

INTERLUDE

All art exercises the power of suggestion over the muscles and senses. . . . All art works tonically, increases strength, inflames desire (i.e., the feeling of strength), excites all the more subtle recollections of intoxication--there is a special memory that penetrates such states: a distant and transitory world of sensations here comes back.

-Friedrich Nietzsche, The Will to Power (427)

When I finish exercising my mind feels like a smooth piece of glass. By the time I finish the class I'm not thinking any more. I'm not running sentences through my mind. That happens best [and] most completely when I look at my body in the mirror and am in my body at the same time.

-Barb White in a conversation about aerobics

Compared with music all communication by words is shameless; words dilute and brutalize; words depersonalize; words make the uncommon common.

-Friedrich Nietzsche, The Will to Power (428)

CONSCIOUSNESS

A great deal of the existing research and overall interest in drumming and rhythm, particularly by ethnomusicologists, is centered around their relationship to consciousness. In many cultures, rhythm, often produced with drums, is utilized as a tool to visit the spirit world, to journey, to trance, to heal, to induce possession, frenzy, ecstasy--in short, to enter "nonordinary" states of awareness.

Many of these rhythmically-induced states are explicitly religious or spiritual in nature and most of these can be placed into one of two broad categories (Rouget). On the one hand, in shamanism, an individual uses percussion--in the form of a drum, rattle, and/or chanting--to travel to another plane. Such a ritual may be used to escort the soul of a deceased member of the tribe to its ancestors, to retrieve the soul of someone who is ill, or to converse or fight with various deities in order to cure an illness, right some imbalance (e.g., call for rain) or engage in prophecy. These journeys generally involve or consist of visionary experiences, what we in the secular and scientific West would probably term "hallucinations." These shamanic uses of rhythm occur all over the world, but are particularly prevalent in regions such as Siberia and among the traditional cultures of the Americas.

On the other hand, in possession, musicians play drums and other instruments while officiants sing or use bells to call to deities, to invite them to occupy the bodies of dancers (to "mount" their "horse," for example, as in yodun). Here, the affected individual does not primarily produce the

music but dances to it, does not travel but is possessed by a divine being: the person embodies, becomes that divine being. The possessed person generally does not remember their possession; in their transformed state these individuals move and speak as the deity who has possessed them and may engage in acts of which their host is incapable (e.g., walking on coals). Possession trance also occurs around the world but is particularly prevalent in West African and African-American cultures: the yodun cult in Benin, the orisha cult among the Yoruba, and the candomblé in Brazil, for example. The phenomenon of "speaking in tongues" (glossolalia) in some Christian sects would be another type of possession trance, as would the frenzy of the Greek cult of Dionysos.¹

Not all cases of nonordinary consciousness linked to rhythm and music fall so neatly into one of these categories. In the case of the Kung people of the Kalahari, the primary purpose of their rhythmically-induced ritual transformations is healing (Katz). Several times each month, the members of a camp spend an entire evening singing and dancing. The women sit around a fire and sing and clap, while the dancers (mostly men but including some women) dance around them, sometimes with rattles tied to their calves. Some of these dancers will enter an altered state known as kia as a result of the activation of num, a healing energy. When the num in an individual is activated and they enter kia, their awareness is heightened. In some instances, for example, they are able to see far-off scenes or the insides of people's bodies. Most important for the purposes of healing, they can see the sickness in people and, using their num, pull out the sickness

¹Although my earlier discussion of the Bacchae, drawing from Blades, highlighted the role of percussion instruments, Rouget argues that the aulos (flute) was the primary instrument for inducing trance among the Greeks. Resolving this dispute is not of great consequence, however. As shall become evident, I am not trying to claim some exclusive power for drumming and other percussion.

and cast it away.

Not everyone will enter kia in a given evening of dancing: in fact, some people will never enter kia. About half of the male population and significantly less of the female population will become healers. The strongest healers can enter kia very quickly (and can even do so outside of the evening-long ritual in order to engage in specific acts of healing); for others it may take several hours of singing and dancing. While in kia an individual can not only heal the entire group as well as "pull" the sickness from specific individuals, they can also perform extraordinary feats such as walking on or handling coals. Their emotional states are heightened, including the fear and pain that num brings. Kia reportedly includes a sense of transcendence and of being more essentially one's self.²

A spiritual framework or religious ritual does not seem to be a requirement for these musically-induced transformations of awareness, however. Hart reports on his experiences of drumming in the following ways:

For almost as long as I can remember, playing the drum has stimulated certain changes in my consciousness--my body awareness starts to fade, time disappears, instead of blood it feels like some other juice is pumping through my veins. (Drumming 22)

For myself, I know that it's possible to ride the rhythms of a drum until you fall into a state of receptivity that can be construed as the beginnings of trance. When I'm drumming, I like to get as close to this state as I can, yet I also know that I can't let myself go completely because if I do, my drumming will deteriorate and I will quickly lose the state. There have been many times when I've felt as if the drum has carried me to an open door into another

²See Katz for more complete descriptions of various aspects of the healing practices and beliefs of the Kung.

world, yet if I let myself pass through that door I can no longer drum and that yanks me back. Perhaps this is why the shaman has an assistant who takes over drumming as the trance deepens. (176)

Talk to any musician or aficionado of music and you will probably get some sense of a transformation, whether it be an increase in energy, a loss of time-sense, a heightening of emotion, an increased sensitivity of the body, or something more overtly recognizable as meditation, trance or ecstasy (Rosenfeld). We may be less likely to code the naturalized practices of our own culture in these ways, but the processes may nonetheless be somewhat comparable. Gilbert Rouget, for example, provides an in-depth comparison made by a (fictional) native African ethnomusicologist between the possession trances of his own culture and opera. To his sensibilities, the performers became their characters no less than adepts become their deities.

Whether these transformations of varying types and degrees deserve the label "altered states of consciousness" is debatable, but the physiological and psychological effects of music are undeniable. Music is highly capable of affecting emotional states³ and its effects can be measured, in a manner similar to a polygraph, physiologically (Storr). Rhythm, embodied in percussion, seems particularly capable of arousing or triggering basic (what we might call, rather appropriately given rhythm's status in mainstream Western European musicology, "primitive") emotional states.

³In the Baroque era, this took an extremely codified form in the "Doctrine of the Affections." Drawing from the work of Descartes' Passions of the Soul and Aristotle's Rhetoric, these exceptionally rational musicians attempted to catalog emotional states and the musical forms (rhythms, melodies, harmonies, etc.) that could incite them. In its most vulgar form, this became a handbook of figures composers could draw from. The expression of affect in music could therefore "be brought under fully rational control" (Weiss and Taruskin 212).

For example, I recently transformed a course of mine into a drum circle for a day. Afterwards, most agreed on the strength of the physical and emotional response, but the "content" of those responses differed dramatically: one student had to fight a strong urge to get up and flee the room, others were fearful of the power of the drumming, while others felt comfortable, safe, or simply energized. (Fight-or-flight?) Music "induces the individual into a state in which both his [sic] inward feelings and his relations with the outer world are dominated by affectivity" (Rouget 123).

