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The Extended Sensorium

The Sounds of a Cosmic Chorus

By Aaron Halevy

Part 2 of 2.

Riemann's Posthumous Hearing

The possibility of human hearing going beyond the simple assumptions of sound, was not discounted by Bernard Riemann in the last researches of his life. Riemann begins, in his posthumously published paper, *The Mechanism of the Ear*, very generally on the question of investigating any sense organs, and only after he lays out the method of proper inquiry for himself does he go "into the ear," so to speak. Keeping in mind what's been said up until now in our reports, both tasks are relevant for us here.

In this late work, Riemann takes the same creative approach which he had developed going back to his 1854 *Habilitation Dissertation* and other work. That is: don't trust your assumptions, ever! For the universe is creative everywhere, even when you're not watching it. In investigating what we sense, we should keep in mind that there must be things which we cannot discount, even though we don't know they exist yet.

Opening the paper, Riemann writes that, to study the physiology of a sense organ there are, "aside from the universal laws of nature," two necessary elements: one, the empirical determination of what the organ accomplishes, and two, the investigation of its construction. From the need to understand the organ's function, there are two possible ways of acquiring this knowledge: either one can look at the parts of the organ and then impose an assumed interaction on these parts as a result of the external stimulus, "or we can begin with what the organ accomplishes and then attempt to account for this." "By the first route we infer the effects from the causes, whereas by the second route we seek causes of given effects." He calls the first route the synthetic route and the second, analytic route.

Senses can receive unimaginably small details. As we have discussed above and in many papers in this report, very fine details often go unnoticed; therefore this first route of synthesis is too difficult to use. Riemann writes that the determination of the finer characteristics from observation of microscopic objects, "is always more or less uncertain." And therefore by following the second route we shall, "seek to account for what the organ accomplishes."

"We must, as it were, reinvent the organ, and insofar as we consider what the organ accomplishes to be its purpose, we must also consider its creation as a means to that purpose. But this purpose is not open to speculation, but rather given by its experience, and so long as we disregard how the organ was produced, we need not bring into play the concept of final cause."

This is the exact same methodological approach Johannes Kepler used when he asked of the eyes, over two hundred years before Riemann, in his Harmonies of the Worlds, "Certainly the mind itself, if it never had the use of an eye at all, would demand an eye for itself for the comprehension of things which are placed outside it, and would lay down laws for its structure which were drawn from itself. For, recognition of quantities, which is innate in the mind, dictates what the nature of the eye must be; and therefore, the eye has been made as it is because the mind is as it is, and not the other way round."

So Riemann asks the ear, "what do you accomplish?" The ear answers, and tells him, "several things, such as a extremely precise discrimination of sound, sensitivity, fidelity of transformation." Riemann includes descriptions of "timbre, intensity, tone and direction," as the parameters for the effects received into hearing. He later describes these each in with their own properties, and judges the ear's fidelity and sensitivity to such things, from experiments done before him, and also, from personal experience found in the subtleties in both poetry aRiemann's critique of Helmholtz's book, *On the Sensations of Tone*, is that the work improves upon the empirical data then existing, but nothing else, and Riemann himself is "frequently compelled to oppose the conclusions that Helmholtz draws from his experiments and observations." So, what could Riemann have been looking for?

Left. Bernard Riemann (September 17, 1826 – July 20, 1866).
Right. Johannes Kepler (December 27, 1571 – November 15, 1630).

Recall the investigations of Kaiser and Teager. They were led to understand that the voice is not what it was assumed to be, and they found that the ear is responding to this process of complexity in speaking and singing as well, mostly without us consciously knowing it. Kaiser said: "[I]f you listen to somebody talk on the telephone, it only takes a second or so of conversation for you to know who is talking, in addition to what was said. If you try to do that analysis spectrum-wise, you'll find that you can't. But this approach is doing it just fine. Why? Because one's ear is looking at the modulations. It's a modulation detector. It's a transient detector. It's not simply a spectrum analyzer. It's a lot more."[17]

For further evidence of what Riemann might be looking into the ear for, we shall revisit his earlier, *Philosophical Fragments*.[18]

"With each simple act of thought, something enduring, substantial, enters into our soul. This substantial thing appears to us, indeed, as a unity, it appears, however (insofar as it is the expression of a spacial and temporal extension) to contain an inner manifoldness; hence, I call this a "*thought object*" ["*Geistesmasse*"]. – All thought is, according to this, the formation of new thought-objects."

"The thought-objects entering into the soul, appear to us as conceptual representations; the distinct inner state of each conceptual representation determines the unique quality of them." and "… all beginning, generation, all formation of new thought-objects, and all unification of the same, requires a material carrier. Hence, all thinking comes to pass at a determined place."

