Triads, Major and Minor

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A few words on Tonality

In this lecture course we are going to talk about the musical system that has dominated Western music since the 17th century. This is the system that has gone global over the course of the past century, enabled by recording and broadcasting technology and adopted because it pleased people of all nationalities. The concept of tonality is complex, and a formal definition is not our concern here, so suffice it to say that it is a system of relationships between chords, where, following particular rules, one chord is given greatest importance, another secondary importance, and beyond these, the others have their own subsidiary uses. As to the nature of these "chords", let us come back to that in a moment.

Every note can form a "key" – you will see on programme notes, for instance, that Mozart's Jupiter Symphony is in C, or Beethoven's Eroica Symphony is in Eb. Each key has its own "scale", which consists of the six other notes that will be used to form the main chords of the key. A scale can be sung or played by moving up to each successive note, as in "do-re-mi-fa-so-la-ti-do". Instead of "do-re-mi", the notes are often given numbers, with the note of the key, do, taken as 1, the next note, re, as 2 and so on, until we reach note 7. Now here is where chords come in. Instead of playing each successive note of the scale, we can play note 1, skip a note and play note 3, skip another note and play note 5. Together, these notes form a chord, and since we started on note 1, this particular chord is the most important chord in the key (as I mentioned earlier), and we call this the "tonic" chord. We can find other chords in the same way, playing alternate notes: 2,4,6 or 3,5,7 and so on.

Now scales turn up in most musical cultures of the world, and there is an unbroken chain of writings about them dating back to Ancient Greece. But they go much further back: there is even a bone flute dating back to a Neanderthal community of 60-thousand years ago, with finger holes that allow a familiar scale to be produced. So the emergence of musical scales was prehistoric, and they were most likely discovered independently in different parts of the world. Chords, however, are by comparison a very modern concept, and their emergence seems to have occurred in just one region of the world, namely, Western Europe.

How did chords emerge, then? The story is a complicated mixture of trial-and-error processes of musicians, the systematic thinking of music theorists, the mathematics and physics of strings and pipes used in musical instruments, the notation and printing of music, and even some theological and philosophical ideas. But for our purposes, we can just make a quick survey of the terrain.

The Birth of Chords

Was there a particular year when a musician invented the chord, in the same way that we can assign a date to the invention of the steam engine or the aeroplane? Unfortunately not, for reasons that will soon become clear. In Western Europe of the late first millennium, Church musicians began to experiment with the combination of voices singing different notes (and words) at the same time. While the results were often interesting, it was not until about 1300 that a full system was formulated, and this proved so robust that it has continued through to the present day, although with many tweaks along the way. The first music to use this system did indeed spend most of its time forming three-note chords along the lines we have described, so why can we not simply say that this was when chords emerged? The problem is that chords were not what the composers of the time had in mind – they were not unaware of the sound of the chords, obviously enough, but their focus was on the melodic lines they were combining. If a musician were to time-travel back to the 1300s and start pointing out chords, the medieval musicians would have failed to see why a mere time-slice of their music should be of any particular interest in itself – for them, what we think of as chords were simply the by-products of more interesting things. Even in the late 1400s, we find Josquin, probably the earliest composer whose name is known to ordinary music lovers today, still writing pieces that are animated by glorious combinations of melodies, but which often seem hopelessly drab if we only want to listen for a succession of chords.

So instead of looking for the moment when chords were invented, we need to look for **a broader time period when musicians began to talk explicitly about chords, and began to shape their music around successions of chords**, rather than as combinations of melodies that just happened to produce chords along the way. If we look at a modern musical score of a piece, the notation moves horizontally from left to right through time. If we draw a vertical at some random point, then we are taking a time slice of the music, and all the musical events starting (or continuing) on that line will be heard simultaneously in any performance of the piece. So the interest of musicians in the 1300s and 1400s was concentrated on the horizontal aspect (in our term), whereas the recasting of music as a succession of chords brought the vertical aspect to the fore. At neither time, though, was the other aspect forgotten – it was simply subordinate to the main task.