In addition to drums, another kind of percussive instrument consistently associated with changes in consciousness is the gong. Hart reports his experience as follows:

Someone handed me a mallet. Striking the gong was like shooting an arrow of sound into the air with a powerful bow. . . . I played them on stage during that tour and when I got back to the Barn I discovered I couldn't stop playing them. They sent me into a deep trance state full of vivid hallucinations. I asked my psychologist friend, Stanley Krippner, to come listen to these gongs. Krippner later conducted some tests on how quickly and deeply one could induce the hypnotic state with a gong. At the time he determined they were the quickest inducer he knew of. (Drumming 104)

Despite this power, the gongs of today are regarded by some as significantly less potent than those produced by the ancient Chinese. Their gong-making techniques have been lost and only a few of these gongs remain. Here is a report on the effects of one of these ancient gongs that was temporarily housed at the Metropolitan Museum of Art:

One single gentle tap of pianissimo strength with a soft padded drumstick to the cymbal's rim produces the following sound phenomena. A soft hum issues and remains unchanged for about ten seconds; then a gradual crescendo develops over the next 20 seconds and begins to gain enormously in volume after 30 to 35 seconds. After about 60 seconds, a colossal triple fortissimo is

reached, which is truly terrifying and close to unbearable; bystanders witnessing the sounding in the large entrance hall of the museum covered their ears and felt like running away from the tremendous roar. (quoted in Hart, Drumming 104)

Similarly, the use of drums and other musical instruments to energize military troops, in some cases even driving them into a "berserk frenzy," highlights not just rhythm's power to entrain, but music's power to transform.

I believe that developing explanations for the power of rhythm to affect human behavior in general and, more specifically, to alter consciousness, is crucial in understanding the importance of world beat music and drumming circles in the contemporary North American context. In particular, given my genealogical endeavor--to uncover and subsequently rearticulate subjugated knowledges in ways that intervene in contemporary social struggles--a political explanation for these phenomena becomes absolutely crucial. Since existing explanations ignore political implications or, at best, refer to politics only obliquely, I need to take some time to sort through the various approaches before extrapolating a semicoherent framework that not only offers an explanation but enables rearticulation. I will attempt to work dialectically between the two dominant modes of explanation: the physiological and the cultural (and their not-too-distant cousins once-removed, materialism and poststructuralism).

Rhythm and Physiology

One way to explain the cross-cultural nature of the connection between rhythmic music and consciousness is to revert to a mechanistic, biological (and hence "universal") framework. Francis Huxley, for example, argued that percussive sounds disturb the inner ear, an organ that regulates functions ranging from posture and muscle activity to breathing patterns, heartbeat

and blood pressure (Needham). More developed hypotheses work from the neurophysiological level, where drumming can operate as an "auditory driver." Loosely interpreted, the theory goes something like this. The ear is a direct receptor for the brain. Drums scatter sound across a wide range of frequencies, causing the sound to decay rather quickly. These short, sharp pulses spread across the spectrum of sound our ears pick up, in a sense "overloading" the hearing mechanism and inducing trance by altering our normal brain wave patterns: quite literally, our brain wave patterns entrain with the external rhythms, altering the physiological foundation for our conscious awareness. In a laboratory setting, Andrew Neher was able to affect the brain wave patterns of human subjects with the use of a drum. Even more striking laboratory results have been obtained through "photic driving," using rhythmic pulses of light (e.g., strobe lights) to affect brain wave patterns.⁴ These studies not only produced changes in the electrical patterns of the brain, but the subjects manifested and reported other symptoms such as muscle twitching, hallucinations, and a variety of emotional responses.

In his (perhaps overstated) interpretation of Neher's research, Hart argues that drumming can be used to drive brain waves from the alpha state (characterizing normal waking consciousness, about eight to thirteen cycles per second) down to the alpha/theta border (about six to eight cycles per second). The theta state "is that period of drifting right before sleep when all sorts of thoughts and memories wash through consciousness" (Drumming 114), and might therefore explain some of Neher's symptoms such as hallucinations and a loss of normal time-sense. Also drawing from Neher's research but extending its application beyond percussion to the

⁴Strobe lights, such as those used on emergency vehicles, can trigger seizures in people with epilepsy. Similarly, rhythmic lights can be used to diagnose epilepsy and some types of tumors (Neher).

human voice, George Leonard argues that the "dangerously sensual" effect of vibrato

might be explained by the fact that its rate of vibration, about seven pulsations a second, precisely matches the theta-wave state of the brain. This is the state associated with the twilight zone between waking and sleeping, in which the customary censorship of the conscious mind is absent. (5)

Although the auditory nature of drumming, as described above, may make it an ideal driver, Gilbert Rouget's cross-cultural review of the relations between music and trance indicates a wide variety of musical instruments --from drums to cymbals, flutes to the human voice--used to induce trance.

Culture and Consciousness

In part because of this variability, Rouget is immensely skeptical of Neher's "pseudoscientific" research and the claims made by others who build off it. Rouget draws from an impressive range of ethnographic research into music and trance to develop his cultural hypothesis. In the course of this review, several objections to an acoustic/physiological explanation are raised. First, there is the immense variability in the means for inducing trance. Drums, rattles, flutes, singing, chanting and dancing are all involved, alone or in combination, in various rites from around the world, calling into question the unique powers Neher and others grant to drums and percussion. The various instruments employed to induce trance deliver "acoustic signals too radically different from one another to be able to produce, at the level of auditory physiology, the same effects on the listener" (76). Nor are there any consistent rhythmic patterns used to induce possession. In some instances no music is used at all. Second, as noted above, sometimes those producing the music go into trance

(shamanism), and other times it is the listeners/dancers (possession). Not only is this variability itself crucial, but it also raises the question of why every person exposed to prolonged rhythmic music is not affected. Third, the same songs and rhythms that induce trance are often performed in nonritual contexts and do not, in those cases, produce trance. Therefore, Rouget argues, the "total situation" is involved and a direct stimulus-response explanation is invalidated. If Neher's thesis were correct, Rouget argues, "half of Africa would be in a trance from the beginning of the year to the end" (175). Finally, because of the importance of context Rouget questions the validity of applying conclusions arrived at in the laboratory to explain the range of cultural practices involving drumming and trance.

Rouget is fond of quoting from Rousseau's Essay on the Origin of Languages: "As long as we choose to consider sounds only through the commotion they stir in our nerves, we will never have the true principles of music and its power over our hearts." His constant refrain becomes that "the relations between rhythm and trance operate at the level not of nature but of culture" (91). Physiological explanations remain at the level of the signifier, and it is in the signified that Rouget finds his answer. Rouget does not discount, for example, the physical force and impressiveness of drums, but although he recognizes the importance of the acoustic element it is reduced to mere medium in his theory.

Though he does not name his criteria as such, Rouget is obsessed with the rigid laws of scientific causality: since trance sometimes happens without drums and drumming often occurs without inducing trance, there can be no causal relationship based on the acoustical properties of drums. For Rouget, trance is always and exclusively brought about by the meaning of the music and the larger ritual context. In the orisha cult of the Yoruba, for example, the drum is a sacred instrument: the sounds of particular types of drums are the voices of particular deities. In addition, certain

rhythms are associated with certain deities: when the rhythm of Ogun (the god of iron) is played, for example, it calls for the possession of the appropriate dancer by that deity. In both instances, the power of the sounds to induce possession comes from their symbolism. The sounds themselves are unimportant except that they are "charged with symbolic meaning, and . . . emotional power" (318). The music functions to communicate: by means of it the group sends a message to the individual concerning their behavior. Music does not "trigger" trance, but "socializes" it.

