Moviegoers see two very different wizards in *The Wizard of Oz*. One, whom the citizens of the Emerald City experience as “the Great and Powerful Oz,” possessed vast powers of magic. The other, revealed by the little dog Toto as “that man behind the curtain,” is but a clever technician, an erstwhile citizen of Kansas and performer with the “Miracle Wonderland Carnival Company.”¹ The wizard of Oz is thus a living blend of art and artifice, of enthralling magic and cornball trickery.

Music shares that kind of double life. For the public, it is wizardry in tones and rhythms, all brought to life by a special few who possess a rare gift. For musicians, it is a craft acquired after years of calculated, repetitive practice. In earlier centuries, just as people feared certain types of magic, so they feared the power of certain types of music (e.g., “enchantments” and “incantations,” from the Latin verb “to sing”).² Today most music lovers, like dwellers in an Emerald City of entertainment, still expect their sources of sonic magic to be as great and powerful as possible. For them, music that can approach intense spiritual or emotional heights ought to have truly spiritual or emotional origins. Yet there have always been the curious few who, like Toto, wanted to pull back the curtain to see what is going on behind the show. As mentioned, the object of that curiosity is neither simple nor unified. There is Oz the wizard but also Oz the special-effects charlatan. There are Dorothy’s ears, but also Dorothy’s memories and Dorothy’s mind. There are questions about how the Scarecrow, the Tin Man, and the Cowardly Lion learned to sing, and how, with Dorothy, they developed a social expression of music—“We’re off to see the Wizard, the Wonderful Wizard of Oz.”

Experts in the field of psychology are well placed to study the great and powerful effects of music on the citizenry. And experts in the field of music have the training to understand some of the levers pulled and knobs twisted by “that man behind the curtain.” From the middle of the 19th century onward, these two tribes

¹ Quotes are from the script of *The Wizard of Oz* by Noel Langley, Florence Ryerson, and Edgar Allen Woolf. Based on the book by L. Frank Baum, the script’s last revision was March 15, 1939.

² See Tomlinson (1993). Only in 2010, for instance, did the Free Church of Scotland vote to allow hymn singing and the use of instruments in its worship services.
of experts have pursued parallel paths of inquiry. What began as a trickle of specialist articles and books has grown over time into a torrent of research, and the once quaint idea of studying music as one might study biology or physics has grown into the active academic discipline of the psychology of music, now better known as music cognition. Two best-selling popularizations of this research—*This Is Your Brain on Music* (Levitin, 2006) and *Musicophilia* (Sacks, 2007)—have brought the subject to the popular imagination.

Today the early years of study in the psychology of music are largely forgotten, even though psychologists and musicians from the past made contributions to questions that are still relevant and by no means fully resolved. So in the manner of *Plutarch’s Lives* (Plutarch, c 100 CE), which paired the life stories of “noble Greeks and Romans,” this chapter will examine three pairings of eminent psychologists and musicians who were all pioneers in this scholarly enterprise. Readers may be surprised to learn that for the greater part of a century the musicians, though technical masters of tonal tricks, focused on the perceived magic while the psychologists, students of the mind, focused on the mechanics of special effects.

I. Helmholtz and Basevi in the 1860s

Hermann von Helmholtz (1821–1894) is still considered one of the greatest figures of 19th-century science. Today almost ten thousand scientists work at the institutions of the Helmholtz Association of German Research Centers. No such fame survives for Abramo Basevi (1818–1885), a nonetheless historically important writer on music. Both men trained as medical doctors, but their paths quickly diverged.

An interest in human physiology led Helmholtz to the scientific investigation of the organs of sensation. In the 1850s, he published landmark research on the eye (Helmholtz, 1856–1867). Then in the 1860s he turned to the ear. The title of Helmholtz’s treatise of 1863 laid out his program in the clearest possible terms: *On the Sensations of Tone as a Physiological Basis for the Theory of Music* (Helmholtz, 1863). His working hypothesis might be summarized as “first understand how the ear works and then you will understand why music is the way it is.” In keeping with an avowedly materialist approach to the mind, Helmholtz pursued an objective physiology of sensation as opposed to the subjective study of human moods, feelings, or thoughts. That orientation was conveyed to his most important student, Wilhelm Wundt (1832–1920), who today is regarded as the founder of empirical psychological research, setting up the first such laboratory in Leipzig in 1879.

In his work on the ear, Helmholtz began with a brilliant insight: he could treat the ear as a complex resonator that registers all the component vibrations of a sound. The long row of hair cells on the basilar membrane (the crucial structure of the inner ear) could be likened to a gradated series of tuning forks, each particular tuning fork or hair cell resonating whenever it was exposed to a vibration that matched its own
natural frequency. In a stroke, he married the physics of vibration—with its new mathematical tool of Fourier analysis—to the physiology of the inner ear. He could now compute the consonance or dissonance of any combination of frequencies (e.g., musical intervals or chords) by analyzing the component-by-component interactions and interferences. His results seemed quite close to the intuitions of musicians as reflected by their treatises on harmony and counterpoint.

Many musicians seized on his results as validating their own proposals for a “science of music” and especially a “science of harmony.” That was the case for Hugo Riemann in Germany and Ebenezer Prout in England, both of whom established national pedagogical regimes that continue in many respects to the present day. Historically inclined musicians could see in Helmholtz’s achievement a final realization of the hopes of Jean-Philippe Rameau, the great French opera composer whose own speculative treatise of 1722 was titled A Treatise on Harmony Reduced to Its Natural Principles (Rameau, 1772). And historically inclined physiologists could recognize that Helmholtz had finally explained earlier speculations about the function of the basilar membrane. The following passage from an English popularization of natural science (Martin, 1781) shows that the analogy between the anatomy of the inner ear and a gradated series of musical sounds had seemed apt even long before Helmholtz was born:

Cleonicas: But that which is destined for the more delicate and refined Uses of Hearing, such as the forming and modulating [of] musical or harmonical Sounds seems to be this other second Cavity of the Cochlea, in whose curious and most perfect Mechanism you observe two spiral Windings of Canals, separated from one another by a thin nervous Membrane, supported through its Length by the Projection of bony Laminae, as you may see in this Cochlea by a proper Section through it.

Euphrosyne: I observe it with a great deal of Pleasure; and, as this Winding-passage grows narrower towards the Summit, I apprehend the Fibres of the auditory Nerve, displayed through the same, may be supposed to have some Resemblance to the System of Strings in a Harpsichord, and that in this Part we may expect to find the true Seat of [the] Cause of Concords and Discords, or of the Harmony and Dissonance of Sounds. (pp. 414–415)

Helmholtz’s justly famous treatise, extending to more than 600 pages of academic exposition buttressed by detailed mathematical formulas and arcane references to ancient Greece and the Hebrew Bible, became an authoritative and frequently reprinted reference work. And its chance rebirth in the postwar era as a bargain-priced Dover reprint in English translation (1954) gave it a second incarnation, at least for amateurs, as a trusted source on the “science of music.” Yet in relation to what is now known about the auditory system and music cognition, the

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3 Riemann’s “functional” theories of harmony received wide distribution through his textbook Vereinfachte Harmonielehre oder die Lehre von den tonalen Funktionen der Akkorde (Riemann, 1893). Prout’s Harmony: Its Theory and Practice (Prout, 1889) was reprinted dozens of times and became a standard text across the British Empire.
“great and powerful” Helmholtz was but a showman who did parlor tricks with the cards of 19th-century physics. The hair cells of the inner ear are not like tuning forks (at least not in the way Helmholtz imagined), the “tuning” of the basilar membrane is too broad for it to be the dreamed of “Seat of Harmony,” and the complex temporal dynamics of neural impulses—something Helmholtz had no way to measure or even to detect—are now believed to play a crucial role in many aspects of music perception.