It was during the 1500s when musicians began to switch their thinking from the horizontal to the vertical. We will look at three reasons behind the change, but it should be said that even in combination, these only made the change likely, not certain – the accumulated personal choices of a great many musicians were decisive. The first reason I will look at is the easiest to grasp, since it calls upon no music theory. The impetus here was external: it came **from a desire to make words more clearly audible** to listeners. For the modern listener, the elaborate combination of melodies in music of the 1300s and 1400s makes the text difficult or impossible to discern. Sometimes two texts were sung simultaneously, but even when there was only a single text, each voice delivered the words at different times. The popular explanation is that the singing was being offered to God, not to man, and so human comprehension was not a problem. But there is a strong reason on a purely human level, which was that the texts were from the Latin liturgy, and everyone who could understand the Latin knew which text was being sung at which point; the texts, moreover, were highly familiar or even committed to memory.

In the 1500s, all of this changed in the regions where Protestantism took hold: the new vernacular texts were familiar to no-one at first, whether they were translations from the Latin liturgy or original compositions. There was also a strong tendency towards music that was simple enough to be sung by the laity, and not just clerics and professional choristers. For the sake of both simplicity and comprehensibility, the independence of the several melodic lines had to be abandoned, and instead, all the voices usually moved to their next note at the same time, allowing the words to be distinguished clearly. There are many examples in the metrical psalm translations set to music in Geneva and other centres of Calvinism, which eventually became the model for new hymns in most strands of Protestantism. Even in Catholicism, there was agreement that the audibility of the texts was desirable, and so there was some streamlining of liturgical music here as well. It could still be argued, in response, that there was nothing to stop Protestants from singing a single-line melody, where the words were bound to be clear; this was the case with Luther's original chorale melodies, but they, too, were soon given chordal arrangements. There was a parallel tendency in the Italian genre of

the madrigal, which were generally settings of secular poetry in the vernacular. Since the texts generally lacked the familiarity of the Latin liturgy, it was again desirable to make them clear to the listener, and composers began to tailor passages very precisely to the text, an approach known as word-painting. As with Protestant music, this necessitated a turn to the vertical dimension.

The second reason is purely musical, stemming from tendencies that arose in the 1400s and peaked in the 1500s, namely, the addition of extra voices. The music that arose from the rules formulated around 1300 was almost entirely in two or three voices. In the second half of the 1400s, four-voice writing became normal, and the number of voices steadily increased during the first half of the 1500s (although it was always possible to return to a smaller number of voices for sections, or for whole pieces). The problem with five, six or seven voices is that the number of possible combinations is severely reduced. From 1300 onwards, there were strict rules governing the combination of the lowest voice with each of the voices above, and looser rules governing the combinations that could arise between the various upper voices. The combinations themselves did not just form sweet-sounding chords, but also included further rules for incorporating dissonances. Every extra voice added must follow these same rules, but instead of any kind of compositional freedom, the main task is to avoid any infringement of the rules, like trying to move on a congested board in the middle of a game of chess. As early as 1523, the Italian composer and theorist Pietro Aaron expresses the problem and tells us that the solution lay in a shift towards vertical thinking:

> In writing first the top voice or soprano and then the tenor, a place is often lacking for the bass when this tenor is finished, and when the bass is finished many notes of the alto can find no place ... Hence modern composers are thought to be better at this, as is evident in compositions written for four, five, six, and more voices in which each voice has a comfortable, easy, and pleasant place because **modern composers consider all the voice parts together** and not one after the other as mentioned above.