There is an intermediate theory, "conditioned reflex," that attempts to account for the role of both physiology and culture but it is important to understand that Rouget rejects this position as well. Here, an individual is culturally conditioned to enter a particular state: the trigger is learned. This might explain, for example, why adepts are not possessed when the appropriate rhythm is played outside the ritual context or why the musicians are not possessed as well. Rouget, however, feels that "talk of conditioned reflex merely adds to the confusion" (178). I am unclear why this is so, but he seems to continue to apply his strict tests for causality to this explanation. In other words, any variability in a pattern leads Rouget to reject nature and embrace culture as the explanation. This is crucial because it so clearly demonstrates Rouget's sense of "nature"--rigid, static, unchanging, universal (sound familiar?)--a sense I shall have cause to challenge. Variability is a trait exclusively associated with culture; "nature" and "culture" become exclusive categories and incompatible explanatory devices.

Subjugating the Signifier

Rouget consistently privileges the signified above the signifier to explain the effects of music, to the extent that the signifier--the acoustical properties of particular instruments and musics--becomes

irrelevant except as the necessary material element (medium) of communication. However, despite the consistency and vehemence of this position, he demonstrates an acute sensitivity to the power and importance of the sheerly acoustical elements of music. Listen to this description:

Physiologically speaking (at the sensorial level), although music is mainly perceived by the ear, this is not the only path it can take. Musical vibrations are wave movements whose amplitude is relatively large when compared to the scale of the human body. The movement of the objects that give rise to these vibrations--or the movement that they excite in objects, since the transfer of energy can take place in either direction--is always palpable and often even visible. It is thus directly perceptible as material and concrete. A musical vibration can be something palpable. If one touches the soundboard of a violin while it is being played, one can feel the sounds quivering against one's finger tip. If one nears one of the extremely large drums the Yoruba beat at their secret oro ceremonies, one will hear the sounds through one's abdomen--which vibrates in sympathy--as much as through one's ears. Similarly, if in the same ceremonies, one comes close to one of the small drums (whose tightly stretched skin is whipped rather than beaten, prestissimo, with extremely slender sticks), one's entire head vibrates. In an organ loft, when the organ plays loudly, one absorbs the music with one's whole body. The whole world trembles, the very air resounds. "To bathe in music" is not just a metaphor. (Rouget 119-120)

This passage comes from a section in which Rouget is discussing how music is experienced: physiologically is the first mode, followed by psychologically, affectively, and aesthetically. I cannot help hear this list, in the context of the larger work, as progressive: he cannot ignore the body but he can diminish it. Rouget seems to harbor some deep fear of sensory, bodily experience, yet the power of his description, presumably based in his own experience, is itself palpable (to me). This ambivalence is structured into his description: although it is scholarly convention (and who knows

what happened in translation), his use of the depersonalized personal pronoun "one" throughout allows Rouget to describe his sensory experience while simultaneously distancing himself from it.

Rouget's fear of sense, body, materiality is manifested in his hostility toward the drum: more accurately, perhaps, it is displaced onto theories, such as Neher's, that attempt to grant the drum a privileged status in inducing trance. The vehemence with which Rouget attacks Neher and those who adopt his argument is quite striking given the otherwise "civilized"--i.e., dry, unemotional, scholarly--tone of his lengthy work.⁵ Listen to his explanation of why Neher and others have been misled:

For a variety of reasons the drum is surrounded by such a particular aura that not only the man in the street but also, very often, the man of science readily lends it very special powers. The often explosive, violent, and brutal nature of the sounds it produces, and the frequently dramatic or obsessive use to which it is put, indisputably confer upon the drum a particularly strong emotional impact. Its sound can be a truly aggressive force, and its vibrations have an almost palpable impact. Whether we observe it in Europe, where it is an instrument of war, or whether we envision it in those distant and barbaric lands in which literature and the cinema inevitably associate it with the bloody and tempestuous rites of "primitive" religions (particularly those ceremonies often indiscriminately lumped together under the vague term "voodoo"), the drum is regarded as the instrument par excellence of frenzy. If, to use Rousseau's terms, there is one instrument capable of "shaking our nerves," then it must, one [probably the same "one"

⁵The only other targets for his scorn--and they are quite telling--are those who use terms loosely. Rouget is into definitions and boundaries in a big way, and spends the entirety of a lengthy chapter distinguishing trance from ecstasy, possession trance from shamanic trance. When Rouget points to examples of other writers using "trance" and "ecstasy" interchangeably it is almost as if with a sense of righteousness in response to moral transgression.

who was carried away by the physical sensations of music, above] would think, be the drum. Moreover, it is also the instrument par excellence of rhythm, and therefore of dance. It is easy to understand how, carried away by their imaginations, some people have believed that it is able physically, and as it were mechanically, to project people out of themselves. Hence the literature, often extremely bad, that has developed around the drum. . . . (Rouget 169-170)

In this passage, Rouget seems unable to decide whether these meanings are associated with the drum because of its intrinsic acoustical properties or because of the "fictitious" meanings layered on top of it. Notice that the "nature of the sounds it produces" are "explosive, violent, and brutal." This would imply some kind of intrinsic relationship between the signifier and the signified, that the sound of a drum is an indexical or at least an iconic sign, but such a view would counteract his thesis that it is the meaning, exclusive of acoustical properties, that is responsible for inducing trance. Rouget therefore shifts his approach somewhat, indicating that it is not so much the sounds themselves as it is the culturally-circulated meanings of the drum in the West that have "insidiously" led people to believe that it is the "violence of the sound involved" that produces trance (87). Notice: paying attention to sound alone--granting power to something that is violent, explosive, brutal, barbaric and primitive--is not only misguided but leads to research that is "devoid of all scientific value" (33). By attributing power exclusively to the cultural, Rouget falls into my earlier characterization of "constructivist" views of language: materiality, physicality and nature (i.e., the feminine and the primitive) are, as Fiske put it, "inert, polymorphous and insignificant until put into discourse" ("Writing" 330). Rouget attributes trance to the systems of representation in which it occurs. Drumming and other music are, in Burke's terms, "the visible tangible material embodiments of the spirit that infuses them

through the medium of words" (Language 362). Rouget is--and I mean this culturally and ideologically, not psychoanalytically--a soma-phobe.

Back to the Signifier

Who better to oppose, dialectically, Rouget's fear of the drum than an avowed hedonist, a champion of the signifier, a theorist of the erotics of language: Roland Barthes. In The Pleasure of the Text, Barthes argues that when we become immersed in the material element of communication--"the articulation of the body, of the tongue, not that of meaning, of language"--the result is jouissance (66-67). In this state of "bliss,"

what is overcome, split, is the moral unity that society demands of every human product. . . . in the text of pleasure, the opposing forces are no longer repressed but in a state of becoming: nothing is really antagonistic, everything is plural. (31)

The maintenance of a social order is made possible by the imposition of a singular meaning, by the subordination of the signifier through its connection "to the canonical, constraining form of the signified" (43). Revolution, therefore, is not made possible through the struggle between ideologies (meaning, sociality)--"it is the subversion of all ideology which is in question" (33). Jouissance is characterized by "the abrupt loss of sociality" and, along with it, subjectivity (39). When value is "shifted to the sumptuous rank of the signifier" the subject's relation to language is brought into crisis (65).

