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Interdisciplinarity and Metaphors

Historical Reflections on Music Theory and the Psychology of Music

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Music theory and the psychology of music have maintained a close relationship, especially since the 1980s. Yet, the liaison between these two fields can be further traced back to the late 19th century, the formative period of both modern musicology and psychology. This article deals with those interdisciplinary works of the late 19th and early 20th centuries, which we may refer to as early music psychology marked by the writings of Hermann von Helmholtz, Carl Stumpf, Hugo Riemann and Ernst Kurth.

Instead of tracing the historical origins of current studies, however, this article attempts to contextualize the discourse of early music psychology and identify how these theories were constructed. The linguistic and metaphorical formations that appear frequently in early music psychological writings are examined – in particular the metaphors related to the notion of musical force, most of which were imported from the contemporary sciences such as physics and physiology. An examination of the »source domains« of metaphors such as »life-force«, »living force« and a group of terms related to physical forces reveals different conceptions of the ways in which the boundaries between the natural and mental sciences may be crossed and of different notions of listening to music. To borrow Morris Berman's expressions, we may observe here a shift from »disenchanted« to »re-enchanted« music psychology.

It is often said that the subject matter of psychology (i.e., the human mind) is constructed by practising psychologists themselves, and that changes in psychological language signify psychological change in their own right. The same holds true for the psychology of music. How do we conceptualize music? How does this conception shape the field of music psychology? By evoking such questions, historical and critical reflections on early music psychology may serve to rethink present-day interdisciplinary works between music theory and music psychology.

1. Crossing Boundaries

As is frequently pointed out, music theory and the psychology of music have maintained a close relationship, especially since the 1980s.¹ Yet, the liaison between these two fields can be traced much further back. In the late 19th and early 20th centuries, the history of music psychology and that of music theory overlapped with each other to a significant degree. The researchers in question, to whom we may refer as early music psychologists, were pioneers in the physiology and psychology of music and also the most influential music theorists of their time. Here are just a few examples that illustrate the interdisciplinary relationship between music theory and psychology: Hermann von Helmholtz exerted a strong influence on the music theorists of that period; the psychologist Carl Stumpf and the music theorist Hugo Riemann were familiar with each other's work and mutually influenced each other;

1 For an overview of the relationship between these two fields since the 1980s, see Krumhansl, *Music Psychology and Music Theory* and Cook, *Perception: A Perspective from Music Theory*.

and the Swiss music theorist Ernst Kurth's *Musikpsychologie* (1931) demonstrated a comprehensive knowledge of psychology and was reviewed by many contemporaneous psychologists (though the reviews were not so favourable). In this regard, it is also worth noting that the first volume of Stumpf's *Tonpsychologie* (1883) was the very first book reviewed in the inaugural volume of the *Vierteljahrsschrift für Musikwissenschaft* (1885), the same issue in which Guido Adler's famous article *Umfang, Methode und Ziel der Musikwissenschaft* was published. The reviewer was Alexius Meinong, a philosopher based in Graz, and he notes the significance of the review in the following words:

It bodes well if a journal that has set itself the task of serving *the totality of musicological interest* can inaugurate its incumbent duty of critical reporting by reviewing a book that appears to claim, in a special way, to operate *at the very centre of that great circle of interests*. This is so, both in terms of the object whose scientific treatment [it takes] as its goal and in terms of the manner in which the author pursues this goal.²

Here, the expressions such as »the totality of musicological interest« and »at the very centre of that great circle of interests« point to the interdisciplinary, or rather multidisciplinary nature of the then newly established field of musicology. On this newly formed map of disciplines, music theory began to find a particularly close relationship with psychology, which also took a new shape in the late 19th century.³ The relationship between the two fields was often described as crossing borders. Helmholtz writes, for instance:

In the present work an attempt will be made to connect the boundaries of two sciences, which, although drawn towards each other by many natural affinities, have hitherto remained practically distinct – I mean the boundaries of *physical and physiological acoustics* on the one side, and of *musicology and aesthetics* on the other.⁴

Likewise, Stumpf describes his book *Tonpsychologie* as »a monograph that cuts through the whole of science diagonally, so to speak«⁵ and writes in the first volume of *Beiträge zur Akustik und Musikwissenschaft* (1898):