It seems obvious to musicians today that we should consider each simultaneous combination of all the voices – the chords, that is (once the dissonances have been stripped away). But it only became obvious thanks to a major innovation in music notation that took root in the early 1600s, which was to scrap the complicated compound symbols that stood for several notes, and instead give each note an individual symbol. The purpose of this was not merely simplification: for the first time, it allowed the voices to be stacked together one above the other. The result was given the name “score” (or “partitura” in Italian). Only a musician acquainted with this modern notational system can speak of a “vertical” aspect to music. Prior to these changes, each voice was written out separately, and composers had to exercise their memories to ensure that all the combinations observed the rules (since the music divides into sections of moderate length, the memorisation task was very demanding, but not superhuman).

In the second half of the century, another change was gradually taking place that would help to bring the vertical dimension to the fore. The Lutheran musician Lucas Osiander is here pondering the options for adding other voices to Luther’s single-voice chorale melodies:

> I know well that as a rule, the composer usually places the chorale in the tenor. But when that is done, the chorale is unrecognizable under the other voices. Then the common man cannot understand what sort of Psalm it is, and cannot sing along. Therefore I have placed the chorale in the top voice so that it is truly recognizable and every amateur can sing along.
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> But all composers understand how difficult it is to compose such a piece of several voices where we must keep within the boundaries of the top-voice chorale melody and … the bass … like keeping between two ditches in a street, but none the less desirous of perfect consonances.

The tradition dating back even before the 1300 watershed placed the chant melody in the lowest voice, called the “tenor”. In the late 1400s, when four-voice writing became normal, the extra voice, called the “bass”, was

placed below the tenor. But from the 1600s to the present day, the normal procedure is to put the main melody at the top of the musical texture, and fill in suitable chords beneath. In this new system, chords were constructed from the bass upwards, so that the harmonisation of a given melody would start from the bass and then fill in the middle voices (musicians often retain the term “voices” even when they refer to lines played on instruments). Most musicians today would find it strange that Osiander even had a problem, but in the context of his own musical environment, we can see that he was straining to reconceive the roles of the different voices in a way that departed from centuries-old norms.

The fourth reason for the emergence of chords stems from instrumental music rather than vocal music, and from improvisation rather than composition. The source in question was the strumming of a guitar – “rasguear” in the original Spanish. While the *rasgueado* technique emerged earlier, a treatise of 1596 is our most important source for the move towards a chordal conceptualisation of music. The author of this treatise on guitar playing was the Catalan doctor and musician Joan Carles Amat, who presented a table of all the chords customarily played on the guitar. As with much writing for instruments of the time, he did not use the notation of singers, but rather a “tablature”, which directly represents the positions of the fingers on the strings, and only indirectly represents the sound produced. This was much the same notational system as guitar “tabs” of today – the internet of today offers tabs for nearly every popular song ever recorded. He showed that there were twenty-four such chords, and although we do not need to worry about this yet, some of you may have guessed that these are the twelve major and twelve minor triads. Amat, the author of the treatise, tells his readers that these chords are like "the colours of the painter, with which one can mix together in any manner”. In the decades following the publication of Amat’s treatise, the guitar music of Spain travelled across Europe with great success:

> [The Spanish guitars] have conspired to banish the lute altogether. In this they have succeeded, just as the Spanish fashion in clothes prevails over all other fashions in Italy.
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> Giustiniani, 1628

While many today see Spain as an outlier on the western fringes of European culture, it was, for centuries, it was the centre of an empire stretching over a large part of Europe (not to mention the Americas). In particular, much of present-day Italy belonged to the Spanish crown in the period of the guitar’s ascendency.

