

MUSIC AND PERCEPTUAL COGNITION¹

Roger E. Bissell

It was a symphony of triumph. The notes flowed up. They spoke of rising and they were the rising itself, they were the essence and form of upward motion, they seemed to embody every human act and thought that had ascent as its motive. It was a sunburst of sound, breaking out of hiding and spreading open. It had the freedom of release and the tension of purpose. It swept space clean, and left nothing but the joy of an unobstructed effort. Only a faint echo within the sounds spoke of that from which the music had escaped but spoke in laughing astonishment at the discovery that there was no ugliness or pain, and there never had had to be. It was the song of an immense deliverance. (Rand [1957] 1992, 20)

1. Introduction

In recent essays touching on the nature of music, literature, and art in general (Bissell 1997b; 1998a; 1998b; 1998c), I have sought to clarify the meaning of a crucial component of Ayn Rand's definition of "art" (Rand 1965)—viz., art as a "re-creation of reality"² (19)—and to address the question of what reality *music* re-creates. I have argued that Rand's definition is essentially correct and derives from the insight that art is one important form in which human beings are able to create a world-in-miniature, a *microcosm*.³ The frame for the painting, the pedestal for the statue, the proscenium for the stage—these all mark the esthetic boundary between this world and the world of an artwork, and they all testify to the truth of Rand's definition. Even for the problematic case of music, Rand (1971) has got it right: "... the nature of the music represents the concretized abstraction of existence—i.e., a world in which one feels joyous or sad or triumphant or resigned, etc. . . . [O]ne feels: 'Yes,

this is my world and this is how I should feel!' or: 'No, this is not the world as I see it'" (61). Art (including music) is the creation of *another version* of this reality (hence, reality is re-created), a micro-world containing some of the *kinds* of things—including emotions—that are present in this world, though not necessarily attempting to replicate *particular instances* of those kinds.⁴

Further, while the emotions are undeniably a *real* aspect of reality and should not be denied the status of representation in music merely because they are internal processes, music is by no means unique in functioning as a "language of the emotions." In so functioning, music must follow pretty much the same general procedures as literature and drama at *their* most effective. In general, while emotion-related impressions and series of events *must* be conveyed by *some* means, they *may* be conveyed by *any* means consistent with the nature of art as re-creation of reality. In particular, if concrete-level emotions are to be suggested by music, it is by presenting a *musical* analogy to the internal and external physical accompaniments of the emotions; and if abstract-level progressions of emotions are to be suggested by music, it is by presenting a series of *musical* events that entice the listener to engage in a progression of mental processes that generate, develop, and resolve (or thwart) his expectations. In this respect (and at some risk of oversimplification), the physical accompaniments of emotions are conveyed by *characterization* in literature and music, while the progressions of emotions are conveyed by *plot* in literature and music. Musical characterization is the composer's means for inducing listeners to experience a melody as if it were a single dynamic musical entity behaving in a certain way and/or having things happen to it—and musical plot is the composer's means for inducing listeners to experience a musical form as if it were a single dynamic musical *process*, an intricate system of means and ends (or causes and effects) aiming at a certain musical goal(s) (Bissell 1998a, 7).

While the nature of concrete-level characterization and action in music has been the subject of much disagreement, purposefulness or goal directedness in music, conveyed by progressions of musical events analogous to plot in literature, has long been acknowledged by music theorists and laymen alike.⁵ Thus, although Rand might plausibly be excused for not seeing the parallel between melody and concrete-level actions of literary characters, the major emphasis that she places on the presence of teleology or goal-directedness in Romantic literature⁶ leads one to reasonably expect her to have incorporated insights about that factor into her writings on music. Indeed, her essays are rife with

statements about both plot and characterization that can be directly extended to music.⁷ Moreover, some of her own best esthetics theorizing would seem to *demand* such application. Commenting on the "popular notion that a reader of fiction 'identifies himself with' some character or character(s) of a story," Rand (1966a) explains that "to identify with" is "a colloquial designation for a process of abstraction: it means to observe a common element between the character and oneself, to draw an abstraction from the character's problems and apply it to one's own life. Subconsciously, without any knowledge of esthetic theory, this is the way in which most people react to fiction *and to all other forms of art*" (37, first emphasis in original, second emphasis added).⁸ Presumably "all other forms of art" is intended to include music, yet the reader of Rand's 1971 essay "Art and Cognition" would scarcely realize that we respond to music in this way—that there is indeed an *existential* basis for our identification process in music, and not just a rather vague sort of abstraction suggested by the interaction between our stored memories and values and the cognitive processes taking place during musical perception⁹—that, as listeners, *we do, in fact, identify ourselves with the tones and melodies taking place in music*, as surely as if they were characters in a novel or a play, and that *we do, in fact, get drawn into progressions of musical events*, as surely as if they were the events in the plot of a novel or play.¹⁰

The process of identification, as described by Rand (1966a) and Koestler (1964), however, is almost too cerebral, too intellectualized a process to completely account for our emotional attachment to an unfolding literary or musical process. The missing key ingredient is *empathy*, the awareness that one has an internal sense of—one feels "in one's gut," so to speak—what another person is feeling, or what feeling a character or musical passage is portraying. It is the closest that human beings can come to mental telepathy, the *impression* that they are actually inside another person's skin or head, experiencing what the other person is going through. This impression, paradoxically, arises from one's own internal body awareness which, though distinguished from perception of the world outside one's body by various labels such as "sensation," "proprioception," or "interoception," is *also* a form of perception.¹¹ When one attributes one's own internal body state to a person or character that one is raptly observing, this completes the emotional circuit that makes one's identification with that person or character fully and convincingly real. Much the same thing happens in musical experience in which, for example, the tension in one's perception of dissonant musical tones or

one's uncertainty about what is going to happen next is projected back into the music, and a melody is perceived as anguished or a musical passage as suspenseful. Once one's own inner state is projected onto another person or character or musical passage (especially melody), the emotions portrayed by the "body language" and goal-directed actions are attributed with the flavor of one's own experience and thus acquire the semblance or appearance of *real* emotions.¹² This is the mechanism underlying psychological identification in general, which more specifically allows not just music, but all of the dramatic arts to function as a "language of the emotions." As such, it is also the basis of the experienced similarity between music and literature, all of the necessary ingredients for the identification of which, as noted, Rand seemed to possess.

On the contrary, however, in stark contrast to her moving description of Richard Halley's "Concerto of Deliverance" in the fictional passage quoted above, Ayn Rand's last, best attempt to explain our experience of music is flawed by the signal failure to even acknowledge, let alone explain, this extensive structural and functional analogy between music and literary drama, as well as the fundamental similarities in our responses to them. Fully redressing this shortcoming in the Objectivist esthetics will require consideration of the musical, psychological, and physiological factors that underlie the analogies to spatial location and motion and goal-directedness. While the latter analogy has been extensively treated, the former has not; so a major aim of this essay will be to establish the basis for our perception of location and motion in music. Also, however, since certain fundamental misconceptions in Rand's view of musical cognition serve to obscure these analogies, and may, in fact, have had such an inhibiting effect on her own thinking and writing on the subject of music, this essay will also serve as a first installment of needed critical and reconstructive work on Rand's esthetics by addressing and correcting certain errors in her epistemology. Through no small irony, some of Rand's best esthetics theorizing appears to have fallen victim to her faulty epistemologizing. Given, then, the primacy she accorded to epistemology (in relation to esthetics), it seems appropriate to begin the task of salvaging her vision of a unified esthetics theory¹³ by carrying out a more careful consideration of the nature of our awareness of musical tones.