In his defense, one should note that Helmholtz confronted the dynamic art of music without any way to record it or to manipulate it systematically. What he was able to study were the isolated, static frequencies produced by devices like tuning forks or sirens. Modern philosopher Roger Scruton (2009) has argued vigorously that a “tone,” as a cultural artifact, is not reducible to the physics of a waveform or of its production:

I claim that sounds heard as music are heard in abstraction from their physical causes and effects, and assembled in another way, as individuals in a figurative space of their own. Sounds heard as music are heard as tones, and tones are animated by a continuous movement in a one-dimensional space. I describe this “acousmatic” experience as central to musical understanding. Even if we are aware that music is a performance, and that in listening to music we are hearing the real actions of real people, putting themselves into the sounds that they produce, this awareness must be registered in the musical movement if it is to be musically significant. When a violinist strains to produce Bach’s great D-minor Chaconne, it is not the strain in producing sounds that we appreciate, but the legacy of that strain in the virtual world of tones. (p. 7)

Scruton’s cautions were first voiced by Helmholtz’s Italian contemporary, Abramo Basevi. Basevi had left his practice as a physician to work full time on music, both as a composer and as a writer of criticism and analysis. He may have been the first professional composer to have described his art in the language of psychology:

Until now the important phenomenon of musical perception has been thoroughly investigated neither by musicians nor by philosophers and physiologists. Nevertheless it is a phenomenon worthy of careful consideration, for on the one hand it raises a veil covering the mystery of hearing, and on the other hand provides to the musician a principle on which rests the greater part of the edifice of musical science.

The word perception is taken by us in a different sense from many meanings that have been assigned to it. My use of the term, however, is close to that sense attributed to it by philosophers, above all of the Scottish School, regarding the immediate occurrence of sensation, and goes beyond the limits [of that definition]. In the present context [caso], sensation as regards pitch communicates to the mind a simple, isolated impression, satisfying in itself, whereas through perception we are led to desire other pitches, as though there were an affinity between them. If we consider therefore a succession of pitches that impresses us according to the nature of our hearing, we easily observe that these pitches do not operate on the
mind merely as simple, isolated sensations without any connection between them, but constitute, by virtue of certain of their analogous and reciprocal tendencies, an organic whole which acquires, we may say, an individuality. This individuality, which gives life to music, and renders it independent of any external imitation, is not at all to be met with when dealing with a succession of other sensations, such as odors, tastes, or even colors. The so-called harmony of colors, held to be comparable to the harmony of pitches, always remains within the dominion of sensation, and perception has nothing to do with it. This will be better understood when we penetrate more deeply to observe the function of perception of music. We shall then be persuaded that to the sense of hearing alone does any faculty belong similar to that which we call perception, which we qualify as musical rather than acoustical because it is perception alone which renders music possible. (Basevi, 1865, pp. 1–2)

In mentioning “physiologists,” Basevi could have been alluding to Helmholtz himself. But Basevi’s ideas had already found expression in a book on harmony that he published in 1862, the year before Helmholtz’s treatise (Basevi, 1862). In his harmony book, Basevi describes how he came to recognize, likely from his experience composing operas and from his musings as an opera critic (he was the greatest contemporary writer on the music of Verdi), that traditional music-theoretical precepts had not kept up with mid-century developments in the art of composition. Simple rules of what constitutes sensory consonance and dissonance, for instance, were insufficient to describe the dynamics of Romantic harmony (Wagner had already composed Tristan und Isolde and more than half of the Ring cycle). Basevi viewed the old rules as describing a static world of acoustical sensation, whereas the new, dynamic art took its bearings from music perception, a learned and culturally specific set of expectations.

In the jargon of today’s cognitive science, Basevi was one of the first to lay out for music the interdependence of “bottom-up” sensation and “top-down” perception. The former may be largely “hard-wired” and depend on the “hardware” of the ear. The latter is the malleable product of learning, experience, and other forms of “software” developed throughout the auditory system and cerebral cortex. The former ought to be shared by all humans, assuming no organic defects or injuries. The latter would differ as people differ, with small differences between individuals within a social group, and large differences between peoples separated by age, class, belief, education, and all the other components of culture.

Helmholtz was aware of the limitations of his materialist program. In the third part of his treatise, titled “The Relationship of Musical Tones,” he cautioned that physical and physiological universals do not translate into cultural universals. And though he subsequently proceeded to ignore his own caveats, as did his admirers, his words are worth repeating today:

Up to this point our investigation has been purely physical. We have analysed the sensations of hearing, and investigated the physical and physiological causes

4 Emphasis is original; translation courtesy of Prof. Jesse Rosenberg.
for the phenomena discovered,—partial tones, combinational tones, and beats. In the whole of this research we have dealt solely with natural phenomena, which present themselves mechanically, without any choice, to all living beings whose ears are constructed on the same anatomical plan as our own. In such a field, where necessity is paramount and nothing is arbitrary, science is rightfully called upon to establish constant laws of phenomena, and to demonstrate strictly a strict connection between cause and effect. As there is nothing arbitrary in the phenomena embraced by the theory, so also nothing arbitrary can be admitted into the laws which regulate the phenomena, or into the explanations given for their occurrence. As long as anything arbitrary remains in these laws and explanations, it is the duty of science (a duty which it is generally able to discharge) to exclude it, by continuing the investigations.

But in this third part of our inquiry into the theory of music we have to furnish a satisfactory foundation for the elementary rules of musical composition, and here we tread on new ground, which is no longer subject to physical laws alone, although the knowledge which we have gained of the nature of hearing, will still find numerous applications. We pass on to a problem which by its very nature belongs to the domain of aesthetics. When we spoke previously, in the theory of consonance, of agreeable and disagreeable, we referred solely to the immediate impression made on the senses when an isolated combination of sounds strikes the ear, and paid no attention at all to artistic contrasts and means of expression; we thought only of sensuous pleasure, not of aesthetic beauty. The two must be kept strictly apart, although the first is an important means for attaining the second.