What does this have to do with drumming? What Barthes outlines could be interpreted as an altered state of consciousness. Drumming-induced trance could be described as an unsettling of "the reader's historical, cultural, psychological assumptions, the consistency of his [sic] tastes, values, memories" (Barthes, Pleasure 14). Drumming's ability, as described

above by Rouget, "to project people out of themselves" could be heard as a disruption of subjectivity. Furthermore, Barthes' perspective begins to bring into focus the political potential of drumming's link to consciousness: a way of resisting the imposition of ideology and subjectivity.

The asocial character of jouissance, however, immediately calls into question the use of Barthes' theory to explain the kinds of trance discussed by Rouget. In the case of possession trance, the individual's identity and memory are temporarily lost. However, the adept takes on another identity, that of the deity, which could hardly be called "asocial" (at least it is not reported to be interpreted that way within the indigenous cultural framework). In the case of shamanism, the person's identity is retained but is dislodged from the immediate constraints of the body, allowing noncorporeal travel. This also is hardly "asocial" as a strong sense of subjectivity is retained.

I am quite willing to grant these rebuttals, because, to move the project forward a step, my primary interest is not in explaining these "other" events. What I want to understand are the implications of drumming and world beat music for Euro-American subjects. In the case of world beat music, what happens when I--that is, an embodied subject whose subjectivity and modes of awareness are the products of particular semiotic systems--am exposed to the music, particularly the rhythms, of another culture? Presumably, based on the ethnographic evidence, a "native participant" in a possession ceremony understands what the ceremony is all about, including the meaning of particular instruments, dance steps, and rhythms. The drumming, in this case, is hardly in the realm of the "pure materiality of the signifier." These ceremonies are rich in meaning, as Rouget insists. But what of the case of me, a nonnative, listening to a recording of that same music? Certainly, this act is also meaningful: I classify the music (as "world beat," as "primitive," as "heathen," as "noise"),

make some sense out of why I do or do not like it, and so forth. Those meanings, however, are comparatively rather vague and general; they don't say much about the specificity of the music, of particular "songs," rhythms, sounds. For me, the signifiers are not bound to particular signifieds with the force of years of socialization, these connections are not caught up in my very subjectivity--at least not with the same dynamics as a "native."⁶

Barthes identifies two "mechanisms" for inducing bliss. On the one hand, "bliss may come only with the absolutely new, for only the new disturbs (weakens) consciousness" (Pleasure 40). The "new" in this case is from a symbolic other than that in which the subject has been formed (or, perhaps, from no "symbolic" at all). This could, therefore, bring about the "crisis" of subjectivity, language and awareness discussed above. Listen to Hart's description of what happens when western European (including Euro-American) bodies are exposed to West African rhythms:

Just before enlisting I had discovered the music of Babatunde Olatunji, the Nigerian drummer who lives in New York. It was my first exposure to the mother rhythms from West Africa that later mutated into my tradition, becoming rock and roll. All I knew then was that whenever I played this music at one of Raphael's parties, the room would transform. It was as though the rhythm of the drum was calling up something from these sleek cosmopolitan bodies that had been asleep. There was a power there that I couldn't ignore. It was calling me back to the drum. (Drumming 91)

⁶To the degree that discourses of "otherness" (e.g., the primitive) are central to Euro-American structures of identity (Torgovnick), the meanings of these musics can be bound up in the subjectivity of a listener such as myself. But this has little to do with the specificity of the signifiers involved: such discourses precisely ignore that specificity. If, however, Euro-American listeners allow themselves to get "caught up" in that specificity, to allow the force of the signifiers to "wash over" their awareness and their body. . .then I believe we are dealing with a very different situation.

Seemingly, such effects of "newness" would hold true for "language" (more narrowly defined) as well, but as the ethnographic evidence indicates, drumming and music in general are particularly powerful in inducing alternative states (of awareness, consciousness, subjectivity. . . I will leave those distinctions undistinguished for the moment).

Distance from the forces of socialization, from the naturalization of the connection between signifier and signified, is not the only way of attaining jouissance. The second means is the opposite of the first:

repetition itself creates bliss. There are many ethnographic examples: obsessive rhythms, incantatory music, litanies, rites, and Buddhist nembutsu, etc.: to repeat excessively is to enter into loss, into the zero of the signified. (Barthes, Pleasure 41; emphasis added)

Here, even with the presence of the constraining forces of the signified, the signifier can be set loose, as it were. The beat, the sound, the rhythm, grounded so strongly in the body, can throw off the limitations of sociality--discipline, subjectivity, meaning. Hence, in a drumming circle there may be no need for the "alien" rhythms of another culture: rhythm, "purified" of meaning by means of repetition, induces the loss of sociality.

In short, the word can be erotic on two opposing conditions, both excessive: if it is extravagantly repeated, or on the contrary, if it is unexpected, succulent in its newness. . . . In both cases, the same the physics of bliss, the groove, the inscription, the syncope. (42)

This, then, provides a sense of the liberatory potential of drumming and world beat: the loss of sociality, language, subjectivity; freedom from constraint: not mechanistic manipulation of biology, but the freedom of the asocial body.⁷ Barthes' ideas, applied to drumming, would certainly

⁷Although in many senses they could not be any farther apart, some of

explain the long-standing fear of the drum and rhythm in the West. As Bernice Reagon put it in a different context and with different intent,

sometimes people think that white people were afraid we were talking to each other with the drums, or they were afraid of the power that the drums had. And I think not only over us as a people, but drums actually charge the air. (Dancing)

Drums activate the body, its repressed drives; they privilege the pleasure principle over the constraints of civilization (Freud). In this sense, the fear of the drum by the Christian West is completely justified.

Jouissance and Materialism

Barthes' relationship with materiality is, however, a bit strained, and, as a result, the politics of jouissance are somewhat questionable. Teresa Ebert's materialist critique of the "ludic postmodernism" of Barthes, Derrida, Irigaray and others highlights the limitations of Barthes' argument for my project. Ebert characterizes this approach as "postpolitical" because it "tends to focus on pleasure--pleasure in/of textuality, the local, the popular, and, above all, the body (jouissance)--as in and of itself--a form of resistance" (7-8). This focus is politically limiting (if not outright

the parallels between Neher's work and Barthes' ideas are interesting. At an explanatory level, they both reject meaning and ground their explanation in the materiality of music, the signifier. They also both explain more than just drumming. As I mentioned earlier, Leonard uses Neher's research to argue that the "dangerously sensual" effect of vibrato in the human voice can be attributed to its rhythm--at about seven pulsations a second, it matches the theta-wave state of the brain. Barthes also discusses the human voice and its link to the possibilities of jouissance. "The grain of the voice, which is an erotic mixture of timbre and language," "the language lined with flesh," succeeds "in shifting the signified a great distance and in throwing, so to speak, the anonymous body of the actor into my ear. . .that is bliss" (Pleasure 66-67).

regressive) for several reasons.