2. The Cognitive Status of Musical Tones

As the point of departure for her remarks on the nature of music, Rand focused on the cognitive status of musical tones, which she

erroneously regarded not as percepts, but as sensations. The error derives from her failure to adhere to her earlier correct view of the nature of sensations themselves. While, in her monograph on epistemology (1966b), Rand correctly characterized sensations as being chaotic, undifferentiated, unisolated, and unretained (5), in her final essay on esthetics (1971), she unfortunately referred to single—which would seem to imply *isolated* (or, at least, isolatable)—musical tones as "pure sensations" (59). Rand could have avoided this conceptual and terminological inconsistency by simply keeping sight of the fact that musical tones are not (usually) chaotic, undifferentiated, and unretained. Instead, however, she adopted a view of musical tones that committed her to the untenable position that while all sensations are, by definition, undifferentiated, etc., a particular type of sensation (a musical tone) is *not* undifferentiated, etc.

Rand's earlier view is that of psychologist William James, who held that we experience "sensations" only during a certain period in early infancy prior to our first perceptual awareness of external objects. Before we are capable of perceiving entities, our world is, in James' words, a mass of chaotic sensations, a "bloomin' buzzin' confusion" ([1890] 1950, 456). Pure sensations, James says, "can only be realized in the earliest days of life . . . A pure sensation [is] an abstraction never realized in adult life" (502). Rand (1966b) clearly echoes James when she says that "[s]ensations as such are not retained in man's memory, nor is man able to experience a pure, isolated sensation. As far as can be ascertained, an infant's sensory experience is an undifferentiated chaos" (5). Her later view, however, is that of physiologist Hermann von Helmholtz, who maintained that we are aware of tones as discrete, particular "sensations" ([1863] 1950, 62-65).

Helmholtz said much that is enlightening on the subject of musical cognition and, to her credit, Rand was very astute in grasping the importance of Helmholtz's ideas to a proper understanding of musical experience. It is clear from the context of his writings, however, that Helmholtz simply did not mean the same thing by the term "sensation" that James does. We are, in fact, aware of musical tones as discrete, particular items of consciousness, as Helmholtz and Rand maintained. It is precisely for this reason that we ought to follow James in regarding them as *percepts*, not sensations. Helmholtz himself repeatedly referred to the act of distinguishing tones from one another as *perceiving the sensation of tone* (62-65). Helmholtz was partly correct: this *is* an act of perception. It is not the perception of *sensations* of tone, however, but of *tones themselves* (in this particular instance, of differences between tones).

The misleading aspect of Helmholtz's terminology—which Rand unfortunately did not detect—is derived from the Representative Theory of Perception. This theory holds that we perceive reality only indirectly, by means of our senses, which construct copies or representations of reality that are then viewed by our minds. This view is indefensible. It has the effect of locking us up in our consciousness, perceiving perceptions (or sensations), instead of reality. On the contrary, as Rand and other Objectivists have repeatedly stated, we do *not* perceive experience.¹⁴ Perceptual experience is the state of awareness in which we perceive things in reality, and we give the *name* “perception” to this process—not to its objects. Further, as Rand's former associates, neurophysiologist Robert Efron and philosopher David Kelley, have pointed out, this applies as much to our awareness of musical tones as to any other thing in reality of which we have discriminated awareness (Efron 1968, 145, 149-50; Kelley 1986, 47, 160-64).

Thus, Rand should have adhered to her earlier view—the Jamesian model—of the nature of sensation. She should have rejected Helmholtz's faulty use of terminology and the faulty view of perception at its root. Her failure to carefully apply her own philosophy to Helmholtz's views led her to embrace an inconsistency in terminology and conceptual understanding which, in turn, undercut her attempt to validate an objective standard for evaluating musical works.¹⁵

Another major factor contributing to Rand's flawed treatment of the nature of music is the inconsistent way she characterizes perception. In earlier writings, she defined a percept or perception as “a group of sensations automatically retained and integrated by the brain of a living organism” (1961, 20; 1966b, 5). This definition does *not* explicitly limit percepts to being percepts only of entities. Entities are admittedly the most important objects of perception for humans and animals, but her definition does not seem to exclude other less important things like musical tones from being objects of perception. In her later thoughts, however, Rand (1971) paralleled the shift in her treatment of sensations, saying instead that perception is *only of entities*, not of their attributes or consequences, such as sounds or smells (46). According to this later view, any sensory state of awareness other than that of an entity itself would be merely a “sensation” or a “pure sense-datum.” Not surprisingly, this is the very manner in which Rand characterizes musical tones (59).

This shift in position about the nature of sensations and perceptions involves more than just an unacknowledged inconsistency in terminology. It is a *conceptual error*, one specific consequence of which

is to render extremely unlikely, if not impossible, a proper understanding of musical experience. Rand's later view contains a strong bias against our recognizing the analogy between sequences of musical tones and the physical motions and goal-directed actions of dramatic characters. If one regards musical tones as mere sensations, one is not likely to treat them as discriminated, differentiated items of consciousness and, as a consequence, one is not likely to realize that their behavior bears certain similarities to the spatial and teleological actions of purposeful beings. This misleading shift in definitions appears to be the primary reason Rand failed to identify the musical-literary analogy and incorporate it into her theory. Despite her reference to melody as a sort of “auditory entity” (1971, 57), Rand's characterization of musical tones as “sensations” (59) certainly discourages our recognizing the analogy between entities and musical tones.

For any other esthetic theorist to make this error would be merely unfortunate. For Rand to have done so is tragic and ironic. It is tragic, because it derails her last, best effort to formulate a unified understanding of the arts, due to the kind of error she should not have made. It is doubly ironic because, as already noted, Rand had already unearthed an abundance of excellent clues to the connection between music and the other arts in her writings on literature, and she had already formulated her view of “esthetic identification,” the unifying phenomenon that characterizes our response to *all* of the arts. The truth about music is obscured by her view of the cognitive status of musical tones. The first step, then, in providing an existential basis for explaining musical experience is to reject the notion that musical tones are “sensations.” Our awareness of them is essentially different from that of pure, undiscriminated sensations. For this reason, we should instead conceive of musical tones as *percepts*.

3. Musical Tones as Percepts

It is generally recognized that we are capable of hearing musical tones (and sounds, in general) as discrete, differentiated, unitary data of awareness—in other words, singling out one particular sound wave from all the others impinging on us and being aware of it individually, as the object of focused attention. Yet, as the science of acoustics tells us, a musical tone is “a sound of a definite pitch, consisting of several relatively simple constituents called *partial tones*, the lowest of which is called the *fundamental tone*, and the others *harmonics* or *overtones*” (*American College Dictionary*, 1964). As such, our awareness of a musical tone is a *composite*, the integrated sum of more primitive awarenesses of a number

of simple tones.¹⁶

Technical objections notwithstanding,¹⁷ it seems reasonable to conclude that the term "sensation" applies properly not to our awareness of musical tones, as Rand claimed, but rather to our awareness of the simple tones that comprise them. What, then, should we call the form of awareness that results from integrating the sensations of simple tones into a musical tone? Rand herself provided the answer, although she never explicitly applied it to music. As already mentioned, she originally defined "percept" as "a group of sensations automatically retained and integrated by the brain of a living organism." This is a perfect description of our awareness of a musical tone! While musical tones are clearly *not* entities, it is equally clear that our awareness of them is essentially the same as our awareness of entities. Specifically, musical tones and entities are both objects of perceptual awareness—"discriminated existents," as Efron calls them (1968, 144). Thus, there is no validity in Rand's claim (1971) that "single musical tones are not percepts, but pure sensations" or that "they become percepts only when integrated [into melodies]" (59). On the contrary, single musical tones are *already* integrated. They are a complex product resulting from the automatic integration of simple tones.