2 »Es darf wohl als gute Vorbedeutung gelten, wenn eine Zeitschrift, die sich die Aufgabe gestellt hat, *der Gesamtheit der musikwissenschaftlichen Interessen* dienstbar zu sein, das ihr obliegende Geschäft kritischer Berichterstattung durch die Anzeige eines Buches inauguriert kann, das in besonderer Weise Anspruch darauf zu haben scheint, *in den Mittelpunkt jenes großen Interessenkreises* zu treten und dies sowohl dem Gegenstande nach, dessen wissenschaftliche Durcharbeitung es sich zum Ziele setzt, als der Art und Weise nach, in welcher der Verfasser diesem Ziele zustrebt.« (Meinong, *Tonpsychologie von Dr. Carl Stumpf*, p. 127, emphasis added. This and all further translations from German sources are by the author, except for sources where an English translation is provided in the list of references.)

3 1879 is often considered as the »birth year« of modern psychology because it was the year in which Wilhelm Wundt established the first experimental psychological laboratory in Leipzig. As is the case with all disciplines, however, modern psychology came to be established only gradually, by way of a very complicated process that began in the mid-19th century.

4 Helmholtz, *On the Sensations of Tone*, p. 1. Similar expressions are also found in Helmholtz's other writings.

5 »Eine solche Monographie, welche das Ganze der Wissenschaft gleichsam quer durchschneidet...« (Stumpf, *Tonpsychologie*, Vol. I, p. VI).

For »acoustics and musicology«, in this *connection* of the [two] concepts, we take into consideration everything that can be adduced for the understanding of the facts of hearing and of music, be they physical-physiological, biological, psychological, or be they ethnological, music-historical and music-technical observations.⁶

The division between the natural and mental sciences and the locus of music theory on this conceptual map of various disciplines was also a topic frequently discussed by Riemann.

It [i.e., *Musikwissenschaft*] is thus rooted in the *exact sciences*, [such as] mathematics and mechanics on the one hand, and also in the *purely mental sciences* of philosophy, logic and aesthetics on the other; physiology and psychology must constitute *the bridge connecting these extremes*.⁷

In his monograph on the psychology of music, Kurth also adopted similar expressions, but only to distinguish his own programme of music psychology from the earlier paradigm of tone psychology. According to him, the character of tone psychology lies in its seeking »the border between the last and most refined bodily process and the first primitive process of the conscious.«⁸ Tone psychology is therefore »more directed toward the sensorial realm of music than to music itself. [...] Just as tone psychology is grounded on the ›theory of wave‹ and sound, music psychology is grounded on the ›theory of Will‹ and sound.«⁹

These writings describe rather vividly the interdisciplinary character of the field, using similar metaphorical expressions invoking the image of crossing borders between the disciplines. Despite the fact that the expression »interdisciplinary« is a recent invention, there is no doubt that early music psychology in the late 19th century represents (or, endeavours to represent) the ideal of interdisciplinarity: its practitioners pertained to, contributed to and benefited from two or more disciplines, and they consciously attempted to emphasize the interdisciplinary character of their works.

6 »Zur ›Akustik und Musikwissenschaft‹ in dieser *Verbindung* der Begriffe rechnen wir alles, was zum Verständniss der Thatsachen des Hörens und der Musik beigebracht werden kann, seien es physikalisch-physiologische, biologische, psychologische, oder seien es ethnologische, musikgeschichtliche und musiktechnische Betrachtungen.« (Stumpf, *Beiträge zur Akustik und Musikwissenschaft*, Vol. 1 (1898), p. VI, emphasis added.)

7 »Sie [Die Musikwissenschaft] steht daher einerseits auf dem Boden der exakten Wissenschaften, *der Mathematik und Mechanik*, andererseits aber auch auf dem der reinen Geisteswissenschaften, *der Philosophie, Logik und Ästhetik*, und die die Extreme verbindende Brücke haben *die Physiologie und die Psychologie* zu schlagen.« (Riemann, *Grundriss der Musikwissenschaft*, p. 9, emphasis added.)