With the elevation of jouissance to the primary means of resistance, an essentially private, personalized act (for example, reading) is substituted for "a collective practice through which existing social institutions are changed so that (economic) resources and cultural power can be distributed without regard to gender, race, class, sexuality" (Ebert 6). "Politics, for ludic postmodernists, is instead a textual practice. . . , a mode of semiotic activism" (15). Ludic politics aims to liberate the individual, particularly the individual libido, instead of "the emancipation of the collectivity of subjects from exploitation. . . through social struggle" (18). Ludic politics therefore violates the basic tenet of materialism: consciousness does not determine social being but is determined by social being. A change in consciousness does not, therefore, result in a change in oppressive social structures. In this sense, Marx and Engels's critique of idealism applies to Barthes' privileging of pleasure: "all forms and products of consciousness cannot be dissolved by mental criticism. . . ; not criticism but revolution is the driving force of history" (181). Despite his claims to materiality (with his focus on the signifier and the body in order to produce a "theory of the materialist subject"), Barthes ultimately (re)produces an ahistorical idealism. To broaden the critique beyond Barthes, my concern here with consciousness can itself be challenged along the same lines: it is antithetical to a collectivist--that is, socialist, materialist--politics.

The individualist, private, idealist nature of Barthes' approach and my appropriation of him is a logical outcome of our class affiliations. Ebert explains, in response to the recent trends in cultural studies as represented in works such as the Cultural Studies collection of Grossberg et al., that

such a validating, affirmative, and pleasure-ful culture studies--concerned primarily with the liberation of (individual) desire and the body as zone of sensuousness--is to my mind a very class-

specific inquiry. Pleasure and desire can be the overriding concern only for the classes of people (middle and upper) who are already "free" from economic want and have the means to pursue or, more specifically in commodity cultures, to consume the means for pleasure. It is also these classes who have the relative luxury of displacing the body as means of labor onto the body as pleasure zone. This fetishization of pleasure validates the priorities and privileges of the middle class. . . , eras[ing] the needs, conditions, and exploitation of the working poor and the impoverished underclass. (8)

Given the vulnerabilities of my project to such a critique, I want to take Ebert's definition of interventionist critique as a challenge:

Critique is a practice through which the subject develops historical knowledge of the social totality: she or he acquires, in other words, an understanding of how the existing social institutions. . . have in fact come about and how they can be changed. Critique, in other words, is that knowledge-practice that historically situates the conditions of possibility of what empirically exists under patriarchal-capitalist labor relations. . . . [it is] the production of historical knowledges that mark the transformability of existing social arrangements and the possibility of a different social organization. (9)

I still believe that drumming and the attention it calls to rhythm have the potential to constitute such a critical practice. This does not mean that I will or must abandon my focus on consciousness, however: it occupies the decentered center, the inverted pinnacle, of this project. For, as Ebert writes,

in order to be effective, cultural critique must intervene in the system of patriarchal oppression at both the macropolitical level of the structural organization of domination (a transformative politics of labor relations) and the micropolitical level of different and contradictory manifestations of oppression (cultural politics). (22)

How does rhythm, as a critical tool, accomplish this? On the one hand, as I attempted to demonstrate in the previous three essays, it both questions and transgresses binaries such as idea/practice, mind/body, culture/nature and macro/micro. On the other hand, by continuing my examination of rhythm and consciousness I want to attempt to make concrete the linkages between these kinds of realms--between collective, material practice and the individual body and consciousness--in order to make apparent the possibilities for intervention and transformation. To do so, I want to turn to lengthy discussions of two different but highly compatible theoretical frameworks: the semiotic/psychoanalytic theory of Julia Kristeva and the fusion of neurology and phenomenology called "biogenetic structuralism." Finally, Volosinov's model of base-superstructure relations and the insights of fractal geometry will be used to bring these two theories together and highlight their implications not only for drumming but for the role of rhythm in everyday social life.

Kristeva and the Subject-in-Process

Julia Kristeva may seem an odd theorist to choose to respond to the demands of Ebert's materialist critique, for she is easily read, and not entirely without reason, as valorizing an apolitical jouissance, a textual practice that is almost identical to Barthes' project. There are, however, crucial differences: read carefully, and with certain interests and presuppositions in mind, her ideas can be appropriated within a more materialist structure. Through a focus on rhythm--what else?--I want to work through her ideas toward such an appropriation.

In Revolution in Poetic Language, Kristeva combines Freudian and Lacanian psychoanalysis with semiotics to develop a theory of the "subject-in-process." She argues that upon the entry into language, the presocial drives (in short, the body) are subjected to the Law, the Symbolic.

Socialization, to follow Freud's formulation, is synonymous with repression, what Deleuze and Guattari term "canalization."

Discrete quantities of energy move through the body of the subject who is not yet constituted as such and, in the course of his [sic] development, they are arranged according to the various constraints imposed on this body--always already involved in a semiotic process--by family and social structures. In this way the drives, which are "energy" charges as well as "psychical" marks, articulate what we call a chora: a nonexpressive totality formed by the drives and their stases in a motility that is as full of movement as it is regulated. (Kristeva, Revolution 25)

Language is composed of both the signifier, the material element of the sign produced by the body, and the signified, the conventional (i.e., social), shared meaning. The body must be disciplined, subjected and controlled in order to produce the appropriate signifiers, which exist as the remnant of the drives. Uncontrolled, these drives interfere with the production of "meaningful" statements and the sense of a stable identity. The drives are therefore sublimated, repressed into the chora.

The chora is not the presocial drives themselves. It is, rather, parallel to the unconscious: it is the site, necessarily asymbolic, where those drives reside, a "rhythmic space" (Kristeva, Revolution 26). The chora is simultaneously the result of the entry into the symbolic and a force opposed to the symbolic. Its repression is never complete, for the subject must rely on the body for the production of signifiers. Hence, any utterance is the result of a dialectical process, with the social (symbolic, disciplining) and presocial (drives, biology, the chora) interpenetrating. All discourse "moves with and against the chora in the sense that it simultaneously depends upon and refuses it" (26).

As a result, all discourse can be heard as fragmented, the product of an ongoing struggle. This fragmentation manifests itself in the utterance as

two analytically distinct dispositions: the semiotic and the symbolic. The semiotic forces in language manifest themselves in the signifier, in the production of sound and movement. Drawn from the chora, however, the semiotic is always heterogeneous: plural, anterior to meaning, always threatening a disruption of the unity of the subject and the signified. The symbolic forces are those elements of discourse associated with sociality, with communication (the exchange of meaning), with the unitary subject. Any utterance "offers itself as the dialectic of two heterogeneous operations that are, reciprocally and inseparably, preconditions for each other" (Kristeva, Revolution 66). To the degree that the subject remains "sane"--able to produce "meaningful" discourse--the symbolic forces are in a fragile state of dominance. At any time, however, the semiotic chora may manifest itself through the production of movements, rhythms, sounds, or sound combinations that are alien to the symbolic "home world" of the subject, creating disfluencies, parapraxis, stammerings, laughter, contradictions, silences, non-sense.