The altered nature of the matters now to be treated betrays itself by a purely external characteristic. At every step we encounter historical and national differences of taste. Whether one combination is rougher or smoother than another, depends solely on the anatomical structure of the ear, and has nothing to do with psychological motives. But what degree of roughness a hearer is inclined to endure as a means of musical expression depends on taste and habit; hence the boundary between consonances and dissonances has been frequently changed, similarly Scales, Modes, and their Modulations have undergone multifarious alterations, not merely among uncultivated or savage people, but even in those periods of the world’s history and among those nations where the noblest flowers of human culture have expanded.

Hence it follows,—and the proposition is not even now sufficiently present to the minds of our musical theoreticians and historians—that the system of Scales, Modes, and Harmonic Tissues does not rest solely upon inalterable natural laws, but is also, at least partly, the result of aesthetical principles, which have already changed, and will still further change, with the progressive development of humanity. (Helmholtz, 1863/1875, p. 235)³

The achievement of Helmholtz, as mentioned, was to combine the physics of vibration with the known physiology of the inner ear to arrive at a “purely physical” analysis of the sensory stimuli associated with individual tones, intervals, and chords. Generations of scientists in the field of psychoacoustics have continued down this same road, building on Helmholtz’s grand synthesis and attempting to connect the

³ Quote is from page 235 in the Ellis translation with emphasis as printed.
outer world of physical vibration to its sympathetic twin in the inner world of the human auditory system. Basevi’s contrasting emphasis on “organic wholes,” perceived as such by virtue of cognitive “affinities,” was taken up as the central subject of the Gestalt psychologists in the first decades of the 20th century (Ash, 1995) and has remained a central concern of music theorists to the present day.

II. Seashore and Kurth in the 1920s

In the spring of 1998, governor Zell Miller of Georgia (U.S.A.) secured funds from the Sony Corporation to distribute a compact disc of classical music to the mother of every newborn infant in the state. The governor of neighboring Tennessee quickly followed suit. Each politician was seeking to gain economic advantage for his state by sowing the musical seeds of future economic harvests. The proximate cause had been media claims of a “Mozart effect”—the inference that listening to Mozart would cause a student’s scores to rise on national examinations, hence making Georgia and Tennessee future brain trusts in a world driven by information and science. But the more general cause was the long-held American belief in educational reform, especially reform tied to new technologies, scientific discoveries, and the needs of business.

Carl Seashore (1866–1949), though born in Sweden (né Sjöstrand), was as American as apple pie. He was raised on an Iowa farm and attended a Lutheran college in Minnesota. His hard work and native talent gained him admission to graduate school at Yale, where he earned that school’s first Ph.D. in the new field of psychology (1895). Seashore embraced the newly industrialized and urbanized America, with its legions of factory workers and an elite core of managers. He envisioned an applied psychology aiding managers by bringing them the latest fruits of scientific research.

In his *Psychology of Musical Talent* (Seashore, 1919), he stated that

> The stress of war [WWI] forced our army to adopt psychological methods for the selection and rating of the human energies of men for assignment to service and for promotion. When the best results are demanded in any occupation, haphazard procedure must give way to procedure on the basis of ascertained facts. When Music shall come to her own she will come to the musically gifted: to that end musical talent must be revealed and encouraged.” (p. vii)

He seems to have viewed schools as factories whose products were future workers. Modern schools would need a managerial class to bring efficiencies to each subject, including music. “For the large cities, the most natural solution is the employment of a consulting supervisor of music, who shall be given general charge of the organization of surveys, the adjustment of the curriculum for the introduction of the tests and exercises, the planning of follow-up work, the giving of individual

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6 The CD was titled *Build Your Baby’s Brain Through the Power of Music* (SONY Classical, 1998).
counsel and more intensive examinations, and the adjustment of groupings for instruction in the public schools on the basis of ascertained talent” (Seashore, 1919, pp. 280–281). To “select and rate” future workers for the factories of music, Seashore devised what became known as the Seashore Tests of Musical Ability. These tests actually measured sensitivity to changes in various acoustic sensations (think Helmholtz rather than Basevi). And in spite of the fact that the results of his tests were poor predictors of success or failure in musical pursuits, they were administered for decades to the masses in countless elementary and secondary schools.

Seashore’s type of boosterism was mercilessly skewered in the novels of Sinclair Lewis, especially in the character of George F. Babbitt, real-estate salesman. One can hear a caricature of Seashore’s voice in Babbitt’s address to the Rotary Club:

The American business man is generous to a fault, but one thing he does demand of all teachers and lecturers and journalists: if we’re going to pay them our good money, they’ve got to help us by selling efficiency and whooping it up for rational prosperity! . . . Not till that is done will our sons and daughters see that the ideal of American manhood and culture isn’t a lot of cranks sitting around chewing the rag about their Rights and their Wrongs, but a God-fearing, hustling, successful, two-fisted Regular Guy, who belongs to some church with pep and piety to it. (Lewis, 1922, p. 188)

The real Seashore had pep in abundance and brought prosperity to his chosen field. His energy, his talent for anticipating the needs of business (even during the Great Depression, he received a huge grant from the Bell Telephone monopoly), and his foresight regarding the research potential of new technologies (the phonograph and motion picture in particular) helped to make his laboratory of music psychology at the University of Iowa the world’s leader in the 1920s and 1930s. Working with specially crafted laboratory equipment that could trace the moment-by-moment fluctuations in pitch and intensity from live or recorded performances, Seashore and his talented students pioneered the study of performance nuances like vibrato and portamento (see, e.g., Small, 1936). It was in Seashore’s laboratory that music psychology first engaged with the actual behaviors of living musicians.

At the same time that Seashore was “selling efficiency” and “whooping it up” for an applied psychology of music, Harvard professor Archibald T. Davison (1883–1961) penned a cautionary book titled Music Education in America: What Is Wrong with It? What Shall We Do about It? (Davison, 1926). Davison lamented the generally low standards of school music, implying that shoddy goods turned out with the utmost efficiency and pep remained, nonetheless, shoddy. He pointed to a number of traits missing in the American system that had been traditional in European instruction. Europeans, of course, had not been immune to the wrenching effects of industrialization and had fostered several educational reforms of their own. The European origins of today’s Waldorf and Montessori schools, for example, date from the early years of the 20th century.
A journeyman musician named Ernst Kurth (1886—1946) encountered this reform movement when he accepted a teaching job at an experimental “country boarding school” at Wickersdorf, south of Leipzig, Germany. The school’s guiding lights were Gustav Wyneken (1875—1964), a noted educational reformer, and August Halm (1869—1929), a composer-theorist whose books on music appreciation for the lay reader would set a very high standard and garner praise even from professional musicians. Kurth, with professional-level musical skills and a doctorate in musicology from the University of Vienna, was now faced with teaching children who had no professional aspirations in music. Instead, music was to be a central focus in developing their “intellectual spirit (Geist) and instilling in [them] the highest German cultural values and traditions” (Rothfarb, 1988, p. 5; see also Rothfarb, 2009).

