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A 'NARROW-KEYED' PLEYEL: THE ERGONOMICS OF CHOPIN'S INTERFACE

One cannot overpraise the genius who presided over the construction of the keyboard, so well adapted to the shape of the human hand. Is there anything more ingenious than the higher [= black] keys – destined for the longer fingers – so admirably serving as points of pivot[?]

FRYDERYK CHOPIN, *Projet de Méthode*[1]

Over the course of his 39-year life, Fryderyk Chopin (1810–1849) discovered a new tactile relationship with the keyboard, developing a choreography for the hands that has never been equalled. Running parallel to these developments, keyboard instruments were themselves undergoing an extraordinary revolution, as manufacturers altered their designs, materials and construction processes in response to the ever-evolving tastes of composers, critics and audiences.

We live in an era in which the fundamental design of the piano has remained virtually unchanged since Steinway lodged the iron-frame, cross-strung patent in 1859.[2] Whether a composer today works on a Steinway, Bösendorfer, Fazioli or Yamaha is of little

Figure 1. Fryderyk Chopin's last piano, 1848 Pleyel (serial number 14810), Fryderyk Chopin Museum, Warsaw, M/87 [image courtesy of Chopin Heritage in Open Access]

1
Jean-Jacques Eigeldinger, *Chopin: Pianist and Teacher as Seen by His Pupils*, tr. Naomi Shohet with Krysia Osostowicz and Roy Howat, ed. Roy Howat (Cambridge: Cambridge University Press, 1986), 192.

2
For an introduction to the history and development of the piano, see Cyril Ehrlich, *The Piano: A History* (London: J. M. Dent & Sons Ltd., 1976) and *The Cambridge Companion to the Piano*, ed. David Rowland (Cambridge: Cambridge University Press, 1998).

importance: primacy is often given to the intellectual process, rather than the physiological. For Chopin however, this intellectual process was merely embryonic to a tactile process: harmonic, melodic and rhythmic ideas that strolled into his head during a walk through the gardens of Nohant were – as George Sand so vividly tells us – mercilessly audited at the keyboard, often in bouts of creative agony.[3] For Chopin, the piano was a compositional tool as necessary as quills and ink; the keyboard itself a crucial interface between the aural conception inside his head, its documentation on paper and its actualisation in sound.[4]

Chopin came into contact with pianos from all of the leading manufacturers of his era, and was keenly aware of their divergent aesthetics. In his youth, he played and composed on the Warsaw pianos of Fryderyk Buchholtz, and gave the premiere of his Concerto in E minor, Op. 11 on a Streicher.[5] During his turbulent sojourn in Vienna during the November Uprising (1830–1831), the composer grew more intimately acquainted with the instruments of Conrad Graf. Upon arrival in Paris in 1831, Chopin composed, performed and tutored almost exclusively on the instruments of Pleyel et Cie – an affinity that was to last until his death, in 1849.[6]

Interest in period instruments and their influence on the works of Chopin has grown exponentially in recent years. Several initiatives driven by Stanisław Leszczyński (Deputy Director, Fryderyk Chopin Institute) have invited performers and listeners to reconsider their aural conception of Chopin's compositions in light of the instruments of their age. In September 2018 the 1st International Chopin Competition on Period Instruments was held in Warsaw, with competitors performing on original instruments by Pleyel, Erard and Broadwood, in addition to contemporary copies by Paul McNulty of instruments by Buchholtz and Graf.[7] In 2010 the Chopin Institute released *The Real Chopin: Complete Works on Period Instruments* – a twenty-one-CD boxed set to commemorate the 200th anniversary of the composer's birth, containing recordings of Nelson Goerner, Kevin Kenner, Fou Ts'ong, Janusz Olejniczak, Wojciech Świtała, Ewa Pobłocka and others performing on an 1848 Pleyel and an 1849 Erard.[8] Other notable recordings have appeared outside Warsaw too, including the six-disc set *Chopin: His Contemporaries and His Instruments*,[9] *Chopin chez Pleyel* by Alain Planès,[10] and Hardy Rittner's album of the complete Etudes on a Graf (*c*.1835).[11] In the past two years, two significant albums were released into the commercial

3
'It was a train of efforts, waverings, frustrated stabs at recapturing certain details of the theme that he had heard; what he had conceived as unity he now over-analysed, in his desire to get it down, and his chagrin at not being able to discover it whole and clear plunged him into a sort of despair. He withdrew into his room for days, weeping, pacing up and down, breaking his pens, playing a measure a hundred times over, changing it every time, then writing it out and erasing it as many times, and beginning all over again on the morrow with painstaking and desperate perseverance. He would spend six weeks on a page, only to hark back to what he had first roughed out.' See George Sand, *My Life*, tr. Dan Hofstadter (New York: Harper & Row, 1979), 245.

4
The idea of the keyboard as an 'interface' comes from Emily Dolan. See 'Towards a Musicology of Interfaces', in *Keyboard Perspectives*, vol. 5, ed. Annette Richards (Ithaca: Westfield Centre for Historical Keyboard Studies, 2012), 1–12.

5
Chopin documented the premiere of the E minor Concerto in a letter to Tytus Woyciechowski: 'It began with Goerner's Symphony. Then my noble self's Allegro in E minor, which apparently went like clockwork, so it seemed on the Streicher piano.' See *Chopin's Polish Letters*, tr. David Frick (Warsaw: Fryderyk Chopin Institute, 2016), 185. For a discussion of the Buchholtz, see Benjamin Vogel, 'The Warsaw piano of Fryderyk Chopin,' in Kamila Stępień-Kutera (ed.), *Chopin's Piano*, tr. John Comber (Warsaw: Fryderyk Chopin Institute, 2018), 100–116.

6
Despite having access to the instruments of Broadwood, Erard and Pleyel at the beginning of his tour of England and Scotland in 1848, Chopin nevertheless placed his allegiance unequivocally with the latter (although he gave his final public performance on a Broadwood). Writing to Wojciech Grzymała from London on Saturday 13 May 1848, Chopin described the conditions in his apartment thus: 'I have three [pianos]. In addition to the Pleyel, one Broadwood, the other an Erard, but until now I could only play on mine.' See *Chopin's Polish Letters*, 436.

7
A 2nd International Chopin Competition on Period Instruments was

market: Alexei Lubimov's *At Chopin's Home Piano* (a recording of Chopin, Bach, Mozart and Beethoven on an upright 1843 Pleyel) was released by the Chopin Institute,[12] and Alain Planès recorded the complete Nocturnes on an 1836 Pleyel for Harmonia Mundi.[13]

Despite this comprehensive array of recordings, a discussion of the advantages and disadvantages of period instruments – and the interpretative choices they permit or negate – remains remarkably overdue in a Chopin literature that has thus far allocated greater primacy to analysis, biography and reception. Theory has lagged conspicuously behind practice, giving credence to Kenneth Hamilton's remarks of a 'Montague-and-Capulet attitude of mutual contempt between faculty musicologists, who despise the players as historically ignorant, and faculty performers, who ridicule the musicologists as practically inept.'[14]

In a recent review of The Third International Chopin Congress anthology *Chopin 1810–2020: Ideas, Interpretations, Influence*,[15] David Rowland noted 'the very limited attention paid to organology': only one essay on this subject was included among the 92 contributions that comprise the multi-lingual two-volume collection.[16] According to William Smialek and Maja Trochimczyk, there are now 6,832 books on Chopin in libraries worldwide, yet under Section E of Chapter III of their *Frédéric Chopin: A Research and Information Guide*, only 14 sources are listed in the category 'Pianos and Other Instruments'.[17] Also significant is Jim Samson's *The Cambridge Companion to Chopin*, and his volumes of *Chopin Studies* (the second co-edited with John Rink), wherein not a single essay is devoted to a discussion of period instruments.[18] Whilst Jean-Jacques Eigeldinger and Benjamin Vogel have both made significant progress in this field, the majority of their publications – in French and Polish respectively – remain largely inaccessible to the Anglophone audience.[19]

Even today, the subtle variances in keyboard topography are not well understood. As Chopin progressed from a Buchholtz to a Graf to a Pleyel to a Broadwood, and experienced the different ergonomic qualities of their keyboards under his fingertips, how might this have affected the notation in his scores? By comparing the key measurements of certain instruments associated with the composer with other examples from their time, this essay will contemplate the extent to which the ergonomics of the keyboard changed over Chopin's lifetime, and offer some preliminary conclusions

announced in March 2022, which took place in Warsaw from 5–15 October 2023. A recording of the winner of the 2018 competition was issued in 2019. See Tomasz Ritter, *Chopin / Kurpiński* (Warsaw: Fryderyk Chopin Institute, 2019), CD recording, NIFCCD 634. Ritter performs on a c.1825 Buchholtz, an 1842 Pleyel and an 1837 Erard.

8
Nelson Goerner, et al., *The Real Chopin: Complete Works on Period Instruments* (Warsaw: Fryderyk Chopin Institute, 2010), 21-CD set, NIFCCD 000–020. Since this release, interest has only increased further: the Chopin Institute has supplemented its catalogue with an additional 'New Series' of period-instrument recordings by pianists such as Garrick Ohlsson, Szymon Nehring, Krzysztof Jabłoński, Akiko Ebi, Howard Shelley, Yulianna Avdeeva, Philippe Giusiano and several others. A complete list of the recordings available can be found at https://en.chopin.nifc.pl/institute/publications/musics, accessed 13 October 2021.

9
Bart van Oort, et al, *Chopin: His Contemporaries and His Instruments* (Leeuwarden, Netherlands: Brilliant Classics, 2010), 6-CD set, 94048.

10
Alain Planès, *Chopin chez Pleyel* (Arles: Harmonia Mundi, 2009), CD recording, HMC902052.

11
Hardy Rittner, *Frédéric Chopin: Complete Études* (Detmold, Germany: Musikproduktion Dabringhaus und Grimm, 2012), CD recording, 760623174761.

12
Alexei Lubimov, *At Chopin's Home Piano* (Warsaw: Fryderyk Chopin Institute, 2020), CD recording, NIFCCD 071.

13
Alain Planès, *Frédéric Chopin: Complete Nocturnes – Piano Pleyel 1836* (Arles: Harmonia Mundi, 2021), 2-CD set, HMM90533233.