This is not to deny that musical tones can be *further* integrated on the perceptual level. Indeed, they can be and, as a matter of course, *are* integrated into higher-level percepts. A large part of the academic study of music theory and analysis is devoted to identifying and classifying these very things. A melody, however, is not the only kind of higher-level percept that is integrated from musical tones. Such percepts *may* be melodic—i.e., *perceptual integrations of successively occurring musical tones*. But even the category of melodic percepts is not limited to melodies *per se*; it also includes *motives*, such as the famous four-note motive (G-G-G-Eflat) at the opening of Beethoven's Fifth Symphony. Moreover, higher-level musical percepts may also (or instead) be *harmonic*—i.e., *perceptual integrations of simultaneously occurring musical tones*—in other words, *chords*. By implicitly eliminating motives and chords from consideration as percepts, Rand thus committed what she herself (1963a) called the "Fallacy of the Frozen Abstraction."¹⁸

Another way in which she committed this fallacy is found in her assertion (1971) that musical tones can be integrated into "a new cognitive experience," when heard in "a certain kind of succession . . . into what may be called an auditory entity: a melody" (57). It is a basic error to regard a melody (or a chord, for that matter) as being some sort of "entity," when its perceptually distinguishable, metaphysically distinct components (viz.,

musical tones) are denied that status.¹⁹ An individual person, a couple, a family, a crowd, a community, and a nation are all entities—though on different levels of perceptual and metaphysical complexity. So, too, is an individual musical tone or chord, a motive or a melody, a sonata, symphony, concert, or series of concerts. It is invalid to deny the reality and the "thingness" of *any* of these. It is invalid to refer to the result of integrating certain musical tones across time (viz., a melody) as being awareness of some sort of "entity," when that same status is denied to our awareness of an individual tone. The latter is, after all, a glimpse of the melody at a specific point within its progression.

This insight leads us directly to the musical-literary analogy. Consider the following imaginary situation. Suppose I observe a man at a number of indifferent, isolated times, and suppose I gradually notice an overall integrating factor that unites all the different, single glimpses of him. Then suppose I mentally integrate these separate awarenesses into a single mental unit, a single action-progression undertaken by the man. Now, what is the metaphysical status of this man, the referent of this integrated product of awareness? Is he an "entity" only by virtue of my having integrated my awarenesses of him as he engages in an action-progression? No, he has been an entity who existed at all of the times that I was aware of him, and who also happens to have engaged in an action-progression. Even though I base this integrated awareness upon a number of discrete, separate awarenesses, rather than an unbroken continuity, I am still aware of a single, unitary man, persisting through time. I do this to the extent that I recognize certain essential things that are the same in each of my separate awarenesses of the man at time 1, time 2, etc. This experience of identity-as-persistence-through-time is, of course, an inference. It is an extension from our simpler awareness of persistence-through-time that is based on continuous, unbroken observation.

Something very similar happens in our awareness of a melody. We hear a progression of tones with different pitches and with approximately the same tone color and volume, and we experience the pattern as a unit. When, later in a musical piece, we hear the same progression of tones but played, perhaps, in a different key, at a different tempo, by a different instrument, etc., it is still perceived and recognized by the experienced listener as the *same melody*. And this is essentially the same as our numerous separate awarenesses of a man as being awarenesses of the same man. This clear-cut analogy is the basis for two very significant types of experience in music: the awareness of an illusion or

semblance of physical motion and of goal-directed action. We need to identify the cognitive basis for these experiences and for our *response* to music of this type.

4. The Nature of Perceptual Cognition

Perception is but one form of cognition and, more generally, of consciousness. As Rand has pointed out (1966c), there are two fundamental attributes of any state, aspect, or function of awareness: the *content* of consciousness and the *action* of awareness in regard to that content. Furthermore, every state of awareness is derived ultimately, whether directly or indirectly, from awareness of the external world, of some aspect of external reality. For this reason, some aspect of external reality is involved, directly or indirectly, in every state of awareness (29). Cognition, then, is a state of being aware in which one has a mental grasp of—i.e., *knowledge of*—some aspect(s) of reality. Such a fact of reality may be an aspect of the physical, existential world, in which case we refer to our awareness of it as a process of extrospective cognition, or *extrospection*. Or, it may be some aspect of one's own psychological, conscious processes, in which case we refer to our awareness of it as a process of introspective cognition, or *introspection* (29).

Within the field of cognition, *extrospection is epistemologically primary*. This is because our first knowledge is of external reality. Only later do we become aware of the psychological processes by which we apprehend reality (30). The aspect of reality that is *directly involved* in one's cognitive awareness is usually referred to as the *object* of cognition. When the aspect of reality is physical and external to oneself, the problem of the cognitive relation between the actions and contents of awareness, on the one hand, and the object of awareness, on the other, is by no means a trivial one. To have *knowledge of* an aspect of external reality is *not* to have that thing literally, physically *inside* one. Nor does one's awareness literally, physically travel through space to the external existents and "grasp" them and haul them back in. In the process of knowing, the physical existents always remain external and indifferent to and unaffected by our awareness of them. (Although any processes necessary in order to manipulate or position the existents so that we can perceive them may, in fact, have some effect upon them, our awareness *per se* does not.) At most, then, there is some relation of *correspondence* between our cognitive contents and the object of cognition. We have *correctly identified* our conscious contents *with* some object of cognition.

Within the narrower field of extrospection (extrospective

cognition), the primary form of our cognitive contact with the world around us is *perception*. As Efron (1968) characterizes it, perception is any form of "direct, immediate awareness of external reality which [results] from energy absorption by receptor organs" (143, 147).²⁰ In perceiving external reality, we do not perceive energy *qua* energy. Instead, we perceive the world in the form of isolated, cohering *things*. As Efron and Kelley point out, these things may be entities, or they may be the consequences of entities, such as sounds, shadows, odors, tastes, etc. (Efron 1968, 144; Kelley 1986, 160–64). *All* of these discriminated existents, however, are the *contents* of perceptual consciousness, *forms* in which we perceive reality. The actual physical causes of these contents, the *objects* of perceptual consciousness—i.e., the entities and the spatially cohering patterns of energy they send out—remain physically external to us during cognition.

In order for perception to take place, there must be not just one, but *two* relations between the external object of perception and the internal content of perception. The *physical, causal* relation between the object and content of perception arises when some external aspect of reality acts as a *stimulus* (in the case of the energy impinging upon our receptor organs) or as a *source of stimulus* (in the case of the entity emitting the stimulus–energy) to the organism. The impingement of the stimulus–energy upon our sensory receptors causes those receptors to send primary sensory inputs to the neural centers of our brains,²¹ where they are integrated into perceptual contents or "percepts." The *non-causal, epistemological or cognitive* relation arises when the sensory contents, to the extent that they are isolated and discriminated, are *cognitively referred* back to external reality. This cognitive reference is made either more closely to the incoming field of energy or further outward to the energy source (i.e., the entity). As Roy Wood Sellars (1922) puts it, one's sensory contents are unconsciously, through contextual verification from further sensory feedback, *taken to be identical* to the external aspect of reality which causes them (25).

As Sellars points out, even though content and object of cognition are not *metaphysically* identical or the same, there are good biological reasons for animals and human beings to *regard* them *epistemologically* (i.e., cognitively) as being such. First, the causal relation between external object and internal contents is, in the vast majority of instances, a very simple, direct, straightforward one (43–49). Secondly, for those organisms possessing consciousness and locomotion, and who must

move about in the world in order to provide for their survival, it would be immensely beneficial to possess a system of reliable *cues for action* in regard to the external world (73-74). Such simple, direct, and reliable cues for action are precisely what is provided by one's sensory contents. It is no wonder, then, that we experience our sensory contents as though they actually *were* external.