Given the unending struggle between the semiotic and the symbolic, successful linguistic practice requires the creation of a mediating structure. The thetic, while aligned with the symbolic, acts as the boundary, as the place where the semiotic and symbolic intersect, allowing for signifying practice. The thetic, therefore, is absolutely necessary for any signifying practice, despite its constant rupture by the semiotic drives. The thetic both necessitates the sublimation of the drives into the chora and allows for the (illusory) sense of unity in the speaking subject called for by the dominant modes of social practice. The thetic constitutes the subject as a position--as with the Cartesian subject, an autonomous, transcendent agent that acts upon its environment--against the forces of the semiotic. The thetic interrupts (always and only temporarily) the heterogeneity of the semiotic, the dialectical and fragmented subject-as-

process, to allow for the positing of identity, the statement of propositions and judgments. "Without the completion of the thetic phase. . .no signifying practice is possible" (Kristeva, Revolution 63). "Such a position is necessary, but only as a limit open to constant challenge" (Desire 140).

In the face of the unity of the thetic, the revolutionary potential of the semiotic forces in language arise from their radical heterogeneity. The existence of the semiotic drives in language provides the means to an antiauthoritarian political practice. In contrast to communication and signification,

What we call signifiante, then, is precisely this unlimited and unbounded generating process, this unceasing operation of the drives toward, in, and through language; toward, in, and through the exchange system and its protagonists--the subject and his [sic] institutions. This heterogeneous process. . .is a structuring and destructuring practice, a passage to the outer boundaries of the subject and society. Then--and only then--can it be jouissance and revolution. (Kristeva, Revolution 17)

As with Barthes, this is a textual practice with a multiplicity of ramifications: for ideology, for the subject, and thereby for the social formation. Although all utterances involve the semiotic, in general it is successfully contained and the illusion of singularity (of truth, of identity) is maintained. Kristeva calls for signifying practices, what she terms (following the Russian formalists) "poetic language," which highlight the semiotic, which foreground and release the heterogeneity of the presocial body. These manifest themselves as "a corporeal, physiological, and signifiable excitation which the symbolizing social structure--the family or some other structure--cannot grasp" (Revolution 180). Such practices, blurring as they do the distinction between signifier and signified,

prevent the thetic from becoming theological: in other words, they prevent the imposition of the thetic from hiding the semiotic process that produces it, and they bar it from inducing the subject, reified as a transcendental ego, to function solely within the systems of science and monotheistic religion. (58-59)

As we saw with Barthes, this revolution is not about a clash between ideologies, but about undermining the function of ideology in general by means of a disruption of the operation of language-as-communication, as a system of exchange, of meaning. In shattering the illusion that language is seamless, unified and self-identical, ideology is denaturalized and the social order's control over the subject and body is disrupted.

At an even more profound level, a privileging of the semiotic disposition in signifying practice undermines the subject itself. Remember, the subject is constituted by means of language, with the entry into the symbolic and the creation of the unconscious and the chora. The subject is intimately linked with--is in fact produced through, though this is denied by covering over the processual nature of the subject--its symbolic. Therefore, eruptions on the part of the semiotic temporarily disrupt the subject and require a repositioning of the thetic. At the extreme end, the loosing of the drives via the semiotic would represent the dissolution of the subject, manifesting itself as an extreme neurosis or schizophrenia.

This disruption is not only possible or evident in the production of discourse but in its "reception" as well. For Kristeva, "intertextuality" is the transposition from one sign system (and hence one order, one disciplining of the body) to another. This passage "demands a new articulation of the thetic--of enunciative and denotative positionality" (Revolution 60).⁸ This "new articulation" creates a corresponding shift--

⁸Ong, for example, discusses the different repressions necessitated by oral as opposed to written cultures.

disruption--in the status of the subject, whether writer or reader, for both processes are productions, practices, performances:

The one who reads, the reader, participates in the same dynamics. If we are readers of intertextuality, we must be capable of the same putting-into-process of our identities, capable of identifying with the different types of texts, voices, semantic, syntactic, and phonic systems at play in a given text. (Kristeva, "Interview" 282)

I want to focus on rhythm and rhythmic music as one of these systems into which the body is subjected, i.e., through which the subject is constituted. Our bodies become accustomed to producing and listening to the rhythms of our culture(s), disciplined to create the rhythms appropriate to our social-symbolic "home world." A central part of socialization is the entraining of our bodies, our daily routines, and our aesthetic sensibilities into the rhythms of our culture. These rhythms may be intimately linked to the rising and setting sun or to mechanical representations of time (the 9 to 5 grind). They may be linked to the seasons (planting, harvesting, gathering, hunting), the moon and tides (fishing, sailing, harvesting seaweed), somatic functions (eating, defecation and urination, menstruation, gestation, sleeping), organizational calendars (quarterly reports, yearly audits, the weekend, the school year), or cyclical economic change (energy prices, tax deadlines and refunds, holiday shopping). They are linked to the very rhythms of our languages and the processes by which we become habitualized to producing those rhythmic patterns physiologically. And they are linked, of course, to the musical sensibilities of our culture.

Given the centrality of rhythm in many forms of social organization, it should come as no surprise that Kristeva's descriptions of the nature of the chora are centered on rhythm, e.g., "a rhythmic but nonexpressive totality" (Revolution 40). In turn, her descriptions of how the semiotic manifests

itself in discourse repeatedly feature rhythm and music. Poetic language unsettles the position of the thetic subject, calling attention to a signifying apparatus, "an undecidable process between sense and nonsense, between language and rhythm. . . , between the symbolic and semiotic" (Desire 135). A phoneme, for example, belongs to the symbolic as a signifier. "But this same phoneme is involved in rhythmic, intonational repetitions; it thereby tends towards autonomy from meaning so as to maintain itself in a semiotic disposition near the instinctual drives' body" (Desire 135). Modernist poetry, to name a particular kind of textual practice, aims "not only to impose a music, a rhythm--that is, polyphony--but also to wipe out sense through nonsense and laughter." Such moves ask of a reader that they shatter their "judging consciousness in order to grant passage through it to this rhythmic drive constituted by repression" (Desire 142). The repressed instinctual drives, Kristeva repeatedly notes, are released as rhythm. Compare this to Reinhard Flatischler's use of rhythmically-chanted syllables to recover "the forgotten power of rhythm":

TA KI, GA MA LA and TA KE TI NA are mantras that are frequently used in my rhythmic bodywork. They have no meaning, but their constant repetition while connecting them with different movements, allows them to go deeply into our consciousness, arousing our own ancient knowledge of rhythm. (16-17)

What, then, might happen to the subject immersed in the rhythms of another culture? A disruption of subjectivity through the release of repressed drives? Entrainment into a different mode of consciousness and/or a different sensibility of one's body? It would be, following this schema, the difference of the rhythms that would lead to a disruption and, perhaps, reformation of consciousness or subjectivity.⁹ The performance

⁹A pattern Rouget identifies in the ethnographic evidence regarding possession trance is relevant here. During the often lengthy "training"

of a different order also produces a different subjectivity or state of awareness. Recall Hart's description of what happens when Western bodies are exposed to West African rhythms: "It was as though the rhythm of the drum was calling up something from these sleek cosmopolitan bodies that had been asleep" (Drumming 91). Sounds like a reactivation of repressed drives and energies that, in turn, would entail a transformation of consciousness and subjectivity.