Kurth’s predicament forced him to question how a student ought to obtain an understanding of music. For the philosopher Scruton, following Wittgenstein and Frege, musical meaning requires “understanding.” But does this involve merely acquiring a vocabulary of technical terms or can it be demonstrated by playing rapid scales and arpeggios? Kurth wanted to lead his students toward something deeper, toward some kind of understanding that was worthy of music as an art form and as a proud achievement of German culture. He found his path in psychology. This was not to be the scientific psychology of experiments and data, but a humanistic psychology focused on personal experience and the empathetic engagement with great works of art.

After a year at Wickersdorf, Kurth took up an entry-level position at the University of Bern, Switzerland. In his inaugural dissertation—the postdoctoral Habilitationsschrift expected of all newcomers to the professorate—Kurth laid out a position similar to that of Basevi, namely that the study of psychoacoustics—“tone psychology”—was distinct from the study of music:

More than in acoustical phenomena, the roots [of music theory] lie in psychological phenomena, whose explanations form precisely the fundamental ideas of theoretical systems. . . . As long as tone psychology provides no clearly decisive solution to the basic question [of the transition from acoustics to music] as a foundation for building all systems of music theory, it must be admitted at the outset that our entire music theory cannot do without a certain instinctive character alongside of an objective scientific one. (Kurth, 1913, p. 6)

In Bern, Kurth developed into a prolific author whose books addressed central problems of music history and theory in terms that could be understood by nonspecialists. His language was academic and not an easy read, but it studiously avoided technical jargon or references to arcane authority (a legacy perhaps of his mentor August Halm). Many of Kurth’s leading ideas about Bach’s “linear” counterpoint

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7 Scruton (2009, pp. 33–34): “In his later philosophy Wittgenstein awakens to the true importance of Frege’s insight, that we can speak of meaning only where we can also speak of understanding.”
8 The translation is from Rothfarb (1988, p. 7).
(Kurth, 1917) or about the “crisis” of Western tonality in the works of Wagner (Kurth, 1920) have become, in the intervening decades, part of the accepted view of classical music, even if their origin with Kurth is rarely known. Towards the end of the 1920s, he summarized his whole approach in the book Music Psychology (Kurth, 1931), whose title epitomized his antipathy to “tone psychology.” Because Kurth was suffering the onset of Parkinson’s disease, this book was to become his swan song.

In Music Psychology, Kurth sought to connect the domains of psychology and music without betraying the values of either, all the while presenting the subject in nontechnical language. His underlying premise—that the tones of music are but the external traces of mental and emotional states or processes—comes across in this paragraph on “the sensation of tone as a threshold phenomenon”:

But sound, once perceived, is a transformation that does not come about arbitrarily but rather already exists as a sensual “Gestalt” or “symbol.” It is the inception of the stimulus, while the musical activity first engages it as an actuality. Already here the contrast between tone psychology and music psychology is predetermined. The former [tone psychology] begins with the transformation of a physical into a psychical phenomenon, is thus essentially physiologically oriented and seeks to approach musical laws from that perspective. The latter [music psychology] begins from an entirely different perspective. For music psychology, sound represents a phenomenon that links its processes to the exterior world. Music psychology sensualizes the way in which sound, conversely, represents the sensualization of physical processes. There [in tone psychology], musical tone means incursion into the interior, here [in music psychology] it means eruption from the interior. (Kurth, 1931, pp. 2–3) 9

Like Basevi in the 19th century or Scruton today, Kurth was at pains to point out the distance that separates a sensation of sound from the cognition of an element of human culture, even if Kurth had no special magic to reveal those inner processes of cognition. For him, the dynamism of human will and emotion could be demonstrated best by the art of melody. The “individuality” of a melodic motive or phrase, something pointed out by Basevi, had its origin in the individuality and uniqueness of a series of mental states:

The interaction among different [melodic] components determines not only the overall flow but rather the characteristics of the individual parts, their disposition, and in particular their endpoints. Here too we encounter everywhere the phenomenon that complicated psychological processual conditions lie behind familiar, seemingly simple processual forms. (Kurth, 1931, p. 268) 10

Kurth, in common with most music lovers, felt that something magical takes place when one feels a connection to those “complicated successions of

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9 Translation courtesy of Lee Rothfarb.
10 Translation courtesy of Lee Rothfarb.
psychological conditions.” In many cases, listeners may interpret the “seemingly simple forms” of tones as shared experiences of great depth and richness. They may even judge some pieces of music worthy of being counted among the finest productions of the human mind.

Reading Kurth can be frustrating for a modern psychologist, who will likely search in vain for a clear statement of a testable hypothesis. Yet the manifest difficulties that plague many contemporary studies of, for instance, “musical emotion” may be a symptom of how, in seeking to simplify a phenomenon for experimental purposes, there is the danger of missing the “complicated successions of psychological conditions” that were palpable for someone like Kurth and likely for many music lovers then or now.

III. Francès and Meyer in the 1950s

Psychology changed greatly in the postwar period, and not merely from technical advances. In Germany, for instance, psychology had not been a separate discipline prior to the 1940s (Ash, 1955, p. 49). Before then, psychology had been taught in departments of philosophy as a subfield, “natural philosophy,” with studies of the mind remaining under the purview of philosophers. Official religion in many European states had also been a factor in keeping discussions of the mind from encroaching on doctrinal teachings about the soul. The pioneer psychologists of the late 19th and early 20th centuries had themselves been at such pains to establish scientific respect for their research that they vigorously strove to keep psychology tethered to measurable phenomena with clear correlates in the physical world. Helmholtz’s materialist orientation to the study of music was thus not only practical, given the limitations of technology, but also an acquiescence to what should not be studied by science.

An early reaction against a psychology limited to sensation could be seen in the rise of Gestalt psychology in the years between the great wars. As early as 1865, physicist Ernst Mach (1838–1916) had realized that a melody and a transposed copy of that melody might not share a single auditory sensation (Mach, 1865/1911). As Basevi would have expressed it, the melody and its transposed copy presented the same “organic whole” to the listener. In 1890, philosopher Christian von Ehrenfels (1859–1932) took up Mach’s observation, arguing that listeners who easily recognized the transposition must have based their judgments not on sensations but on a Gestalt quality shared by both sets of tones (Ehrenfels, 1890). The German word Gestalt (“shape” or “configuration”) became the watchword for a more holistic approach to perception.

Carl Stumpf, though a pioneer of tone psychology (in both his and Kurth’s sense of the term; Stumpf, 1883–1890), was a high-ranking professor of philosophy in Berlin. Yet as a graduate student he had shared the same professor with von Ehrenfels, and as a boy he had developed substantial abilities as an amateur musician. These and other factors had made him sympathetic to the potential for a psychology that
focused on the emergent properties of perceived Gestalts. Three of his protégés (all with training as amateur musicians)—Max Wertheimer (1880–1943), Kurt Koffka (1886–1941), and Wolfgang Köhler (1887–1967)—became famous for their work in Gestalt psychology, which they brought to America following the Nazi takeover of German universities. Kurth and others recognized the potential of Gestalt ideas for music psychology, but it remained for a postwar generation of scholars to realize that potential and to participate in what became known as the “cognitive revolution.” In the American context, this meant the eclipse of behaviorism, with its emphasis on observable stimuli and external responses, and the rise of cognitive psychology, with its focus on unseen but statistically demonstrable mental processes and internal representations.