In thus referring our sensory contents outward to external reality, we are *cognitively selecting* some existent—the energy wave or its source, the entity—as our object of perception. Such an act by an organism of cognitively selecting an external existent as its object of awareness, *distinct from* its content of awareness—even though sometimes not *distinguished from* it—is a basic feature of all knowledge, referred to by philosophers as *intentionality or meaning*.²² The aspect of external reality, the existent, to which we refer our sensory contents may be either the entity and its attributes that cause the stimulus *or* the consequences (such as light waves or sound waves) of the entity's action that act as stimulus-energy. Even though one of the referent existents, the entity, is located further away from us on the causal chain than the other, the energy wave, and even though our awareness of the former is *mediated by* awareness of its consequences, we still have the same process—*viz.*, *external reference of discriminated sensory contents*—operating in either case. In other words, *the process of perceiving sounds and the process of perceiving entities are essentially the same*. They are both processes of perceptual cognition.

5. Hearing Compared to Vision and Touch

While acknowledging the basic commonalities between auditory, visual, and tactile perception, it is also quite interesting to contrast hearing with the other two modalities, especially (because of what it implies for this discussion) their relative efficacy at perceiving entities. Probably the most important data that an animal or human being can have about a physical entity is its spatial location. (This includes any of the many other attributes or aspects that are consequences of its location, such as size, shape, motion, and direction and speed of motion.) Granted, this is not the *only* survival-relevant data that we can have about entities. It is certainly, however, the first and most important data we can have: *where* the entity is and what (at least overtly) the entity is *doing*.

We find, in fact, that vision and touch have highly developed receptors for spatial position, but hearing does not. For hearing, our awareness of the location, size, shape, motion, etc., of entities is very limited. We have no well-developed place-receptors for these attributes

in our auditory faculty. The limited sound localization we *are* capable of is by means of echo-location and binaural localization. Both of these faculties, however, operate for all intents and purposes only on the horizontal plane. (In this context, “horizontal” means: parallel to the surface of the earth—and thus perpendicular to the line of the body when it is in an upright position.) We have no auditory receptors for place that give minute spatial detail, such as is given by the retina of the eye or the surface of the skin. Thus, in contrast with our considerable ability to perceive sound waves that are transmitted by an entity's vibrations, our auditory perception of entities *per se* is extremely limited. Our external perceptual reference quite often tends to go no further than the point of discriminable sound waves that reach our ears—and not beyond, to the entity whose vibrations generate those waves.

I would not go so far as to say, as does Rand (1971, 46) that we have *no* perception whatsoever of entities through sound. I would merely say that such perception is normally much less accurate, reliable, and useful than that provided by vision and touch. It is therefore normally disregarded and allowed to fall into disuse, in favor of our much more highly refined abilities to perceive location by vision and touch. Indeed, it is well known that blind persons must rely, to a much greater extent, upon their sense of hearing. Many of them develop their capacities of sound localization to a much greater extent than sighted persons do. They use additional inferences from their knowledge and their tactile awareness in order to compensate for their lack of visual data. For the rest of us, however, the existents we tend most often to perceive in hearing are *sounds*—*i.e.*, discriminated, differentiated *sound waves* that are emitted by entities—rather than the entities themselves. The term “sound” is *also* used in a psychological or cognitive sense to refer to the *form* or *content* of one's awareness of a sound (wave), *i.e.*, the *means* by which one is aware of a sound. In this sense, *a sound is the auditory perceptual content of awareness that arises when a certain type of energy (viz., a sound wave) is transmitted from a vibrating entity to the organs of hearing in the ear and thence to the brain*. To avoid any possible confusion here, it simply should be noted that one does *not* perceive sound *qua* content; sound *qua* content is the form in which one perceives sound *qua* existent.

Recall now the earlier distinction between object and content of perception. The object of perception is some external existent cognitively selected by a conscious organism as the object of perceptual awareness. The content of perception is the aspect of a conscious organism's state of

perceptual awareness that corresponds to the object; it is a perceptually discriminated and grasped existent. In this context, then, a *sound (in the psychological sense) is a discriminated existent*. A *sound wave (or sound in the physical sense) is the existent*, some of which may be discriminated (and thus become a sound in the psychological sense), or not. Although all the different sound waves coming from the various entities in one's surroundings are physically mixed together, the ear can usually discriminate and differentiate among them and attend to one of them in particular. That is, we are capable of perceptually singling out a given physical sound by suppressing the physiological effect on our hearing apparatus of the other sound waves—and *experiencing* it as a (psychological) sound (viz., a chirp, tweet, rattle, buzz, honk, voice, tone, etc.).

A tone, being of definite pitch, is the type of sound particularly relevant here. While it is true that we often have little or no effective awareness of the actual spatial location of the sound wave or of the entity emitting it (solely through sound, that is), musical tones nonetheless present a striking metaphor of location and motion. This analogy is experienced in connection with the tonal attribute known as "pitch." Pitch is not experienced as a quality similar to color, even though both are correlated primarily with the frequency of the energy coming in. Instead, we experience tonal pitch as having a definite location. More specifically, we experience tones as being located in the vertical dimension. Even more specifically, tones of greater frequency are heard as being "higher" in pitch, and tones of lesser frequency as being "lower" in pitch. We further experience a *change in pitch* as being analogous to or seeming like actual *spatial motion* and as taking place along the vertical dimension.

6. The Analogy to Spatial Location and Motion

Lippman (1952) notes that although modern psycho-acoustics has made a few important modifications of Helmholtz's original theory, his concept of *place-frequency perception of tonal pitch* remains valid (171-92). Furthermore, it is fully analogous to the place-contour model of our visual perception of the spatial location of entities. As Watt (1917) explains, the basic physiological fact underlying our perception of tonal pitch as ordinal or positional, rather than qualitative, is the structure and function of our ear's tonal pitch receptor (26).²³

Anatomically, the receptor lies in a line along the basilar membrane of the inner ear, which responds to variations in the frequency of sound energy in essentially the same way that the surface of the retina of the eye responds to variations in the spatial contour of light energy.

That is, we hear pitch (of tones) in essentially the same way that we see spatial location (of entities). That is why, even though the pitch of tones and the color of light are both the consequence of the frequency of incoming stimulus energy, we experience color as being on a qualitative continuum, whereas pitch is experienced as being on a continuum of location or position. It must be stressed, however, that pitch is not *actually* spatial. It is merely *analogous* to spatial location. As Watt notes, both pitch and spatial location belong to a larger, more general category: the category of *position within a continuum of order* (29). For this reason, we can regard the pitch location of a tone—plus any more complex attributes that it may in part determine—as being an analog to (or a metaphor for, or bearing figurative resemblance to) the spatial location and similar derivative attributes of *entities*.

Granting the fact of the place-reception of tonal pitch,²⁴ why is pitch experienced as being along a *vertical*, "up-down" continuum, rather than a horizontal one? As a partial explanation, Lippman (1952) suggests that, corresponding to real space, in which the vertical dimension is less symmetrical than the front-back and right-left dimensions, the pitch series is not symmetrical, neither in pitch quality, nor in its expression in tonal volume, nor in the underlying aural anatomy²⁵ (155) and that our binaural localization of objects is poorest in the vertical dimension (assuming an upright bodily position as the norm), thus leaving a partial void, open to the possibilities inherent in pitch (55).²⁶ These factors, however, merely indicate the dimension *along which* it is most likely that our experience of pitch as a relational phenomenon would lie, helping to explain the overall aptness of the vertical dimension for characterizing pitch (as opposed to the more symmetrical right/left and front/back dimensions, which are more important in locating entities).

