THE MUSICAL HUMAN

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PART ONE

LIFE

CHAPTER 1
VOYAGER

Imagine that several billion years from now, possibly long after Earth has been consumed by the Sun, aliens open the *Voyager 1* space probe launched forty years ago by NASA and listen to the Golden Record, packed with twenty-seven samples of Earth's music, as well as greetings in fifty-one languages (see **Figure 1.1**).[1] Assuming our aliens could decipher the hieroglyphic operating instructions etched on the metal disc, they could choose from a mind-boggling array of sounds: Bach's *Brandenburg* Concerto No. 2, court gamelan from Java, percussion from Senegal, 'Johnny B. Goode' by Chuck Berry, Beethoven's Fifth Symphony, pan pipes from the Solomon Islands and much more. What might these aliens say? The comedian Steve Martin quipped that an extraterrestrial message had been intercepted and decoded: 'Send more Chuck Berry!'[2] It is rather more likely that we will never know. But the sobering lesson of this thought experiment is that it knocks musical heads together and puts into perspective music's petty territorial squabbles. Viewed from an interstellar distance, Earth may not have a single musical language – just as it is unlikely that there is a single alien language. But we can discern that there very well might be something irreducibly *human* about all the music of the Earth. Imagining human culture from the perspective of a non-human species can be salutary. The philosopher Thomas Nagel did that for our theory of consciousness with a famous essay called 'What is it like to be a bat?'[3] What can aliens tell us about what it is like to be a musical human?

Figure 1.1 Voyager 1 and the Golden Record

Put Beethoven, Duke Ellington and Nusrat Fateh Ali Khan, the king of Qawwali (see **Figure 1.2**), in a bar, buy them a drink, and ask them where music came from. Their answers would not be as far apart as you might think. It doesn't mean anything if it doesn't swing, says Ellington. 'From the heart, may it go to the heart,' answers Beethoven. According to Khan, 'One must be willing to release one's mind and soul from one's body to achieve ecstasy through music.'[4] They are saying that music is about life, emotion and the spirit. That what pours out of music can't be pinned down to the notes. That music is essentially human, and that it makes us human.

Figure 1.2 Nusrat Fateh Ali Khan

Music is linked to our origins as a species. So it is irresistible to write a big and bold account, a 'big history'. Such a history would go deeper than the usual story of who wrote what and when (Bach, 1685–1750; wrote the *St Matthew Passion* in 1730). It would be a party to which all are invited: King David with his lyre and the composers of the psalms; Pythagoras; Lucy the australopithecine; singing apes and dancing parrots. It would begin with the cosmic music of the spheres and how simple organisms flinch to sounds. It would take in the protomusical languages of early *Homo sapiens*, and ask what marks them apart from birdsong or the calls of gibbons. It would track the dissemination and parallel development of musics around the planet, and focus on how and why Western music splintered off as a law unto itself, not as an inevitable triumph, but with consequences both good and bad. One consequence, for instance, is that Western music operated within the vehicle of white supremacy.

An evolution of music is an exciting prospect. But it hits one roadblock after another. There is no recorded music before

1877, when Edison invented his phonograph. Musical works exist, at a stretch, no earlier than AD 800. The earliest Greek music notation is 500 BC. Before then, nothing and silence. Music historians can only look with envy at the archaeologists working with relics and fossils. Music doesn't have any fossils, other than the odd bone flute discovered in ancient caves. A description of the evolution of music from physical objects would be *Hamlet* without the Prince, times ten. The rest is silence indeed.

Some Preliminaries

Luckily, the prospect is actually a lot more promising than it seems. But first, let's consider some preliminary limitations. It feels self-evident that there has been music for as long as there have been people, so writing its evolution might seem straightforward. The elephant – or woolly mammoth – in the room is that, for nearly the entirety of its existence, we have no idea what music sounded like. The first ever sound recording of a piece of music was a scratchy and unidentified twenty-three-second cornet solo, made on a phonograph in 1878 at St Louis in the US.[5] Before then, we have to make do with signs on paper called scores. We like to pretend that we agree how to reproduce these signs into sounds. But the reality is that performance practice is built on a rickety edifice of conventions. The institutions that are Radio 3's *Record Review* or *Building a Library* are founded on the assumptions that no two versions of a work sound alike. Performance practice is always changing. The liberties opera singers took in the early twentieth century, such as *portamento*, make us laugh today (*portamento* is when the singer slides from note to note like a trombone).[6] If you line up recordings of Tchaikovsky's *Pathétique* Symphony from Serge Koussevitzky in 1930 to Sir Simon Rattle today, then they are getting faster.[7] Tchaikovsky is getting faster. The choirs at St John's and King's College in Cambridge pride themselves on having unique sounds, shaped in part by the

distinctive acoustics of the two chapels. If you walk across Cambridge from one evensong to another, you will get a different experience, even when the choirs are singing the same pieces.

The situation gets more desperate once you consider how much, or how little, the musical score tells you. Let's begin our timeline in 1786, when Mozart composed a wonderful piano concerto in A major, K. 488. And for the sake of argument, let's pretend that the score handed down to us is a more or less accurate representation of the sounds the audience heard in Vienna during one of the subscription concerts Mozart himself performed during the spring of that year (overlooking the fact that Mozart doubtless would have 'jazzed up' his piano part, like a modern improviser).[8] Now, let's reverse-engineer music history, going back as far as we can. We'll do this by watching the signs of musical scores melt away one by one until there is nothing left.

300 years ago

Robinson Crusoe is published in 1719. Jean-Antoine Watteau paints *The Pleasures of Love* the same year. Bach completes book one of the *Well-Tempered Clavier* in 1722. The score shows us melody, harmony and rhythm. But we don't know how loudly or how fast the music was played. The C-major prelude that begins the set is nowadays performed either softly, piano, or more confidently, forte, at all manner of speeds. The signs of tempo and dynamics have fallen off the map.

500 years ago

Michelangelo begins painting the Sistine Chapel ceiling in 1508. He writes a sequence of sonnets to his lover, Tommaso dei Cavalieri, in 1509. During his sojourn in Ferrara in 1505, the great Flemish composer, Josquin des Prez, writes a mass in honour of its ruler, Duke Ercole d'Este I, his *Missa Hercules*

dux Ferrariae. Not only are there no indications of loudness or speed, Josquin doesn't notate legato or staccato expression – how smoothly or sharply notes are to be sung. Expression has fallen off the map.

800 years ago

The first Gothic cathedrals. Cimabue's crucifix, 1287. In 1250, Hildegard of Bingen, abbess of a nunnery at Rupertsberg, theologian, composer, poet and inventor of German botany, writes both the words and the music of her liturgical drama, the *Ordo Virtutum*. These chants have no harmony, no rhythm, no tempo, no dynamics, no expression, just pitches. We don't even know whether the nuns sang these chants solo or together as a group. Nearly everything has fallen off the map.

1,700 years ago

Saint Augustine completes his *Confessions* in AD 400. A champion of music, Augustine writes: 'Do not seek for words, as though you could explain what God delights in. Sing in jubilation.'[9] We have no idea what music Augustine heard, and need to wait until the ninth century AD for the earliest chant notation. Written as wavy lines above the text, this 'neumatic' notation indicates the contour of a note, not the exact pitch. It is a descendant of the Masoretic accents (*ta'amim*) of Jewish biblical cantillation in the reciting of the Torah. It is really a mnemonic, jogging the memory of readers who would already have known the melody. Pitch, the last parameter left on music's map, is gone. Also dead is the idea of individual authorship. We are used to crediting music to human beings with a name. But this music is an orphan. It is fitting that the idea of the composer goes down with the ship of music.

2,000 years ago

We are not finished yet, for music has a ghostly proto-life. The ancient Greeks devised an elaborate theory of music, and invented types of musical scale we still use today, such as the Dorian, Aeolian and Lydian modes. We can be sure that their world was full of music. Yet very little of this music survives in a notation that can be deciphered. The contrast with the temples, statues and tragic drama of the ancient world is stark. Where is the musical equivalent of the Parthenon? Of Sophocles' *Theban Trilogy*? A poignant counterexample is the great Alexander Mosaic, preserved in the Naples National Archaeological Museum. A copy of an early third-century BC Hellenistic painting, this vital, vivid depiction of the battle between Alexander the Great and Darius gives the lie to the myth that realism in art had to wait until the Italian Renaissance. Painters and poets could represent the human long before that. So why not in music? Or, if the musical human *was* around in ancient times, why has the proof vanished? An ancient world flooded with sculptures, temples, poems and plays would presumably have resounded with music too. But from where we stand today, there is a deafening silence.

Pushing right back, the endgames of recorded human art are the period 4,000 years ago, the time of *The Epic of Gilgamesh*, the earliest known narrative poem, and then a ten-fold leap back of 40,000 years or more to the first cave paintings, such as in the Lubang Jeriji Saléh cave in Borneo (which contains, at time of writing, the oldest known figurative painting we have, a picture of a bull). We have literature, we have painting, but no music. It is relatively easy for a modern reader to identify with the adventures of the 4,000-year-old Sumerian demigod described in *The Epic of Gilgamesh*. Yet we know that the epic was originally sung, and although there is an imaginative reconstruction of the music by Peter Pringle, the Canadian singer-songwriter, who accompanies himself singing in ancient Sumerian on a three-string 'gishgudi' lute, there is no way of evaluating its accuracy.[10] Similarly, it is probable that the ancient caves were sites of music-making because of their

acoustic properties. A French archaeologist called Igor Reznikoff proposed that the paintings clustered at points of maximum resonance in the caves. Next to the paintings were discovered shards of bone flutes.[11]

The lack of a material record should not be mistaken for a lack of music; pessimism is unwarranted. We can be almost certain that the ancient world had music. The curvature of caves amplified sound on similar acoustic principles to the vaulted ceilings of churches and cathedrals, which are essentially modern caves for praising a god through music. And while music may not have fossils, it wrapped itself around the bones of ancient technologies and rituals. Most promisingly, half of the musical human lies in us, in the structure of cognition and in the musical practices it supports. We haven't changed that much since, to most intents and purposes, *Homo sapiens* became fully evolved 40,000 years ago, at the same time as recorded art. The idea that evolutionary modernity happened forty millennia ago is bracing; it relegates modern history to footnotes. If we can hear through the surface differences, we can extrapolate a great deal from where we are today.