And later he writes, "In order to explain our soul-life, we must assume that the thought-objects produced in our nervous system endure as a part of our soul, that their interconnections continue unchanged, and they are subjected to a change only insofar as they enter into a connection with other thought-objects."

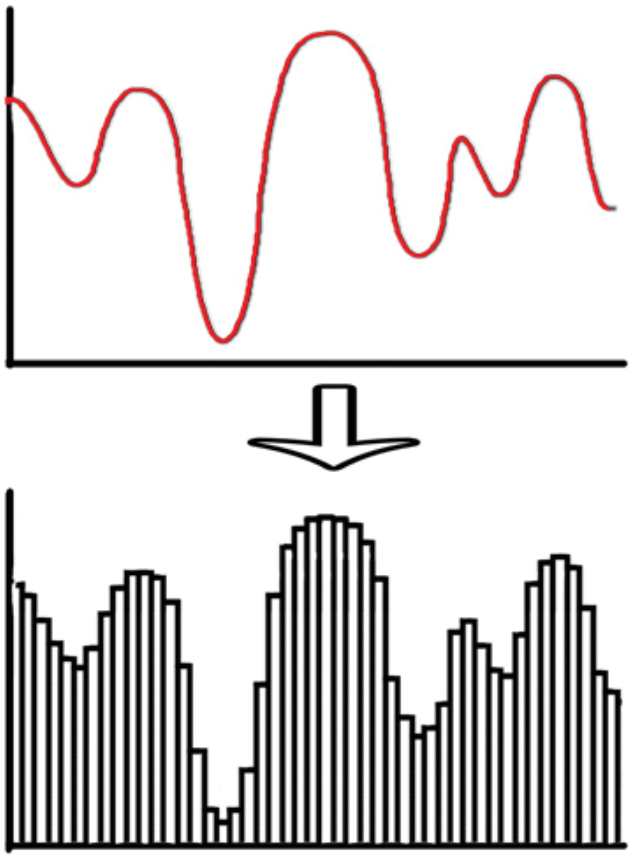
These ideas, along with what Kepler wrote, form a good place to understand the minds use of the senses. Now go back for a moment, and think about what the voice is doing for the mind in using register shifts. Why do register shifts exist but to communicate to mind? The resonance within the ear must ascend to the subjective resonance within the mind which re-forms the idea. This presupposes that the mind is tuned to the reception of such slight indications. That puts the performer and the audience at a much higher responsibility and attention than anyone is wont to do these days, and that brings us to the next part of this study.

MP3s Versus Your Ears

To get into the implications of this discussion on the subject of digitized music, the following recap is necessary.[19] When a recording is made, the assumptions embedded in the method of sound production are the same as that which come from Helmholtz. And if we assume what sound is, then our recording devices will take the parameters associated with sound and strive to recreate those effects. When recording was first developed in the late 1800s and early 1900s the method was straightforward: a device must receive the effects of the sound vibrations in the air and those vibrations had to be transferred into a medium, wax or a soft plastic; when the sound is reproduced, those vibrations are sent backwards via a needle, to a device to recreate the recorded vibrations. This was good enough, assuming that that is all that must be captured. Technology advanced from wax to vinyl records and also to magnetic tape, all the while remaining "analog". The step to "digital" recordings was taken, as in Laserdisc, CD, mp3, WAV, etc. whatever the excuses were, it was a most dangerous step. The effect recorded was now assumed again for the purpose of reduction of information amount, the data played back was shrunken, "to the limits of human perception," and the sound emitted is only an approximation of the original sound.

Keeping in mind, that the unimportant "extraneous noise," which is cut out of digital recordings, are the signals which are "too high" or "too low," for human hearing. It is assumed that young people can hear up to 22,000 Hz, while most adults can't hear frequencies higher than 15,000 Hz, so provided that the sample is in depth enough, "there is no audible difference between an analog original and a digital transfer of it … our ears can not tell the difference." After the phenomena presented above, and thinking about that presented in the rest of this larger report, the question is better posed as, "is the mind which uses those ears listening?" In any digital recordings what can be thought of as the "living-noetic sound" of the performed music is assumed to be reducible. It is as if your living dog was cut into a thousand parts, those parts were then frozen in ice-cube like chunks, and then your dog was reassembled of these chunks in the shape of the dog–playing fetch would be a difficult task.