What basis can there be for experiencing the location of a high frequency tonal pitch specifically as "high" and a low frequency one as "low," rather than vice versa? There is no necessary, universal, intrinsic, causal connection between actual spatial highness or lowness of the sound-source and the tone's "highness" or "lowness." They may even, of course, vary independently of one another. Nor, as Lippman observes, is there any such connection between the tone's "highness" or "lowness" and the spatial position of the pattern of stimulus energy on the basilar membrane or in the auditory neural centers of the brain (140-41). Nor, he notes, is there a universal cultural or linguistic connection between "highness" or "lowness," as we in the Western world attribute to tones and tonal pitch.

Some primitive cultures, in fact, use qualitative, rather than positional qualities to describe tones (e.g., "bright-dark," "sharp-dull," or "large-small"). The ancient Greeks used "high" and "low" in exactly the *opposite* way that we moderns apply those terms to tonal pitch. On the ancient Greek view, the "highest" tones were those produced by the longest strings on their musical instrument, the lyre. The lyre was apparently held in such a playing position that the longest strings extended highest into the air (spatially), because of their length, and vice versa (144-47)

Still, there is the unmistakable experience most (if not all) of us have, in which tones of greater frequency seem to be higher than tones of lesser frequency. There must be *some* basis for this experience of high frequency tones sounding high and vice versa. If the basis is not *actually* spatial, then it must involve at least one or more *associations* between our perception of tone and our spatial experience. If our applying the terms "high" and "low" or "up" and "down" to tones is not arbitrary and without any basis whatsoever, it can only be explained, Lippman says, by showing how "the qualities of tones are strongly reminiscent of up and down experience, or are tied to such experience in some fashion" (141-42).

At least four characteristics or aspects of tones vary in parallel with pitch and are also associatively related to our spatial experience: (1) The *vibrations* from tones with "high" and "low" pitches are *localized*, respectively, in spatially high and low positions in the listener's body (2).²⁷ Tones with "higher" pitch are experienced as having a *brighter* quality. Tonal brightness is associated with visual brightness, which is associated with visual/physical highness in space. And conversely, for "lower"-pitched tones (3).²⁸ Tones with "higher" pitch are experienced as having a higher degree of tension of *intensity*, which is correlated with higher spatial location. And conversely, for "lower"-pitched tones (4).²⁹ Tones with "lower" pitch are experienced as having greater *extensity*, as being slower in giving rise to a definite impression, as being coarser, as being larger. Tonal extensity or largeness is associated strongly with physical largeness or extensity, which is associated with physical lowness in space. And conversely, for "higher"-pitched tones.³⁰

We have thus established the psycho-physiological basis for Western culture's widely accepted analogy between tonal pitch and spatial position.³¹ More specifically, we have explained why it is that tonal pitch is experienced, in terms of deep-rooted associations, as being "high" or "low" in "tonal space." Indeed, as Helmholtz has suggested, the "characteristic resemblance between the relations of the musical scale and of space [is] of vital importance for the peculiar effects of music" (370).

He goes on to say that "[s]uch a close analogy consequently exists in all essential relations between the musical scale and space, that even alternation of pitch has a readily recognized and unmistakable resemblance to motion in space, and is often metaphorically termed the ascending or descending *motion* or *progression* of a part" (370). In other words, a change in pitch is experienced as "tonal motion" in an upward or downward direction. What is the basis for *this* experience?

7. Motion and Emotion in Music

The physical event that gives rise to the experience of change of pitch as upward or downward "tonal motion" is an increase or decrease in the rate of the sounding body's vibration and a resultant increase in the frequency of the sound wave generated by that vibration. The physiological event involved is a shift of excitation, one way or the other along the basilar membrane, to a new location. This shift gives rise to an experience of a new pitch-location of the tone, "higher" or "lower" than the previous one. When the change of frequency and the change of place of excitation on the basilar membrane are continuous, the tonal motion is experienced as being smooth and sliding from one pitch-location to the next. When the physical and physiological factors undergo an abrupt, discontinuous change, however, the tone seems to move by step, by skip, or by leap. (Which one, depends upon the magnitude of the pitch interval between the original and subsequent pitch locations.) What is more, when the time interval separating the two tones is approximately .05 seconds, one hears not first one tone and then the other, but instead one tone moving across one's field of hearing from one pitch location to another. When the pitch and time intervals between successive tones is small enough, this apparent motion no longer seems to leap or skip or step. Instead, it takes on the character of continuous movement of pitch. This phenomenon is at least partially operative in musical melody—enough so as to give a fairly strong impression that only one moving tone is involved.

The various phenomena just described—involving pitch and temporal discontinuity between successive occurrences of tone—are analogous to visual phenomena involved in animated electric signs and motion pictures, respectively. The general name for these various types of apparent spatial and tonal motion and continuity is the "phi phenomenon." The existence of this type of phenomenon demonstrates the fact that it is not necessary to have a fully continuous pattern of stimulation of the retina or the basilar membrane in order to experience the appearance of spatial

or tonal motion or persistence of being. All that is necessary, as Kimble and Garnezy (1968) explain, is the successive stimulation of spatially separate points on the retina or the basilar membrane, within certain upper limits on the time interval involved (231). This is what we experience, to an appreciable degree, in *melody*. Given the natural propensity to interpret and respond to even the *semblance* of physical motion in anthropomorphic terms,³² this completes a major part of the explanation of why we respond to melodies similarly to the way we respond to people in literature, drama, and real life.

Thus, we see how melody is able to provide a convincing and engaging analogy to an entity—specifically, a literary character—engaged in physical movements and gestures. As striking as this analogy is, however, it is but a partial explanation of music's emotional effect for two reasons. First, the analogy between music and space is necessarily an incomplete one. Even if we were to pursue a more detailed correlation of tonal attributes such as texture, rhythm, and harmony to spatial attributes (and it is possible to do so, though regrettably beyond the scope of this essay), the analogy would become more and more tenuous, as we attempted to integrate less well-defined correlations into the whole. While a pair of counter melodies, for instance, might plausibly be compared to a pair of lovers or combatants,³³ at some point the attempted one-to-one matching of nuances becomes simply pointless. There will be leftover musical details and aspects of one's emotional response that (as discussed above in the Introduction) relate more to the felt qualities of tone than to the semblance of motion *per se*. The flip side of the seldom realized deep commonalities between music and the other arts is the more familiar fact that, in the final analysis, music is also, to a large degree, *sui generis*. Despite its significant commonalities with the other dramatic arts, it is also a realm of human expression with a considerable amount of autonomy.³⁴

Secondly and more importantly, however, if purely physical action were the only analogy that music were capable of portraying, many of us would find music dull and uninteresting in rather short order, just as we do literature that presents little more than fist fights, chase scenes, and battles. Meaningful activity in general involves more than mere physical motion. To borrow a few of Rand's choicer words (1968): "Since art is a concretization of values, there are not many errors as bad esthetically—or as dull—as . . . physical action divorced from any psychological conflict or intellectual value-meaning" (86-87). As a matter of fact, however, certain music *is* experienced as being analogous to more than just physical motion. Quite often we hear not only "the essence and form of upward motion

... the freedom of release . . . the joy of an unobstructed effort," but also the "triumph . . . the tension of purpose." That is, we often experience events in music as seeming to be *purposeful* and *logically connected*, leading to the resolution of a climax. The resemblance between such musical events and *plot* in literature is unmistakable and not at all accidental.³⁵ But that is an issue of the hierarchical structuring common to literature, music, and the vast interconnected network of products of the human conceptual faculty.³⁶ Thus, while the unfolding of a hierarchically ordered set of events can indeed be perceptually experienced and enjoyed during a process of listening or viewing, the nature and value of plotfulness in music is a subject more properly dealt with under the heading of "Music and Conceptual Cognition."