14
Kenneth Hamilton, *After the Golden Age: Romantic Pianism and Modern Performance* (Oxford: Oxford University Press, 2008), 23. There are, of course, some notable exceptions to this rule – Hamilton himself being chief among them, along with Roy Howat, Neal Peres Da Costa and Tom Beghin, to name but a few.

of causality between instrument, compositional process and notation.

The width of an octave

In 1872 the Baltic writer and amateur musician Wilhelm von Lenz (1809–1883) – who had previously been a student of Liszt, Chopin, Berlioz and others – published a memoir entitled *Die Grossen Pianoforte-virtuosen unserer Zeit aus persönlicher Bekanntschaft: Liszt – Chopin – Tausig – Henselt*.[20] Through the intermediary of Liszt, Lenz came to study with Chopin in early October 1842 and, according to Eigeldinger, 'provides the most abundant and detailed information on Chopin's wishes as to interpreting his works.'[21]

In addition to serving as an invaluable guide for performance practice (perhaps the most frequently cited in the literature), Lenz also imparts crucial insights into the kind of piano Chopin worked with during the early 1840s. We know, for example, that it was a Pleyel (Lenz had apparently been told 'Chopin played on no other instrument'), and that the piano's light, sensitive action enabled Lenz to manage 'better than ever' the controversial variant Liszt had notated into his copy of the Mazurka in B flat major, Op. 7 No. 1.[22] We also know from Camille Dubois (née O'Meara; 1830–1907) that 'Chopin always had a cottage piano [*pianino*] by the side of the grand piano on which he gave lessons', so it is highly likely that Lenz performed on the grand, with Chopin demonstrating on the pianino.[23]

One of the most intriguing – yet problematic – observations Lenz made of Chopin's Pleyel was that it had 'narrow' keys. Writing about the Scherzo in C sharp minor, Op. 39, which Chopin had dedicated to his favourite student, Adolf Gutmann (1819–1882), Lenz surmised that:

> [...] it was probably with his [Gutmann's] prize-fighter's fist in mind that the bass chord in bar six was thought out, a chord that no left hand can take – least of all that of Chopin, who arpeggiated it on his light-touch, *narrow-keyed*, Pleyel.[24]

Running contrary to Lenz's claim is this assertion from Karol Mikuli (1821–1897): 'For playing double notes and chords, Chopin demanded that the notes be struck simultaneously; breaking was allowed only where the composer himself had specified it.'[25]

The chord Lenz mentions (Example 1) spans the interval of a tenth. The fingering for this chord suggested by Jan Ekier and Paweł Kamiński in the *National Edition of the Works*

15
Chopin 1810–2020: Ideas, Interpretations, Influence, ed. Irena Poniatowska and Zofia Chechlińska, 2 vols (Warsaw, Fryderyk Chopin Institute, 2017).

16
David Rowland, 'Review: *Chopin 1810–2010: Ideas, Interpretations, Influence*,' in *The Chopin Review*, 2 (2019). The journal's third issue has recently addressed this lacuna, with no less than four articles present by Benjamin Vogel, James Parakilas, Jonathan D. Bellman and Jun Ishimura. See *The Chopin Review*, 3 (2022).

17
William Smialek and Maja Trochimczyk, *Frédéric Chopin: A Research and Information Guide*, 2nd edn, (New York: Routledge, 2015), xv; 113–115.

18
Jim Samson (ed.), *Chopin Studies* (Cambridge: Cambridge University Press, 1988); John Rink and Jim Samson (eds), *Chopin Studies 2* (Cambridge: Cambridge University Press, 1994). See also *The Cambridge Companion to Chopin*, ed. Jim Samson (Cambridge: Cambridge University Press, 1992).

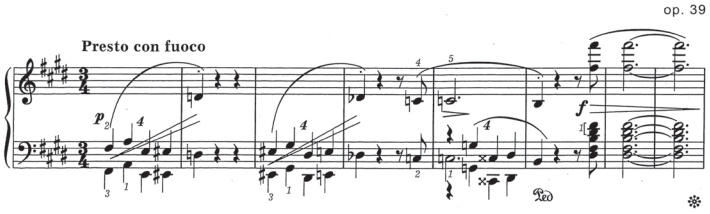
19
Eigeldinger's most significant publication on this topic has yet to be translated into English. See Jean-Jacques Eigeldinger, *Chopin et Pleyel* (Paris: Fayard, 2010). An essay by Benjamin Vogel appears in an English translation by John Comber. See Benjamin Vogel, 'The Young Chopin's Domestic Pianos', in Artur Szklener (ed.), *Chopin in Performance* (Warsaw: Fryderyk Chopin Institute, 2004), 57–75.

20
Wilhelm von Lenz, *Die Grossen Pianoforte-virtuosen unserer Zeit aus persönlicher Bekanntschaft: Liszt – Chopin – Tausig – Henselt* (Berlin: Behr, 1872). All English translations quoted here come from Eigeldinger, *Chopin: Pianist and Teacher*.

21
Ibidem, 169.

22
Ibidem. For a discussion of the relationship between Lenz and Gutmann, see 166. For a list of Chopin's works Lenz was permitted to play, see 81 and 87.

of Fryderyk Chopin (taking both the D sharp and F sharp with the thumb) indeed makes it possible – for the present author at least – to strike all of the notes in the chord simultaneously, as Mikuli stipulates. The stretch notwithstanding, what makes the chord difficult are the notes in the middle, which force the unused third finger to contract into a claw-like shape to avoid colliding with the lid of the keyboard.



Example 1. Fryderyk Chopin, Scherzo in C sharp minor, Op. 39, bars 1–8 (*National Edition of the Works of Fryderyk Chopin*)

If Chopin himself could not play all of the notes in the chord simultaneously, as Lenz claims, why did he choose not to place the arpeggio marking before it? Was it perhaps because he knew that Gutmann's hand could manage it simultaneously, and the sound of the notes being struck together was closer to his ideal than what his own hand could produce? Or did he simply forget to write the sign in, or assume that arpeggiation was a given, and that the marking would only add unnecessary visual clutter? We can only speculate.

Given Lenz's earlier assessment that Chopin's Pleyel 'responded more easily than my Erard',[26] it is logical to conclude – as others have done – that Lenz was also making a Pleyel–Erard comparison when he wrote of the 'narrow-keyed' Pleyel.[27] Whilst it may not have been possible for Chopin to play the chord in bar six of the Scherzo without arpeggiating it, Lenz's observation implies a larger benefit of the Pleyel: it was nevertheless possible for Lenz to take other large chords and intervals on Chopin's piano *without* arpeggiating them – something he could not do on his own Erard. Chopin's Pleyel therefore possessed a kind of enabling power: it was the instrument on which the gulf between the composer's notation and 'the sound world in which they [his compositions] really live' was bridged.[28]

It is interesting to note how pervasive the notion of period instruments having narrow keys has become – in scholarly literature, performance editions, programme notes and social media platforms alike – despite a lack of empirical evidence. In a recent publication by the Chopin Institute on the construction of a copy of a Fryderyk Buchholtz piano by Paul McNulty, Benjamin Vogel summarises the differences between period instruments and their modern equivalents thus:

23
Camille Dubois is quoted in Frederick Niecks, *Frederick Chopin as a Man and Musician*, 2 vols, 3rd edn., (London: Novello, 1902), ii: 188. See also Eigeldinger, *Chopin: Pianist and Teacher*, 63 and 164.

24
Italics appear as quoted in the translation given in ibidem, 85–86.

25
Ibidem, 41. The historical performance practice of breaking chords that have not been marked with arpeggiation (evident in many early recordings) is beyond the scope of the present investigation. For the definitive discussion, see Neal Peres Da Costa, 'Unnotated Arpeggiation', in *Off the Record: Performing Practices in Romantic Piano Playing* (Oxford: Oxford University Press, 2012), 101–187.

26
Ibidem, 91.

27
See Jan Marisse Huizing, *Frédéric Chopin: The Études: History, Performance, Interpretation*, tr. Matthias Müller (Mainz: Schott, 2015), 47.

28
The full quote from Lenz reads: 'Chopin's compositions have opened a new era in the piano's history. But they run the risk of being misunderstood if one has not known the master's way of playing, his intentions and his conception of the instrument – since their result on paper is quite different from that of the sound world in which they really live.' See Eigeldinger, *Chopin: Pianist and Teacher*, 65.

> The narrowness of the keys made it easier to play octaves, for example (the span of an octave was around one centimetre less than today), and their shallow dip (less than half that of today) and light action enabled the player to obtain a sound immediately for minimum effort. One may say that the virtuosi of those times did not need to be of excellent health, the best proof being Chopin himself.[29]

In a programme note for a concert in Toronto featuring a restored 1848 Pleyel, piano technician Marcel Lapointe writes:

> The pianos from this era are very different from the modern piano. The sound is not as loud, the action lighter, and the keys smaller. The octave span is narrower, and the key dip is eight millimetres, compared to ten millimetres on the modern piano.[30]

In an evocative account of the process of restoring period instruments, Paul Kildea writes:

> Some surviving Pleyel pianos from the 1840s have been fully and authentically restored [...]. There is new buckskin on the butts and catchers, new pin blocks glued and bolted into place, and replacement ivory: from old instruments, or from auction houses or repositories, sanded down slightly to fit the thinner keys.[31]

An Instagram post by the Chopin Institute – albeit poorly translated into English – was captioned thus:

> How should a hand of a pianist look like? It should be wide, with long fingers to play big intervals on the keyboard? Well, Fryderyk Chopin was a far cry from this stereotype: average height, slight build, his hands were delicate as well. However, it did not stop him from becoming one of the most admired pianists in Europe. What helped him was the shape of the 19th-century pianos, which had slightly narrower keys than the keys in modern instruments. This made it possible to the pianists with short fingers to play the most difficult passages.[32]

The image of the 'narrow-keyed' Pleyel has evidently 'congealed into a fixed configuration' (to borrow a phrase from Samson), becoming universally accepted well before it has been investigated, analysed and documented.[33] The origin is likely to have been Lenz's memoir – the anecdote about the Scherzo passed down through generations of performers and musicologists – and the accounts of today's performers themselves, who recall Lenz's words when attempting to explain their sense of tactile alienation when adjusting to a period instrument for the first time.