The Big Idea

The present book moves progressively back in time, reverse-engineering music from the musical human in the early twenty-first century, through the several thousand years of recorded human history, fanning out more speculatively to prehistory and the prehuman music of animals. It is in three parts, counterpointing three timelines a little like Christopher Nolan's film *Dunkirk*, which tells its story simultaneously as a week, a day and a single hour. The first timeline is a human lifespan. I explore the many ways music is interwoven with life from the sounds in the womb to old age. The second timeline is music in world history. The third and broadest timeline is evolutionary.

We expect histories to move from left to right, from past to future, so why have I chosen to do the opposite? We have no

choice, given that virtually everything we can know about music's deep history is an extrapolation from the present. This is the first strand of my argument. The second strand is that everything happens three times, in a recurrent act of rejecting music's nature. The musical human's original sin is turning away from animal music. This is re-enacted, aeons of time later, in the peculiar fate of European music, in its turn towards abstraction. And the rejection of nature is performed in the microcosm of a Western lifespan, in the betrayal of our musical birthright in favour of passive listening. We are all born with the capacity to be active musicians. Very few of us end up actively participating in music-making. Why is that?

The hoary idea that life repeats history, or that 'ontogeny recapitulates phylogeny', according to the nineteenth-century biologist Ernst Haeckel, was once consigned to the dustbin of history.[12] Psychologists of musical emotion have gingerly picked this idea out of the dustbin. For instance, it is now believed that the human embryo acquires emotional sensitivity in the same order as animal evolution. It develops brainstem reflex first, a crude reaction to extreme or rapidly changing acoustic signals. This is something that simple organisms do. The embryo next learns to associate sounds with negative or positive outcomes. Such 'evaluative conditioning' is achieved by reptiles. Mammalian understanding of basic emotions (such as fear, anger or happiness) is acquired by a newborn baby in its first year. Children outstrip other mammals when they learn more sophisticated emotions, such as jealousy or pride, in their pre-school years.[13] These degrees of emotional sensitivity are associated with brain regions: from brainstem (the brain's deepest part, extending from the spinal cord) through the amygdala (located in the basal ganglia, and part of the brain's reward system) to the neocortex (part of the cerebrum's outer layer, and responsible for higher-order brain functions such as thought). It is hard to resist associating the layering of the human brain with archaeology. Freud couldn't:

> Suppose that Rome is not a human habitation but a psychical

> entity with a similarly long and copious past – an entity, that is to say, in which nothing that has once come into existence will have passed away and all the earlier phases of development continue to exist alongside the latest one.[14]

There is a well-known bit in Haydn's so-called *Surprise* Symphony that makes even knowledgeable listeners flinch every time. The loud orchestral bang, after a patch of murmuring string figures, trips our brainstem reflex. Familiarity doesn't lessen the shock, because the brainstem is stupid (it never learns from experience: it will flinch to Haydn's surprise no matter how many times it hears it). Many levels above that, Haydn crafts a musical surface of exquisite complexity. This speaks to the listener's neocortex, because this is the part of the brain that processes the patterns, expectations and memories of musical syntax. Music, like the human brain itself, embodies its own evolution.

The First Timeline: Life

The musical world is a blooming, buzzing confusion of sounds. The music on your iPhone may carry different harmonies, scales and rhythms from the gamelans of Bali or the chants of the Brazilian rainforest. As the linguist Noam Chomsky taught us, we find universality not on the surface of spoken utterances but in the deep mental structures that generate them – in the rules of the game. It is the same with music. People across the planet may speak different musical languages. However, the musical mind displays surprising consistency. Nearly everyone in the world can follow a rhythmic pattern, clap or dance in time, sing a song (however accurately or inaccurately), remember a melody, and identify an emotion associated with some music they like. One particular capacity is akin to the 'cocktail party' trick of picking out a conversation among a hubbub of voices. The psychologist Albert Bregman called this 'auditory scene analysis', and we do something similar when we discern an

ominous noise in the jungle or follow one strand of a musical conversation in a Bach fugue or a jazz ensemble.[15] Although such abilities are second nature to most people, the neurological architecture that makes it possible is massively complex, and well beyond the capacity of animals. For instance, no animal can consciously move in time to a regular beat, with the interesting exception of parrots.[16] Our musicality is related to the sheer size of our brains, but also to our bipedalism. Much of our sense of bodily rhythm stems from the fact that we walk upright on two feet in a regular gait. It is odd that humans associate music with motion, given that tones are invisible and, strictly speaking, don't really 'move' in any space.[17]

The cognitive represents one side of musical universality. Another is the world of musical behaviours. Every aspect of our lives is interwoven with music, and a key element of this is emotion. Consider these three examples. A few years ago, when my daughter was two years old, we took her to a London Symphony Orchestra children's concert at the Barbican. At some point in the programme, the orchestra struck up with Rossini's *William Tell* Overture, which readers of a certain age might associate with the theme tune of *The Lone Ranger*. Within seconds several thousand toddlers instinctively began delightedly bouncing up and down on their parents' knees in time with the orchestra. They had probably never heard the music before, and if they had, I doubt they would have linked it to memories of galloping cowboys. Music psychologists term such intuitive and immediate responses to music 'emotional contagion', as if one 'caught' an emotion , as in an epidemic.[18] The lessons of this episode are manifold. Despite their varying cultural and educational backgrounds, the children responded to the music in the same way, and instantly. Their reaction made clear the connections between music and emotion – an overwhelming joy – and between emotion and *motion* – in this case, a gallop. They never saw Clayton Moore riding Silver in the 1950s TV show. But the children instinctively 'felt' these motions in the music.

The links between motion, emotion and universality are apparent in my second example. When my daughter was a little older and at primary school, she and her friends were caught up in the 'Gangnam Style' dance craze that swept the world. We all know the song and the moves; we've all danced it ourselves. How strange, though, that a Korean pop song broke through all language barriers, to the extent that British schoolchildren even learned the words (my younger daughter now knows the Korean lyrics of songs by the band BTS)? Scholars of K-Pop tell us two interesting things.[19] First, that 'Gangnam Style' spread from the schoolyard up: long before it penetrated the national consciousness, it was being incubated in the playgrounds of primary schools. Second, that the vehicle for this contagion was the dance move itself, which children loved to copy. The physical action was the 'meme', to borrow Richard Dawkins's term for a cultural gene spread through mass imitation.[20]

The third example is my own adult reaction to watching the tragic denouement of Akira Kurosawa's 1985 film *Ran*, a Japanese adaptation of *King Lear*. As the film ends with the blinded fool Tsurumaru feeling his way on a cliff-edge, the score plays a haunting Japanese flute lament. Toru Takemitsu, the contemporary composer who wrote the music, based it on ancient Japanese scales. And yet the pathos contained in the flute lament effortlessly communicates to Western audiences. When I first saw the film, although I had very little exposure to Japanese music, I found the emotions communicated by Takemitsu's score instantly comprehensible and devastating. The psychologist of emotion, Paul Ekman, demonstrated that we are able to recognise the meaning of facial expressions in photographs of people from other cultures.[21] Takemitsu's lament taught me that music was also like that. As with the downturned lines of a sad face, the descending contours and exhaustion of sad music travels across vast cultural distances.

Emotion, a fundamental aspect of musical experience, is an important theme for this book. Charles Darwin taught us that emotion is something we share with animals.[22] It is an inter-

species umbilical cord back to Mother Nature. This will emerge at the end of the book when I turn to animal music. But the role of musical emotion will hover over my first chapters, where I consider how music brings together cognition, feeling and behaviour at every stage of a human life.

Before she is born, a baby will have heard sounds *in utero* gurgling through her amniotic fluid.[23] On arrival, the child's musical skills will be surprisingly developed. They will be able to recognise irregularities in beats, discriminate the contour of vocal intonations, and participate in the 'motherese', or infant-directed speech exchanged with their caregiver, their first musical game. Newborn infants are predisposed to learn a vast array of musical materials, and the West's preoccupation with consonance and symmetry (epitomised in nursery tunes such as 'Twinkle, Twinkle Little Star', a melody that spawned Mozart's piano variations, *Ah, vous dirais-je maman*, K. 265) represents a narrowing of possibilities. Had the child been born, say, in Java or Ghana, then they would have been exposed to – and internalised as second nature – complex tuning systems and metrical patterns that sound irregular, or even 'unnatural', to Western ears. This narrowing of scope represents one of the key markers of the musical human in the West. Another marker, perhaps the very signature trait of Western music compared to the rest of the world, is a trajectory from active musical participation to passive listening. Even in the West, childhood is saturated with music-making, from games and nursery songs with mother, to glockenspiel fun at kindergarten, to the delight kids take in the music on children's TV. Most children will have some level of performing experience at school, from singing in a choir to playing in the orchestra or a band. By adulthood, Western people's experience of music is usually entirely passive. The propensity to perform has been taught out of them and an iron curtain has come down. On the one side of this barrier there are the creative composers and musicians. On the other side sits the audience. One symptom of this divide is the idea of creativity as God-given genius, rather than as a universal birthright, like language acquisition.