As a promissory note on such a consideration, and by way of concluding the present study, it is appropriate to comment on Rand's suggestion (1971), led by her view of musical tones as sensations, that music is so cognitively valuable because it "is the only phenomenon that permits an adult to experience the process of dealing with pure sense data . . . Music offers man the singular opportunity to reenact, on the adult level, the primary process of his method of cognition: the automatic integration of sense data into an intelligible, meaningful entity" (59). Granted, there *is* integration involved in musical experience, but as I have already shown, it is *not* the integration of sensations. Rather, as has been made clear by Meyer (1967) and others, music involves the integration of perceived tones into ever higher hierarchical levels of perceptual complexity of pattern. And in this respect, we can see a striking analogy between the process of musical perception and the life-long process of building up a *conceptual hierarchy*. Thus, I would reformulate Rand's assertion about musical value as follows: music offers us the opportunity to reenact, solely within the *perceptual* field of hearing, the higher-order, volitional process of integrating percepts *and* concepts into an intelligible, complex *conceptual* hierarchy. Can there be any doubt that *this* experience, to a conceptual consciousness, would be "a unique form of rest and reward" (59)? Furthermore, music offers us the opportunity to reenact, solely within the perceptual field of hearing, the volitional process of integrating actions and values and goals into a complex plan of goal-directed action. This, too, would be a rewarding experience for a conceptual consciousness—less likely restful, however, than exhilarating!

NOTES

1. This essay is adapted from "The Nature of Music, Evaluating Music Objectively," a chapter of my unpublished manuscript, *Esthetics, Objectively*, commissioned in 1971 by Equity Incorporated (Milo A. Schield, Joel Myklebust, and Douglas B. Rasmussen), and appears here with their permission. Earlier versions of this essay received welcome critical input from Thomas V.V. Burnham, Louis Torres, Michelle Kamhi, Dean Brooks, and Becky Bissell.
2. The full definition Rand (1965) offers is: "Art is a selective re-creation of reality according to an artist's metaphysical value-judgments" (19).
3. See Gilbert and Kuhn 1972, 6 and Tonelli 1967, 256, from whom my own use of the term is drawn, and Bissell 1997b, 34, 46-54, 62, an earlier version of which was rejected for journal publication in 1974 because an anonymous screener claimed that the concept of a "microcosm" did not provide significant clarification of Rand's view of art. Also see Peikoff 1991, 417; he first made explicit use of this term in discussing Rand's view of art in his lectures on the philosophy of Objectivism (1975-76). He gives no more than passing mention of the term. But even Rand's critics and followers lack an understanding of the term's relevance and misconstrue her definition of art (see note 4 below). The entire edifice of her esthetics theorizing would thus seem to rest on shaky conceptual ground.
4. Mainstream challenges to the "re-creation" theory (and its earlier incarnation, the classical "imitation" theory) have been flawed by a misdirected focus on the more concrete level of artworks—viz., on the *contents* of the microcosm presented in an artwork, i.e., on the supposed re-creation within the artistic microcosm of *things from reality* (such as human figures, still life, etc.). See Bissell 1997b, 46-54 in regard to Langer 1953, 46, 76; Hospers 1967, 52; Beardsley 1967, 18, 20, 22. See also Bissell 1998c, 101-5, in which I argue that not even the pre-eminent Rand-oriented esthetics theorists, Michelle Kamhi and Louis Torres (1997), are immune to this error; and specifically in regard to music, see Rand 1971, 52.
5. See Leonard B. Meyer (1967) for one of the clearest expositions of goal-directedness in music. Such music, from Bach to Bartok, he refers to as "teleological" (71-72).
6. See especially Rand 1969, 99-105; 1968, 82-87.
7. See, for instance, Rand 1968, in which she says: "A plot is a purposeful progression of logically connected events leading to the resolution of a climax" (82); "The plot of a novel serves the same function as the steel skeleton of a skyscraper: it determines the use, placement and distribution of all the other elements . . . Just as one cannot pile extraneous weight or ornamentation on a building without regard for the strength of its skeleton, so one cannot burden a novel with irrelevancies without regard for its plot. The penalty, in both cases, is the same: the collapse of the structure" (84); and "Since the nature of an action is determined by the nature of the entities that act, the action of a novel has to proceed from and be consistent with the nature of its characters" (87).
8. Arthur Koestler (1965) concurs, at least in the case of literature, for which "[t]he magic tie is identification" (345), a mental state that results when one allows the subject/object

distinction between oneself and another person or thing to blur or fade away. This happens by means of an act of projection, introjection, or empathy. Such a process can occur whether it is performed toward another *real*, physically existing person or toward an illusory, fictional person, as in a movie, play, or novel. In either case, one has "for the moment more or less forgotten [one's] own existence and participates in the existence of another at another place and time" (278). Koestler further says that "the extent to which a character in a novel 'lives' depends on the intensity of the reader's participatory ties with him," i.e., upon the "partial breakdown of the crust of personal identity" (345). In other words, identification depends upon one's temporarily *inhibiting* one's "self-assertive tendencies" and momentarily *suspending* one's own anxieties, ambitions, and other concerns (278). "This remains true," Koestler says, "regardless whether the reader admires, despises, hates or loves the fictional character" (345-46).

9. See Rand 1971, 50-64.

10. See Bissell 1998a, 7-9; 1998b, 129-30. The Rosetta Stone that once and for all reveals the fundamental similarity between the psychological mechanisms that operate in our response to dramatic music and literature was unearthed by Steven Pinker (1997) in his account of a film made by social psychologists Heider and Simmel (1944). The plot of their movie consists of the striving of a protagonist to achieve a goal, the interference by an antagonist, and the final success of the protagonist with the aid of a helper. The "stars" of this movie are three dots (!), which Pinker says it is impossible *not* to see as "*trying* to get up [a] hill . . . *hindering* [the first dot] . . . and *helping* it reach its goal." The point is that people, even toddlers, "interpret certain motions . . . as animate agents [which] propel themselves, usually in service of a goal" (322). The behavior of musical tones in dramatic music is completely analogous to that of these dots and is naturally, unavoidably experienced in the same way.

11. See note 20 below. Also see Damasio 1994, 232; Kagan 1994, 285-90; Bissell 1997a.

12. I am indebted to my wife Becky for pressing me to expand upon these points.

13. See Bissell 1998c; Rand 1966a, 37; 1971, 73.

14. The clearest exposition of this point by an Objectivist philosopher is found in Kelley 1986, 36. Also see (or, rather, hear) Peikoff 1972—viz., the section of his lecture on John Locke dealing with the Representational Theory of Perception; Bissell 1996 in regard to Searle 1983, in which he explains how representationalism is avoided by regarding perception and consciousness in general as a process of looking at reality "horizontally" *with* or *through* percepts and concepts, rather than being aware *of* or gazing *at* them "vertically" as they loom up between oneself and reality (57-61); and Bissell 1997a in regard to Dretske (1995), who regards "[c]onscious mental states—experiences, in particular—[as] states that we are conscious *with*, not states we are conscious *of*" (101).

15. In fairness, James, too, spoke ambiguously of our awareness of musical tones. It appears, however, that he regarded them as percepts, at least to the degree that we have a *discriminated* awareness of them (502-3). Discriminated awareness is how James characterized percepts

in general (526-27).