The Major Triad

Let us look now at the distinction between consonances and dissonances. Consonances were formed by two notes that seemed to blend together well – the reasons were theorised by the Ancient Greeks, and this knowledge was part of the normal schooling of medieval musicians in the Church. The completion of the explanation had to await developments in mathematics and physics in the 1600s and 1800s, but the musicians’ intuitions were borne out. A dissonance was the opposite: a combination of notes that did not blend. The smoothest consonance is the octave, produced for example, by two strings where the lower note is produced by a string double the length of the other – we call this the frequency ratio 2/1. The smoothness is such that musicians give the same name to both notes. When men and women sing the same melody, for example, the women will generally sing an octave higher than the men – but at every moment, the notes will have the same name, and the listener will not perceive the result as a combination of two different melodies. The fifth, with the frequency ratio 3/2 is not quite so perfect a blend: it is usually heard as two notes, but some will mistake it for a single note, and in the singing of a large group, those whose voices are suited neither to the lower nor the higher octave will unwittingly gravitate to the fifth above the lower note.

The major third was problematic at first, considered neither quite a consonance nor quite a dissonance, although its status gradually progressed towards inclusion in the consonances, as we shall see. In the 1300s, the third was still derived from a series of fifths, resulting in the ratio 81/64 (the high numbers in themselves

indicate the lack of smoothness in the sound). It was known first as an “imperfect dissonance” which meant that it was not so dissonant as to require the additional rules that governed the use of full dissonances. Later in the century, it was relabelled as an “imperfect consonance”; there was no change in the use of the interval by composers, but the new name hinted at subsequent developments. It was only in the 1400s, as we know from writings on keyboard tuning systems, that the low-numbered ratio 5/4 was adopted as the correct tuning for a now much smoother sounding third, and by this stage, composers did begin to find new uses for the interval, placing it in contexts where only the octave and the fifth would previously have been considered suitable.

In 1558, the Italian music theorist Gioseffo Zarlino wrote:

> …in perfect composition, as I will explain elsewhere, the third and fifth (or their octave duplications) must in fact be present at all times…

Previously, sections or whole pieces had ended on an octave, or an octave and a fifth. But now, halfway through the 1500s, the third could be added to the final sonority, and indeed, Zarlino thought that it *should* be added. A little later, the establishment of this sonority as fully legitimate – not only in the middle of proceedings, but as the final word – invited the application of a theological metaphor:

> For God has also portrayed the Holy Trinity to some extent in the music, in that no more than three voices can be found or contrived which rightly sound together.
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> – Lucas Osiander, 1580s

A few decades later another German theorist, Johannes Lippius, named the sonority the “trias harmonica perfecta” (perfect harmonic triad) in his treatise of 1612, again associating this entity with the Trinity of Christian theology. The lowest note he associated with God the Father. It was quite normal at the time to make these theological associations in fast advancing sciences, such as astronomy and mathematics – it was not a peculiar habit of music theorists.

Just as the major triad established itself as central in the musical practice of the 1600s, new developments in mathematics added a further justification. In 1636, the polymath Marin Mersenne published his work on the vibration of strings. Mersenne found that a plucked (or bowed) string did not merely vibrate at one frequency, but at several. These additional frequencies, he demonstrated, were in the proportions of the harmonic series: that is, the main vibration was doubled in the second vibration, tripled in the next vibration, quadrupled in the next and so on. The fourth, fifth and sixth of these vibrations produced a major triad (the first, second and third produced notes of the same name at a lower pitch):

> The order of the Consonances is natural, and ... the way we count them, starting from unity up to the number six and beyond is founded in nature.

This association of the major triad with nature has remained very strong, and perhaps the most famous example of its symbolic use is the beginning of Wagner’s majestic four-opera cycle *The Ring of the Nibelungs*. In the orchestral prelude to the first opera, *Das Rheingold*, where the River Rhine is depicted, a single chord, an E-flat major triad is held for 136 bars (about 4’15”). This was, at the time, an astonishing thing to do, because normally chords change every few seconds. Wagner later wrote a mythologising account of how he came up with this effect:

> Returning home in the afternoon, I stretched out dead-tired on a hard sofa, to await the long-desired hour of sleep. It did not come; instead I sank into a sort of somnolent state, in which I suddenly felt as if I were sinking in rapidly flowing water. Its rushing soon represented itself to me as the musical

> sound of the E-flat major chord, which continually surged forward in a figured arpeggiation; these arpeggios appeared as melodic figurations of increasing motion, yet the pure E-flat major triad never changed, and seemed through its persistence to impart infinite significance to the element in which I was sinking. Feeling as though the waves were now roaring high above me, I awoke in sudden terror from my half-sleep.