The contrast with the rest of the world is stark. In the 1960s and 1970s, the British anthropologist John Blacking wrote a series of ground-breaking books on the Venda people of the Northern Transvaal region of South Africa, including *Venda Children's Songs* and *How Musical is Man?*[24] Blacking showed that, for the Venda, music-making – or 'musicking' as many scholars now call music as an activity – was communal, participatory and seemingly as natural as breathing. The philosopher Kathleen Higgins's book *The Music Between Us* has claimed Blacking's participatory vision as an ideal for Western music too.[25] But this sounds like special pleading, given how far the Western apple seems to have fallen from the tree.

The gap between listening and doing widens in adult musical life. Our passive consumption of music in the West goes beyond sitting and listening (alone or in a concert), although that is the model for how we attend to music. In practice, music soundtracks nearly every walk of life, from driving our car, to cooking an evening meal, to shopping in the aisles of a supermarket, to pounding a treadmill in the gym. There is music in lifts, in airports, on television, in films and accompanying video games, and, thanks to earbud culture, literally everywhere we walk or sit. Music can regulate mood (cheer us up or calm us down), influence shopping decisions (should I buy a German or a French bottle of wine?), and reflect or express actions in a movie (here comes the shark!). Music has attained a climax of ubiquity, thanks to the easy and limitless availability of seemingly everything on digital streaming media such as Spotify. *Everything now*, to quote the title of the Canadian indie band Arcade Fire's most recent album. Why have we become so dependent on ubiquitous music, while being at the same time almost completely disengaged from actually *making* it?

Things aren't quite so bleak, however. Popping through the looking glass to the other side of this barrier, we find that there is life *within* the music itself. A beneficiary of the West's disengagement from performance is that music itself has become more performative. Music has a magical capacity to

imitate our gestures, intonations and emotions.[26] Its expressivity is obvious in a vast spectrum of styles, genres and historical periods: the string instruments seemingly 'talking' to each other in a Haydn string quartet, as do the jazz musicians in Miles Davis's *Kind of Blue*; the orchestra in Stravinsky's *The Rite of Spring* appearing to 'murder' its sacrificial victim; the sexual energy in 'Great Balls of Fire' leaping out of Jerry Lee Lewis's manic piano playing. How does music do that? The anthropologist Michael Taussig has revived Darwin's idea that mimesis – the capacity of art to imitate human nature – is due to the primal human gift of mimicking or miming.[27] Is Western music's hyper-developed mimesis a compensation for its abstraction?

Mimesis informs the many social practices with which music is involved, practices that I will later show are common worldwide. As we shall see, nearly every culture, at every epoch, has versions of these musical activities, and this opens a door into a global music history. Darwin saw the origin of music in animal courtship rituals, where singing prowess could be as attractive to a possible mate as colourful plumage. We now think there is much more to music's evolutionary origin than that. But love, desire and sex are certainly well represented in romantic lieder, opera and popular music. And the dynamics of yearning and climax are also wired into our musical language, when a chromatic chord strives to resolve to a fulfilling consonant harmony.

Music also fights. It can energise soldiers or sportsmen, or be weaponised as noise to extract a Central American drug baron from his lair or teenagers from a shopping mall. It can embody aggression in music, from Verdi's 'Dies Irae', to the posturing MCs in hip-hop, to rival football anthems in a stadium. We use music to party. What happens, I ask, when you move your body to dance music; how does dance bring people's bodies together? When you listen to music without moving, as in a concert hall or your armchair at home, does your brain 'dance'? We use music to worship, and to fill up the God-shaped gaps in our secular world with a sense of the numinous.

Going to a concert, or indeed a rave, is an act of collective spiritual contemplation. The anthropologist Judith Becker's notions of musical 'trancing' and 'deep listening' help build useful bridges with world music.[28] I ask whether the musical 'genius' is really divine, and wonder why only the West has this concept. We use music for travelling. I'll reflect on how the spread of music gives us news from elsewhere; and how we use music to map our places and spaces. Piped world music, such as we might imbibe with our cup of coffee at Starbucks, affords an instant ear-shot of cultural tourism.

The Second Timeline: Music in World History

A Western child's gradual shift from musical participation to passive listening is emblematic of what happened to Western music as a whole as it broke away from music's continental shelf. How does one show this, in the light of all the challenges I have identified? How can one even imagine a world history of music? We can begin by ruling out the obvious, which is to piggyback simply on established frameworks, such as John Roberts's *History of the World*, or indeed his later *The Triumph of the West*.[29] Some timelines are compelling, such as the idea that, in the first centuries AD, the world was dominated by two empires, the Roman and the Chinese, and that the Roman empire fractured into religious warfare while the Chinese more or less held together. Such a perspective picks out something essential about the perplexing variety of European music, while the arresting feature of the Chinese musical tradition is its continuity. Yet what breaks the back of this framework is that the vast majority of world music was never written down because its musical cultures were oral, not literate. Africa, traditionally the cradle of civilisation, epitomises that. Take the case of the fourteenth-century empire of Mali, sub-Saharan Africa's most formidable kingdom. It is refreshing to be reminded that there was more to ancient African culture than Egypt; and that there is life beyond the usual story of music's

development from Egypt and Mesopotamia through to Greece, Rome and Western Europe. Under the rule of Mali's colourful King Mansa Musa, allegedly the richest man in history, Timbuktu became the cultural centre of the medieval world. The 60,000 people Mansa took with him on his pilgrimage to Mecca included many musicians, who sang and played while they marched.[30] Sitting on his throne, next to the court executioner, Mansa liked to surround himself with trumpeters and drummers. None of this music survives, although some of ancient Mali's instruments, such as the lute-like kora and the djembe drum can still be heard on the streets of Mali today. The situation in highly literate China is not much better. One of the most famous figures of the Tang Dynasty (618–907), the golden age of Chinese civilisation, was the poet, painter and musician Wang Wei (701–761).[31] Much of Wang Wei's poetry is anthologised, and some, in translation, was set by Gustav Mahler in his orchestral song cycle, *Das Lied von der Erde*. Yet of Wang Wei's music itself we have nothing.

There is also the broader question of what 'history' actually is. History as 'one damn thing after another', in the historian Arnold Toynbee's choice phrase, stubs its evolutionary toe against the proposition that nothing has *really* changed since human modernity was achieved 40,000 years ago. Within the rolling chronicle of kings, empires and wars, this hyperbole can be enjoyed with a very large dose of salt. The dose is smaller in the relatively hermetic world of music, especially when the means of production – to borrow a Marxist perspective – does not appear to have changed very much over the millennia, as is the case, for instance, with the many hunter-gatherer societies across the world. The American ethnomusicologist Anthony Seeger, relative of the folk singer Pete, wrote his book *Why Suyá Sing* based on his fieldwork with the Kisedje Indians of the Mato Grosso, Brazil.[32] One of his encounters with the Kisedje opened up a wonderful crack of insight into how they conceive of time. Answering their curiosity about his own musical culture, Seeger played them some songs on an old tape machine. The Kisedje told him that the music sounded

very old, and Seeger realised that this was because the machine was playing too slowly, so that the pitches were unusually low. The Indians associated low pitch with the sound of their ancestors, and they heard Seeger's tape as the voice of something ancient. Moving north, an encounter between the ethnomusicologist David Samuels and a San Carlos Apache musician illuminates Native American attitudes to history.[33] During a band rehearsal, the musician explained to Samuels the Apache concept of *bee nagodit'ah*:

> [H]e told me he liked it when I turned the fuzz box on in the middle of the guitar solo. He said it added something to it. He called it 'bee nagodit'ah', 'inagodit'ah'. I asked him what that meant, and he said it means 'something being put on top of something else'.

Native Americans view history not like a linear succession of events but as a simultaneous layering of past, present and future. The Navajo word for 'the tribes' past' is *atk'idaa*, which means 'on top of each other'. This does suggest ways of remembering the past beyond linear written records. For instance, the songs of the First Nations record genealogies, events, tribal migrations, even travel pathways through dangerous landscapes such as glaciers. Not only are these sung 'histories' non-linear and circular (stressing renewal through adaptation rather than change), they also mix up tenses of past, present and future, primal myth leaking into the memory of individuals while also sliding into prophecy. Their way of doing history makes our fixation with dry succession look a bit mundane; instead, they are more interested in the layering of attitudes and emotional relationships. It certainly tells us that non-Western culture is not 'timeless' in the stereotypical sense that used to be fashionable in academic circles, where historians charted the West, and anthropologists studied the rest.[34]

One way of resolving this quarrel between history and anthropology is to look at the ways music can perform history.

The ‘songlines’ of contemporary Australian Aboriginal people, in which they record clan histories and mythologies, suggest how this might have been done in the ancient past long before writing.[35] There is a gathering scholarly fashion to extrapolate modern African American music back to Mother Africa, as in the songs of the griots of Mali and Senegal.[36] A griot is a kind of troubadour, a strolling poet, who tells the history of their ethnic group or nation in song. Again, there is no reason to disbelieve that a griot plying his trade in contemporary Mali, on principles not dissimilar to a Detroit rap artist, would be so different from one of those musicians accompanying King Mansa Musa on his pilgrimage in 1324.