The first great postwar psychologist of music, Robert Francès (1919–), reached the age of 21 the same year that the Nazis reached Paris. As a graduate student at the Sorbonne, he joined the Resistance but was later captured and sent to the concentration camp at Auschwitz. He survived the war, received both the Médaille de la Résistance and the Croix de Guerre, and eventually completed his dissertation, *La Perception de la Musique* (Francès, 1958). From its first pages Francès makes clear that he will cross Kurth’s “threshold” to study the cognition of music, not merely the sensations of sounds studied by Helmholtz or Stumpf:

*The peripheral auditory or visual apparatus is only a threshold at which the message does not stop… But this initial contact is specific: when music is perceived, it is heard as integrated into sonorous forms and brings into play extremely flexible reflex mechanisms, as well as unique activities developed in large measure by education. There is a type of musical perception that has little in common with simple audition; it is to that we devote our efforts here. In all of its complexity, it is identified with a part of the aesthetic experience, insofar as that embraces equally both experience and creation. We can conceptualize it only as a process of development, and never as simply falling under a “stimulus-response” schema. We must distinguish between the effects of acculturation—unreflective, involuntary, and resulting from almost passive familiarity with works—and the effects of education, where perceptual development is supported by the acquisition of concepts and symbols that provide for the definition of forms, their elements and articulations. (Francès, 1958, pp. 2–3)*

How does one do experiments on mental processes that can be neither seen nor felt, and that may lead to no overt behaviors? In the case of music, it was Francès himself who pioneered a number of innovative techniques that made it possible to study the musical mind. His dissertation presented 16 experiments that demonstrated how, through an analysis of listeners’ responses to questions given in carefully designed experiments, one could pinpoint the effects of acculturation and education. His second experiment provides a good illustration of his ingenuity.

Francès cited Seashore’s prewar laboratory as having demonstrated that even the greatest musicians often played some pitches higher or lower than the standard.
Musicians claimed that these deviations corresponded to a tone’s “tendency” to rise or fall. Francèse sought to determine whether listeners shared musicians’ ideas about contextually determined melodic tendency:

> Until now, those phenomena have in effect been presented either as facts, based on the analysis of instrumental playing and vocal interpretation, or as consequences deduced from the precepts of harmonic writing. . . . For a theory of the development of musical perception such as ours . . . [it is important to see] in what measure the precepts of writing have been transformed into perceptual tendencies, resulting in the tonal integration of tones into a whole. . . . If we take as a base the tempered tuning of a piano, and lower the pitch of two of its notes, we would expect this alteration to be less noticeable to the listener when those notes contribute to a structure where they are subject to descending influences (in keeping with the tendencies defined earlier), than where they are subject to ascending influences. . . . [From the empirical results of tests on 22 musically trained subjects] we can conclude that the global impression of correct intonation was greater in the first piece (where the flattening of the critical notes conformed to the descending influences they had each time they occurred) than in the second piece (which exerted ascending influences on the same notes). (Francèse, 1958, pp. 55–60)

The detuning of two tones on a piano calls for no special technology. Francèse’s innovation was to embed each of the mistuned tones in two conflicting contexts. In the musical context where the detuning was in the direction of perceived tendency, listeners were less likely to notice a bad tuning. In the context where the detuning was contrary to the perceived tendency, listeners were more likely to notice something amiss. The same detuned note—the identical sensation—was perceived as in or out of tune depending on the context, which means that the musical perception of tuning is dynamic and depends on the learned musical context. In this and the other experiments, Francèse showed that the mental structures of music perception derive from the “second nature” of experience and not from the facts of acoustics. “The functions of each scale degree . . . are normatively defined by the theory of classical harmony, but through frequent use they come to determine expectancy reactions—momentary perceptions entirely saturated with knowledge or containing a small degree of uncertainty” (Francèse, 1958, p. 78).

“Expectancy” was the starting point for the other great figure of the postwar years, Leonard B. Meyer (1918–2007). Meyer and Francèse had so much in common that it is ironic that they never met and seemed largely unaware of each other’s major works. Like Francèse, Meyer had earned his bachelor’s degree in philosophy, had fought the Nazis in France, read Gestalt psychology with great interest, knew all kinds of contemporary and non-Western music, and wrote a dissertation (1954) that became his most famous book, *Emotion and Meaning in Music* (Meyer, 1956). These two scholars differed relatively little in their outlooks or aims. Both studied, in Basevi’s term, music perception, and both saw music less as a natural outgrowth of physical laws of vibration and more as a culturally specific product of learning and acculturation. But whereas Francèse was a scientist for
whom evidence was statistical, Meyer was a humanistic scholar for whom the best evidence often lay in the artworks themselves. Meyer believed in statistical evidence, but only late in his career did he collaborate with psychologists on empirical studies.

In the scheme of this chapter, Meyer counts as one of the musicians. And it is true that he played the violin and had been a talented young composer who trained with Modernist luminaries like Stefan Wolpe, Otto Leuning, and Aaron Copland. But one of Meyer’s equally influential teachers had been the cultural historian Jacques Barzun at Columbia University, and Meyer’s dissertation was written under the auspices of the Committee on the History of Culture at the University of Chicago with philosopher Charles Morris as one of his supervisors. So Meyer’s *Emotion and Meaning in Music* can be read from a variety of perspectives that include Gestalt psychology, aesthetics, music theory, music history, and the psychologies of emotion, learning, attention, and mental representations.

Take for example his statement of “the central thesis of the psychological theory of emotions”: “Emotion or affect is aroused when a tendency to respond is arrested or inhibited” (Meyer, 1956, p. 14). Meyer illustrated this thesis with many examples of the musical tendencies of individual tones or small configurations of tones. Drawing on the Gestalt psychologists, he pointed out that the tendencies of scalar passages to continue in the same direction is a special case of the Gestalt law of good continuation. And the tendency of a melody to change direction after a large intervallic gap is a special case of the Gestalt law of Pragnanz. Meyer developed these and similar aspects of his work into a system of music analysis in his book *Explaining Music* (Meyer, 1973), and Meyerian melodic analysis was further developed by his student Eugene Narmour (1939—) in *The Analysis and Cognition of Basic Melodic Structures* (Narmour, 1990).

Yet for every quote from *Emotion and Meaning in Music* that describes the bottom-up processing of tones according to universal principles of pattern perception, there are many more quotes that describe the top-down effects of learning, experience, memory, education, and culture. Psychologists and music theorists influenced by Meyer have generally focused on the former whereas musicologists and ethnomusicologists have focused on the latter. The course of Meyer’s own career displayed a gradual shift toward the bigger picture. His last major work, *Style and Music: Theory, History, and Ideology* (Meyer, 1989), addressed the history of 19th-century music within the context of a theory of musical style and compositional choice.