8 »...die Grenze zwischen letztem, feinstem körperlichen Vorgang und erstem, primitivem Bewusstseinsvorgang.« (Kurth, *Musikpsychologie*, pp. 49f., emphasis added). Note that in Kurth's writings, the critical distinction between tone psychology and music psychology does not lie in the object of these studies, as many later scholars have suggested. More important in distinguishing these two paradigms of study is the methodological approach.

9 »Die Tonpsychologie ist daher mehr auf das Sinnesgebiet der Musik als auf diese selbst gerichtet. [...] Wie sie sich dort [in der Tonpsychologie] auf Wellenlehre und Schall gründete, so hier [in der Musikpsychologie] auf ›Willenlehre‹ und Schall.« (Kurth, *Musikpsychologie*, p. 51.)

2. Metaphors in Interdisciplinary Contexts

The purpose of this article, however, is not to trace the origin of the current idea of interdisciplinarity back to the 19th century, nor merely to reveal the contributions of the so-called »great men« of early music psychology to the interdisciplinary relationship between music theory and the psychology of music, but rather to contextualize these early music psychological writings by examining the intellectual and cultural surroundings and the modes of thought shared by the writer's contemporaries. By doing so, I believe the historical study of a field can provide us not only with knowledge about its past, but also with self-reflective insights upon the present state of our field. More precisely, the issues that concern us here are how this »intersection«, »bridge« or »borderline« between two realms can be conceived and how nineteenth-century music scholars conceptualized the interdisciplinarity of their field.

In an attempt to seek answers to these questions, the framework of the theory of metaphor can be adopted in structuring the account of early music psychological discourse. Following the works of George Lakoff, Mark Johnson¹⁰ and others, metaphor here denotes much more than a figure of speech and represents a form of thought. It structures and defines how we think and experience: we tend to understand one thing (the target domain) *in terms of* another (the source domain), the entire process being dubbed »cross-domain mapping«. In fact, the word »metaphor« comes from the medieval French *metaphore* and Latin *metaphora*, meaning »to carry over« or »to transfer«, thus highlighting the meaning of metaphor as cross-domain mapping. Defined in such a way, metaphors are present in all forms of discourse, even in science, which is commonly considered to contain only strictly literal discourse. Many historians of science have examined the role of metaphor in constructing scientific theories and have spoken of »making truth« rather than »discovering truth«. ¹¹ The role of metaphor in constructing discourse has also been noted in music theory¹², which basically began as an attempt to treat music as an autonomous subject.¹³

From this perspective, what concerns us here are questions such as why certain metaphors are selected and used and how metaphorical thinking reflects and shapes our ideas about music and the mind. Many of the preceding studies on metaphor maintain that metaphor is body-derived and contend for the biological grounding of language. This may be true, but in many cases, metaphor cannot be explained solely as originating in the body. Certain metaphors are chosen more or less consciously in a particular cultural context in order to highlight (or hide) some aspects of the target domain. Hence the role of cultural context in shaping metaphorical mapping is equally significant as that of biological grounding.

Linguistic and metaphoric formations frequently appearing in early music psychological discourse are examined below – in particular, metaphors related to the

10 Lakoff/Johnson, *Metaphors We Live By*.

11 See, for example, Kuhn, *Metaphor in Science*; Feldmann, *From Molecule to Metaphor* and Brown, *Making Truth*.

12 For example, Saslaw, *Forces, Container, and Paths*, Zbikowski, *Metaphor and Music Theory*, Zbikowski, *Conceptual Models and Cross-Domain Mapping* and Spitzer, *Metaphor and Musical Thought*.

13 Here, I am thinking of a relatively recent development in music theory – its establishment as an independent discipline in the second half of the 20th century, especially in North America.

notion of musical force. What makes these force-related metaphors more interesting in our discussion is the fact that these metaphors were brought in from the contemporary sciences, more specifically the »hard sciences« such as physics and physiology. In other words, hard sciences constitute the source domain, from which the early music psychologists borrowed expressions, while music forms the target domain, which they wanted to understand. This is significant, because, as noted above, early music psychology has been repeatedly described as being at the border-region of science and art (or music) and one of its main concerns was »crossing boundaries«. Hence, the examination of metaphorical mappings can reveal the way in which interdisciplinarity across the disciplines was conceptualized. This article addresses how these scientific concepts were incorporated into early music psychological discourse and how they reflect conceptions of music and the mind.