16. We are not conscious of these simple tones as discrete, differentiated items of perceptual awareness. We are either aware of them as a chaotic, undifferentiated aggregate—or as a single, integrated sum, an individual composite, a musical sum. Furthermore, we can only *presume* the former. Only by inference do we think that there is a period early in everyone's life—a point prior to the time when we are capable of being aware of discriminated, individual tones—in which our awareness of simple tones is a chaotic, undifferentiated aggregate. We have no memory of the experience, to be sure. To reiterate, however: neither during this hypothetical period in infancy, nor in adulthood, are we able to hear, in a discriminated way, the simple tones comprising a musical tone. The options are, at most, two: unorganized aggregate or individual, composite musical tone.

17. See Haydon 1941 for a thorough discussion of acoustics and auditory perception. Acousticians have special devices that generate only the frequency producing one of the specific simple tones (i.e., the "fundamental" or one of its "overtones") present in a musical tone (suppressing the frequencies of all the other simple tones). Thus, it could be claimed, we *can* have perceptual awareness of the simple tones comprising a musical tone. Whatever the truth of this controversial claim about artificial generation of simple tones, however, it is clearly a special case, lying outside the physiological and psychological context of the earlier discussion. The initial claim still stands: *as a member of a larger complex* (consisting of itself and other partials), *a simple tone cannot be perceptually discriminated* (from the complex). Also, when the ear's sensory mechanism receives the simple sound wave, it vibrates so as to *add* overtones. Again, the inner ear and brain are presented with a *complex* of frequencies to integrate, seemingly an inescapable fact of human hearing. Even in this special case, then, we have no perceptual awareness of the primary components of the sensory complex sent to the brain, only the complex—integrated or not. A second objection is simply this: we *must* be capable of isolating those individual simple tones in *some* manner, otherwise acousticians would not know what they were doing in building a simple-tone generator. In fact, however, we isolate simple tones from the complex to which they belong not perceptually, but *conceptually*. Only a process of *abstractive listening*, mediated by considerable conceptual knowledge, allows musicians and laymen to isolate the various partials of a musical tone. (This capacity is similar to conceptually abstractive vision, a valuable asset to practitioners of the visual arts, particularly painting.) The exact physiological mechanism is unknown, but somehow or other the conceptual faculty can suppress the perceptual processing of all but one of the simple tones comprising a musical tone. This unnatural, constrictive use of the conceptual faculty appears to be the *only* way we can be aware of such simple tones; they are not accessible to normal, unhindered perception.

18. Rand defines this as the fallacy "which consists of substituting some one particular concrete for the wider abstract class to which it belongs . . ." (94). See also Bissell 1973.

19. See Peikoff 1982 for a discussion of the metaphysical view behind this denial of the reality of the "isolated individual," which he ties directly to Plato's theory of universals (17-21). See Bissell 1973 for a discussion of the Platonic basis of the Fallacy of the Frozen Abstraction, as well as other examples of Rand's commission of the fallacy.

20. Efron notes that the perception of external reality is sometimes called "exteroception." This is to distinguish it from one's direct, immediate awareness of the physiological state or condition of one's own body that results from energy absorption by receptors in one's internal organs, muscles, joints, etc. These latter types of awareness are referred to variously as "sensations," "feelings," or "interoceptions" (144). The important point to bear in mind is that both are sensory forms of *extrospection*. Both, in a broader sense of the term, are forms of perception. That is, even though exteroception is of facts *inside one's body*, it is of facts *outside one's mind*. That places it within the field of extrospection, rather than introspection. The ambiguity, with which we can now easily deal, lies in the term "external reality." For the purpose of this discussion, I will use it in the sense of: *external to the body*, rather than in its more fundamental sense which includes bodily states as well (as in Dretske 1995, 149ff). See also Bissell 1997a.

21. These, too, are often referred to as "sensations." See Efron 1968.

22. See my discussion of intentionality in Bissell 1971, as well as Parker and Veatch 1959 and Sellars 1922.

23. In addition to this primary, psycho-physical evidence for Helmholtz's claim that pitch is ordinal rather than qualitative, Watt (1917) presents *phenomenal* evidence: We can conceptually describe tones more in terms of order, using an ordinal series based on location on a musical staff or in an a-to-g alphabetical sequence, than qualitatively in terms of the bird or animal that utters them (in the same manner as colors and smells are named after flowers) (23). He also provides evidence from our *ability in discrimination*, indicated by our absolute memory for pitch, which is considerably more accurate than our memory for qualities such as color, as well as our ability to readily analyze complex combinations of sound (24), and *systematic* evidence from a parallel study of the senses, which shows that "integrations of sensory experience such as distance, direction, and motion result in man's senses from the integration of the attribute presumed to be inherent in differences of localization, and the musical counterparts of these integrations—interval, direction, and melody—are dependent upon variations in pitch" (24-26).

24. It is interesting to speculate about the evolutionary basis for the existence of such a striking anomaly as the place-reception of tonal pitch. It has little relevance to human survival under normal circumstances. It doesn't tell us any of the essential facts about an entity that might be needed as cues for action—facts such as spatial location, size, shape, distance, motion, etc. At least a partial explanation may be found in the evolution of the mammalian ear away from earlier structures and functions that did have more survival value. If, as Lippman claims (155), the ear was originally a tactile organ, why was its capability for tactile perception of location abandoned? Perhaps, as vision and touch became more strongly correlated with the sense of body motion and orientation, the ear's tactile locating function was no longer needed. This redundancy would have freed the ear's localizing ability to develop in a different direction, to provide data *not* available (at least, not all the time) from sight or touch. But why pitch? What survival advantage might the perception of pitch-as-location provide? For a possible answer, see note 30 below.

25. See also Mach 1914, 277-78, 282-83.
26. See also Boring 1963, 72-73, 75, 77; Jeffress, 1948, 36-37.
27. See Lippman 1952, 150-51, and Revesz [1946] 1972, 77.
28. See Lippman 1952, 147-48, and Stumpf, [1883, 1890] 1965, 202-20.
29. See Lippman 1952, 151-53. Tension involves effort, and the most universally experienced force against which we must exert effort is the force of gravitation. Thus, a higher degree of tension or effort would be demanded in order to achieve a greater spatial height with respect to the earth's surface.
30. See Lippman 1952, 147-49, and Stumpf, 221. This particular correlation may be the reason that our auditory place perception became transferred from the location of physical objects to the pitch of musical tones. A more threatening creature would be larger and thus (probably) closer to the ground and also (probably) one that made a sound that was "lower" in pitch. There would be a definite survival value in such a correlation between "high" pitch and height in space, and vice versa.
31. It must be recognized that these are not necessary, *intrinsic*, universal connections, just more-or-less strong associations. They work in tandem to give us the experience of tones of greater frequency as seeming to be higher in space, and vice versa. But neither are these connections in any way arbitrary or *subjective*. This way of relating "highness" and "lowness" to pitch has an *objective* basis in reality. The same may be said, of course, for the ancient Greek practice of relating "highness" and "lowness" in pitch in the inverse order—and for the association by primitive cultures of qualitative, rather than positional, attributes to pitch. Within the context of experience and according to the criteria of relevance of the various cultures, each of these modes of characterizing pitch has an *objective* basis in the facts of reality. As Lippman (1952) expresses it, "the variances between cultures on this matter may arise because of the peculiarities in attitude of various cultures; such cultures may be thought of as absolute [i.e., objectively based in facts of reality], however, in the sense that they form an ever-present possibility for human reaction" (147, emphasis added). Furthermore, each mode of characterizing pitch is *objectively appropriate*, within the context of knowledge and relevance of the culture. However, in comparing the amount of knowledge and assessing the relative objective appropriateness of the criteria of relevance (i.e., standards of value and importance) of each culture, we can see that the designations of "high" and "low" employed by modern Western culture are *objectively more appropriate* than those of the ancient Greeks and primitive cultures, for two specific reasons: (1) the Western designations of "high" and "low" for tones are *internal* to the experienced qualities of tones, whereas the Greek designations are external to them; (2) the Western designations are *more precise* with respect to measurement and differentiation than are the qualitative designations of primitive cultures.
32. See note 10 above.
33. For a plausible example of the former, consider the middle section of Rachmaninoff's

- Prelude in G Minor.
34. See Lippman 1952, 243-46, 250-52; Kurth 1947, 116-36.
35. See Bissell 1998a; Meyer 1967; Koestler 1964.
36. See Rand 1996c, 32-33.

