5	Frightful anguish; bitter despair
E major	–4	+1	–1	3rd+5; 5th–3	Fire and wildness; exuberant joy
E minor	–4	+3.5	–1	3rd7.5; 5th–3	Tender, gentle, lamenting
F major	+4	0	+4	3rd–4; 5th0	Gentle, complaisant and calm
F minor	+4	+1	+4	3rd–3; 5th0	Extreme grief; misery, the grave
G♭ major	0	+5	+2	3rd+5; 5th+2	Intense passion; heroic resignation
F♯ minor	0	0	+2	3rd0; 5th+2	Rage, fury, discontent, melancholy
G major	+3.5	–1	+1	3rd+4.5; 5th–2.5	Gay and sprightly; pleasant, rustic
G minor	+3.5	+5	+1	3rd+1.5; 5th–2.5	Ill-will, bitter feelings, resentment
A♭ major	+1	+4	+4.5	3rd+3; 5th+3.5	Tender key; sentimental sympathy
A♭ minor	+1	–1	+4.5	3rd–2; 5th+3.5	Misery, depressed heart, lament
A major	0 (A440)	+2	–4	3rd+2; 5th–4	Friendly, cheerful, innocent love
A minor	0 (A440)	+4	–4	3rd+4; 5th–4	Sorrow, piety, womanliness
B♭ major	+5	+1	+4	3rd–4; 5th–1	Tenderness, boldness, dignity
B♭ minor	+5	+2	+4	3rd–3; 5th–1	Night; gloomy, dull; but noble
B major	–1	+4.5	0	3rd+5.5; 5th+1	Overstraining; overexcitement
B minor	–1	+1	0	3rd+2; 5th+1	Pious trust, gentle lament, gloomy

ABSTRACT
Since the seventeenth century, writers about music have discussed what were considered to be the intrinsic differences in affect between the various keys. These were continuations of late-Renaissance discussions of the expressive properties of the different church modes, and those distantly reflected discussions of the Greek modes in Plato's *Republic*. By the turn of the twentieth century, a large (and evolving) literature on the subject had accumulated, and despite more than a half-century of piano temperaments that were loosely referred to as 'equal' (or in Albert Lavignac's phrase, 'the uniformity inherent in the system of temperament'), the entire concept of key characteristics—that is, an accounting of the expressive differences between supposedly equally tempered keys—was well established. No two accounts of key associations were alike, but there were general patterns, especially for the more diatonic keys: C major was considered innocent, C minor for funereal and serious pieces, F major gently pastoral, D major warlike and triumphant, and so on.
For us, unfortunately, late eighteenth- and nineteenth-century tuning instructions are incomplete. In treatise after treatise, these temperaments—generally described as 'equal' even when they clearly are not—are to be produced by tuning certain fifths 'a little weak,' other fifths 'strong,' and finally (at the end of the process) expecting the requisite correspondences between enharmonic equivalents to result from these vaguest of instructions. Despite the claims that such instructions were complete, self-standing, and intended for autodidacts, further preparation, such as working with an accomplished technician, would have been necessary. To proceed directly from these treatises, then, is impractical, so the problem of an unequal temperament appropriate to Chopin's music requires a different approach.
The composer's personal preferences regarding temperament and key associations had much in common with typical practice of the time. Even clearer is Chopin's statement, from his unfinished piano method: "Intonation being the tuner's task, the pianist is free of one of the greatest difficulties involved in the study of an instrument,' which demonstrates that despite his exacting requirements, he was happy to turn the task over to professionals. The search for such a temperament today requires experimentation, which enables us to discover how narrower and wider thirds and fifths produce the mood and affect of each key. Such experimentation can produce a temperament generally compatible with the majority of instructions for contemporary temperaments—thus completely usable for the piano repertoire of the time—but frankly revelatory when Chopin's music is played in it. And although vanishingly little that can be heard remains of such temperaments, Vladimir de Pachmann's 1927 recording of Chopin's Nocturne in E minor, Op. 72 No. 1 testifies to a temperament in which different triads have different qualities, timbres differ depending on the different relationships between overtones, Chopin seems to be intentionally milking these differences, and the subtleties of his music seem to multiply a thousandfold.

KEYWORDS
Chopin, key characteristics, temperament, tonality, unequal temperament

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