But Lenz's remarks warrant further interrogation: if the keys on Chopin's Pleyel were indeed narrower than those of Lenz's Erard,

29
Benjamin Vogel, 'The Warsaw piano of Fryderyk Chopin', in Kamila Stępień-Kutera (ed.), *Chopin's Piano*, tr. John Comber (Warsaw: Fryderyk Chopin Institute, 2018), 100.

30
Marcel Lapointe, *About the Pleyel Piano*, online programme note, https://www.tafelmusik.org/downloads/programme-notes/2012-2013/about-the-pleyel-piano.pdf, accessed 25 July 2020.

31
Paul Kildea, *Chopin's Piano: A Journey Through Romanticism* (London: Allen Lane, 2018), 94.

32
Fryderyk Chopin Institute, Instagram post (19 May 2020), https://www.instagram.com/p/CAVmC_mnlNR/, accessed 25 July 2020.

33
See Jim Samson, 'Myth and Reality: A Biographical Introduction,' in *The Cambridge Companion to Chopin*, ed. Jim Samson (Cambridge: Cambridge University Press, 1992), 8.

how great could this variance have reasonably been? Was this due to a manufacturing defect or inconsistency, or could Chopin have consciously sought out such a piano precisely because of this quality? What kind of variance could there have been between the width of an octave on a Graf, Pleyel, Erard and Broadwood? Did these variances change over Chopin's lifetime, or have anything to do with whether it was an upright, square or grand piano? To my knowledge, these questions have never been asked in an English scholarly publication on Chopin.[34]

In order to gain a more accurate understanding of these differences, it would be preferable to obtain the measurements of several different instruments of each of the manufacturers associated with Chopin in order to evaluate how much they varied – both within their own labels and from each other. The process of visiting multiple historical keyboard collections around the world and gaining access to their instruments in order to measure the width and length of their keys would be a costly and time-consuming endeavour. Fortunately, a considerable amount of research in this field has already been conducted.

In 1987 Martha Clinkscale created a database of information on historical pianos, which formed the basis of her monograph that was subsequently published in two volumes by Oxford University Press.[35] In 2011 all of the data was made publicly accessible on Clinkscale Online, a digital resource that sought to expand Clinkscale's existing print database by allowing users to submit information on newly discovered instruments, enter corrections or additional information on the existing catalogue, and peruse the entire database free of charge.[36] Its validity as a source is undermined only by the immensity of its scope: historical instruments are continually being discovered, restored, relocated to new collections, damaged, lost or even destroyed. As such, the amount of information documented on each piano is far from consistent: some entries contain the serial number, compass, provenance, and a wealth of measurements and other information concerning the instrument's construction and history; others record merely the make of the piano, its estimated year of production, and its current location (frequently unknown).[37]

Despite these obvious limitations, the information in Clinkscale Online has not yet been given sufficient attention in terms of what it can reveal to us about the kinds of instruments Chopin composed, performed and tutored on. There are over one hundred Pleyel pianos in the database encompassing several models (square, upright and grand), the earliest dating from 1809 and the latest from *c*.1857–1858. At the time of writing, there were 12 Pleyels (dating from 1820 to 1856) that contained the measurement of the length of three octaves. The database contained considerably more three-octave measurements for the other manufacturers; therefore, 17 Grafs (dating from *c*.1811 to 1839), 16 Erards (dating from *c*.1825 to

34
Jan Marisse Huizing compares the octave span of Mozart's Walter piano (supposedly 17.8 cm) with Chopin Pleyel (supposedly 18.5 cm) and today's Steinway (supposedly 18.9 cm) but cites no source (or specific instruments) upon which his conclusions are based. See Huizing, 46–48.

35
Martha Clinkscale, *Makers of the Piano, Volume 1: 1700–1850* (Oxford: Oxford University Press, 1993), and *Makers of the Piano, Volume 2: 1820–1860* (Oxford: Oxford University Press, 1999).

36
https://www.earlypianos.org, accessed 30 June 2020.

37
The editors of *Clinkscale Online* openly acknowledge the immensity of their task: 'Database administrators continually work to maximise data accuracy, but due to the massive number and geographical spread of the instruments, information must come from many sources. This sometimes results in information that is incomplete or lacking broadly accepted descriptive language. Users are strongly encouraged to help refine the data by submitting corrections and additions.' See https://www.earlypianos.org/faq.html, accessed 30 June 2020.

1860) and 13 Broadwoods (dating from 1816 to 1859) were selected for the present study, the data assembled into a table that displays their averages and variances, along with the modal number for each manufacturer (Table 1).

Table 1. Octave widths on selected instruments by Graf, Pleyel, Erard and Broadwood

Width of an octave	Graf	Pleyel	Erard	Broadwood
Average	160 mm	162 mm	165 mm	164 mm
Narrowest	159 mm	158 mm	160 mm	162 mm
Widest	160 mm	164 mm	166 mm	166 mm
Modal number	160 mm	163 mm	165 mm	163 mm
Variance between narrowest and widest	1 mm	6 mm	6 mm	4 mm

The greatest variance between the narrowest and widest octave measurement occurs with the Pleyels and Erards, while the Graf instruments remain strikingly consistent over the 17 examples examined. Erards were, on average, three millimetres per octave wider than the Pleyels, and five millimetres wider per octave than the Grafs. Of the four manufacturers, the Graf instruments clearly had the narrowest octave widths, although one Pleyel (an 1838 square; serial number 7115) measured just 158 millimetres per octave – narrower even than the average Graf.[38]

In order to assess the validity of Lenz's account of Chopin's Pleyel, it is worth comparing a few selected instruments from around 1842. There is a Pleyel grand from this year (serial number 9486) with an octave span measuring 160 millimetres: such an instrument is perhaps a more reliable indication of how 'narrow' the keys on Chopin's Pleyel might have been.[39] One of the Erards in the database from around the same time (*c*.1842; serial number 15908) measured 165 millimetres.[40] If the data is accurate, this proves that Lenz may indeed have had a point: the octave width on Chopin's Pleyel could theoretically have been half a centimetre narrower than Lenz's Erard, which goes some way to explaining the enabling power the Baltic musician ascribed to it.

The data also tells us that the width of an octave on Pleyel pianos did not broaden over the course of Chopin's lifetime, but instead shifted back and forth by a few millimetres. The type (square, upright or grand) does not to appear to substantially or consistently affect this trend: an 1820 square Pleyel (serial number 923) had an octave width of 160 millimetres; this distance was only two millimetres wider on an 1851 square (serial number 16479).[41] Far more significant, however, is the average five millimetre increase in the width of an octave on Erard keyboards: an upright from *c*.1825 (serial number 4474) had an octave width of 165 millimetres; in 1859 the octave width on a grand (serial number 32043) measured exactly

38
Clinkscale Online, CEP-2605, https://www.earlypianos.org, accessed 30 June 2020.

39
Ibidem, CEP-2604.

40
Ibidem, CEP-6562.

41
Ibidem, CEP-2491; CEP-5019.

the same distance.[42] Broadwoods were, on the whole, somewhere in between Pleyel and Erard, although Chopin's closest contact with Broadwood pianos came during the twilight of his life, when he lacked the physical ability to continue composing.

The validity of these observations can be tested by examining instruments we know to have been owned or associated with the composer. Contained within the Cobbe Collection at Hatchlands Park in Surrey is the 1848 Pleyel (serial number 13819) that Chopin brought to London for his final concert tour; the 1848 Broadwood (serial number 17047) that Chopin played in London soirées and for a concert in Manchester; and an 1843 Erard (serial number 713) purchased by the composer Julius Benedict for Jane Stirling, who became Chopin's pupil in the same year.[43] The Collection also contains a *c*.1836 Graf (serial number 2257) owned latterly by Gustav Mahler, which I will include in the present comparison due to its well-documented provenance.[44] Conveniently, all four of these instruments contain a three-octave measurement in Clinkscale Online which, once again, I used to calculate the span of a single octave.

Table 2. Instruments in the Cobbe Collection at Hatchlands Park, Surrey

The Cobbe Collection	*c*.1836 Graf	1848 Pleyel	1843 Erard	1848 Broadwood
Width of an octave	159 mm	163 mm	166 mm	164 mm

In comparing these instruments (Table 2), we again see that the Graf has the narrowest keys, followed by the Pleyel, and the difference between the octave measurements for Jane Stirling's 1843 Erard and Chopin's 1848 Pleyel is three millimetres (exactly the same as the difference between the average Pleyel and Erard presented in Table 1), which is not far off the five-millimetre possibility listed earlier for the 1842 pianos.

So how do these differences compare with a modern piano? Unfortunately, Clinkscale Online only contains data for pianos up to 1860, and there is no analogous database for contemporary instruments. To get at least some indication, however, I measured the octave widths on the piano I practise on at home (a 1982 Yamaha G2), along with a 2016 Bösendorfer 214VC, and a 2010 Steinway D-274. The variances between these instruments are, not surprisingly, almost non-existent (Table 3).

Table 3. Octave measurement comparison between contemporary instruments

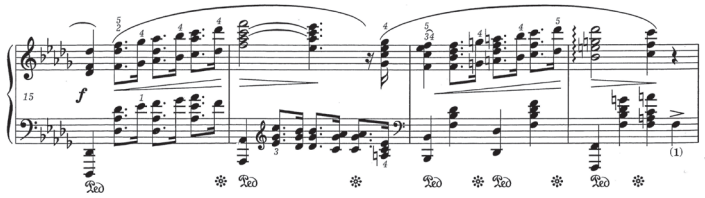
Contemporary pianos	Yamaha G2	Bösendorfer 214VC	Steinway D
Width of an octave	166 mm	166 mm	165 mm

42
Ibidem, CEP-4989; CEP-1270.

43
Ibidem, CEP-2618 (Pleyel); CEP-5693 (Broadwood); CEP-5691 (Erard). See Alec Cobbe, *Chopin's Swansong: The Paris and London Pianos of His Last Performances now in the Cobbe Collection* (London: Chopin Society and Cobbe Collection Trust, 2010). The provenance and authenticity of the Pleyel was confirmed by Eigeldinger. See Paul Majendie, 'Chopin's piano found in English country house', https://www.reuters.com/article/us-arts-chopin-idUSL2141309320070321, accessed 30 June 2020.