In this example, Wagner starts with a single note in the deep basses, then adds a fifth over it, then a third, and weaves further melodic patterns over the triad. It is as if a universe is created from nothing.

In the prelude to one of his earlier operas, *Lohengrin*, the major triad appears, on the contrary, in a very high register and held there for a while for us to admire its celestial sonority. This is to symbolise the first glimpse of Lohengrin, the saviour knight. As the vision is realised, the triad becomes more material in lower registers.

The Minor Triad

We have already mentioned Zarlino, the theorist who told us, in the middle of the 16th century, that triads, as we call them, should be used pervasively. He mentions two types of triads, the “major” and the “minor”. The outer voices forming the triad stood a fifth apart. The voice in the middle would divide the fifth up into a major third and a minor third. The kind of third formed by the lower two notes gives its name, major or minor, to the whole triad. These two kinds of triad could be formed on any available note, giving twelve major and twelve minor triads, as in the twenty-four chords listed in the guitar treatise mentioned earlier. But while the major triad, as we saw, can be derived easily from the harmonic series of acoustics, the minor triad cannot. Mathematically, we can find one formed by harmonics 10, 12 and 15, but these harmonics are either absent or very weak in actual musical sounds, so the mathematical relationship has no bearing on our perceptions (even worse, the lowest frequency of the harmonic series has a different note name from the lowest note of the minor triad, so it cannot blend in the way that the major triad does). Composers intuitively grasped the relative artificiality of the minor triad, and we find that pieces of the 1600s and 1800s that have minor tonality nevertheless end on a major triad (so a piece in C minor, for example, will end on a C-major triad).

For over a century after the system of major and minor tonality emerged, neither had accrued any clear associations with particular emotions. There was indeed an operatic convention for laments, but this called upon “chromaticism”, i.e. the use of notes outside of any given key. The German music theorist Mattheson, for example, writing in 1713, presents a different emotional state in association with each of the twenty-four keys, instead of one emotion for major and another for minor. Admittedly, musicians of his day were not hearing keys as we hear them today, for the entirely concrete reason that their keyboard tunings gave each key its own subtly distinctive sound, whereas in modern tuning, widely accepted since the mid-1800s, these difference in tuning disappear (that is, all twelve majors sound the same as each other, and all twelve minors likewise). There were also only certain keys in which some of the wind instruments could play, and this was also a likely influence on Mattheson’s associations. He tells us that C major is “suited to rejoicing and other occasions where joy is in full scope”, while B major has an “offensive, hard, unpleasant, and also somewhat desperate character”. He warns against using G major for expressions of love, because it conveys simple merriment rather than any tenderness. The theorist Johann Heinichen, writing in 1728, has different opinions on these matters. He tells us that “we have heard famous composers write the saddest and tenderest of music in D, A and B-flat major; while in A, E and C minor ... [they write their] most powerful and brilliant music. It remains the case, therefore, that every single key ... without distinction [is] suited to the expression of many opposing emotional states”. The fact that he picks out major keys for sadness and minor keys for brilliance, suggests, however, that he is writing here as a contrarian, aware of a developing consensus that found quite the opposite in the major-minor distinction.