3. Force-related Metaphors in Music Psychology and Music Theory

Historically, *force* has been one of the most popular metaphors in the discourse on music. Plato, François-Joseph Fétis and Jean-Philippe Rameau were among the many who used the metaphor of force when discussing music. In early music psychological writings, however, the metaphor of force and related terms were featured particularly frequently as well as more consistently and systematically than in the works of earlier theorists.¹⁴

Apparently, the main reason why force-related metaphors are used in discourse on music is to highlight the dynamic quality of music. According to the cognitive linguist Mark Johnson, features that play a role in our sense of force include

- interaction or potential interaction;
- a vector quality or directionality;
- a single path of motion;
- origins or sources and goals or targets;
- the degree of power or intensity;
- a structure or sequence of causality.¹⁵

The conceptual metaphor of force is used to highlight these features. In addition, most of the force-related metaphors in early music psychological writings were imported from the hard sciences, as noted above. This may simply point to early music psychology's aspiration to be »scientific«.

If we look into the origins of these metaphors more closely, however, diversity begins to emerge among the various force-related metaphors, and three categories can be identified: (1) life-force (*Lebenskraft*), a metaphor drawn from physiology; (2) living force (*lebendige Kraft*), drawn from physics; and (3) a group of terms related to mechanical force and energy (*Energie*), also drawn from physics.

14 Rothfarb provides a review of »the energeticist school« of music theory. See Rothfarb, *Energetics*. For a brief review of historical precedents in the theory of musical tension, see Lerdahl, *Tonal Pitch Space*, pp. 166f.

15 Johnson, *The Body in the Mind*, pp. 43f.

Let us begin by considering the first two categories. Riemann, who frequently employed spatial metaphors and later formulated a theory of musical imagery (*Tonvorstellungen*)¹⁶, also used the dynamic metaphor of force in his writings.¹⁷ Riemann's motif is conceptualized not as a stagnant entity, but rather as a unit of force, and the structure of the normative 8-bar period as a whole is explained by the interplay among the forces of its components – forces, which are, as Riemann warned, not to be confused with the acoustical intensity of tones.¹⁸ He even attempted to graphically represent the dynamic values of rhythmic patterns.¹⁹ As such, Riemann's conception of rhythmic motifs indicates the characteristic features of the force metaphor mentioned by Johnson, in particular the »interaction or potential interaction between entities« and »the degree of power or intensity«.

In naming this dynamic quality, Riemann used two expressions interchangeably – »life-force« and »living force«. The two phrases may sound similar but the contexts in which they are used are very different. Compare the following quotations:

The smallest segments into which musical structures can be analyzed [...] are not [mere] chains of otherwise indistinguishable elements. Rather, each of them represents a small organism of individual life-force; hence the name motif (element of motion) is precisely suitable for them.²⁰

Just as the essence of the harmonic-melodic is variation of pitch, so too the essence of the metric-rhythmic is variation of living force: of loudness (dynamic) on the one hand, and of speed of note succession (agogic, tempo) on the other hand.²¹

The difference between these two metaphors becomes clearer when we look into the sources from which they are borrowed. The metaphor of life-force is borrowed from late eighteenth-century physiology and organic chemistry. It designates some kind of power that was believed to be inherent in organic living beings. Under the influence of the physician and chemist Georg Ernst Stahl (1660–1734), many late eighteenth-century physicians and natural philosophers, such as William Cullen (1710–1790)

16 See Riemann, *Ideen zu einer »Lehre von den Tonvorstellungen«, Neue Beiträge zu einer Lehre von den Tonvorstellungen and Die Phrasierung im Lichte einer Lehre von den Tonvorstellungen*.