By contrast to the walking music historians of the Australian Northern Territory, Mali or North America, another window into music in world history is peoples’ own origin myths, the stories cultures themselves tell about where music comes from. Although each culture has its own musical origin myth, one aspect is very common. It is extraordinary how much of the world imagines that music emanates from the resonance of the cosmos, that musical harmony comes out of *universal harmony*, the music of the spheres. One of the earliest such myths is inscribed on a set of Bronze Age chime-bells discovered in China in 1978. The so-called ‘Marquis Yi of Zeng’ bells, dated around 400 BC, are engraved with a system of music notation. This is one of the first examples of a music theory that hears in the harmoniousness of music an echo of the harmoniousness of the universe as well as a model for good government, a way of thinking that stamps Chinese thought for thousands of years. This philosophy was put into the eloquent words of the *Yue Ji*, dating from the same period:

> Music has its being in the harmony between Heaven and Earth. Ceremonies have their being in the hierarchical gradations between Heaven and Earth. Music-making starts from Heaven, and the ceremonies are fixed by means of the Earth.[37]

Fast-forward to the English mystic Robert Fludd, in his 1617

treatise *Utriusque Cosmi* (*The Origin and Structure of the Cosmos*), or to the astronomer Johannes Kepler's 1619 *Harmonices Mundi* (*The Harmony of the World*), and nothing much has changed.[38] A cutting-edge example of universal harmony is the Quantum Music Project being conducted even now by a group of scientists and music theorists based in Oxford and the Serbian Academy of Sciences and Arts in Belgrade, led by Dr Ivana Medic.[39] The group investigates musical properties in the basic principles of quantum physics. There is something daunting and rather humbling in the thought that there was music long before humans came along, and in the certainty that there will be music long after we have disappeared.

All the same, something in world history does move. There is a timeline. Sometimes we know more about the musical history of other cultures than in the West. For instance, the collapse of the Han Dynasty in ad 220 instigated a comparable period of change and instability in music.[40] The arrival of Buddhism in China made melodies more flowing (or 'melismatic', meaning several notes would be sung per syllable), whereas earlier Chinese tunes were as monosyllabic as its words. By comparison, music history of the European 'Dark Ages' is much murkier.[41] The problem for a 'timeline' model of history is that the river of time has many bends. A dramatic example is the staggered arrival of the Bronze Age since, obviously, cultures discovered bronze at different times. While the Bronze Age was established through most of the world 4,000 years ago, it reached the islands of Java and Bali somewhat belatedly around ad 500.[42] This was the bronze that was fashioned into the gongs of Bali's and Java's fabulous gamelan ensembles. This little vignette reminds us that world history is shaped by geography as well as climate, and so seldom marches in single file. The physical materials of music history become available to various parts of the world at different times.

World history, then, is not straightforwardly 'linear', progressing episode by episode like a story told by a narrator. If

one reason for that is geography, another is because enduring musical practices may cut across the timeline. For instance, a rock painting in Tassili n'Ajjer, part of the Sahara desert, dated 6000 BC, depicts five women and three men dancing together. The anthropologist Gerhard Kubik thinks that it prefigures a contemporary Zulu stamping dance called *indlamu*.[43] It is as if time has stood still for 8,000 years. Yet another reason why history doesn't 'progress' in a line is that musical practices associated with so-called 'primitive' social and cultural conditions are still alive in corners of the world today. See for example the music of contemporary hunter-gatherer societies, such as the Inuit and African Pygmies. It is precisely the survival of such music that opens a door to the past, however. The archaeologist Iain Morley extrapolates from Eskimos, Pygmies and other hunter-gatherers to imagine what prehistoric music might have sounded like. In short: if music is shaped by cultural conditions, and if these conditions are similar to prehistoric conditions, then we really do have an insight into music 40,000 years ago.[44]

As a taster of that, let's consider how music might have reflected the three stages of human civilisation: hunting and gathering, farming and town life.

The story begins with nature and the musical human's relationship primarily with animals. This is the case in contemporary Papua New Guinea, where communion with animals or animal spirits is the basis of music for the Kaluli tribe.[45] They are obsessed with the songs of the *muni* bird, which they hear as the weeping of their ancestral spirits.

The invention of farming and agriculture heralds both a cyclical and longer-term conception of time, and a grounding of music in a sense of space. As well as adopting repetitive, cyclical rhythmic patterns, music can now draw a line between culture and nature. In the music of the African Nyau, masked figures representing animals emerge from the forest to take over the village and then retreat.[46]

The coming of towns is sporadic across world civilisation. In the Fertile Crescent, the advent of early town life is reflected in

the music of the Bible. One striking consequence of the shift into towns and cities is that music needed to become louder so as to carry across larger groups of listeners. The Caananite lute would have had to have been played more virtuosically and in a more dance-like way than earlier lutes so as to be audible within a busy urban community.[47] We can speculate that the shepherd boy David would have played his lyre (or 'harp') more gently before he ascended the throne, or perhaps played a different instrument altogether. The psalms contain no less than 117 superscriptions about how their music is to be played, although Hebrew scholars can't agree how to decipher them. For instance, some scholars interpret the superscription *mizmôr* as meaning 'song'; others, that the psalm is to be accompanied by plucked-string instruments.[48]

Music reflected evolving social and then courtly relationships in many ways. Scholars have mapped the distribution of kingship systems in Africa according to the texture of their songs.[49] Thus tribes organised loosely around a strong king tend to sing by alternating snatches of melody between a leader and a chorus, and with multiple rhythms at the same time – 'polyrhythms'. It is as if the leader symbolises the king, the chorus, his people. The structure of music tends to reflect the structure of society in many of the world's musical cultures – Chinese, Balinese, Indian and the courts of medieval and Renaissance Europe. The stratified polyphony resounding in Queen Elizabeth's Chapel Royal in Hampton Court, perhaps a motet by Thomas Tallis or William Byrd, is a sonic symbol of a feudal hierarchy, with the God-Queen sitting on top. The soaring boy trebles are airy analogues of those cherubs painted on the ceiling.

While historical epochs do march on, if not in single file, some do so more slowly, or not at all. This takes us back to the beguiling problem of cultural universals. Though universalising has fallen out of fashion in anthropology, there is a case to be made that how we use music today in the West has lots in common with the rest of the world, and that it probably hasn't changed very much historically. One striking example of a

cross-cultural universal is the lullaby. In a study ranging from the rainforests of Gabon to rural Vietnam, the psychologists Sandra Trehub and Laurel Trainor found clear similarities between lullabies and play songs. Across the world, lullabies tend to be gentle, fairly slow and highly repetitive, with descending melodies, rocking rhythm and a lot of onomatopoeia ('hush!'). Play songs are more animated because they are meant to amuse the child. It is also striking how many lullabies contain an element of threat, as if to make the safety of the cradle all the more comforting. In a standard lullaby, Japanese mothers terrify their infant with scary night birds: 'Owls, owls, big owls and little/ Staring, glaring, eyeing each other.'[50] In the West, terrified babies dream of breaking boughs and falling cradles. Similar analogies abound across the spectrum of music. Among the Inuit of Canada, an aggrieved man has the right to challenge his opponent to a contest in which they sing taunts and gibes at each other.[51] Song contests go back to the duelling shepherds in Virgil's pastoral *Eclogues*.[52] And the film *8-Mile*, in which the rapper Eminem battles rival MCs in the clubs of Detroit, vividly shows how song contests are also the basis of hip-hop. In a classic study, the great anthropologist Alan Merriam lists a plethora of songs used by the Tutsi of Rwanda:

> Songs for boasting purposes, for war and greeting, songs sung when young married women meet together and reminisce about absent friends, children's songs, songs to flatter a girl, and many more [including] boasting songs called *ibirirmbo*, in which two men sing in competition with each other, alternating musical phrases; they may vie either in praising one cow or in singing of the merits of one cow against another.[53]

Clearly, what is sauce for the cow is sauce for the gander, and the many other musics of social life: hunting, healing, war, lament, love, worship and so on. The concept that knits all these practices together is ritual, a name for a repeated pattern of activity we invest with meaning. Going to hear a classical

music concert in Carnegie Hall is as much a quasi-religious ritual (sit quietly, attend reverently, applaud the leader, applaud the conductor, do not clap between movements…) as the ancient Sumerian 'sacred marriage' ceremony for the Babylonian fertility goddess, Inanna, which was performed annually for 2,000 years.[54] The West worships Beethoven as a god; behold Him scowling imperiously like Jupiter on his throne in Max Klinger's statue (see **Figure 1.3**). It could even be argued that listening to your favourite piece on your headphones, lovingly traversing the music's journey from start to finish, is a kind of mental ritual, not so distant from praying or meditating. What is so interesting about the ritual we call 'Beethoven's *Eroica* Symphony' (No. 3 in E-flat major) is that it bundles together a lot of mini-rituals: hunting, fighting, grieving, playing, celebrating. The hero of the *Eroica* is a French horn, the European instrument of hunting. The hero fights a battle against the orchestra, mourns his losses and returns in triumph.[55] Each time and culture renders these rituals in its own particular musical language. Beethoven's reference was the Napoleonic wars, and his soundscape was an empire of notes. Two things set Beethoven's symphonic ritual apart. First, the encyclopaedic multiplicity: across the world, all these particular musical rituals (hunting, mourning, etc.) are normally conducted separately, not thrown together within a single work, ruled by Beethoven's empire of the mind. Beethoven once said, after his love affair with the Corsican general was over, that if he knew as much about fighting as he did about musical composition, he would teach the French military a thing or two.[56] The second difference is the rituals' abstraction from context: there is no real hunting or fighting going on in this symphony, not even any words or actions. Just tones floating in space. Something has changed.