When we turn from theorists to composers, we can find a distinction between major/happy and minor/sad in Vivaldi’s *Four Seasons*, preceding Heinichen by just a few years. In the Winter concerto, for example, the first movement, in the minor, portrays the bitter cold outdoors, but the slow movement, in the major, takes us into the warmth indoors; the finale then presents a cold wind in the minor and a warm wind in the major. The keys of the Summer concerto work in a similar way – the outer movements are in the major when the heat

is comfortable, but a shepherd trying to find shelter from the oppressive noonday sun is given a minor key in the middle movement (the correlation is not with temperature itself, but with the pleasure or displeasure that it brings about). Vivaldi made much use of minor keys during his career: not only is the main key minor in about 40% of his pieces, but where the main key was major, the slow movement was normally minor. This means that almost all his pieces had at least one minor-key movement. This ubiquity of minor keys across pieces was quite normal for the time.

How strange it is, then, that just a few decades later, the major is everywhere, and minor a rarity. In the era of Haydn and Mozart, we find that only 2-7% of symphonies are in a minor key (depending on the year and place). What could explain this enormous and rapid shift? Some of the arguments we have already seen are pursued with vigour by theorists. Jean-Jacques Rousseau wrote in 1768 that "the minor mode is not given by Nature; it is discovered only by analogy and inversion". Given the importance of the concept of Nature in Rousseau's writings, minor keys are clearly not a good thing in his opinion. Johann Philipp Kirnberger, in 1779, claims that music in the minor is less complete and "appropriate for the expression of sad, doubtful sentiments, for hesitation and indecision". Bernard Germain de Lacépède argued that minor keys are marked by "impaired consonances" which leave the listener dissatisfied and unsettled. This is a serious disincentive to their use: not only do minor keys sound unstable, but they can destabilise the listener, leading, potentially, to personal and social problems (Plato had once made just such an argument for banning certain Greek scales).

For this reason, minor-key pieces by Haydn or Mozart are always exceptions, with some special feature or motivation, and likely to carry titles. Haydn's famous "Farewell" Symphony (No. 45, 1772) exemplifies all these elements: aside from the title, it is in the unusual key of F# minor, it was supposedly motivated by a dispute between the orchestra and its noble employer; at the end of the finale, the musicians leave one by one (blowing out the candles by their music stands).

Opera was a great source of musical associations, and by the mid-1700s, whenever there was a storm scene or a scene with supernatural characters, minor keys predominated. In Gluck's opera "Orfeo" (1762), for example, the supernatural Furies are given an exciting scene that is largely in the minor. But the modern associations for major and minor had not yet settled into place, and Orfeo laments the loss of his wife in a beautiful aria that is set in a major key. A century later, this struck the music critic Eduard Hanslick as a misjudgement:

> Whenever Orpheus sings "Che farò senza Euridice", he moves thousands to tears (including Rousseau). Boyé, a contemporary of Gluck's, remarked that one could just as well set words of opposite meaning to the same melody, and perhaps they would then be more faithful to the melody ...
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> We are left quite unconvinced that the composer can be absolved in this instance, since music possesses specific tones for the expression of passionate grief.

But Gluck was the pre-eminent operatic composer of his day, and did not make blunders. We can only conclude that the use of a major key for noble suffering was still possible in the 1760s for Gluck, although Boyé's comment registers the fact that there was a trend in progress that would favour the minor in such situations. But by the 1860s, Hanslick wonders how anyone could ever give a major-key aria to the grieving Orfeo.

The watershed came with Beethoven, who chose minor keys for many of his major works. Perhaps the most unforgettable opening chord in the whole musical literature is the startling seven-note C-minor chord slammed down in the piano's low register in Beethoven's *Pathétique* Sonata. As Beethoven intuited, and as science has since demonstrated, the use of small intervals at the lower end of the piano is troubling to the listener, because the apparatus of the inner ear is ill-equipped to distinguish the notes from each other. This was not a misjudgement, of course – Beethoven was trying to shock his listeners, and by contemporary accounts, he succeeded. In terms of the aesthetic theorising of his times, he would often leave beauty behind