Remember, the electromagnetic component of unheard melodies, as from an aurora, have not yet been recorded by any device, analog or digital, yet people are able to respond both consciously and unconsciously to these "sounds." What then might be lost as a result of digital recordings (or perhaps any recordings) of classical musical compositions? How much



The transfer of the original sound into digital information can be seen in these curves and rectangles shown above. In the digital recording: X = the "sample rate" i.e. samples per second (measured in Hz), and Y = the "resolution" i.e. the amount of divisions of the unit (measured in bits). X and Y give you the "bit rate" i.e. the amount of data taken per second.

of the nuance is lost in the forced digitalization of such performances which utilize the slight changes, as the register shifts imply, as discussed before? Taking the approach of Riemann while thinking about these phenomena, taking the implications of the complicated process in human singing and register shifts, the assumptions of regular sound mechanics really do "confine" what we could be hearing, and therefore should be thrown out the window, along with your collection of mp3s.

With this process in mind, think of another interesting aspect of the classical musician's power to communicate: silence. Silence is very important for making classical music. It is the apparent nothing that causes that which follows it. The greatest performers speak of a unique musical silence as something which could not be reduced to just a "lack of sound." Any deeper study of a Beethoven piece, where one might find a *fermata*, also known as a *corona,* [20] over a rest, would reveal an entire world of "unheard" substance, which the scope of this paper can not bring us to. To hint at the idea, one very good pianist, once told me, "for Beethoven, silence becomes the most beautiful music. He provides you with a dense moment, which in performance it must be defined by many factors… This pause ,must reflect a total change in the idea, of the overall space. It is much more difficult to play silence, because it must be determined by the conditions of the whole concert, by the state of the audience, the way the entire night has gone, in other performances and by the way you've shaped the whole performance until that moment. This expression of musical silence must be determined by all this, and you have to be aware of all of it in this instant when you create it." Any reconstruction of so-called "silence" must necessarily discount this idea, it could only be read as, "no information = empty space." Would you really want to put that

into your head through your earphones?

When human beings communicate, is it only information? In speaking, "saying one thing," with the raising of an eyebrow, and then "saying the same thing thing," (and thus expressing something beyond both) is not something which can be reduced to "information." Imagine a population which has lost its access to these ironies through a degeneration of music and of speaking. Imagine after decades that this population would loose connection to the development of their senses to recognize these ironies. Their science suffers, their art suffers, and ultimately their humanity suffers. Morality becomes only an opinion and chaos rules till they can no longer economically care for themselves. Such were the intended results wrought upon our own society started during the turn of the 19th century into the 20th century by such scoundrels as Bertrand Russell, C.K. Ogden and Sidney Hook. That degeneration which we experience in music and culture today, was the intended effect of the infamous *Congress for Cultural Freedom*.

Why was this done to us, you ask? "Learn to know thyself," was the advice given to Prometheus as he fought against the new tyrant Zeus, in Aeschylus's drama of ancient Greece. This motto was one of the mottoes inscribed at the wall of Delphi at the time. The other motto which often accompanied it was, "Think as a mortal." This addition gives the first motto a "know your place, and keep in your place," or "don't act or think outside your station in life," kind of command from the Delphic order. This comment, at it comes from Oceanus's mouth in Aeschylus's drama, would most definitely reverberate within the Greek audience watching the play, for it was a well-known command at the temple. This Delphic control can be seen as a model for the Congress for Cultural Freedom, as they would embrace this dictum in its new form, "Hear as a mortal."[21]

Some Final Considerations

As Shawna Halevy has recently developed the point in the case of Albert Einstein,[22] the scientific mind's ability to passionately investigate the reality of the universe which lies through, to the other side, so to speak, of our sense perceptions, is developed in classical expressions of artistic composition. Debating analog or digital is missing the more important point – participating in a live audience which intently listens to the mind of the composer emanate through the performance, will always be superior to any recording. Think of the connection of the performer to the audience at those dense moments of thought filled silence, is there something more taking place, on a higher level of communication? Could a virtual chorus or virtual symphony ever communicate that?[23] That special power, which exists as a chain of minds singly, magnetically linked in a performance of a great work, from composer to conductor, to musicians and to the audience, is a special human power which breaches clock time and unites all participating souls in a moment of heavenly eternity. Such silent power is what Keats reflected upon in his last stanza of his *Grecian Urn*. To perceive these finer effects which we've discussed, requires a cultural development, and to perceive what is beyond those subtle hints, is a result of thousands of years of tuning into these creative processes of art, science, language and politics.