44
Ibidem, CEP-5690.

It is worth noting just how close the average octave span of an Erard matches its modern successors. Perhaps this explains why so many performers today choose to record Chopin on an Erard, despite the composer's well-documented affinity with Pleyel: there is less tactile alienation on an instrument that has keys of essentially the same width.[45] If a modern pianist attempts to play Chopin on a Graf however, or one of the 'narrow-keyed' Pleyels, their entire geographical intuition of the keyboard can be skewed by up to half a centimetre. Performing octaves on such a piano might feel almost as if one is playing sevenths, which explains why some pianists and writers (as we will see below) might automatically assume that *all* Pleyel pianos of Chopin's time had narrower keys. So what kind of technical challenges might these variances alleviate? Throughout Chopin's output, there are numerous examples of chords which almost every performer today arpeggiates. Consider the tonic chord in the left hand on the third beat of bar 15 in the *Marche* of the Sonata in B flat minor, Op. 35 (Example 2).

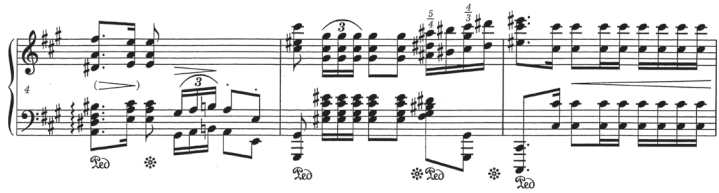


Example 2. Fryderyk Chopin, *Marche* from the Sonata in B flat minor, Op. 35, bars 15–16 (*National Edition of the Works of Fryderyk Chopin*)

Like the chord Lenz singles out in the Scherzo, the interval between the fifth finger and the thumb in the left hand is a tenth, and once again, Chopin chose *not* to notate the wavy arpeggio line before it, a decision he sticks with in the subsequent reappearances of the same chord in bars 23, 69 and 77. Unlike the Scherzo, the consistent omission of this sign is less likely to be a coincidence: it suggests Chopin wanted the chord to be struck simultaneously. On a modern piano, this is nearly impossible to achieve. When I attempted this on a *c*.1846 Pleyel (serial number 13084; with an octave span of 163 mm) at the Sydney Conservatorium of Music, the results were the same: the chord had to be arpeggiated. Might it have been possible for Chopin to strike it simultaneously on his 'narrow-keyed' Pleyel? In this instance, it seems unlikely.

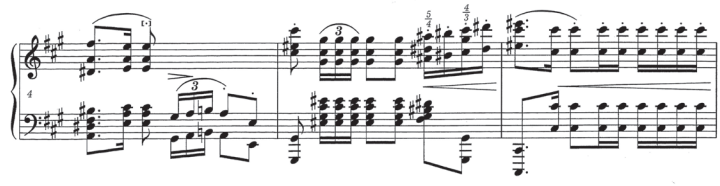
Yet other examples invite further scrutiny, such as the diminished seventh chord on the first beat of the fourth bar in the first version of the Polonaise in A major, Op. 40 No. 1 (Example 3). The interval spanned in both hands is again a tenth; however, only the left hand is arpeggiated. Like the *Marche*, Chopin repeats this directive three times (in bars 18, 84 and 100). He could well have extended this wavy line up into the treble stave if he had wanted to.

45
A further avenue of exploration – beyond the scope of the present study – would be to compare the average hand span of the nineteenth century with the twenty-first, and to reconsider Chopin and his instruments in light of the literature on human physiology.



Example 3. Fryderyk Chopin, Polonaise in A major, Op. 40 No. 1, first version, bars 4–6 (*National Edition of the Works of Fryderyk Chopin*)

Things get rather interesting when we compare the first version of the Polonaise with the same bars in the second version (Example 4). In bar 7, and all the subsequent repetitions of this chord, the arpeggiation before the left-hand chord has been removed altogether. In the 'Performance Commentary' for the *National Edition*, Ekier and Kamiński write: '[...] the editors regard the first version as being of equal importance [to the second] and recommend its concert use in case of difficulty in performing the thicker, more awkward chords of the second version.'[46]



Example 4. Fryderyk Chopin, Polonaise in A major, Op. 40 No. 1, second version, bars 4–6 (*National Edition of the Works of Fryderyk Chopin*)

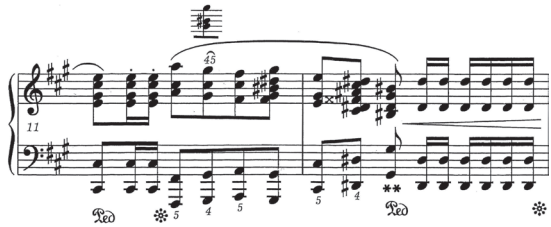
Could Chopin have sketched the first version at a piano with slightly wider keys – perhaps an Erard with a 'ready-made tone'[47] – only to revise it later on his 'narrow-keyed' Pleyel, making subtle alterations here and there, thickening some of the harmonies and removing the arpeggiation markings? Although I am yet to discover any evidence that suggests Chopin was working at an Erard at this time, it remains within the realm of possibility.[48] It goes without saying that playing the six-note chord with the five fingers of the right hand on the second quaver beat of bars 12 and 91 (Example 5; consistent in both versions) is noticeably easier to execute on an instrument with narrow keys.

On the fourth beat of bar 30 in the Prelude in F sharp major, Op. 28 No. 13, we find a ninth in the right hand between the E and the F sharp, a difficulty that is easily circumvented by arpeggiation on a modern piano (Example 6). Tellingly, when I attempted to play this passage on the *c*.1846 Pleyel, I discovered I could play the notes of this chord simultaneously without much difficulty. Viewed in the overall context of the melodic contour of the eight-bar phrase, Chopin's notation makes perfect sense: arpeggiating the chord in

46
Jan Ekier and Paweł Kamiński, 'Performance Commentary / Source Commentary (abridged)', in *National Edition of the Works of Fryderyk Chopin: Series A. Works Published During Chopin's Lifetime*, ed. Jan Ekier, vol. vi (Kraków: Polskie Wydawnictwo Muzyczne, 2010), 2. For a summary of the differences between the first and second versions of the Polonaise, see 8–9.

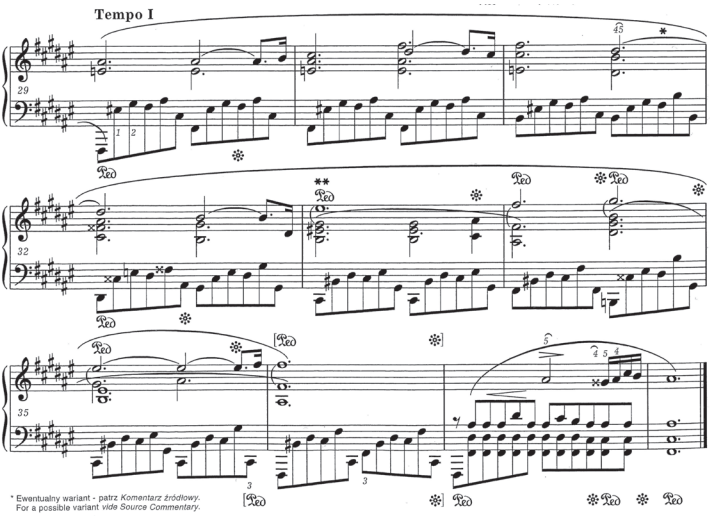
47
Eigeldinger, *Chopin: Pianist and Teacher*, 26.

48
The 'early version' of the Polonaise in A major, Op. 40 No. 1 derives largely from Julian Fontana's manuscript *Stichvorlage* and, as such, we are unable to rule out the possibility that the arpeggiation signs may have been added by Fontana himself. I am grateful to Jeffrey Kallberg for this observation.



Example 5. Fryderyk Chopin, Polonaise in A major, Op. 40 No. 1, first version, bars 11–12 (*National Edition of the Works of Fryderyk Chopin*)

bar 30 invites a premature deceleration of momentum, creating an agogic emphasis that would otherwise be more effectively saved for the melodic climax of the phrase – the top G – in bar 34.[49]



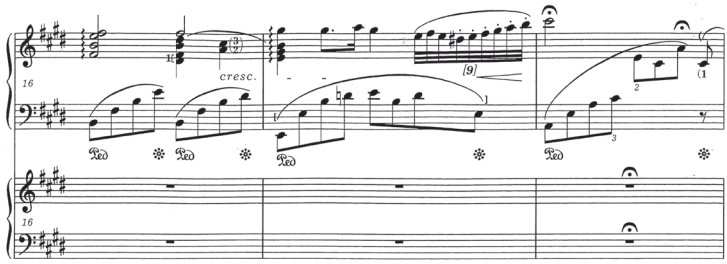
Example 6. Fryderyk Chopin, Prelude in F sharp major, Op. 28 No. 13, bars 29–38 (*National Edition of the Works of Fryderyk Chopin*)

Chopin's proclivity for dense harmonies, and his specific instructions for how they should be played, are a frequent feature throughout his output. Even in youthful works, we find examples that illustrate this. Consider bars 16–17 in the Romance from the Concerto in E minor, Op. 11 (Example 7), wherein arpeggiation is indicated before the dominant (with suspension) chord on the first beat of bar 16, and again before the tonic chord on the first beat of bar 17. Significantly, the dominant chord on the third beat of bar 16 has no arpeggiation before it, despite the fact it would be considerably easier to play if it did. Once again, the interval here is a tenth, and Chopin indicates that the D sharp and F sharp are to be taken with the thumb.[50] That this chord appears without arpeggiation in between two chords that *are* arpeggiated proves

49
The comments of Jan Kleczyński (1837–1895) on this topic seem especially pertinent: 'In a musical phrase composed of something like eight measures, the end of the eighth will generally mark the termination of the thought, that which, in language written or spoken, we should indicate by a full-point; here we should make a slight pause and lower the voice. The secondary divisions of this phrase of eight measures, occurring after each two or each four measures, require shorter pauses – that is to say, they require commas or semi-colons. [...]. From these general rules, Chopin arrived at the following conclusion, to which he attached much importance: *do not play by too short phrases;* that is to say, do not keep continually suspending the movement and lowering the tone on too short members of the thought; that is again to say, do not spread the thought out too much, by slackenings of the movement – this fatigues the attention of the listener who is following its development.' See Eigeldinger, *Chopin: Pianist and Teacher*, 43–44.