Similarly, drumming (alone or in a group)--with its sheer repetition, its focus on rhythm, its call to embodiment--could disrupt thethetic, activate the chora in ways not necessarily symbolically productive or "meaningful." The imposition of "alien" rhythms is unnecessary. The ego becomes the subject-in-process, being transforms into becoming. If there is no preestablished structure for anotherthetic, another subjectivity (as with possession trance), the body and consciousness may "wander," become nomadic: time-sense alters, states of affectivity flow, the drives no longer "interrupted": the body produces and experiences sounds that no longer obey the bar of repression, the signifier/signified split:

By reproducing signifiers--vocal, gestural, verbal--the subject crosses the border of the symbolic and reaches the semiotic chora, which is on the other side of the social frontier. The reenacting of

phase that initiates must pass through before becoming "qualified" adepts, much of the music used is in stark contrast to the music used in both the possession ceremonies themselves and other practices within the culture. This music helps create a kind of break that is important in differentiating the adept from those who are not open to possession. This is not "simply" symbolic, but following Kristeva may establish, in a sense, a differentthetic or subject-position. I must be careful, however, in applying a theory of the subject developed in contemporary, Western European culture to a culture in which the nature of the symbolic and its relation to the constitution of the subject may be radically different.

the signifying path taken from the symbolic unfolds the symbolic itself and . . . opens it up to the motility where all meaning is erased. . . . The Dionysian festivals in Greece are the most striking example of this deluge of the signifier, which so inundates the symbolic order that it portends the latter's dissolution in a dancing, singing, and poetic animality. . . . In cracking the socio-symbolic order, splitting it open, changing vocabulary, syntax, the word itself, and releasing from beneath them the drives borne by vocalic or kinetic differences, *jouissance* works its way into the social and symbolic. (Kristeva, Revolution 79-80).

In the drumming circles I attend, Betty often warns people before we begin to go only as far out as we can bring ourselves back. Kristeva warns that too excessive of an unleashing of the semiotic can result in schizophrenia, psychosis or a loss of symbolic function and identity.

At this point, a Kristevan reading of the potentials of drumming and world beat may not seem substantially different from my earlier, Barthean one. Many of Ebert's criticisms of "ludic politics" still resonate. Such temporary "disturbances" and "pleasures" of the subject do not intervene in material structures of dominance. Kristeva's "poetic revolution" is not a politics insofar as a political program is both a function of a stable identity and involves collective action directed toward the transformation of social institutions. It is, therefore, an idealistic (textual) and individualistic (subjective) endeavor.

Kristeva does not entirely agree, nor do I. Although Kristeva admittedly focuses her theoretical and analytical attentions onto textual practices and states of subjectivity, her approach does account for the role of material structures outside of the drives and signifiers. Kristeva indicates that the semiotic chora, the "location" of the repressed drives and "originator" of signifiers, is structured out of

a) instinctual dyads, b) the corporeal and ecological continuum, c) the social organism and family structures, which convey the constraints imposed by the mode of production, and d) matrices of enunciation, which give rise to discursive "genres" (according to literary history), "psychic structures" (according to psychiatry and psychoanalysis), or various arrangements of "the participants in the speech event" (in Jakobson's notion of the linguistics of discourse). (Revolution 87; emphasis added)

Let me clarify the importance of these elements vis-à-vis rhythm and the concerns of materialism. The "instinctual dyads" refer to the presocial drives that, following Freud, Kristeva posits as dichotomous (life drives/death drives, ego drives/sex drives, et cetera). These are the remainders of the presocial body: they manifest the body as an active player in this process instead of as a passive slate to be inscribed. Their inclusion here is crucial: it is a reintroduction of a certain form of materialism. Such is also the case with the "corporeal and ecological continuum." As the examples I provided above indicate, the rhythms with which the body entrains are not only "cultural" but "natural" as well: the drives are thereby structured in terms of the body's relation to its physical environment. If, for Marxism, consciousness is determined by the economic base of collective life, certainly this can include the ways in which the means of production is shaped by the "natural" environment as a material force.

With the third element, the "social organism and family structures," Kristeva attempts to account for the role of the economic base of society in her theory of the subject-in-process. These structures "convey the constraints of the mode of production"; it is here that the requirements of the structures in society responsible for the systemic production of material and cultural inequality are communicated to the subject in the form of certain disciplinings of the body. Along with the fourth element

(matrices of enunciation, to which I shall return in my discussion of Volosinov), these represent the ways in which the social is written into the very structures of the subject, thereby producing any necessary repressions (the unconscious, the chora). Since the forces that structure the chora--e.g., familial and other institutional relations, music (remember Attali) and language (which I will get to)--are formed or mediated by the means of production, it is the means of production that determines, at least in part, how the liberatory energies of the semiotic will manifest themselves.¹⁰ In turn, the excitation of these energies is liberatory precisely because it can result in the subject's unwillingness or inability to participate in those structures: because ideology loses its force and because the body and its desires--remember Chaplin's dance--no longer meet the requirements of the mode of production. The rhythms are skewed, disruptive, without productive (and therefore economic) value.

My explanation of how the body's rhythmic discipline is necessary for economic productivity does not share Kristeva's primary focus on language as an ideological and subject-producing mechanism. My appropriation of her ideas nevertheless indicates a necessary link to what Ebert would consider "legitimate" political issues: the transformation of socioeconomic structures. As Kristeva claims, "the subject of a new political practice can only be the subject of a new discursive practice" (quoted in Ann Jones 61). Within the "apparent asociality" of the semiotic and *jouissance* "lies the social function of texts: the production of a different kind of subject, one capable of bringing about new social relations, and thus joining in the process of capitalism's subversion" (Kristeva, Revolution 105). The revolution in poetic language brings about in the subject what collective,

¹⁰Recall from my discussion of "Discipline" the idea of dominant and resistant rhythmic forms--i.e., in Foucault's terms, that any system of power produces its own resistances (e.g., jazz).

political revolution brings about in society: "The history and political experience of the twentieth century have demonstrated that one cannot be transformed without the other" (17).

I do not think Ebert would quite buy this rebuttal to her critique of ludic politics, but what both Ebert and Kristeva hold in common is the split, the binary: private/public, ideas/materiality, subject/collective. What I have been trying to show in the last several pages, by means of a rehearing of Kristeva through a focus on rhythm, is the untenability of such distinctions. Social organization (e.g., the family, the mode of production) is inseparable from instinctual, somatic and psychic organization. Consciousness and subjectivity are not products of socioeconomic structures (materialism), nor the reverse (idealism). And it is not simply a matter of conceiving of a more complex, dialectical, overdetermined relation between them: rhythm questions the split. I hope glimmers of this have become evident in my discussion of Kristeva; to clarify my point I will add another layer, take a different cut with the ideas of biogenetic structuralism.

Neurophysiology, Culture and Consciousness

Biogenetic structuralism and neurophenomenology are names for an approach integrating anthropology and phenomenology with recent advances in the neurosciences in order to theorize the relationship between brain, culture and consciousness. Laughlin, McManus and d'Aquili begin by emphasizing that all experience is the product of cognitive processes and structures that are both cultural and physiological. These cultural and physiological structures do not simply interact, but actively form one another. Although biogenetic structuralism pushes for the recognition that all experiential events, however strongly influenced by culture, have a physiological basis, such an approach can be used to understand how the

body is cultural all the way down (Hawes). Which is not to say it is only cultural: the human brain as theorized by biogenetic structuralism is both highly plastic and equipped with hard-wired cognitive structures.