For Meyer, Gestalt principles of pattern perception were but one factor within the complexities of music perception. Equally important was the acquisition of memories for specific musical behaviors. “What Bertrand Russell says of understanding language also applies to the understanding of music: ‘Understanding music is not a matter of dictionary definitions, of knowing this, that, or the other rule of musical syntax and grammar, rather it is a matter of habits correctly acquired in one’s self and properly presumed in the particular work’” (Meyer, 1956, p. 61). Meyer believed that the way to acquire such habits—or what today
one might call procedural memories—was through a listener’s sensitivity to the “probability relationships” in a particular type of music:

Musical styles are more or less complex systems of sound relationships understood and used in common by a group of individuals. The relationships obtaining within such a style system are such that: (a) only some sounds or “unitary sound combinations” are possible; (b) those sounds possible within the system may be plurisituational within defined limits; (c) the sounds possible within the system can be combined only in certain ways to form compound terms; (d) the conditions stated in (a), (b), and (c) are subject to the probability relationships obtaining within the system; (e) the probability relationships prevailing within the system are a function of context within a particular work as well as within the style system generally. The occurrence of any sound or group of sounds, simultaneously or in sequence, will be more or less probable depending upon the structure of the system and the context in which the sounds occur. (Meyer, 1956, p. 45)

His description of a probabilistic system was couched in the terminology of 1950s information theory, but it could as easily describe the outlines of a 21st-century computational study of a musical corpus or a behavioral study of statistical learning.

Helmholtz’s model for auditory sensation resembled a telephone switchboard with wires leading to resonators on the basilar membrane. Much the same model was still valid in Seashore’s laboratory. But the type of music cognition envisioned by Basevi, Kurth, Francès, and Meyer requires a massive memory for the thousands of contingencies, collocations, and associations that together make up a real understanding of a musical culture. It is only thus that a handful of tones could combine and recombine, century after century, culture after culture, into unique webs of meaningful patterns capable of entertaining, consoling, and amazing people for the greater portion of their lives. An emergent property of our vast musical memories may well be musical magic.

IV. Psychologists and Musicians Today

A. Establishing a Foothold in the Academy

The cognitive revolution of the 1950s and 1960s grew and was consolidated in the 1970s and 1980s. In terms of enrollments, psychology now vied with economics for first place at most colleges and universities. The number of scholarly journals dedicated to psychology rose so quickly and the range of topics explored became so great that many of the older, more distinguished journals were forced to subdivide so as to serve individual specialties. Yet while psychology departments

11 An early paper in the cognitive revolution was Tolman (1948). An important book that consolidated the cognitive perspective was Neisser (1967).
expanded and sought to attract scholars in each of the major specialties, few departments chose specialists in music.

The academic pedigree of the psychology of the arts could not have been stronger: Gustav Fechner (1801–1887) had established experimental aesthetics in 1876 as one of the oldest branches of experimental psychology (Fechner, 1876). Yet a century later, funding for research in music psychology could be difficult to obtain from governmental agencies whose priorities were commonly directed toward medicine or industry. Because many if not most modern psychological laboratories are funded by government grants, specialists in music psychology faced an uphill battle. Another problem lay in getting research published in respected journals. In many cases the scholars who evaluated proposed articles in music psychology were not themselves well acquainted with the field.

The problem of funding remains, though the situation has improved somewhat with the recent increase in public interest. The problem of publishing, by contrast, has greatly improved because enterprising music psychologists founded their own journals and established scholarly societies to host conferences where new research could be disseminated in a timely fashion. The editor of this volume, Diana Deutsch (1938—), was among the prime movers during those breakthrough years, and she worked with pioneers in Europe and Japan to help create an international scholarly profile for the new discipline.

The situation in music theory had many parallels with that of psychology, though on a smaller scale. The 1970s saw the founding of a national society in the United States, the founding of a new journal devoted to music theory, and the institution of annual conventions. With its origin in the teaching of basic literacy to young musicians, and with strong ties to avant-garde composition, academic music theory was not well positioned to join in the cognitive revolution seen in psychology. Furthermore the relationship with music psychology became strained when Leonard B. Meyer argued against setting up a separate academic society for music theory. Admitting that secession from the American Musicological Society (AMS) might have some short-term benefits, Meyer nonetheless argued that music theorists would end up talking to themselves and thereby jeopardize their impact on the larger audience. Several theorists from the secessionist faction, most with few ties to the AMS, were irritated by such prominent opposition and essentially banned Meyer and his students from the new society for a decade. That era has finally passed, and in the new century, one of Meyer’s students became president of this

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13 Deutsch developed and edited the first edition of The Psychology of Music in 1982; founded Music Perception, an interdisciplinary journal, in 1983; and was instrumental in setting up both the International Conference for Music Perception and Cognition (1989) and the Society of Music Perception and Cognition (1990). These two societies now meet regularly in alternate years.

14 The Society for Music Theory (SMT) was founded in 1977 and joined the American Council of Learned Societies in 2000. Music Theory Spectrum (Los Angeles: University of California Press) is the official journal of the SMT and was first published in 1979.
same Society for Music Theory. Judging from the number of books and articles connected with music cognition that have recently received awards from the theory society, it seems clear that old wounds have largely healed and that younger generations of music theorists now see research in music cognition as furthering their professional interests in music learning, composition, improvisation, performance, and listening.

The 1970s and 1980s saw not only the emergence of the psychology of music as an autonomous and interdisciplinary academic specialty, but also the fruits of research derived from the increasingly refined techniques of cognitive psychology. Basevi’s belief in the “affinities” of groups of tones found empirical support in a host of studies carried out by Albert Bregman (1936—; see Bregman, 1990), Diana Deutsch, and W. Jay Dowling (1941—), all scholars inspired by the work of Meyer and Francès. And statistical evidence for mental representations of the sense of key or tonality was obtained from studies performed by Carol Krumhansl (1947—), a student of one of the leading cognitive psychologists, Roger Shepard (1929—). Leonard B. Meyer, still active, began to collaborate on studies of musical schemata with the psychologist Burton Rosner (Rosner & Meyer, 1986), and music theorists Eugene Narmour and Fred Lerdahl both collaborated with Carol Krumhansl. Although joint authorship of papers stemming from active collaborations within or across laboratories has long been the norm in science, it is still uncommon in music theory and music history. Music cognition, with its close, more historically oriented twin of “cognitive musicology,” is helping to bring the culture of teamwork to the humanities. And a better term for the recent generation of scholars may be “music psychologists,” since the tribal distinctions between musicians and psychologists have begun to blur within the academy.