50
The bold fingerings in the *National Edition* are Chopin's own.

beyond any doubt what the composer's intentions were: the chord was to be struck simultaneously, in order to differentiate it from that which had come before, and that which was to follow. Seen in this way, Chopin's arpeggiation markings are far from arbitrary: they are calculated decisions based on the composer's ideal of what kind of sound he wanted to recreate, undoubtedly tested and refined on the instruments available to him at the time.[51]



Example 7. Fryderyk Chopin, Romance from the Concerto in E minor, Op. 11, version with second piano, bars 16–18 (*National Edition of the Works of Fryderyk Chopin*)

Contemporary performers have rightly observed that playing octaves and large intervals on period instruments is easier than on a modern piano. In a YouTube video promoting a concert on a recently restored 1848 Pleyel grand piano used in a concert with Toronto's Tafelmusik Orchestra in October 2010, pianist Janina Fialkowska described the process of adapting to the instrument thus:

> And then, we have the keys, and this is what, for the modern pianist, takes a little while to adapt to because they are narrower than the normal modern piano, which means that playing an octave feels like you're playing a seventh.[52]

In an interview for *Diapason Harmonie* in May 1991, the Polish pianist Janusz Olejniczak (whose recordings appear in the Chopin Institute's *The Real Chopin* series) described his first encounter working with period instruments for Andrzej Żuławski's film *La Note Bleue*:

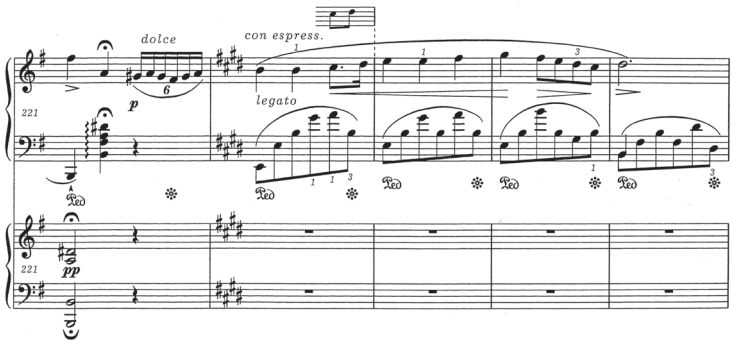
> In 130 minutes of film, there are 110 minutes of music. Of course, some of the music is used as background, but there are also a lot of pieces that I play live, on three different pianos, including an upright piano and especially the old Pleyel with its mechanical issues. I'd never played an instrument from that time [before]. A lot of things about the fingering and technique suddenly made sense. There are chords that you have to produce as an arpeggio on a modern keyboard which are right under your fingers, with the Pleyel's slightly narrower keys. The legato is also more natural.[53]

51
It is important to acknowledge, however, that there are some exceptions that undermine this theory, chief among them being the B section of the Nocturne in C minor, Op. 48, wherein Chopin does not include an arpeggiation mark before the first beat of bar 33 in the left hand – an interval of a twelfth, impossible to take simultaneously on any piano.

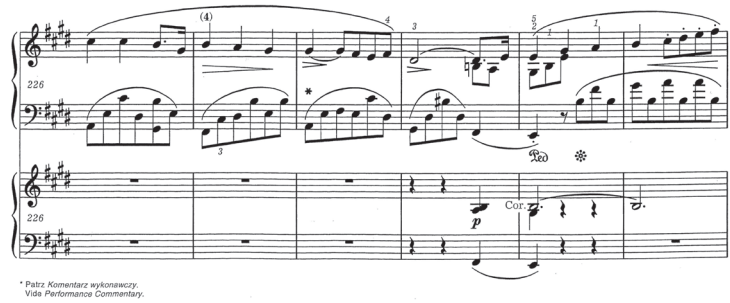
52
Janina Fialkowska plays 1848 Pleyel grand piano, online video, https://www.youtube.com/watch?v=_sBvZh_GI9A, accessed 25 July 2020.

53
Janusz Olejniczak, quoted in a programme note by John Glofcheskie for a recital on an 1852 Broadwood and a Steinway for the Vancouver Chopin Society in 2017, http://www.earlymusic.bc.ca/wp-content/uploads/2017/03/Chopin-Recitals-programme-notes.pdf, accessed 25 July 2020.

Olejniczak's last observation is significant: *legato* must surely be one of the most frequently encountered terms in Chopin's music. Returning to the Concerto in E minor, Op. 11, an instructive example can be found in the contrasting second theme of the Allegro: at bar 21, Chopin indicates the right-hand melody is to be played *con espress.*, the left-hand arpeggiation *legato* (Example 8). Each bar in the left hand is individually slurred, with some of the quaver figurations (bars 225 and 234, for instance) double stemmed as crotchets. On a modern piano, it is difficult to perform these bars exactly as Chopin notated them. In bar 226 (Example 9), we find a stretch of a tenth on the third beat in the left hand (again not arpeggiated).



Example 8. Fryderyk Chopin, Allegro from the Concerto in E minor, Op. 11, version with second piano, bars 221–225 (*National Edition of the Works of Fryderyk Chopin*)



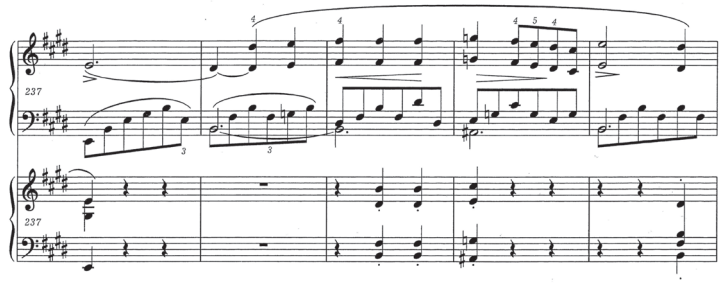
Example 9. Fryderyk Chopin, Allegro from the Concerto in E minor, Op. 11, version with second piano, bars 226–231 (*National Edition of the Works of Fryderyk Chopin*)

In the 'Performance Commentary' for the *National Edition*, Ekier and Kamiński write that 'a particularly beautiful effect is produced by the application of a "harmonic legato" (fingers sustain components of the harmony)':

> Such execution could be suggested by the marking *legato*, written at the beginning of the section in E major (bar 222). The employment of this performing device, much liked by Chopin, in the whole section (to

bar 234), is indicated also by additional crotchet stems in bars 234 and 250–251.[54]

From bar 239 to bar 245, Chopin notates the first beat of each bar as double-stemmed dotted minims, as if the importance of the *legato* direction could not be overemphasised (Example 10).[55] In bar 238, we find another stretch of a tenth between the fifth finger and the thumb of the left hand, necessitated by the tied B on the first beat – a note that (on a modern piano) is particularly challenging physically to sustain for the stipulated duration (incidentally, Chopin notated no pedal for these bars, suggesting a physical *legato* was paramount).

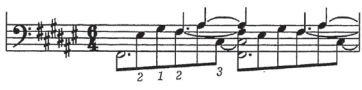


Example 10. Fryderyk Chopin, Allegro from the Concerto in E minor, Op. 11, version with second piano, bars 237–241 (*National Edition of the Works of Fryderyk Chopin*)

Eight years later, *legato* remained an essential component of Chopin's pianistic style, with the designation appearing – among numerous other examples – in the Prelude in F sharp major, Op. 28 No. 13, under the left-hand figuration in bar one. Once again, Ekier and Kamiński make a case for 'harmonic legato', advocating a practical solution for the modern piano (Example 11):

> The *legato* description under the bottom stave probably means 'harmonic legato' (holding down components of a harmony with the fingers). Its precise execution was easier on pianos in Chopin's time, which had narrower keys.[56]

Whilst essentially true, Ekier and Kamiński imply that all pianos in Chopin's time had narrower keys – an assumption which, as we have demonstrated, is problematic.



Example 11. 'Harmonic legato' solution for the Prelude in F sharp major, Op. 28 No. 13 by Jan Ekier and Paweł Kamiński ('Performance Commentary' to the *National Edition of the Works of Fryderyk Chopin*)

54
Jan Ekier and Paweł Kamiński, 'Performance Commentary / Source Commentary (abridged)', in *National Edition of the Works of Fryderyk Chopin: Series B. Works Published Posthumously*, ed. Jan Ekier, vol. 6a (Kraków: Polskie Wydawnictwo Muzyczne, 2010), 3.

55
Chopin's double-stemmed notation also has implications for voicing.

56
Jan Ekier and Paweł Kaminski, 'Performance Commentary / Source Commentary (abridged)', in *National Edition of the Works of Fryderyk Chopin: Series A. Works Published During Chopin's Lifetime*, ed. Jan Ekier, vol. 7 (Kraków: Polskie Wydawnictwo Muzyczne, 2010), 3.

Whilst a narrow-keyed Pleyel may alleviate some of the tension necessary to sustain these extended hand positions by as much as half a centimetre, it also creates problems of accuracy for the modern pianist. One of the most challenging works to recalibrate on such an instrument would surely be the Etude in C major, Op. 10 No. 1. Essentially an exercise in agility for the expansion and contraction of the right hand across *brillante* arpeggios that map the entire geography of the keyboard, Chopin's first Etude features harmonies divided up into four octaves, predominantly comprised of two hand positions: an extension between the thumb and index finger (occurring between the first two notes of every ascent) and a contraction of the thumb into the next position as it passes underneath the index finger, typically arriving at the same note recently depressed by the fourth finger. Although some of the harmonies and fingerings change within each two-bar pattern, the basic expand-contract exercise is reversed on the way down. With the exception of bars 41–48, this figuration continues unabated for 78 bars before landing back where it began on the tonic octave.