The tragedy of our contemporary situation is the lack of perception of another sense, a sense of history. The cultural implications of this attack on the US and European culture, can not to be denied. Young people in our time, more and more, go though life assuming that the things which shape their opinions and their actions and emotional reactions, and thoughts, are all a product of their personal experience. Their sense experience in their lifetimes. So what could Lyndon LaRouche be possibly tapping into when he speaks of being, "3000 years old, in terms of experience"? Do his senses extend to places beyond his life? If you think of senses now being tuned to the finer subtleties of the mind, yes. A sense of history is the finest sense possessed by most historic figures, like an FDR, a Lincoln, a Bismark, and poets like a Shelley, Shakespeare, Dante or Homer.

Mozart's moral challenge to the audience through his opera Don Giovanni, Beethoven's commitment to beauty in his combination of voices and instruments in his 9th Symphony, and these pieces worked on from the bel canto tradition in the natural tuning of C=256: this is the mission embarked upon by the LaRouche Movement today. Such like challenges are the only gifts by which our destroyed generations may re-tune ourselves with human history. There are many questions which remain uncovered in the discussion of hearing, singing and human communication through re-living classical compositions. What even finer senses still exist in human beings which we deafen and blind ourselves to all the time in our society? To free our minds from the blindness of sense perception, miraculously, as Helen Keller did, will give us the power to create a future for mankind.

Footnotes

[17]See fn. 1

[18]A translation of Riemann's Philosophical Fragments can be found in the Winter 1995-1996 edition of "21st Century Science and Technology" Magazine

[19]See Sky Shields, "What, Exactly, Is a Human Being? Analog, Digital, and Transcendental" In EIR Vol. 35, No. 1, 2008, Jan. 4, 2008. www.larouchepub.com/eiw/public/2008/2008_1-9/2008-1/pdf/59-63_3501.pdf

[20]The difference of terms is important. Fermata, a more recent name for this notation, means to stop, or halt; while corona on the other hand means "crown", or as a verb, "to fulfill."

[21]It is worth noting, that Aeschylus, in his response from Prometheus clearly shows his contempt for this command, and inspires the audience to do the same. Plato himself took this command up in his *Alcibiades* dialogue, and in the *Apology*. He turns the command on its head, and gives it the significance that civilization attributes it ever after: "the unexamined life is not worth living."

[22]See the video, "The Genius of Albert Einstein" www.larouchepac.com/node/15482 & Shawna's unpublished notes on Einstein's connection to his music.

[23]Eric Whitacre's Virtual Choir - 'Lux Aurumque': www.youtube.com/watch?v=D7o7BrlbaDs

Ode on a Grecian Urn

(1819)

by John Keats (1795-1821)

Thou still unravish'd bride of quietness,
Thou foster-child of Silence and slow Time,
Sylvan historian, who canst thus express
A flowery tale more sweetly than our rhyme:
What leaf-fringed legend haunts about thy shape
Of deities or mortals, or of both,
In Tempe or the dales of Arcady?
What men or gods are these? What maidens loth?
What mad pursuit? What struggle to escape?
What pipes and timbrels? What wild ecstasy?

Heard melodies are sweet, but those unheard
Are sweeter; therefore, ye soft pipes, play on;
Not to the sensual ear, but, more endear'd,
Pipe to the spirit ditties of no tone:
Fair youth, beneath the trees, thou canst not leave
Thy song, nor ever can those trees be bare;
Bold Lover, never, never canst thou kiss,
Though winning near the goal—yet, do not grieve;
She cannot fade, though thou hast not thy bliss,
For ever wilt thou love, and she be fair!

Ah, happy, happy boughs! that cannot shed
Your leaves, nor ever bid the Spring adieu;
And, happy melodist, unwearièd,
For ever piping songs for ever new;
More happy love! more happy, happy love!
For ever warm and still to be enjoy'd,
For ever panting, and for ever young;
All breathing human passion far above,
That leaves a heart high-sorrowful and cloy'd,
A burning forehead, and a parching tongue.

Who are these coming to the sacrifice?
To what green altar, O mysterious priest,
Lead'st thou that heifer lowing at the skies,
And all her silken flanks with garlands drest?
What little town by river or sea-shore,
Or mountain-built with peaceful citadel,
Is emptied of its folk, this pious morn?
And, little town, thy streets for evermore
Will silent be; and not a soul, to tell
Why thou art desolate, can e'er return.

O Attic shape! fair attitude! with brede
Of marble men and maidens overwrought,
With forest branches and the trodden weed;
Thou, silent form! dost tease us out of thought
As doth eternity: Cold Pastoral!
When old age shall this generation waste,
Thou shalt remain, in midst of other woe
Than ours, a friend to man, to whom thou say'st,
'Beauty is truth, truth beauty,—that is all
Ye know on earth, and all ye need to know.'