and attempt to explore the sublime in his music – the realm of awe-inspiring or even terrifying phenomena. For all the riches of Haydn and Mozart that Beethoven had inherited, this was new territory for music. Haydn even asked the young Beethoven to suppress the stormy C minor Piano Trio in his Opus 1, because he thought that it would be too much for the public. Surveying Beethoven's major instrumental works – the symphonies, string quartets, piano sonatas and chamber pieces with piano – we find that a little a quarter have a minor key as their main tonality, and the proportion is higher if we go down to the level of individual movements. This is still lower than nearly a half, as we find a century earlier, but it was an enormous increase on the generations of Haydn and Mozart. It was also more significant than the high proportion in the early 1700s, because back then, the minor was neutral, whereas now, it indeed tied to negative emotions, and in many cases, Beethoven's intention was not so much to depict those emotions as to induce them in the audience.

Together with the greater use of the minor, the heightening of emotion and the departure from conventions of musical beauty, Beethoven also added drama to his instrumental works, as if a stage play was compressed from three hours to thirty minutes. All of these developments or innovations allowed Beethoven to create a narrative form that led from travails through immense struggle to a final victory against the odds. At the core of the musical realisation of the narrative was the passage from minor to major. The best-known example is the Fifth Symphony, in C minor. The narrative crosses the whole four-movement form, but the breakthrough occurs when the minor-key Scherzo, first grimly determined and later eerie, is ready to come to a close, but instead moves into a mysterious additional passage that builds up enormous tension that reaches a glorious climax in a blaze of C major, which is the moment when the jubilant finale begins. During the build-up, all the notes of the scale that make it minor are changed, one by one, to the major.

Schubert's career largely overlaps with Beethoven's, and he idolised his older contemporary, but even so, his artistry led him in a different direction, with shows up in his handling of the major and minor contrast. In Schubert, major and minor often alternate, not to create Beethovenian dramatic tension, but with a casualness that is quite the opposite – as if the sun is disappearing for a moment behind a cloud and then re-emerging, remote from tragedy and triumph. Among his well-known Impromptus of 1827, Op. 90 No. 2 moves from major to minor, while no. 4 moves from minor to major, not to enact a Beethovenian drama, but as the final point in a series of alternations between major and minor, decided on a whim. If the endings had been the other way round, the result would not strike the listener as surprising.

Notice that in all the forgoing discussion of major and minor, we have been talking about keys, rather than just individual chords. Without immersing ourselves in technical details, we can say, briefly, that the main chord (the "tonic") in a major key is a major chord, while the tonic of a minor key is a minor chord. But as we saw at the beginning, we can produce six more chords from the scale of a given key, and it is important to note some of these other chords, will be major and some minor. A major key will use some minor chords and vice versa. In a major key, the third most common chord, for example, is normally one of the minor chords (chord II, for those who have some knowledge of these things). Prokofiev, as a kind of compositional stunt that he pulled off beautifully, wrote a whole movement in a major key without using a single minor chord – this was the finale of his First Symphony which was to express an untrammelled joy. It is arguable whether it is even possible to do the reverse: to write a piece that clearly establishes a minor key piece without using any major chords. The difference stems from a crucial technical obstacle that we will discuss next time. For what it is worth, Prokofiev tried to achieve this in the introduction to the "Field of the Dead" scene in Alexander Nevsky, again for expressive reasons – in this case, to create the most sombre music imaginable. There is a piano piece by Ernő Dohnányi that uses all the twelve minor triads and only those, but it was a virtuoso exercise intended for the conservatoire practice room rather than the concert hall, and it is only a concatenation of chords rather than anything that amounts to a particular minor key.

My final example comes from one of Scriabin's late preludes (op. 74 No. 4), in which he uses a chord with both major and minor thirds. In the context of Scriabin's work, we can judge that this was not an attempt to create a bittersweet chord, but part of his ongoing experiments with new ways of combining pitches. The results of his experiments are too remote from tradition to evoke any clear emotional associations – their unfamiliarity gives them a vague air of mystery and unease.

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