Within each two-bar subphrase, the hand expands and contracts on average eight times, with the intervals between the thumb and index finger ranging from a minor third to a minor seventh. Table 10 (see Appendix) maps where these intervals appear, and how many times the stretch is repeated within each bar. To assess the different measurements some of these intervals would have represented on pianos of Chopin's time compared with those of our own, we must first compare them side by side (see Table 4).[57] Far and away the most commonly encountered interval between the thumb and index finger is the perfect fifth, which is executed 93 times during the course of the Etude. The cumulative distance (the length of the interval multiplied by 93) the hand would need to stretch for this interval alone over the course of the entire Etude would equate to 924 cm (1824 Graf), 930 cm (1842 Pleyel), 959 cm (*c*.1842 Erard), 953 cm (1848 Broadwood), and 959 cm (2010 Steinway D). Performing the work on an instrument with narrow keys might indeed prove beneficial for reducing tension and fatigue in the thumb.

We can only speculate what make of piano Chopin may have used when he conceived this Etude. An early reference to 'a large *Exercice en forme* in my own peculiar style' exists in a letter to Tytus Woyciechowski on 20 October 1829, only a few months after Chopin had performed his Variations on 'Là ci darem la mano' from Mozart's *Don Giovanni*, Op. 2 on a Graf at the Kärtnertor Theatre in Vienna.[58] As Alan Walker recently noted:

> All we know with certainty is that the first two 'exercises' exist in manuscripts that posterity instantly recognises as the Studies in C major and A minor, Op. 10, nos. 1 and 2. They bear the date November 2, 1830, placed there the day that Chopin departed Warsaw

57
Since the diagonal measurements from a white key to a black key are not listed in Clinkscale Online, it is only possible to calculate the distance of major and perfect intervals in the key of C major.

58
Chopin's Polish Letters, 142. On 8 August 1829, Chopin wrote to his family: 'I have chosen for my concert one of Graf's instruments; I'm afraid I'll offend Stein through this, but I will thank him kindly for his politeness.' See ibidem, 112–114.

Table 4. Distances between the intervals in C major on five different pianos

Interval	1826 Graf (serial number 988)	1842 Pleyel (serial number 9486)	*c.*1842 Erard (serial number 15908)	1848 Broadwood (serial number 17047)	2010 Steinway D (serial number 588098)
Unison	19.875 mm	20 mm	20.625 mm	20.5 mm	20.625 mm
Major 2nd	39.75 mm	40 mm	41.25 mm	41 mm	41.25 mm
Major 3rd	59.625 mm	60 mm	61.875 mm	61.5 mm	61.875 mm
Perfect 4th	79.5 mm	80 mm	82.5 mm	82 mm	82.5 mm
Perfect 5th	99.375 mm	100 mm	103.125 mm	102.5 mm	103.125 mm
Major 6th	119.25 mm	120 mm	123.75 mm	123 mm	123.75 mm
Major 7th	139.125 mm	140 mm	144.375 mm	143.5 mm	144.375 mm
Perfect 8ve	159 mm	160 mm	165 mm	164 mm	165 mm

for good – suggesting that he had been putting his portfolio into some sort of last-minute order in preparation for a much longer journey abroad.[59]

The Etude in C major is therefore very unlikely to have been conceived at a Pleyel, Erard or Broadwood, and far more likely to have been sketched at a Graf or Buchholtz. Curiously, the cumulative distances spanned on the 1842 Pleyel (which may have been close to the one Lenz played on in Chopin's apartment) were similar to the 1826 Graf – a difference of only six centimetres throughout the 93 iterations of perfect-fifth intervals. Much more significant is the cumulative difference between the Pleyel and the Erard from approximately the same year, which vary by nearly 30 centimetres – the length of a standard ruler. This not only lends further credence to the enabling power Lenz observed in Chopin's Pleyel, but also posits another reason why the composer may have consistently gravitated towards Pleyel pianos: the proportions of the latter's keyboards were closer to what Chopin had experienced in his youth in Warsaw and Vienna.[60]

The length of the keys

For many modern pianists, the tactile alienation experienced when playing Chopin on a period instrument for the first time has as much to do with vertical variables as it does with the horizontal. In a promotional film produced by the Chopin Institute, the American pianist Garrick Ohlsson documents his process of selecting a period instrument for his recording as part of *The Real Chopin* series.[61] At the beginning of the video, he is shown playing on three instruments in the Institute's collection: an 1848 Pleyel (serial number 13503), an 1838 Erard (serial number 14214) and an 1849 Erard

59
Alan Walker, *Fryderyk Chopin: A Life and Times* (London: Faber & Faber, 2018), 152.

60
This point has already been observed by Eigeldinger, albeit more in relation to aural phenomena rather than purely mechanistic aspects such as the width of the keys: 'In their sonorous qualities, if not in details of workmanship, the Pleyels of those days were closer to some Viennese instruments (Graf) than to the Erard. These characteristics, in perfect harmony with Chopin's playing and taste, explain his well-known predilection for the Pleyel.' See Eigeldinger, *Chopin: Pianist and Teacher*, 92.

61
Garrick Ohlsson – New CD: NIFCCD 219, NIFCCD 049, online video, https://www.youtube.com/watch?v=wv5xeclUFPg, accessed 23 July 2020.

(serial number 21118). After testing selected passages of the Scherzo in E major, Op. 54 on all three instruments, he eventually opts for the 1849 Erard.

He describes the sound of the 1848 Pleyel as 'noisy' and 'not as round' (compared to a modern piano); on the 1849 Erard he is 'more at ease with the relationships of loud to soft and the balance of the treble and the bass.' He describes the 1838 Erard as 'difficult', primarily because of a second lid mechanism on the bottom of the keyboard that makes his knees feel cramped: 'you can't play it with this up, and I'm just too tall.' His next observation is more revealing: 'this one [the 1838 Erard] is the most difficult for me to play, because the distance from the white keys to the black keys … the keys are shorter.'[62]

Ohlsson's observation is significant precisely because it reveals the extent to which the measurements of keyboards were changing during Chopin's lifetime: like the width of the keys, the lengths of the keys were also not fixed or standardised. Between two Erards manufactured 11 years apart, the length of the keys had changed significantly – in this case enough to make Ohlsson gravitate towards the later model: 'This one just … I don't have to think as much!'[63] In other words, the 1849 Erard is, for Ohlsson, closer to a modern piano than the 1848 Pleyel and – crucially – the 1838 Erard. Once again, we can investigate Ohlsson's observations in light of the data in Clinkscale Online to evaluate the extent to which the length of the keys varied over Chopin's lifetime.

By comparing eight Grafs (*c*.1811 to 1839), 13 Pleyels (1820 to 1852), 13 Erards (*c*.1825 to 1860) and 13 Broadwoods (*c*.1825 to 1859), we discover that the greatest variance between the length of the white keys occurs with Broadwood (24 millimetres between the shortest and longest example), with Graf and Pleyel virtually identical, both with 15-millimetre variances (Table 5). With respect to the black keys, the greatest variance occurred with Pleyel (21 millimetres), while Graf remained much more consistent, the length of the black keys on average at least four millimetres longer than the other three makes (Table 6). Like the width of the octave, this data again proves these measurements were by no means fixed, and fluctuated from model to model, varying (at its most extreme) by up to 21 millimetres.

By subtracting the length of the black keys from the length of the white, we are also able to calculate the distance from the edge of the white keys to where the black keys begin (Table 7) – the measurement to which Ohlsson refers. Surprisingly, this variance is minimal on the Erards (seven millimetres) and much more apparent with the Grafs (17 millimetres) and Broadwoods (16 millimetres). Nevertheless, a comparison with the average distances between the white and black keys of period pianos with their modern counterparts is enough to prove the validity of Ohlsson's point (Table 8).

62
Ibidem.

63
Ibidem.

Table 5. Comparison of the length of the white keys on selected pianos by Graf, Pleyel, Erard and Broadwood

Length of white keys	Graf	Pleyel	Erard	Broadwood
Average	144 mm	141 mm	141 mm	139 mm
Shortest	137 mm	133 mm	132 mm	131 mm
Longest	152 mm	148mm	145 mm	155 mm
Modal number	No mode	140 mm	139 mm	No mode
Variance between shortest and longest	15 mm	15 mm	13 mm	24 mm

Table 6. Comparison of the length of the black keys on selected pianos by Graf, Pleyel, Erard and Broadwood

Length of black keys	Graf	Pleyel	Erard	Broadwood
Average	97 mm	93 mm	92 mm	92 mm
Shortest	91 mm	81 mm	81 mm	80 mm
Longest	103 mm	102 mm	97 mm	98 mm
Modal number	95 mm	95 mm	93 mm	88 mm / 95 mm
Variance between shortest and longest	12 mm	21 mm	16 mm	18 mm

Table 7. Comparison of the distances between the beginning of the white and black keys on selected pianos by Graf, Pleyel, Erard and Broadwood

Distance from beginning of white keys to black	Graf	Pleyel	Erard	Broadwood
Average	46 mm	48 mm	49 mm	48 mm
Shortest	40 mm	43 mm	45 mm	43 mm
Longest	57 mm	53 mm	52 mm	59 mm
Modal number	43 mm	45 mm / 52 mm	45 mm	48 mm
Variance between shortest and longest	17 mm	10 mm	7 mm	16 mm

Table 8. Comparison of the key length measurements between three modern pianos

Modern pianos	1982 Yamaha G2	2016 Bösendorfer 214-VC	2010 Steinway D
White key length	150 mm	149 mm	149 mm
Black key length	95 mm	94 mm	93.5 mm
Distance from beginning of white keys to black	55 mm	54 mm	51 mm

The question of which piano is best suited to the physiognomy of the hand is, of course, a personal one that depends on the length and shape of one's fingers. But from all of this, a broader and more intriguing question must be asked: if the tactile alienation Ohlsson experienced between two different Erards was enough to influence his decision regarding which instrument to record on, could a similar variance have been enough to influence Chopin's decision regarding which instrument to compose, perform and teach on?

We can gain an accurate idea of the general shape and length of Chopin's fingers by examining the plaster cast of his left hand made by Auguste Clésinger (1814–1883), currently held in the Musée de la Vie Romantique in Paris (Figure 2). It is in all respects a beautifully proportioned hand: neither particularly small nor especially large.[64] What we immediately notice is that Chopin's fingers were long and slender, not stubby and fat. What kind of keyboard might his hand have been most comfortable on?