Figure 1.3 Max Klinger's *Beethoven* depicted as a Greek god

What *really* exercises anthropologists and historians alike is the question of why rituals change.[57] What are the drivers of historical change? When change does leave its mark on history, it is often recorded as an encounter between one musical culture and another. These encounters can be as benign as migration or trade, or happen through warfare, colonialism and religious conversion. Bronze arrived in Java on the back of Hinduism. The reason why so much choral music in modern Africa sounds like Anglican hymn tunes couldn't be more straightforward: African music was colonised by British missionaries. The Ghanaian ethnomusicologist Kofi Agawu goes so far as to call Western tonality 'a colonising force'.[58] In pre-modern times, nearly all accounts of African music come from Muslim writers in the train of the 'Arabisation' of North Africa. Most of these reports, starting around AD 700 and culminating in the books of the first significant African historian, Ibn Khaldun (1332–1406), are appallingly racist. At his mildest, Ibn Khaldun wrote that Africans 'are found eager to dance … due to expansion and diffusion of the animal spirits'.[59] Islam

also has a powerful role in the music of the Indian subcontinent, where Hindu–Muslim conflicts inflect an otherwise relatively stable and continuous tradition based on the Vedic hymns of the Sanskrit *Rigveda*.[60] Of all the world's musical cultures, India's is the closest to Western models of a linear history. The 253 ragas mentioned in the *Sangita-Ratnakara* bespeak the flowering and proliferation of an ancient tradition – a central historical stream – to encompass great diversity. The historical shift from *marga* (divine ritual music) to *desi* (secular, provincial) traditions also parallels the evolution in Western Europe from Latin Church music to more popular or folk-like vernacular styles after the Middle Ages.[61] The key difference is the Indian guru system. While India enjoyed methods of written notation and music theory every bit as sophisticated as those in the West, this wasn't the main conduit of transmitting music from one generation to the next. Music in India was handed down in an oral tradition from master to pupil in an unbroken chain.

So why is change in European music so different? Over and above the fact that Christianity was often – but not always – on the aggressive end of colonial encounters (Buddhism, Islam and Hinduism did their work too), we can throw back a number of red herrings. The first misconception is that Western music was more abstract. There is plenty of highly speculative and rarefied music in China, India and the Middle East. The equal-tempered tuning system, the basis of J. S. Bach's revolutionary *Well-Tempered Clavier*, was discovered more than a century before the Germans by Chu Tsai-yu, a prince of the Ming Dynasty, in 1584.[62] The treasure-house of ancient Greek music theory (including the ideas of Pythagoras, Aristoxenes and Aristotle) passed into the safe custody of Islamic thinkers in the Middle Ages.[63] Nor is Western music distinguished by its distanced, reflective attitude. What the anthropologist Judith Becker calls 'deep listening' is assumed also in the Indian concept of *rasa*, which literally means the 'juice' or 'taste' of an emotion.[64] Immersed in the music, the listener distils its emotion to its essence, transcending the feelings of everyday

life. Indian music's transcendental quality attracted the attentions of Romantics such as Schopenhauer and Wagner. Indeed, a raga performed by a classical Carnatic singer – or, from the devotional Sufi tradition, by Nusrat Fateh Ali Khan – can soar as ecstatically as *Tristan und Isolde*.[65]

The classical explanation for the 'triumph' of Western music begins with the bureaucracy of the militant Church and the reforms of Pope Gregory VII in the eleventh century, the man who roped Christendom in a network of Gregorian chants. It then segues in the late Middle Ages to the febrile energies of the rising merchant classes on the path, after the Renaissance, to liberal democracy, climaxing with the heroic idealism of a Beethoven.[66] Guillaume de Machaut's 1365 *Messe de Notre Dame*, the first musical mass setting in history, is a useful touchstone.[67] His mass is as embedded in time, place and function as any music in Africa, India or China. Its sounds can also be savoured as objects in themselves, abstracted from these contexts. However, it is not this abstraction or distancing that is so unusual; we have encountered that elsewhere. Rather, it is Machaut's creatively destructive attitude to layers of history inscribed within a written musical language. He could do that because the norm in Western music was to write music down and disseminate it far beyond a face-to-face, oral encounter between master and pupil. The French musicologist Jacques Chailley has touched upon Western music's paradoxical fusion of continuity and destruction in a notorious 1961 book called *40,000 Years of Music*.[68] The joke was that Chailley got through the first 39,000 years in two pages. Nevertheless, Chailley's lasting insight is that Western music is at heart a violent culture in which every style kills the one before.

Although the fruits of the Western musical tradition are glorious, it is not hard to see in this cycle of destruction a reflection of the peculiarly critical cast of Western thought in general. This critical outlook really took off in the early seventeenth century with scientists and philosophers such as Galileo and Descartes. Experimental science proceeds by

falsifying earlier theories. Cartesian philosophy defers not to ancient authorities such as Aristotle or Aquinas but to the operations of the mind alone ('I think, therefore I am'). However, this way of looking at the world probably originates with the ancient Greek philosophers' notion of the human as a spiritual and rational being separate from nature. By this light, the destiny of the human would be to climb ever higher out of nature's swamp, and to progressively control, if not to suppress, natural impulses such as emotion. Accordingly, the dignity and freedom of human reason inheres, in the final analysis, in its distinction from animal instinct. And by exactly the same argument, the identity of the musical human lay in its separation from the music of the animals.

The Third Timeline: The Evolution of Music

Now imagine that those aliens listening to the Golden Record on *Voyager* were octopods, like those gigantic hyper-sentient beings in the film *Arrival*. The film is more highbrow than most sci-fi cinema; *Arrival*'s heroine was a linguist struggling to penetrate an intergalactic language barrier, and Villeneuve, the director, brought in a real linguistics professor, Jessica Coon from McGill University, to advise. She could easily have been a musicologist attempting to decode the creatures' *musical* language. The fog-horn-like deep bass drones in Jóhann Jóhannsson's haunting soundtrack evoke what the aliens' music might sound like, but this remains a suggestion. Marine biologists at the Taiwan National University of Science discovered that cephalopods, including octopuses and squids, have a hearing range of between 400Hz and 2,000Hz, and hear best at 600Hz (D5), which is about an octave above middle C on a piano keyboard.[69] The human range is vastly superior, 20Hz–20,000Hz, somewhat broader than the piano's eighty-eight keys. So what the aliens would be capable of hearing on the Golden Record might be very restricted by our terms. Bach's *Brandenburg* Concerto No. 2 would sound as

calls to resolve emotional conflicts.[76] One call, a 'long series' of fast sounds in a steady rhythm and melody, expressed friendly approach and positive emotion. Another call, a 'tight series' of higher frequencies, was used to express anger and aggression. The problem, then, that gelada calls aren't really a language is more than compensated by the fact that we can identify with the emotions they express. They bear out Darwin's idea that there is an evolutionary continuity in the *emotions* between animals and humans. It is not the music that binds us and them, it is the common emotions. It is possible that our music shares a similar repertoire of basic emotions with animals from 8 million years ago. To strip away the surface of a Mahler symphony, to peel the young (in evolutionary terms) neocortex to expose the amygdala, the seat of the primal emotions, is to sing with the Neanderthals and the ancient African apes.[77]

The superstar in the hominin pantheon, and the mother of us all, is Lucy, the australopithecine discovered in Africa in 1974, and dated about 3.2 million years ago.[78] Lucy stood one metre tall, like a chimpanzee, had a brain size one third that of a modern human, was bipedal, yet probably spent half her time in trees. Her call repertoire would not have been dissimilar to that of apes. Lucy and her descendants on the long evolutionary march towards *Homo sapiens* indicate the adaptive links between habitat, brain size and social complexity. For the more recent *Homo ergaster* 1.5 million years ago, hunting out on the open savannah where he would have been much more exposed, there would have been safety in numbers. This would have led to more complex social interactions with others in the group, and we can assume that his repertoire of calls would have expanded, along with his brain size. Most importantly, he walked upright on two feet. For *Homo ergaster*, as well as later hominins such as *Homo habilis* and *Homo rudolfensis*, bipedalism would have had many musical consequences. The larynx dropped in the throat and became less rigid, further increasing the range of possible sounds. Rhythmic walking or running enhanced the hominin's sense of time-keeping, coordinating actions and group activities. Bipedalism freed the

hands to make tools and perhaps bang together primitive musical instruments. But it also meant mothers would not always have been able to carry their child, and there is a theory that lullabies evolved as a surrogate for touching the baby – reassuring the set-down infant through the mother's voice. Mastery of movement, in the independence of the torso from arms and legs, would also have enabled dancing. The archaeologist Steven Mithen has proposed that rhythm had even more valuable effects.[79] The possibility of synchronised music-making (clapping, singing or dancing together) enhanced group cohesion by enabling the tribe to share the same emotional state. Emotional attunement through music would have strengthened the early human's 'theory of mind', an intuition of another person's thoughts and feelings.

According to the linguist Alison Wray, 700,000 years ago, in the Middle Pleistocene era, *Homo heidelbergensis* would have spoken or sung a 'protolanguage', a series of holistic, syllable-like utterances.[80] Most evolutionary linguists think that it would have been difficult to disentangle language from music at this period. In other words, there is a view that what later became language and music split apart from a common source.[81] For music to become an idiom of artistic expression also required a certain amount of leisure. Symmetrical stone hand-axes, discovered as early as the Acheulean bifacials (a stone tool with two faces) 1.5 million years ago, evidenced a degree of surplus display, perhaps for sexual selection, or even simply as an object of aesthetic pleasure in itself.[82] Symmetry is beautiful, but the skill to carve it would also have been attractive to a prospective mate.

Mithen, in his influential book *The Singing Neanderthals*, has portrayed the Neanderthals as both an evolutionary dead end and as a lost musical ideal of what human musicality could have been, and might still become.[83] *Homo neanderthalensis* first appeared about 250,000 years ago, and the last ones died out as recently as 30,000 years BC, either from hunger or, more likely, picked off by adaptively stronger *Homo sapiens*. Mithen persuasively speculates that the Neanderthals' musical ability

was heightened in compensation for not having evolved a language as *sapiens* did, which he infers from their lack of symbolic artefacts, from their cultural stability (their tools did not evolve), and from their small communities (which required limited communication). Mithen dubs their protolanguage 'Hmmmmm', which is an acronym for 'Holistic, manipulative, multi-modal, musical and mimetic'. The eighteenth-century philosopher Jean-Jacques Rousseau would not have known about the singing Neanderthals. But perhaps they are the nearest thing to his ideal of the 'noble savage', a mythical just-so story of human origins in a musical paradise.