Music theorists Narmour and Lerdahl attracted considerable interest from music psychologists because they had expressed their ideas about music expectancy or coherence in terms that offered testable hypotheses, unlike the case with Kurth or Basevi. It is from this period that the field of music cognition began to supplant traditional music theory regarding basic questions like “what is the nature of consonance and dissonance,” “what is the span of musical memory,” “what are the ratios of various performed rhythms,” “what are the effects of musical structure on musical performance,” and so forth. The strong psychological content of these and similar questions was recognized by music theorists and musicians alike. And where academic music theory was tied by tradition and curricular necessity to the repertory of 18th- and 19th-century European concert music, the tools of music cognition

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15 Justin London, one of Meyer’s last doctoral students, became president of the Society for Music Theory in 2007.
16 Books by these distinguished psychologists would include Auditory Scene Analysis: The Perceptual Organization of Sound (Bregman, 2009), The Psychology of Music (Deutsch, 1982), and Music Cognition (Dowling & Harwood, 1985).
17 A good summary of her studies from the 1970s and 1980s can be found in Krumhansl (1990).
could be applied with equal effect to vernacular, traditional, and courtly musics the world over.

B. Disruptive Technologies

Technology has always been a double-edged sword. In the industrialization of 19th-century Europe and North America, it freed millions from back-breaking toil, yet it also condemned millions to repetitive, mind-deadening work in factories. Musicians have alternately hailed and decried each new technology of music reproduction because these technologies change the way musicians reach their listeners. John Philip Sousa, the most prominent American bandmaster in the days of Seashore, thought the newfangled phonograph was a calamity and in 1910 wondered aloud, “What will happen to the American voice now that the phonograph has been invented? Women used to sing lullabies to their children” (quoted in Wilkinson, 2009). Of course a new industry formed to serve the phonograph, and giant companies rose to promote and sell recordings. In the process these companies made fortunes for themselves and brought considerable wealth to the most talented or fashionable of several generations of musicians. The recent shift from the physical to the digital delivery of recordings was tenaciously resisted by these same companies. In the resulting free-for-all of downloading and digital piracy, many musicians have returned to nearly the same economic model that prevailed before Sousa: the live performance of music for small crowds.

Psychologists have generally welcomed each new technology as another weapon in their arsenal. Were Helmholtz and Basevi alive today as medical students, they would certainly need to learn about the important role of computer-assisted imaging in diagnosis. The various new technologies that allow doctors to peer inside the body quickly attracted the interest of music psychologists, who had always dreamed of being able to view a brain in the act of listening. Technologies based on registering the electrical signals in the brain promised new insights into the temporal dynamics of musical thought. Such technologies are good at specifying when an event is registered, though not very good at specifying precisely where. The converse is true for technologies based on the metabolism of sugars in the brain. They can help reveal the “wiring diagram” of the parts of the brain involved in listening, though they are not very good at distinguishing rapid events. Since the 1990s, these imaging technologies have become a major focus of studies in music cognition, and for the general public the pictorial evidence from these studies can seem more real, more certain than the statistical evidence of behavioral studies.

The neurologists and other medical researchers who typically supervise the new imaging technologies have often joined in studies that address particular issues in music cognition. And because music is a “signal” that can be described with some precision and that is relatively easy to apply in experiments (as opposed, for example, to a person’s social interactions), music cognition is beginning to be seen as an important key toward understanding general issues in cognition. Thus specialists in brain studies of music listening like Robert Zatorre and Isabel Peretz have
established international reputations in cognitive science generally.\(^{19}\) Yet not everyone has been thrilled by the rush toward imaging. William Uttal has likened the faddish nature of imaging studies to “the new phrenology” (Uttal, 2001), phrenology being the debunked science of plotting the various “faculties” of the brain according to the topology of bumps on the skull. Given the astounding density of neurons in the brain and the phenomenally complex patterns of their interconnections, learning that some six or seven regions are active in response to hearing Mozart may be no more revealing than flying over the East Coast of the United States at 30,000 feet and announcing that at approximately 7 p.m. lights turn on in six or seven metropolitan centers.

**C. Outmoded, Narrow Theories**

Technology will doubtless make steady progress in improving the spatial and temporal resolution of both current and future forms of brain imaging. The tools available have such great potential and are used by researchers of such ability that much of what we now know of music cognition may be transformed in the coming decades. What could impede that effort are inadequate theories of music. We recognize that the brain has a degree of complexity almost beyond imagination. Yet in music cognition, many studies attempt to demonstrate mental representations of simplistic music theories that were never more than idealized sketches of actual musical knowledge. In traditional societies, including preindustrial Europe, musicians were trained through long apprenticeships, often for 10 years or more. During this rigorous training, the apprentices learned to imitate and internalize hundreds if not thousands of particular models and patterns used by their masters. This was what was meant by learning the “mystery” of a craft,\(^{20}\) and it was control of this mass of detailed knowledge that allowed one to become an independent musical artist. Such was the training of Bach and of almost every famous musician up to the time of Ravel and Stravinsky.

The rise of music schools for the young-adult children of the bourgeoisie in the late 18th and early 19th centuries posed a great challenge for the teacher. These college-age students could not devote themselves to a decade of apprenticeship, and as young adults they could not internalize a musical practice with the facility of a child. Child apprentices could learn music like a first language, whereas older students sometimes found the patterns of music as difficult as a second language. The solution to this pedagogical dilemma was to imagine a science of music constructed on a “science of harmony.” Like a real science, this science of harmony could be developed complete with axioms, theorems, and proofs. The calculus of this pseudoscience would involve manipulations of chords, usually conceived as uniform triads built upon each note of the scale. Privileged successions of these triads, corresponding to the model of simple cadences, would count as a syntax and

\(^{19}\) An overview of their work can be found in Peretz and Zatorre (2005).

\(^{20}\) Apprenticeship is discussed in Stuart (1933, p. 168). For the training of musicians, see Gjerdingen (2009a, 2009b).
This compromise between the truths of musical practice and what a casual student could absorb has been firmly in place since the latter part of the 19th century. Today only specialists in the history of music theory recognize that almost no famous composer from the 18th or 19th centuries could today pass a collegiate examination in basic harmony, so foreign to them would be these classroom concepts.

A similar problem lies in the ethnocentric nature of many theories of music. Experience with diverse musics helps one to avoid confusing the nature of the musical brain with the “second nature” of one particular style. A C-major triad, for example, might seem like a natural element of music to someone in the globalized world of today. But just a few hundred years ago, such a musical artifact could be found only in Europe. No other peoples on earth made such a sound, even after possibly 40,000 years of music making. Were the C-major triad as natural as, say, “natural language,” then even the most technologically backward tribes should all have stumbled upon it after 30 or 40 millennia. The untold possibilities that diverse and equally natural music cultures offer to research in music cognition have only begun to be explored, and it may be some time before fledgling research in this area by innovative scholars like David Huron comes to be recognized as helping to define the cognitive underpinnings of all musics. The very first publication by Leonard B. Meyer was a series of annotations for a set of slides showing an ethno- graphic collection of musical instruments (Rosenthal, 1952), and the author of the present chapter, a student of Meyer, began graduate school in ethnomusicology. Many others who study music cognition share this interest in diverse musics. But the field of music cognition may benefit most directly from the many non-European scholars who have now taken up this work and who may direct the tools of music cognition toward their own musical traditions.