Chopin hints at the answer in his unfinished *Projet de Méthode*, wherein he instructs the student to:

> Find the right position for the hand by placing the fingers on the keys *E*, *F#*, *G#*, *A#*, *B*: the long fingers will occupy the high [= black] keys, and the short fingers the low [= white] keys. Place the fingers occupying the high [= black] keys all on one level and do the same for those occupying the white keys, to make the leverage relatively equal; this will curve the hand, giving it the necessary suppleness that it could not have with the *fingers straight* [...]. A supple hand; the wrist, the forearm, the arm, everything will follow the hand *in the right order*.[65]

Figure 2. Auguste Clésinger, *Moulage de la main de Chopin*, Musée de la Vie Romantique, Paris. Photo by Dylan Henderson, January 2015

64
For a discussion on Chopin's hand, see Jean-Jacques Eigeldinger, 'The Hand of Chopin: Documents and Commentary', in *Chopin and His World*, ed. Jonathan D. Bellman and Halina Goldberg (Princeton: Princeton University Press, 2017), 297–311.

65
Eigeldinger, *Chopin: Pianist and Teacher*, 194.

Chopin goes on to write that learning scales by starting with C major is 'useless' (he deletes the word 'absurd'): ergonomically, it is 'the most difficult for the hand as it has no pivot.'[66] As Mikuli and others would later attest, the 'scales with many black keys (B, F sharp and D flat) were studied first, whereas C major, as the most difficult, came last.'[67] To demonstrate this fundamental pianistic tenet, Chopin devised his Etude in C major, Op. 10 No. 1, evidently with a view to proving just how difficult the key of C major really was. 'The pivot is the index finger,' he wrote in Ludwika Jędrzejewicz's copy of the *Projet du Méthode*, 'which divides the hand in half when it spreads open.'[68]

If we define the 'natural position of the hand' as one where the thumb and fifth fingers are on the white keys and the longer fingers are on the black, any position necessitating all fingers on the white keys is by definition a position without a pivot. There are 312 intervals between the thumb and the index finger over the course of the Etude in C major, Op. 10 No. 1; only 56 of these (about 18%) have pivots (see appendix). The Etude is therefore Chopin's most 'unpianistic' composition: stripped of its pivot, the longer fingers mercilessly pushed outside their comfort zone onto the white keys, the hand encounters formidable difficulties, which is precisely why the Etude continues to hold so much pedagogical value.[69] Friederike Streicher (née Müller; 1816–1895) was instructed to practise it in the mornings very slowly: 'If you study it as I intend it,' Chopin told her, 'it widens the hand and enables you to play runs of wide broken chords like bow strokes. But often, unfortunately, instead of making people learn all that, it makes people unlearn it.'[70]

With the exception of this Etude, the ergonomic challenges of C major were judiciously avoided throughout the majority of Chopin's output: as many scholars have pointed out, he consistently favoured keys with several sharps or flats.[71] In an essay exploring the relationship between the psychological characteristics of keys and Chopin's works, Zofia Chechlińska noted that the most commonly used key was A flat major – a total of 24 works.[72] It is therefore neither coincidental nor surprising that Chopin frequently prescribed the music of other composers in this key to his students: Beethoven's Sonata in A flat, Op. 26 was a favourite, while the first Exercise in A flat from Clementi's *Préludes and Exercises* formed an important part of his curriculum.[73] Weber's Sonata in A flat, Op. 39 was also popular, as were the concertos in A flat by Field and Hummel. Over a decade before Józef Sikorski penned the earliest biography of Chopin,[74] Robert Schumann sketched

66
Ibidem. Earlier in the *Projet de Méthode*, Chopin writes: 'Many times, without thinking, minds who know nothing about piano playing have seriously proposed that the keyboard be levelled: this would eliminate all the security that the pivot points give to the hand, [and] consequently make the passage of the thumb in those scales involving sharps and flats extremely difficult'.

67
Ibidem, 34.

68
Ibidem, 29, 90.

69
Despite the fact that it appears as the very first Etude in his Op. 10 set, Chopin nevertheless entrusted his Etudes 'only to the most advanced students', suggesting he was only too aware of just how dangerous they could be for the 'uninitiated'. According to Mikuli, Chopin also prescribed 'a selection of Cramer's *Etudes*, Clementi's *Gradus ad Parnassum*, Moscheles's *Stylstudien zur höheren Vollendung* [*sic*, probably Op. 95, possibly Op. 70], which he especially liked; and J. S. Bach's Suites and individual Fugues from *Das Wohltemperierte Clavier*'. See Ibidem, 60.

70
Ibidem, 68.

71
See Ibidem, 100. Alan Walker also recently posited that Chopin transposed the 'Là ci darem la mano' theme from Mozart's *Don Giovanni* from its original key of A to B flat in the Variations, Op. 2, 'presumably for greater physical comfort at the keyboard.' See Walker, 118–120.

72
Zofia Chechlińska, 'Chopin and the Meaning of Keys', in *Chopin 1810–2020: Ideas, Interpretations, Influence*, 2 vols, ed. Irena Poniatowska and Zofia Chechlińska (Warsaw: Fryderyk Chopin Institute, 2017), i: 345–352.

73
Eigeldinger, 59–63.

74
Józef Sikorski, 'Recollection of Chopin', tr. John Comber, in *Chopin and His World*, ed. Jonathan D. Bellman and Halina Goldberg (Princeton: Princeton University Press, 2017), 45–84.

his own portrait in music, setting 'Chopin' (*Carnaval*, Op. 9) in the key of A flat. This was surely not a coincidence.

So what was it that Chopin found so appealing about A flat? Whilst many eighteenth- and nineteenth-century composers, critics and theorists ascribed gloomy and funereal associations to the tonality, Chechlińska observed how Chopin's works are, for the most part, inconsistent with such affects.[75] In the case of the Fantasy, Op. 49, however (a work as much in the key of A flat as it is in F minor),[76] some of the historical texts assume greater meaning. The key of A flat invoked the 'Plutonian realm' for Georg Joseph Vogler (1749–1814); while Christian Schubart (1739–1791) and August Gathy (1800–1858) heard 'eternity' and 'consolation' in its radius.[77] Ferdinand Hand (1786–1851) believed the key expressed 'a presentiment of the life hereafter or of a higher happiness'.[78] More insightful still is Gustav Schilling (1805–1880), who may as well have been describing the swirling ascent in the penultimate bars of the coda in Chopin's Fantasy when he wrote: 'spirit and soul appear to swing over into the heavenly and spiritual homeland.'[79] Farther on in the *Universal-Lexicon der Tonkunst* (1835–1836), Schilling gets even closer to the mark:

> [A flat] also likes to modulate to F minor's melancholy and grave-desiring longing, to D♭ major's grief and rapture, and, through enharmonic transformation, to E major, the key which is not yet complete, although granting more than partial enjoyment and satisfaction.[80]

It is by no means an inaccurate description of Chopin's modulatory tendencies: F minor and D flat also number among his most frequently used tonalities (all three keys appear in the Fantasy) and, although Chopin does not modulate to E major in the Fantasy, he does use enharmonic transformation to arrive in the key of B major (the dominant of E) for the *Lento, sostenuto* episode that Mieczysław Tomaszewski memorably names the 'epiphany'.[81] There is thus a convincing argument to be made for A flat being a kind of portal through which Chopin could easily traverse the contrasting psychological landscapes of F minor (the relative minor), E flat (the dominant) and D flat (the subdominant), all the while juxtaposing the remembered past with the painful present and an idealised future.

Returning to the physical topography of the keyboard, what these tonalities all have in common are three to five flats: in all cases, the hand has its pivot, enabling the longer fingers to assume their natural position on the black keys. Whilst Chopin may or may not have been consciously aware of some of the psychological key affects cited above, he was surely attuned to their unique ergonomic possibilities. The changing measurements of the keys on the different pianos he encountered over his lifetime –

75
Chechlińska, 348–349.

76
See Carl Schachter, 'Chopin's Fantasy Op. 49: The Two-Key Scheme', in Samson (ed.), *Chopin Studies*.

77
See Rita Steblin, *A History of Key Characteristics in the Eighteenth and Nineteenth Centuries* (Michigan: UMI Research Press, 1983), 281–285.

78
Ibidem, 284.

79
Ibidem.

80
Ibidem.

81
Mieczysław Tomaszewski, *Chopin: The Man, his Work and its Resonance*, tr. John Comber (Warsaw: Fryderyk Chopin Institute, 2015), 514.

particularly the distance between the beginning of the white and black keys – would have only served to heighten this awareness to a greater extent than it would for a composer today.

Given his well-known predilection for A flat, it is worth examining the frequency with which Chopin employed other keys (Table 9).[82] Curiously, A minor and C major are both popular (at least numerically); however, the majority of the works Chopin wrote in these keys are dance miniatures. There are six mazurkas in C major (Op. 6 No. 5, Op. 24 No. 2, Op. 33 No. 2, Op. 56 No. 3, WN 24, and WN 48) – all of which have a character consistent with Schubart's 'innocence, simplicity, naivety, children's talk' or Schilling's 'rustic, natural life of pleasure'.[83] Johann Mattheson (1681–1764) thought C major was 'also suited to rejoicing and other occasions where joy is in full scope',[84] sentiments that are certainly consistent with the character of Chopin's song 'Hulanka' [Drinking Song], WN 32 – a mazur based on a poem by Stefan Witwicki (1801–1847).