17 See, for example, Riemann, *Musikalische Dynamik und Agogik*.

18 To quote Riemann: »The musician defines the concluding meaning (concluding force) of the second vis-à-vis the first since ancient times as *weight*-intensification (not to be confused with *tone*-intensification!).« [»Die abschliessende Bedeutung (Schlusskraft) des zweiten gegenüber dem ersten, definiert der Musiker seit Alters als *Gewichtsverstärkung* (nicht zu verwechseln mit *Tonverstärkung*)!.« (Riemann, *Symmetrie oder Parallelismus?*, p. 146.)

»The signs do not express the real dynamic shading, which is, as we know, dependent upon various other factors, but rather only the *dynamic power* of the motifs in a purely metric-rhythmic sense.« [»Die Zeichen drücken also hier nicht die effektive dynamische Schattierung (die ja doch von verschiedenen andern Faktoren mit abhängig ist, wie wir wissen), sondern nur die *dynamische Potenz* der Motive in rein metrisch-rhythmischer Bedeutung aus.«] (Riemann, *Musikalische Dynamik und Agogik*, p. 205.)

19 See, for example, *ibid.*, pp. 143f. and 148.

20 »Die kleinsten Glieder, in welche sich musikalische Gebilde zerlegen lassen, die Tongruppen von zwei oder drei Einheiten, sind nicht Verkettungen übrigens unterschiedsloser Elemente, vielmehr repräsentiert jede derselben einen kleinen Organismus von eigenartiger Lebenskraft; mit Recht kommt ihnen daher der Name Motiv (Bewegungselement) zu.« (*Ibid.*, p. 11.)

21 »Wie das Wesen des Harmonisch-Melodischen die Veränderung der Tonhöhe ist, so ist das Wesen des Metrisch-Rhythmischen die Veränderung der lebendigen Kraft, einerseits der Tonstärke (Dynamik), andererseits der Geschwindigkeit der Tonfolge (Agogik, Tempo).« (*Ibid.*, p. 10.)

and Robert Whytt (1714–1766), argued for a principle unique in living things. In the mid-19th century, the concept of life-force and vitalism resurfaced briefly in the life sciences, especially in the works of Johannes Müller (1801–1858), but was soon met with severe criticism, particularly from Rudolf Hermann Lotze (1817–1881) and Justus Liebig (1803–1873). Although it was a technical term in eighteenth-century physiology, life-force was often regarded as something equivalent to soul and was tinged with a spiritualist mode of thinking, hence it later came to be condemned in late 19th-century empirical and scientific psychology.²²

On the other hand, the phrase »living force« was borrowed from mechanical physics: it was the translation of Gottfried Wilhelm Leibniz' *vis viva* – the force of a body in motion measured by the product of its mass and square of its velocity (mv^2).²³

Riemann might have used these terms without any conscious awareness of their precise meanings in scientific usage. In fact, there is a passage in *Musikalische Dynamik und Agogik* where he used the term life-force in the sense of mechanical living force – in the sense of a force that varies according to two variables of pitch and dynamic, corresponding to the »mass« of music.²⁴ Nonetheless, it is also possible that Riemann was aware of the scientific definitions of these terms: throughout his life, Riemann tried to keep up with trends and developments in the contemporaneous sciences. It is also noteworthy that Riemann maintained a close relationship with Lotze who became famous because of his criticism of life-force. The application of the notion of force in physiology, according to Lotze, presented »a wretched view« (*einen trostlosen Anblick*).²⁵ Putting aside this circumstantial evidence, it is certain that a comparison of Riemann's usage of these terms as quoted above shows two considerably different and conflicting conceptions of music, which existed in tandem in one theorist's writings. In the first passage, the motif is referred to as a small organism, revealing the idea of organicism. In contrast, in the second passage, music is objectified and materialized and can be »measured« by the product of its dynamic and tempo.

The metaphor of life-force that was drawn from physiology also appeared in the music-theoretical writings of other music theorists such as Heinrich Schenker and Arnold Schönberg, manifesting their organic conceptions of music as a living whole.²⁶ The mechanical notion of force imported from physics also continued to appear in later music-psychological writings, but these later usages illustrate yet another conception of music and the mind, thus forming the third category in our discussion.

Kurth developed his theoretical system entirely based upon the conceptualization of music in terms of force. He presupposed attracting forces of all tones for all other

22 The history of the idea of force and life-force cannot be presented here comprehensively, due to the limitations of space. This history is, however, highly related to the history of early music psychology, especially its aspiration for »scientificity« (*Wissenschaftlichkeit*). See Kim, *Theories of Musical Hearing*, chapter 1.