Our prehistoric timeline ends in Chapter 10, 100,000 to 40,000 years ago, with what Gary Tomlinson has provocatively called musical 'modernity'.[84] For *Homo sapiens* in the Upper Pleistocene, our 'modern' musician, the following pieces of the musical jigsaw fell into place: discrete pitches; a dual-system hierarchy of melodic contours and individual notes; a combinatorial system to arrange the building blocks into new music; wider diversity and greater precision; tighter control and more specific meanings. These are all aspects that music shares with symbolic systems and languages. The irony is that to achieve all this, music needed to diverge from language, something the Neanderthals never managed. How can we infer that? From the archaeology of bones and tools we can deduce the co-evolution of musical sophistication with cognitive and social complexity. Also, at a critical point, culture feeds back into human evolution to apply selective pressure. Culture is what transmits non-genetic information across generations via archival group memories. We have encountered distant descendants of Pleistocene musical memory in the walking song-historians of the African griots, Australian Aboriginal people and Native Americans.

All this refutes the cognitive scientist Steven Pinker's egregious put-down of music as 'auditory cheesecake' with no evolutionary significance.[85] The truth could not be further away. The Cambridge music scholar Ian Cross has contended that the very 'semantic indeterminacy' of music, what he terms

music's 'floating intentionality' or flexibility of meaning, has been invaluable for hominins in their negotiation of social situations of uncertainty or ambiguity.[86] Far from being a derivative luxury, what the philosopher Daniel Dennett calls a 'spandrel', music always conferred evolutionary advantage.[87] But the long view does reveal a stark truth about the nature of music across the aeons, and a certain darkness. This darkness continues to shadow music's most brilliant achievements. Musical modernity seems to have drawn a line under nature twice over, epitomised in two epochal steps: the step from animal communication to hominin protolanguage; and the dead end of Neanderthal 'Hmmmmm' song. Our consolation is that the relative abstraction of music can be viewed from two angles. From one side, music mirrored the abstract 'thinking at a distance' (from immediate proximity) of mind and symbolic language. From another side, however, music has always continued to harbour the emotional immediacy and holistic, gestural nature of animal cries and early protolanguage. Musical emotion is our 'species memory'. The fact that even contemporary music carries along with it such prehistoric baggage says something incredibly central about how we experience music, the value it brings to our lives and to our civilisations. This book will argue that, as far as we can infer from performances, recordings, historical records and archaeological relics, this has always been the case for music across the world. It may be particularly true for Western music, for good or ill.

Postscript: The Musical Posthuman?

Writing this book in the Holocene, between two Ice Ages, it is difficult for me to avoid the many grounds for pessimism about music's future. Music's fate is most precarious in the West, where it came of age incredibly late in geological terms, long after the other arts, and has already slipped back behind them again. Everyone reads new novels, art galleries are thriving, yet

training are literally a 'no-brainer', I am much more concerned with the cultural factors that shape – and often stunt – it across the world, and across the life cycle. The crucial question is this: if the music instinct is innate, why is it so often not allowed to blossom? We can take nothing for granted, not least what we even mean by the word 'music' itself.

In Africa, where the musical human was born, there is a common assumption (explored later) that *everyone is musical*. And yet the puzzle is that hardly any indigenous group in Africa has a word for what the West calls 'music'.[4] The Vai of Liberia have words for 'dance' (*tombo*), 'song' (*don*) and 'instrumental performance' (*sen fen*), but no all-encompassing concept of music as organised sound. For the Tswana of Botswana, singing and dancing mean the same thing (*gobina*), and the Dan in Côte d'Ivoire, while lacking a single term for music, name a variety of songs, such as dance song (*ta*), praise song (*zlöö*), and funeral laments (*gbo*). By comparison, no indigenous African language has managed without a word for song, dance or, indeed, language. Africans don't tend to separate sound from song and dance, from words and movement. The absence of a word for 'music' resonates with the Namibian philosophy of *ngoma*, which describes the interconnectedness of the arts in sub-Saharan Africa.[5] Another aspect of *ngoma* is the inseparability of composing, performing and listening, three other activities that have split apart in the West.

Africa is the cradle of the musical human, and I shall speculate on its infancy in Chapters 5 and 10. For now, Africa can stand for the musical world outside the West. Most of Asia and South America share the African belief that musicality is a birthright. Just as importantly, their arts are similarly interconnected. Against this baseline of common and richly (not narrowly) defined musicality, the career of the Western musician, from the cradle to the retirement home, can be construed as a kind of fall. Assuming that musical human nature is the same across the world – and I shall interrogate that assumption – then the Western child falls, and fails, at two

hurdles. Every child is a born performer, but most lapse into a state of artistic passivity. Every child is creative, but falls, at the second hurdle, into a misconception that only some are talented. How much of this is due to the complexities of modern urban life simply getting in the way? One study found that 90 per cent of amateur musicians in modern Germany, the home of European music, had interrupted their musical activities between the ages of twenty and sixty because of family and career.[6] Even if the modern teenager is more likely to be messing around with laptops than guitars, the forty-year hiatus in musical life is arresting.

This chapter shines a light on the arc of our musical lives from gestation and infancy through puberty, maturity and death, from amateurs to professionals. There are beguiling questions along the way, all pointing to the immense variety of music. What does bouncing a baby on your knee have to do with polygamy? Or drunkenly circling an Oxford quad anti-clockwise at midnight with an African dance? Why did the West invent teenagers, and to which devil did Beethoven sell his soul? Was Mozart *that* different from you and me, and who was the Carnatic Mozart? Lastly, I shall wonder whether the Western cult of genius is at bottom a disability culture.

It's a shame, because the story begins so promisingly. Then down comes baby, cradle and all.

Beginnings

This is how it starts. The cochlea curls into its snail-like spiral in the sixth week of gestation.[7] Two weeks later it sprouts auditory receptors, the corti. In the eighth week, the foetus acquires ossicles, those small bones in the middle ear. By week eleven, it grows a tympanic membrane with auditory cells, but the apparatus only starts to work in the twentieth week. At this point, a loud noise above 100 decibels will startle the embryo, and make its legs kick and its heart race. By week thirty-six, ear and brain are fully interconnected (via afferent and efferent

nerve fibres), and the human ear is finished. On the cusp of birth, the baby can discriminate a recording of her mother's voice from the real thing. The recording agitates her. After birth, that voice will captivate her. Play the child the sound of a heart beating seventy-two times a minute and she will be soothed, sleep more soundly and gain weight faster.[8]

Scientists have spent a lot of time measuring what the infant listener can do. She can perceive a regular beat from her first day, and will move rhythmically to music, but *not in time with music* until she is four years old.[9] Synchronising to a beat is what nearly all animals can't do. Humans can, but it is interesting that we only acquire this ability slowly. Aged two to five months, babies can tell two rhythms apart; and when they reach seven to nine months, they can recognise the rhythmic pattern even when it is played faster or in a different key. Young children are more sensitive than adults to very high pitch, and to tiny changes in pitch. On the other hand, ask any three-year-old to sing a melody back to you, and they are likely to remember the broad up-down contour, not the exact notes. This propensity stays the same between five months and five years. As for hearing harmonic relationships within keys, that only settles when they are seven years old, an age when, in many ways, a person becomes musically mature.

Why is melodic contour so important for infants, rather than exact pitch? It is because the idea of contour – the up-down arc of intensity – crosses over boundaries between music, language, motion and emotion. Meaning for pre-verbal children is cross-modal because all these elements are blended together seamlessly. The connection between music and movement is especially important, and is due to the vestibular system within our inner ear, which is responsible for our sense of balance.[10] Physical motion drives our musical careers, from motor control of our vocal cords and being bounced or rocked by a parent, to learning to manipulate the keys of a piano, and swaying or beating time. The neural link of auditory and motor systems is almost unique to humans; it is present only in some (but not all) songbirds, and cetaceans such as whales and

(a psychological term for grouping) categories in units of not less than five and not more than seven.[24] Seven is a particularly comfortable set. We have the seven seas; the seven colours; the seven dwarves; the seven notes of the scale. The second thing we have in common is asymmetry. The distance between notes of the scale is almost always irregular. In the West, when we do have a totally regular scale – such as the whole-tone scale, or a chain of major thirds (the octave divides symmetrically into three thirds) – it can sound mysterious or spooky. That is the sound of Paul Dukas's *Sorcerer's Apprentice*, whose motto is a symmetrical chain of thirds. Patel suggests that we use asymmetry to orient ourselves in the world. Think how disorientating it would be to move around a perfectly circular room with all the windows exactly the same distance apart: it would be as confusing as a perfectly circular scale.