With the exception of two etudes (Op. 10 Nos. 1 and 7) and the first Prelude of Op. 28, Chopin's use of C major is generally consistent with the characteristics ascribed to the tonality by Schubart, Schilling and Mattheson, suggesting – atypically in this case – that psychological factors may have been given primacy over the ergonomic challenges. We should also note however that – with the exception of the *Introduction and Polonaise Brillante* for cello and piano, Op. 3 – nearly all of the works Chopin wrote in this key are relatively short-lived: he never used C major for longer, more ambitious compositions, such as the Concerto, Op. 21 (F minor), the sonatas Op. 35 and 58 (B flat minor and B minor), the Fantasy, Op. 49 (F minor / A flat), the Polonaise-Fantasy, Op. 61 (A flat), the Scherzos and the Ballades, and the Barcarolle, Op. 60 (F sharp). Even in the Concerto in E minor, Op. 11 (a work set in a tonality with only one sharp), Chopin makes frequent use of its four-sharp major mode (most conspicuously in the Romance and Rondo movements, but also in the contrasting theme of the Allegro), the key with which it was easiest to obtain the most natural hand position on the keyboard. It would be perhaps more accurate to rename the work the Concerto in E major, Op. 11.

82
The number of works in A flat major and A minor listed in Table 9 (26 and 15 respectively) differ slightly from the numbers given in Chechlińska. The present table is based on the catalogue for the *National Edition*, at https://www.chopin-nationaledition.com/wp-content/uploads/2013/05/numbering_en.pdf, accessed 30 August 2020.

83
Steblin, 223–225. It remains to be said that the psychological affects of keys by Schubart, Vogler, Gathy, Hand, Schilling and Mattheson were undoubtedly influenced by the tuning and temperament of instruments of their time, an aspect addressed in the previous issue of this journal. See Jonathan D. Bellman, 'Nineteenth-Century Temperaments and the Music of Chopin', in *The Chopin Review*, 3 (2022).

84
Ibidem, 222.

Table 9. The tonalities of Chopin, organised by frequency of use

Tonality	**Number of times used in Chopin's oeuvre**
A flat major	26
C sharp minor	15
A minor	15
F minor	14
C major	12
E flat major	12
C minor	12
E major	10
F major	10
G minor	10
D flat major	9
G major	9
B flat minor	8
G flat major	7
B major	7
B minor	7
E minor	7
A major	6
B flat major	6
F sharp minor	6
D major	6
F sharp major	5
E flat minor	5
G sharp minor	4
D minor	4

Conclusion: the natural position of the hands on the keyboard

A single period instrument alone cannot yield any definitive conclusions in our understanding of Chopin's works. As we have demonstrated, the width of an octave and the length of the keys was by no means fixed or standardised during Chopin's lifetime, and in any case varied from model to model and make to make. Once we accept these variances, a range of factors in Chopin's notation begins to make more sense: striking chords with large intervals (such as tenths) simultaneously would have probably been easier on a Pleyel or Graf than it would have been on an Erard (or a modern piano), and this variance is likely to have affected Chopin's notation

of arpeggiation markings across multiple genres throughout his life. A 'narrow-keyed' Pleyel would also have had clear advantages for works that *do* specify arpeggiation, too – most significantly the Etude in E minor, Op. 25 No. 5, the elastic *leggiero* left-hand chords of which are a defining part of its raison d'être. As Vogel and others have already pointed out, these narrower keyboards also make it easier to play octaves, as in the Etude in B minor, Op. 25 No. 10, the penultimate bars of the coda of the Ballade in G minor, Op. 23 or the culminating themes of the Fantasy in F minor, Op. 49.[85]

Just as it was necessary for Chopin to audit mercilessly a musical idea that came into his head at the keyboard, it would also have been necessary to test such ideas in terms of how they felt under the hand. We therefore cannot discount the possibility that keyboards themselves had a role to play in Chopin's choices of tonality: an idea heard internally in the key of C major may have naturally modulated into a tonality with more sharps and flats on a keyboard with a shorter distance between the beginning of the white and black keys. It is unlikely that the harmony of works such as the Mazurka in A minor, Op. 17 No. 4 or the Prelude in E minor, Op. 28 No. 4 were conceived rationally and deliberately away from the instrument. Much more convincing is the theory that they were crafted at the keyboard, their overarching tonalities inviting Chopin to 'find' innovative chromatic voices in the left hand and adorn the reprise of his melodies with elegant *fioriture* as the longer fingers of the hand assumed their natural position on the keys. An uncommonly keen awareness of the difficulty of hand positions without a pivot – reinforced and challenged on various different keyboards throughout his lifetime – would surely have been one of the driving motivations to write the Etude in C major, Op. 10.

As Garrick Ohlsson put it: 'Part of the genius of Chopin [...] was that he understood the sound possibilities of this developing instrument, perhaps better than anybody, and also the relationship of the human hand with this technology of keys, and what it could do.'[86] The 'technology' of Chopin's era was developing so rapidly that variances in the keyboard itself were inevitable. Alive to these subtle shifts in keyboard topography, Chopin consciously and unconsciously exploited their advantages and compensated for their weaknesses, in the process inaugurating new genres of composition. By the age of 20, Chopin had already discovered – as Heinrich Neuhaus so memorably put it – the equivalent of Columbus's egg at the piano, 'the seed of wheat which yields a thousandfold harvest'.[87] Through his discovery of the 'natural position' of the hands on the keyboard, Chopin redefined what was possible on the instrument, but only because to him how something felt at the keyboard was as important as how it sounded.

85
Vogel, 'The Warsaw Piano of Fryderyk Chopin', 100.

86
Garrick Ohlsson – New CD: NIFCCD 219, NIFCCD 049, online video, https://www.youtube.com/watch?v=wv5xe-clUFPg, accessed 23 July 2020. The American psychologist Howard Gardner writes: 'And yet, even with my focus so intently on the message, the experience of my fingers on keyboards feels like more than simply a means to a desired end. In the creation of both music and text, if I could bypass the keyboard and directly transmit mental signals to an instrument or to the computer, I would not want to do so.' See Howard Gardner, 'Keyboards', in *Evocative Objects: Things We Think With*, ed. Sherry Turkle (Cambridge: MIT Press, 2007), 49.

87
Heinrich Neuhaus, *The Art of Piano Playing*, tr. K. L. Leibovitch (London: Barrie & Jenkins, 1983), 84–85.

Appendix: Table 10. Intervals in the Etude in C major, Op. 10 No. 1

Minor 3rd	**Major 3rd**	**Perfect 4th**	**Augmented 4th / Diminished 5th**	**Perfect 5th**	**Minor 6th**
Bar 30 (x4)	Bar 32 (x4)	Bar 7 (x4)	Bar 6 (x4)	Bar 1 (x4)	Bar 5 (x4)
Bar 31 (x 4)		Bar 11 (x4)	Bar 8 (x4)	Bar 2 (x 4)	Bar 14 (x4)
		Bar 15 (x4)	Bar 12 (x4)	Bar 9 (x4)	Bar 17 (x4)
		Bar 25 (x4)	Bar 34 (x4)	Bar 10 (x4)	Bar 53 (x4)
		Bar 26 (x3)	Bar 41 (x4)	Bar 13 (x4)	Bar 62 (x4)
		Bar 27 (x4)	Bar 45 (x4)	Bar 16 (x4)	
		Bar 28 (x 4)	Bar 54 (x4)	Bar 26 (x4)	
		Bar 37 (x4)	Bar 56 (x4)	Bar 29 (x4)	
		Bar 39 (x4)	Bar 60 (x4)	Bar 33 (x4)	
		Bar 42 (x2)	Bar 69 (x1)	Bar 35 (x4)	
		Bar 43 (x2)	Bar 70 (x4)	Bar 36 (x4)	
		Bar 44 (x2)	Bar 72 (x4)	Bar 38 (x4)	
		Bar 47 (x4)	Bar 73 (x4)	Bar 40 (x4)	
		Bar 48 (x4)	Bar 74 (x4)	Bar 42 (x2)	
		Bar 55 (x4)	Bar 75 (x4)	Bar 43 (x2)	
		Bar 59 (x4)		Bar 44 (x2)	
		Bar 68 (x4)		Bar 46 (x4)	
				Bar 49 (x4)	
				Bar 50 (x4)	
				Bar 57 (x4)	
				Bar 58 (x4)	
				Bar 61 (x4)	
				Bar 67 (x4)	
				Bar 69 (x2)	
				Bar 71 (x4)	
				Bar 76 (x4)	
8 times	4 times	61 times	57 times	93 times	20 times
8 pivots	4 pivots	0 pivots	27 pivots	4 pivots	0 pivots

Major 6th	**Minor 7th**
Bar 3 (x4)	Bar 22 (x4)
Bar 4 (x4)	Bar 23 (x4)
Bar 18 (x4)	Bar 64 (x2)
Bar 19 (x4)	Bar 69 (x1)
Bar 20 (x4)	
Bar 21 (x4)	
Bar 24 (x4)	
Bar 51 (x4)	
Bar 52 (x4)	
Bar 63 (x4)	
Bar 64 (x4)	
Bar 65 (x4)	
Bar 66 (x4)	
Bar 77 (x4)	
Bar 78 (x4)	
58 times	11 times
12 pivots	1 pivot

ABSTRACT
Over the course of his 39-year life, Fryderyk Chopin discovered a new tactile relationship with the keyboard, developing a choreography for the hands that has never been equalled. Running parallel to these developments, keyboard instruments were themselves undergoing an extraordinary revolution, as manufacturers altered their designs, materials and construction processes in response to the ever-evolving tastes of composers, critics and audiences.
Chopin came into contact with pianos from all of the leading manufacturers of his era, and was keenly aware of their divergent aesthetics. For him, the piano was a compositional tool as necessary as quills and ink; the keyboard itself a crucial interface between the aural conception inside his head, its documentation on paper and its actualisation in sound.
One of the most intriguing – yet problematic – observations of one of Chopin's pianos from the early 1840s comes from the Baltic writer and amateur musician Wilhelm von Lenz, who observed the composer performing and teaching on a 'light-touch, narrow-keyed, Pleyel'. The evidence to support Lenz's observation has, thus far, been largely anecdotal, yet today, almost all pianos of Chopin's time are assumed to have narrower keys than their modern counterparts, despite a lack of empirical evidence.
By comparing the key measurements of instruments associated with the composer with other examples from their time, this essay contemplates the extent to which the ergonomics of the keyboard changed over Chopin's lifetime, and offers some preliminary conclusions of causality between instrument, compositional process and notation.

KEYWORDS
Fryderyk Chopin, Wilhelm von Lenz, Pleyel, Erard, Graf, Broadwood, nineteenth-century pianos, keyboards, ergonomics, arpeggiation, legato

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