23 It is also noteworthy that the very first usage of the term »energy« by the English polymath Thomas Young (1773-1829) was in the sense of *vis viva*, now called »kinetic energy«. The transformation of living force to kinetic energy thus raises an interesting point in our discussion of Riemann, who used the term »living force«, and Kurth, who employed the term »kinetic energy«.

24 Riemann, *Musikalische Dynamik und Agogik*, p. 173.

25 See Lotze, *Leben: Lebenskraft*, p. xix.

26 See Saslaw, *Life Forces*.

tones and further identified various forms of musical forces such as »musical gravity« (*musikalische Schwerkraft*) and »leading-tone tension« (*Leittonspannung*), which can conflict with one another. This not only points to the first and second features of the force metaphor noted above (i.e., »interaction between entities« and »directionality«) but also reminds us of some of the recent studies on musical force, although their definitions of each type of musical forces are different from those proposed by Kurth.²⁷

Kurth continued to use metaphors drawn from physics in his writings. In physics, »kinetic energy« designates the energy of motion and »potential energy« denotes the energy stored within a physical system that can be converted into other forms of energy. For Kurth, kinetic energy is the force of melodic motion that unfolds in the horizontal and temporal dimension, whereas potential energy refers to the force that is contained in the vertical dimension of music, i.e., the chord. In his last monograph *Musikpsychologie*, Kurth applied the metaphor of force to the experience of music as a whole and dubbed music the play of forces (*Kräftespiel*), »the constant interaction of kinetic and potential energy«. This metaphor of force highlights something fundamentally different from the spatial metaphor of imagery that features as the central concept in the earlier paradigm of music psychology, especially the one proposed by Riemann. The strong association of musical imagery with concrete visual images was precisely what Kurth disputed with his metaphor of force. The dynamic quality of his conceptualization of music cannot be described by stationary spatial representation.

As such, the force metaphor serves to accentuate the dynamic quality of music and, as in all other cases of metaphorical mapping, this is based upon the similarity between the source domain and the target domain. At the same time, Kurth's metaphor of force and energy is essentially different from the use of the same metaphor by other writers, in that he noted not only the similarity but also the dissimilarity between the two domains. According to him, physical forces and musical forces are different because:

*Physical forces become recognizable only in their effects. Their measure lies in the acceleration that they bestow upon a mass, in the work performed during a certain [period of] time. [...] Hence, there [i.e. in physics], mass is the primary, the prerequisite for the concept of force. In music it is the other way round in so far as only the sensation of force engenders the impression of mass in tones [...].*²⁸

Kurth claims that it is the listener who breathes energy into the tone. Hence, despite the use of terms borrowed from sciences, Kurth's music psychology points to metaphysics. For Kurth, sensing musical force is conceived as active, rather than passive.

27 For example, see Larson, *Modeling Melodic Expectation*; Larson/VanHandel, *Measuring Musical Forces* and Lerdahl/Krumhansl, *Modeling Tonal Tension*.

28 »*Physikalische Kräfte* werden nur an ihren Wirkungen erkennbar. Ihr Mass liegt in der Beschleunigung, die sie einer Masse verleihen, in der während bestimmter Zeit geleisteten Arbeit (sei es räumlicher oder innerer Veränderung der Masse). Die Masse ist also dort das Primäre, Voraussetzung für den Kraftbegriff; in der Musik ist es insofern wieder umgekehrt, als erst die Kraftempfindung den Maseeindruck in den Tönen erzeugt, die an sich (physikalisch betrachtet) von Masse frei, kein Gegenstand, sondern Reize sind.« (Kurth, *Musikpsychologie*, pp. 104f.)