Complexities

The thread between child and adult is cut when language comes along and elbows music into its niche. Yet sometimes this thread continues, as when a child *fails* to acquire language, and instead uses music as a proxy for communication. This was the case with the remarkable Romy Smith, a girl born with severe learning difficulties who was taken under the wing of the equally remarkable Professor Adam Ockelford, a foremost authority on music and autism, and Romy's piano teacher. Despite being developmentally delayed, never learning to speak, and displaying many of the characteristics of autism, the eleven-year-old Romy was exceptionally musical, had perfect pitch and used melodic fragments from the 100 pieces of music she had learned to interact emotionally with other musicians and, indeed, to control these interactions. Ockelford helps shatter the myth that children on the autism spectrum can't read or express emotions. Romy enjoys teasing Adam by playing her 'Music has Finished' motif as a joke, not really

intending her music lesson to be over at all, or by playing the opening notes of one melody and veering off into another (such as the Irish song 'Cockles and Mussels', or the Christmas carol 'Away in a Manger', tunes which begin with the same motif).[25] Ockelford points out that such humour requires a sophisticated 'theory of mind': for Romy to make him believe the opposite of what she was thinking meant she had to put herself in his shoes; to imagine another person's consciousness. This is to pick up Malloch's thread several years down the line. For Ockelford, 'music provided Romy with a medium with which to explore the dynamics of social interaction in the absence of language'.[26]

Neuroscientists such as Patel have taught us that, while the brain regions responsible for music and language interact in complex ways, damage to one does not necessarily lead to a deficit in the other.[27] Pamela Heaton, another leading autism expert, has clarified that 'deficits' do not generalise from the social to the musical: that is, a child may have difficulty reading people's faces, but have no trouble identifying whether a musical theme is happy or sad. Nor is this facility affected by intellectual impairment.[28] Like most people, children on the autism spectrum can read musical emotions by the age of six, and achieve mastery when they are eight.

Children with complex needs train a powerful searchlight on the core of the musical human. What emerges from such studies, loud, clear and majestic, is the spectacular power of music. This is why Ockelford eloquently rejects the 'deficit model' that governs our top-down systems of education, by which we measure children's attainment by what they *can't* do. The once-standard term 'deficit' has begun to jar because it is so negative, and because it presupposes an idealised state of physical or cognitive 'normality'. Far more humane, surely, is to begin with what children *can* do. Ockelford's *Sounds of Intent* programme – whose website has had 9 million visits worldwide – is a practical framework for evaluating a child's growing musicality in six rising steps.[29] Young people with the profoundest learning difficulties can be at the six-month

from supportive parents and teachers, self-motivation and sheer hard work rather than pure 'talent'. Actually, in a self-reinforcing feedback loop, success may happen by manufacturing a perception that a child *is* talented.[31]

3. Mozart's facility lay in playing with clichés and patterns absorbed from other people's music. This was entirely normal at the time. Italian conservatoires and foundling hospitals churned out hundreds of child keyboard-composers drilled to their fingertips in the conventions of the classical style. It was the basic training of all composers.[32]
4. His mature masterpieces are no less reliant on conventional patterns strung together. The American musicologist Robert Gjerdingen compares these 'schemata' to the stereotypes of fairy tales ('Once upon a time'; 'There was once a poor miller'; 'Just outside the forest there dwelled a poor woodcutter'), or, more strikingly, the figures strung together by a skilled ice-skater: glides, spins, jumps, salchows, axels, lutzes and camels. Mozart's best-known piano sonata, K. 545 in C major, almost synonymous with the sound of a toy piano, is a chain of *musical* figures: an 'Opening Gambit', such as a 'Romanesca', could be followed by a 'Prinner', an 'Indugio', a 'Ponte', another 'Prinner', and so on. Mozart could easily have improvised this chain of clichés, and probably did, extremely quickly.[33]
5. The crux of Barrington's tale is that Mozart could also imitate *emotional* patterns; the conventional musical expressions of love, rage and other dramatic types. He was a mimic. There is no indication that he understood these adult operatic emotions, or even felt them. It was enough that he knew which musical patterns evoked them.

This final caveat is perhaps the most telling, given the still-raging debate in autism research on the recognition of emotion. Did Mozart have Asperger syndrome?[34] Remarking on another of his students, the exceptionally gifted composer-pianist Derek Paravicini, a blind autistic savant, Ockelford makes a striking observation. Even if the twelve-year-old Paravicini didn't

82 Albert Lord, *The Singer of Tales* (Cambridge, Mass.: Harvard University Press, 2000).
83 Georg Danek and Stefan Hagel, 'Homer-Singen', *Wiener humanistische Blätter* 37 (1995), pp. 5–20.
84 West, *East Face of Helicon*, p. 198.
85 D'Angour, 'Musical Setting'.
86 Thomas Schmitz, 'Reading Greek Literature', in Enmarch and Lepper (eds), *Ancient Egyptian Literature*, pp. 25–44 (pp. 42–3).
87 Charles Rose, *The Archaeology of Greek and Roman Troy* (Cambridge: Cambridge University Press, 2014), p. 90.
88 West, *East Face of Helicon*, p. 163.
89 Friedrich Nietzsche, *The Birth of Tragedy and other Writings*, trans. Ronald Speirs (Cambridge: Cambridge University Press, 1999).
90 Wilson, 'Euripides' Tragic Muse', pp. 440–5.
91 Timothy Power, *The Culture of Kitharôidia* (Cambridge, Mass.: Harvard University Press, 2010), pp. 35–8.
92 Barbara Castiglioni, 'Music, Ritual, and Self-Referentiality in the Second Stasimon of Euripides' Helen', *Greek and Roman Studies* 6 (2018), pp. 247–64 (p. 256).
93 Hagel, *Ancient Greek Music*, p. 6.
94 Eric Csapo, 'Euripides and Tragic Theatre in the Late Fifth Century', *Illinois Classical Studies* 24–5 (1999–2000), pp. 399–426.
95 Ibid., p. 417.
96 Timothy Moore, 'Stinging Auloi, Aristophanes, Acharnians 860–71', *Greek and Roman Musical Studies* 5 (2017), pp. 178–90 (p. 186).
97 Csapo, 'Euripides and Tragic Theatre'.
98 West, *East Face of Helicon*, p. 192.
99 Ibid., p. 284.
100 Egert Pöhlmann and Martin West, *Documents of Ancient Greek Music* (Oxford: Clarendon Press, 2001), pp. 12–13.
101 See the clip on https://www.youtube.com/watch?v=FFE2lYpl4xQ
102 Karl Marx, *The Eighteenth Brumaire of Louis Bonaparte* (New York: Cosimo, 2008) p. 1.
103 Power, *Culture of Kitharôidia*, pp. 3–4.
104 Nicholas Horsfall, *The Culture of the Roman Plebs* (London: Bloomsbury, 2003), p. 40.
105 John Landels, *Music in Ancient Greece and Rome* (London: Routledge, 2001), p. 201.
106 Power, *Culture of Kitharôidia*, p. 7.
107 Timothy Moore, *Music in Roman Comedy* (Cambridge: Cambridge University Press, 2012), pp. 83–4.
108 Power, *Culture of Kitharôidia*, p. 8.
109 Moore, *Music in Roman Comedy*, p. 88.
110 Power, *Culture of Kitharôidia*, p. 8.
111 Günther Fleischhauer, 'Rome', *Grove Music Online*.
112 Landels, *Music in Ancient Greece and Rome*, p. 203.
113 Fleischhauer, 'Rome', p. 9.
114 Horsfall, *Culture of the Roman Plebs*, p. 11.
115 Ibid., pp. 13–14.
116 Power, *Culture of Kitharôidia*, pp. 1–2.
117 Fleischhauer, 'Rome', p. 7.
118 Alain Baudot, *Musiciens romains de l'Antiquité* (Montreal: Les Press de l'Université de Montréal, 1973), p. 30.
119 Ibid., p. 32.
120 Moore, *Music in Roman Comedy*, p. 140.
121 D'Angour, 'Musical Setting', pp. 64–71.

Chapter 7

1 Voltaire, *Essais sur les moeurs et l'esprit des nations* (Paris: Garnier frères, 1963 [1773]), I, p. 683.
2 As Christopher Page notes, the first kings of Spain, France and Italy were not dissimilar from Rome's vassal local rulers. They were just more autonomous than before, and more civilised. See Christopher Page, *The Christian West and its Singers: The First Thousand Years* (New Haven: Yale University Press, 2010), pp. 11–13.
3 Ibid., pp. 270–4.
4 Anthony Birley, *Hadrian: The Restless Emperor* (New York: Routledge, 1997), p. 134.
5 For some of Mesomedes' songs, see Charles Cosgrove, *An Ancient Christian Hymn with Musical Notation: Papyrus Oxyrhynchus 1786: Text and Commentary* (Tübingen: Mohr Siebeck, 2011), p. 141.
6 Jared Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (New York: W. W. Norton, 1997).
7 Karen Armstrong, *A History of God* (London: Vintage, 1999), p. 37.