REFERENCES

- Beardsley, Monroe. 1967. Aesthetics, history of. In Edwards 1967, 1: 18, 20, 22.
- Bissell, Roger E. 1971. To catch a thief. *The Individualist* (July/August 1971). Also posted on the Internet at <http://members.aol.com/REBissell/indexmm9.html>
- _____. 1973. On the thawing out of frozen abstractions: an essay in mental economics. *Equitas* 1 (March-July 1973): 6-9. Also posted on the Internet at <http://members.aol.com/REBissell/indexmm4.html>
- _____. 1996. Searle on intentionality. Presented during Institute for Objectivist Studies seminar on epistemology. Posted on the Internet at <http://members.aol.com/REBissell/indexmm2.html>
- _____. 1997a. Review of Fred Dretske's *Naturalizing the Mind*. *Journal of Consciousness Studies* 4, no. 3. Also posted on the Internet at <http://members.aol.com/REBissell/indexmm7.html>
- _____. 1997b. The essence of art. *Objectivity* 2, no.5. Also posted on the Internet at <http://members.aol.com/REBissell/indexmmm7.html>
- _____. 1998a. Thoughts on musical characterization and plot: the symbolic and emotional power of dramatic music. *Art Ideas* 5, no. 1. Also posted on the Internet at <http://members.aol.com/REBissell/indexmmm8.html>
- _____. 1998b. How Steven Pinker's mind works. *Reason Papers* 23 (Fall). Also posted on the Internet at <http://members.aol.com/REBissell/indexmm11.html>
- _____. 1998c. Kamhi and Torres on meaning in Ayn Rand's esthetics. *Reason Papers* 23 (Fall). Also posted on the Internet at <http://members.aol.com/REBissell/indexmmm9.html>
- Boring, E.G. 1963. *The Physical Dimensions of Consciousness*. New York: Dover.
- Damasio, Antonio R. 1994. *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Grosset/Putnam.
- Dretske, Fred. 1995. *Naturalizing the Mind*. Cambridge: MIT Press.
- Edwards, Paul, ed. 1967. *The Encyclopedia of Philosophy*. 8 vols. New York: Free

Press.

Efron, Robert. 1968. What is perception? *Boston Studies in the Philosophy of Science* 4 (1966-68).

Gilbert, Katherine E. and Helmut Kuhn. 1972. *A History of Esthetics*. 2nd ed. New York: Dover.

Haydon, Glen. 1941. *Introduction to Musicology*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Heider, Fritz. and M. Simmel. 1944. An experimental study of apparent behavior. *American Journal of Psychology* 57.

Helmholtz, Hermann Ludwig Ferdinand von. [First and Fourth German editions: 1863, 1877]. 1950. *On the Sensations of Tone as a Physiological Basis for the Theory of Music*. New York: Dover.

Hospers, John. 1967. Aesthetics, problems of. In Edwards 1967, 1: 52.

James, William. [1890] 1950. *The Principles of Psychology*. New York: Dover.

Jeffress, L.A. 1948. A place theory of sound localization. *Journal of Comparative Physiological Psychology* 41.

Kagan, Jerome. 1994. *Galen's Prophecy: Temperament in Human Nature*. New York: Basic Books.

Kamhi, Michelle and Louis Torres. 1997. Meaning in art. *Aristos* 4 (September): 6.

Kelley, David. 1986. *The Evidence of the Senses: A Realist Theory of Perception*. Baton Rouge: Louisiana State University Press.

Kimble, Gregory A. and Norman Garnezy. 1968. *Principles of General Psychology*. New York: Ronald Press Company.

Koestler, Arthur. 1964. *The Act of Creation*. New York: Macmillan.

Kurth, Ernst. 1947. *Musikpsychologie*. Bern, Switzerland: Verlag Krommholz.

Langer, Susanne K. 1953. *Feeling and Form*. New York: Charles Scribner's Sons.

Lippman, Edward Arthur. 1952. *Music and Space*. Unpublished Ph.D. dissertation, Department of Philosophy, Columbia University, available from University Microfilms, Ann Arbor, Michigan.

Mach, Ernst. 1914. *The Analysis of Sensations and the Relation of the Physical to the Psychological*. Trans. by C. M. Williams. Rev. by Sydney Waterlow. Chicago: Open Court.

Meyer, Leonard B. 1967. *Music, the Arts, and Ideas*. Chicago: University of Chicago Press.

Parker, Francis H. and Henry B. Veatch. 1959. *Logic as a Human Instrument*. New York: Harper & Row.

Peikoff, Leonard. 1972. *Founders of Western Philosophy: Thales to Hume*. 12 audiotaped lectures. Oceanside, California: Lectures on Objectivism.

_____. 1975-76. *The Philosophy of Objectivism*. 12 audiotaped lectures. Oceanside, California: Lectures on Objectivism.

_____. 1982. *The Ominous Parallels: The End of Freedom in America*. New York: Stein and Day.

_____. 1991. *Objectivism: The Philosophy of Ayn Rand*. New York: Dutton.

Pinker, Steven. 1997. *How the Mind Works*. New York: W. W. Norton & Co.

Rand, Ayn. [1957] 1992. *Atlas Shrugged*. 35th anniversary edition. New York: Dutton.

_____. 1961. The Objectivist ethics. In Rand 1964.

_____. 1963a. Collectivized ethics. In Rand 1964.

_____. 1963b. The goal of my writing. In Rand [1969] 1975

_____. 1964. *The Virtue of Selfishness: A New Concept of Egoism*. New York: New American Library.

_____. 1965. The psycho-epistemology of art. In Rand [1969] 1975.

_____. 1966a. Art and sense of life. In Rand [1969] 1975.

_____. 1966b. Measurement and cognition. In Rand [1966-67] 1990.

_____. 1966c. Concepts of consciousness. In Rand [1966-67] 1990.

_____. [1966-67] 1990. *Introduction to Objectivist Epistemology*. 2d ed., expanded. Eds., Harry Binswanger and Leonard Peikoff. New York: New American Library.

_____. 1968. Basic principles of literature. In Rand [1969] 1975.

_____. 1969. What is Romanticism? In Rand [1969] 1975.

_____. [1969] 1975. *The Romantic Manifesto: A Philosophy of Literature*. 2nd rev. ed. New York: New American Library.

_____. 1971. Art and cognition. In Rand [1969] 1975.

Revesz, Geza. [1946] 1972. *Einfuehrung in die Musikpsychologie*. Bern and Munchen: A. Francke Verlag.

Searle, John R. 1983. *Intentionality: An Essay in the Philosophy of Mind*. Cambridge, Massachusetts: Cambridge University Press.

Sellars, Roy Wood. 1922. *Evolutionary Naturalism*. Chicago: Open Court.

Stumpf, Carl. [1883, 1890] 1965. *Tonpsychologie*, vol. 1. Amsterdam: Hirzel.

Tonelli, Gilberto. 1967. Baumgarten, Alexander Gottlieb. In Edwards 1967, 1: 256.

Watt, Henry Jackson. 1917. *The Psychology of Sound*. Cambridge, Massachusetts: Cambridge University Press.