This is in a stark contrast to the writings of Helmholtz. Being a scientist, Helmholtz rarely used metaphorical language but he did use the metaphor of force and motion in discussing melody:²⁹

All melodies are motions within extremes of pitch. [...] Every motion is an expression of the force, by which it is produced, and we instinctively know how to assess the driving forces when we observe the motion produced by them. This holds equally and perhaps more for the motions due to the expression of the force of the human will and human impulses.³⁰

Both theorists saw melody as motion and used metaphors drawn from physics, but their conceptions of music and its study were completely different. Whereas Helmholtz's conception concerns the force we receive from the tonal stimuli, Kurth claims that there is another energy, which we, as listeners, breathe into the tone. Again, this can be better understood if we go back to the origin of the metaphor. Among the factors that may have influenced Kurth's holistic and dynamic conception of music are developments in the contemporaneous sciences. In physics, the German chemist Wilhelm Ostwald (1853–1932) proposed the theory of »energetics« (*Energetik*) against the atomistic-mechanical viewpoint, and in biology, Hans Adolf Eduard Driesch (1867–1941) further developed the Aristotelian notion of entelechy. In fact, Kurth quoted Driesch's criticism of contemporary psychology³¹ several times in his *Musikpsychologie*. Instead of attempting to point out the association between Kurth's theory and a specific field of science of that time³², however, we may perhaps reflect upon the underlying principle for his employment of the analogy of force in the first place. The notions of force and its more modern counterpart, energy, have been elusive concepts, even as scientific terms, throughout history. The early definitions of force in the pre-scientific ages intermingled with spiritual elements such as human will power and a metaphysical sense of causal activity. It was Isaac Newton who formulated force as a mathematical concept and judiciously sought to avoid the criticism of force as an occult concept. Still, a vestige of spiritual elements remained (even with Newton and afterwards) and it was precisely this allusion to the psychic dimension that plays an important part in Kurth's metaphorical mapping from physical force to musical one.

29 The intellectual history of the concepts of force and energy and its relation to the development of music-psychological theories are more complicated than the sketch given here. For one thing, Helmholtz was one of the first scientists who established the principle of conservation of energy. This discovery in physics was made in the philosophical background while Helmholtz was rejecting the mysterious notion of life force proposed by *Naturphilosophie*. Such an idea hence manifests Helmholtz's materialistic thoughts on the relationship between mind and the body and is related to the nature of his theory of tone-sensations, which in turn influenced the works of many music theorists in the 19th century. See Kim, *Theories of Musical Hearing*, chapters 1 and 2.

30 Helmholtz, *On the Sensations of Tone*, p. 250.

31 Driesch, *Grundprobleme der Psychologie*. I thank Helga de la Motte-Haber for drawing my attention to Driesch's writings.

32 For a discussion of the relationship between Kurth's theory and contemporary science, see Rothfarb, *Ernst Kurth in Historical Perspective* and Krebs, *Innere Dynamik und Energetik*.

4. Conclusion: From »Disenchanted« to »Re-enchanted« Music Psychology

To summarize, force-related metaphors commonly discussed in late nineteenth and early twentieth-century music psychology are closely related with contemporary sciences, such as physiology and physics, thereby pointing to the interdisciplinary nature of early music psychology. A further examination of the source domains of these metaphors, however, reveals different conceptions of music and the mind, and accordingly different notions about the nature of the field studying the relationship between the two. This is to say that the interdisciplinarity of the field was a common interest of early music psychologists, but each of them had different ideas about how it could be achieved. Examining further how the force-metaphor from science was used in music-psychological discourse may bring to light different conceptions about the ways to cross the boundaries between the natural and mental sciences.

The metaphor of force can also address the issue of agents when listening to music. Sometimes the metaphor of mechanical force (or force as effect) exemplifies the notion of music as being objectified and materialized, and its study as being scientific and quantitative; at other times, the metaphor of force as causal activity points to a more or less subjective and spiritualistic side of music and the mind, and its study points more toward metaphysics. To use Morris Berman's expression, we may describe it as a shift from »disenchanted« to »re-enchanted« music psychology.³³

It has been pointed out that the subject matter of psychology (i.e., the human mind) is constructed by practising psychologists themselves and that changes in psychological language signify psychological change in their own right.³⁴ The same holds true for the psychology of music, I believe. How do we conceptualize music? How does this conception shape the field of music psychology? In posing these questions and searching for answers to them, historical and critical reflections on early music psychology may come to be more immediately relevant to us.

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