8 Janet Abu-Lughod, *Before European Hegemony: The World System A.D. 1250–1350* (Oxford: Oxford University Press, 1991).
9 Edward Henry, 'The Rationalization of Intensity in Indian Music', *Ethnomusicology*, 46/1 (2002), pp. 33–55.
10 Page, *The Christian West*, p. 256.
11 James McKinnon, 'Desert Monasticism and the Later Fourth-Century Psalmodic Movement', *Music and Letters* 75/4 (1994), pp. 505–19.
12 Alexander Lingas, 'Music', in Elizabeth Jeffreys, John Haldon and Robin Cormack (eds), *The Oxford Handbook of Byzantine Studies* (New York: Oxford University Press, 2008), pp. 915–38 (p. 925).
13 James McKinnon, 'Proprization: The Roman Mass', *Cantus Planus, Papers Read at the Fifth Meeting*, Éger Hungary (1994), pp. 15–22.
14 Page, *The Christian West*, p. 264.
15 James McKinnon, 'Musical Instruments in Medieval Psalm Commentaries and Psalters', *Journal of the American Musicology Society* 21/1 (1968), pp. 3–20 (p. 4).
16 Alexander Lingas, 'Medieval Byzantine chant and the sound of Orthodoxy', in Andrew Louth and Augustine Casiday (eds), *Byzantine Orthodoxies, Papers from the 36th Spring Symposium of Byzantine Studies* (Aldershot: Ashgate, 2006), pp. 131–50 (pp. 142–3).
17 Page, *The Christian West*, pp. 458–9.
18 Ibid., p. 445.
19 Catherine Bradley, *Polyphony in Medieval Paris: The Art of Composing with Plainchant* (Cambridge: Cambridge University Press, 2018).
20 Cited in Piero Weiss and Richard Taruskin, *Music in the Western World* (New York: Schirmer, 2008), pp. 60–1.
21 Niceta of Remesiana, *On the Benefit of Psalmody*, trans. James McKinnon, https://media.musicasacra.com/media2/niceta.pdf
22 Plato, *Laws,* in John Cooper (ed.), *Complete Works* (Indianapolis: Hackett Publishing Company, 1997), pp. 1318–616.
23 Karla Pollmann, 'Augustine's legacy: success or failure', in *The Cambridge Companion to Augustine*, David Meconi and Eleonore Stump (eds) (Cambridge: University of Cambridge Press, 2914), pp. 331–48, p. 331.
24 Ibid.
25 Francesco Ciabattoni, *Dante's Journey to Polyphony* (Toronto: University of Toronto Press, 2010).
26 Joseph Needham, Ling Wang and Derek De Solla Price, *Heavenly Clockwork: The Great Astronomical Clocks of Medieval China* (Cambridge: Cambridge University Press, 1986), p. 74.
27 Peter Pesic, *Polyphonic Minds: Music of the Hemispheres* (Cambridge, Mass.: MIT Press, 2017).
28 Alejandro Planchart, *Guillaume Du Fay: The Life and Works* (Cambridge: Cambridge University Press, 2018), p. 125.
29 Lorenz Welker, '*Portugaler*: Guillaume Du Fay's Contributions to Instrumental Music?', in Fabrice Fitch and Jacobijn Kiel (eds), *Essays on Renaissance Music in Honour of David Fallows: Bon jour, bon mois, et bonne estrenne* (Rochester, NY: Boydell Press, 2011), pp. 124–37.
30 Lingas, 'Medieval Byzantine chant', p. 146.
31 Ibid., p. 143.
32 William Reddy, *The Making of Romantic Love: Longing and Sexuality in Europe, South Asia and Japan, 900–1200 CE* (Chicago: The University of Chicago Press, 2012), p. 142; George Beech, 'The Eleanor of Aquitaine Vase, William IX of Aquitaine, and Muslim Spain', *Gesta* 32/1 (1993), pp. 3–10.
33 Dwight Reynolds, 'North Africa and the Eastern Mediterranean: Andalusian Music', in Michael Church (ed.), *The Other Classical Musics: Fifteen Great Traditions* (Rochester, NY: The Boydell Press, 2016), pp. 246–69 (p. 251).
34 Ibid., p. 252.
35 Ibid., p. 257.
36 Latin poets tended to avoid rhyme, because it was too easy to do in that language. See Tova Rosen, 'The Muwashshah', in María Rosa Menocal, Raymond Scheindlin and Michael Sells (eds), *The Literature of Al-Andalus* (Cambridge: Cambridge University Press, 2000), pp. 165–89; Sayyid Naqī Ḥusain Ja'farī, *Essays on Literature, History & Society: Selected Works of Professor Sayyid Naqī Ḥusain Ja'farī* (Delhi: Primus Books, 2010), pp. 24–6.
37 Salma Khadra Jayyusi, 'Andalusi Poetry: The Golden Period', in Salma Jayyusi and Manuela Marín (eds), *The Legacy of Muslim Spain* (Leiden: Brill, 1997), pp. 317–67 (pp. 347–50).
38 Salim Al-Hassani, *1001 Inventions: The Enduring Legacy of Muslim Civilization* (National Geographic, 2012).
39 Thomas Christensen, 'Music Theory', in Mark Everist and Thomas Kelly (eds), *The Cambridge History of Medieval Music* (Cambridge: Cambridge University Press, 2018), pp. 357–82 (p. 370).
40 https://www.youtube.com/watch?v=ybMscMHHAQA
41 José Miguel Puerta Vílchez, 'Art and Aesthetics in the Work of Ibn Hazm of Cordoba', in Camilla Adang, Maribel Fierro and Sabine Schmidtke (eds), *Ibn Ḥazm of Cordoba: The Life and Works of a Controversial*

Thinker (Leiden: Brill, 2013), pp. 253–374 (p. 330).
42 Valerie Gonzalez, *Beauty and Islam: Aesthetics in Islamic Art and Architecture* (New York: Tauris, 2001), pp. 69–94.
43 Anna Gade, 'Recitation', in Andrew Rippin and Jawid Mojaddedi (eds), *The Wiley Blackwell Companion to The Qur'an* (Oxford: Wiley Blackwell, 2017), pp. 577–90.
44 Walid Hedari, 'Marcel Khalife's socio-political life: The case of "Oh My Father, I am Yusuf" ', *Methaodos.revista de ciencias sociales* 4/1 (2016), pp. 119–134 (p. 124).
45 Scott Marcus, 'The Eastern Arab World', in Church, *The Other Classical Musics*, pp. 271–94 (p. 282).
46 Shahzad Bashir, *Sufi Bodies: Religion and Society in Medieval Islam* (New York: Columbia University Press, 2011), p. 72.
47 Laura Lohman, *Umm Kulthum: Artistic Agency and the Shaping of an Arab Legend, 1967–2007* (Middletown, CT: Wesleyan University Press, 2010), p. 94.
48 Oliver Leaman (ed.), *The Qur'an: An Encyclopedia* (London: Routledge, 2006), p. 77.
49 *Falsafa* is the Arabic rendering of the Greek pronunciation of *philosophia*, and it described the period from the ninth century AD when Greek philosophy was taken up by the Abbasid Caliphate. The flowering of *falsafa* included such luminaries as Al-Kindi (801–873), Al-Farabi (872–951) and Avicenna (980–1037). Armstrong, *History of God*, p. 203.
50 Jay Bonner, *Islamic Geometric Patterns: Their Historical Development and Traditional Methods of Construction* (New York: Springer, 2017).
51 Marcus, 'The Eastern Arab World', pp. 280–5.
52 *Cantigas* were medieval solo (monophonic) songs, especially characteristic of lyrics in the Galician-Portuguese language. Joseph O'Callaghan, *Alfonso X and the Cantigas De Santa Maria: A Poetic Biography* (Leiden: Brill, 1998).
53 Rosen, 'The Muwashshah', p. 166.
54 Simon Sebag Montefiore, *Jerusalem: The Biography* (London: Phoenix, 2012), p. 212.
55 Richard Widdess, 'North India', in Church, *The Other Classical Musics*, pp. 139–60 (p. 146).
56 Cited in Martin Clayton, *Time in Indian Music: Rhythm, Metre, and Form in North Indian Rag Performance* (Oxford: Oxford University Press, 2008), p. 10.
57 David Beck, 'India/South India', in Jeff Titon (ed.), *Worlds of Music* (Belmon, CA: Schirmer, 2009), p. 268.
58 Sachs, *Rise of Music in the Ancient World*, p. 158.
59 Anne Sheeran, 'Sri Lanka', in Alison Arnold (ed.), *The Garland Encyclopedia of World Music: South Asia: The Indian Subcontinent* (New York: Garland Publishing, 2000), p. 956.
60 Lewis Rowell, *Music and Musical Thought in Early India* (Chicago: The University of Chicago Press, 1992), pp. 35–8.
61 Widdess, 'North India', pp. 142–6.
62 David Clarke and Tara Kini, 'North Indian classical music and its links with consciousness: the case of dhrupad', in David Clarke and Eric Clarke (eds), *Music and Consciousness: Philosophical, Psychological, and Cultural Perspectives* (Oxford: Oxford University Press, 2011), pp. 137–56.
63 Rowell, 'North India', pp. 327–36.
64 Martin Rohrmeier and Richard Widdess, 'Incidental Learning of Melodic Structure of North Indian Music', *Cognitive Science 5 (2017), pp. 1299–1317.*
65 Bo Lawergren, 'Buddha as a Musician: An Illustration of a Jataka Story', *Artibus Asiae* 54/3–4 (1994), pp. 226–40 (p. 227).
66 Ibid., p. 228.
67 Sachs, *Rise of Music in the Ancient World*, pp. 190–1.
68 Clayton, *Time in Indian Music*, p. 17.
69 Regular Qureshi, *Sufi Music of India and Pakistan: Sound, Context, and Meaning* (New York: Oxford University Press, 2006).
70 Bonny Wade, *Imaging Sound: An Ethnomusicological Study of Music, Art, and Culture in Mughal India* (Chicago: The University of Chicago Press, 1998).
71 Ibid., pp. 3–6.
72 Katherine Butler Schofield, 'Learning to Taste the Emotions: The Mughal *Rasika*', in Katherine Butler Schofield and Francesca Orsini (eds), *Tellings and Texts: Music, Literature, and Performance in North India* (OpenBook Publishers, 2015), pp. 407–22 (p. 410).
73 Allison Busch, *Poetry of Kings: The Classical Hindi Literature of Mughal India* (Oxford: Oxford University Press, 2011), p. 151.
74 A stupendous undertaking, *Science and Civilization in China* (1954–1986) was conceived and edited by Joseph Needham, who also wrote or co-wrote many of its twenty-seven volumes, all available from Cambridge University Press.
75 Needham (ed.), *Science and Civilization in China*, Vol. 4, Part 2, *Physics and Physical Technology: Mechanical Engineering* (Cambridge: Cambridge University Press, 1965), p. 582.

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