V. A Continuing Challenge

Although no one has yet come to a complete understanding of musical wizardry, the curtain has been pulled back enough to increase, rather than decrease, our appreciation of the art of music and its amazing artificers. A continuing challenge for new research will be to avoid oversimplifying the magic, to avoid reducing it to just a “man behind the curtain” pulling levers.

Permit me to introduce a last unsung pioneer of music psychology, Vernon Lee, the pseudonym of one of the most intriguing of the “eminent Victorians,” Violet Paget (1856–1935). Paget was a wealthy English expatriate living in a villa above

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21 The training of the American composer Walter Piston (1894–1976) is illustrative. He picked up the rudiments of music on his own and learned to play various instruments in the course of jobs with dance bands. After World War I, he enrolled at Harvard, graduating at age 30. He then went to Paris (1924–1926) to study with, among others, Nadia Boulanger. She gave him traditional European training in the apprenticeship tradition. When he returned to Harvard, he published two books on a greatly simplified vision of harmony, Principles of Harmonic Analysis (Piston, 1933) and Harmony (Piston, 1941) that contain few traces of the apprenticeship tradition. The latter book is still in print.
Florence. There she hosted the cream of European writers and artists, including major figures like Oscar Wilde, John Singer Sargent, Henry James, and Edith Wharton. In the last decades of the 20th century, when the letters of this multi-talented woman were finally made available for study (her lesbianism had made her correspondence potentially compromising to friends from her own era), she became something of a hero to feminists. But by this time, her major accomplishments in the history of 18th-century Italian music and her pioneering work in empirical musical aesthetics had been largely forgotten. Though she was cited by both Leonard B. Meyer and Robert Francès, today most scholars in music cognition have never heard of her.

In the years before the First World War, Paget collected detailed responses of almost 150 music lovers to questions about their experiences of music. After the war, and after a number of further delays, she was able to publish her research in book form shortly before her death—*Music and Its Lovers: An Empirical Study of Emotional and Imaginative Responses to Music* (Lee, 1932). The quality of the responses she was given, some extending to three and four handwritten pages in answer to a single question, stands in stark contrast to the modern norm of “On a scale from one to seven, please rate the happiness of the following musical excerpt.” And the detailed information that she received about the musical lives of her respondents—their imagination of music, their ability to recall melodies and harmonies, their skill in improvising, their taste in music, their taste in art and drama—conspired to paint a richer picture of who they were than the typical modern question “How many years of music lessons have you had?”

In studying these questionnaires, Paget was quickly disabused of any simplistic theory of music and emotion. Her respondents were clearly individuals:

*The conclusion became obvious that there existed two different modes of responding to music, each of which was claimed to be the only one by those in whom it was habitual. One may be called listening to music; the other hearing, with lapses into merely over-hearing it. Listening implied the most active attention moving along every detail of composition and performance, taking in all the relations of sequences and combinations of sounds as regards pitch, intervals, modulations, rhythms and intensities, holding them in the memory and coordinating them in a series of complex wholes, similar (this was an occasional illustration) to that constituted by all the parts, large and small, of a piece of architecture; and these architecturally coordinated groups of sound-relations, i.e., these audible shapes made up of intervals, rhythms, harmonies and accents, themselves constituted the meaning of music to this class of listeners; the meaning in the sense not of a message different from whatever conveyed it, but in the sense of an interest, an importance, residing in the music and inseparable from it. (Lee, 1932, p. 31)*

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22 In addition to the London publication (Lee, 1932), the book was published in New York by E. P. Dutton in 1933. Quotations are from the New York print.
If her “listeners” were the ideal Victorian audience for the performance of symphonies and chamber music (what the French called musique savante), then her “hearers” had a more 20th-century experience of music casually incorporated into everyday life, which today would include the iPod as a technological aid for creating “soundtracks” to individual lives:

Even the least attentive “Hearers” have moments, whose frequency and duration depend both on general musical habits and on the familiarity with the particular piece or style of music, of active listening; for they constantly allude to their ability to follow or grasp, as they express it, the whole or only part of what they happen to hear. But instead of constituting the bulk of their musical experience (in such a way that any other thought is recognized as irrelevant) these moments of concentrated and active attention to the musical shapes are like islands continually washed over by a shallow tide of other thoughts: memories, associations, suggestions, visual images and emotional states, ebbing and flowing round the more or less clearly emergent musical perceptions, in such a way that each participates of the quality of the other, till they coalesce, forming a homogeneous and special contemplative condition, into whose blend of musical and non-musical thoughts there enters nothing which the “Hearer” can recognize as inattention, for which, on the contrary, the concentrated musical “Listener” recognizes the lapses and divagations whereof he complains. Moreover, in this kind of hearing the music really seem fewer intrusions from everyday life. Musical phrases, non-musical images and emotions are all welded into the same musical day-dream, and the trains of thought are necessarily harmonious with the music, for if they were conflicting, the music (which is heard though not always listened to) would either drive them away or (as in the lapses of the more musically attentive) cease to play any part. For these intermittently and imperfectly perceived sequences and combinations of sound do play a very important part in these day-dreams. By their constancy, regularity and difference from anything else, they make and enclose a kind of inner ambience in which these reveries live their segregated and harmonious life. (Lee, 1932, p. 32)

In contemplating the narratives of her respondents, Paget came to advocate what today many would term “embodied cognition” as the foundation of central aspects of musical emotion:

There exists another usually unsuspected class of “images,” or shall we say memory, namely of the movements we have made and the posture we have assumed. Nay more: that while such images of movement usually enter consciousness under cover of visual sensations yet it is to “the existence of these schemata that we owe the power of projecting our recognition of posture, movement and locality beyond the limits of our own bodies” [a quote from Dr. Sir Henry Head]. . . . It is such Schemata, such ghosts of past movement, which, evoked by our auditory sensations, inform us not indeed of the movement of sounds in time, for these are dealt with by our sense of present pace and rhythm, but rather of musical spans (which we call intervals), musical directions, upwards and downwards (towards and away from) attractions we call harmonies and discords, in fact imaginary movements mapping out a metaphorical space which we feel to exist as the sound-space.
it is the existence in our own mind of such Schemata of movements and movement’s various modes which accounts for our sense of the stresses and strains, the suspensions and resolutions, the modes of activity of musical sounds, even independently of that distribution in time which we refer to as pace and rhythm. (Lee, 1932, pp. 79–80)

Paget goes on to connect these embodied schemata of motion and posture to memories of affective states, and to locate the special, otherworldly status of musical emotions (as reported by her respondents) to resonances or perceived affinities between patterns of auditory sensations and these affectively laden schemata.

One cannot do justice to her more than 500 pages of discussion in a few paragraphs. But the above excerpts do, I hope, give an indication of the type of sophisticated discussions of music cognition that were actively taking place almost a century ago. What we have gained in methodological rigor and numerical precision since then has sometimes come at the cost of a reductionism that can mistake “that man behind the curtain” for the truly Great and Powerful art form that inspired such research in the first place. Music cognition is heir to a music psychology hard won by generations of musicians and psychologists, and its future will be successful to the extent that its practitioners can help people understand both the artifice and the art of this world of tones.

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