Early in the developmental process, the neurons in the brain are undifferentiated. Through cognitive development, some neural pathways are grooved and reinforced--canalized--through activity while others atrophy from lack of use. Hence, to take one example, our language patterns (involving certain neural patterns) become inscribed at the neurostructural level. In this way, "experience comes to be canalized (constrained, limited, focused, preprogrammed) by society" (Laughlin et al. 3). We can only experience or think along the lines made possible by our existing neural patterns:

Even in abstract thought, the group member's cognitive operations are canalized by socialization so that abstract operations tend to occur in socially prescribed circumstances, upon socially prescribed themes and domains, utilizing socially provided symbolic materials. (177)

Social control is not simply ideological or symbolic, but extends into the neurophysiological level. That young people are far more likely to recover from brain damage not only serves as evidence of increasing neural differentiation through time, but indirectly demonstrates the increasing level of neurophysiological conditioning by environmental (including, of course, cultural) structures.¹¹

¹¹Research on the phenomenon of "kindling" provides additional conceptual and empirical support for the model of the brain posited by biogenetic structuralism. Kindling--first proposed as a model for epilepsy and more recently for trauma-induced depression--is the name for a process whereby the brain is "rewired." In animal experimentation, the brains of rats are electrocuted, which induced mild seizures. Over time, as current is periodically reapplied, the seizures become more intense; soon, less current is required to induce the same level of seizure. Eventually, no

While the structure of experience is mediated by the structure of the nervous system, any neural structure is the product of a dialectic between previous neural structures and the environment. The "brain" is a living, developing system. Neurons become involved in hierarchy after hierarchy of neural networks and "those networks function as living organ-izations" (Laughlin et al. 52). Not uncoincidentally, biogenetic structuralism uses the term "entrainment" to describe the process by which neurons link and combine into complex networks in response to environmental influences. These networks form "neurognostic models" that are activated by certain stimuli or intentional activities ("consciousness") and that mediate those experiences. In language, for example, the signifier "calls up" the corresponding neurognostic model, which provides the neurophysiological basis for the conscious or unconscious "meanings" (signifieds). Models can lay dormant for extended periods of time until activated by intention, intraorganismic activity or environmental stimuli.

In "normal" consciousness, we continually and very rapidly disentrain and reentrain neural models, generally without conscious attention to such

external stimulation is required at all; the animals enter into periods of seizure "spontaneously" (see Racine and Wada for reviews and examples of such research; please do not forgive them for their treatment of animals). Robert Post, a psychiatrist who works with manic depressives, noticed a similarity (i.e., an isomorphism) between the kindling phenomenon and the "cycling" pattern in his patients, in which an initial trauma is followed by a period of depression three to five years later, again one or two years after that, and so on until a point of crisis is reached with "rapid cycling" (Kramer). In the terms of biogenetic structuralism, certain neural pathways--a neurognostic model of "crisis"--are being entrained, the canalization hardening and deepening with each activation of the model. The parallels to the explanation biogenetic structuralism posits for percussion-induced possession (see below) are striking. The transformative potentials for drumming-induced "traumas" follow close behind.

shifts (e.g., I stop reading to pet the cat or answer the phone). Certain of these "models" can be understood as genetically encoded to the extent that they function "automatically" and without needing to be "learned." Most obvious here would be the brain's control over basic physiological functions such as breathing, heart rate, blood pressure and so on. Within the constraints of hard-wired structures, other models (such as reading or riding a bike) can be learned, developed from the interaction between the organism and its environment. Yet these models can potentially become "automatic" themselves: once the model has been sufficiently "entrained" it can function without conscious control unless something "new" (unaccounted for in the existing model) happens that requires adaptation. In a reverse sense, through extensive contemplation and training, autonomic structures can be manipulated, entrained into the conscious network, as in the case of yogis who can drastically lower their metabolic functions "at will."

Similarly, a neural model can "penetrate" other models. So, for example, a particular signifier (the flag) not only "calls up" the model that mediates its "meaning" (imperialism, anger, disgust), but that "meaning" can in turn raise my heart rate. The "penetration" of one model by another can be "automatic" or "intentional," hard-wired or conditioned.¹² Symbolic

¹²Music, for example, can not only "mean" something, it also alters physiological functions, what Storr terms "arousal." Storr also points out, and this would be very consistent with biogenetic structuralism, that if I listen to music from a technical/formal (analytic) mode, the degree of physiological arousal is greatly diminished. The analytic "neurognostic model," which I can "select" (entrain to conscious network) instead of another mode of listening to music, does not penetrate the neural systems governing physiological arousal to the same degree, if at all. This has crucial implications for my own understandings of the effects of drumming and world beat: formal analyses of music may not tell me much about how

penetration" can explain (as well as complicate) Rouget's thesis that it is the meaning of music that induces trance. A person is conditioned to have a certain response to a particular symbol (e.g., a particular chant, rhythm or instrument). The neural model that mediates the symbol's "meaning" penetrates other models, inducing certain physiological, behavioral and experiential states (walking on coals, speaking in a different voice or language, subjective identification as a deity). Rituals and other organized social activities can be used to alter consciousness through the conditioning (entraining) and activation of "nonordinary" neurological structures that provide the neurochemical basis for nonordinary states of consciousness. Models not only mediate the experience of particular stimuli, but constitute modes of awareness, what Laughlin et al. term "phases" of consciousness. Examples of such phases might include "normal" waking consciousness, sleeping or dreaming. Other activities, each of which requires a reentrainment of the appropriate neural models, can also be understood as phases of consciousness, such as reading, meditating, engaging in conversation, or being depressed, drunk or stoned. A transition from one phase to another requires that certain neural structures be disentrained and others reentrained. This transition is a "warp" between phases.

In African and Caribbean possession cults, such as those found in Haiti, rhythm--produced by drums, bells, rattles, clapping and dancing--brings on the possession of the dancers by orishas, divine beings. The human being dances, and as the possession begins, they begin to stumble and may even fall to the ground, their body wracked by convulsions. This period of uncoordination is understood as the transition phase between the human and divine states. In the terms of biogenetic structuralism, the neural

it is generally experienced. I stand by my (relative) musicological ignorance!

pathways are being disentrained from their "ordinary" state and reentrained into their "nonordinary" (i.e., divine) state.¹³ Both behavior and consciousness are thereby altered. The neurological model of "possession" is learned and remains dormant until activated through environmental stimuli--in this case, the entirety of the possession ritual as well as specific ritualistic rhythms. This explanation accounts for why everyone present does not enter into a possessed state: only those who have gone through the extensive initiation have developed the "nonordinary" neural model of possession that is triggered by the ritual (everyone present presumably has a model for their role and experience of the ritual--just not a model that results in "possession").¹⁴ This also explains how a specific

¹³I must take care in applying scientific explanations to the practices of another culture, even if the scientific theory itself, as is the case with biogenetic structuralism, draws from the philosophical traditions of other cultures. I recall, for example, Wade Davis's conclusion at the end of The Serpent and the Rainbow that even after he found the chemical used to create zombies in Haiti, he was skeptical that the answer was to be found in a chemical or in the causal explanations of Western science. Science, he felt, grounded as it is in the assumptions of a Western world view, cannot explain a cultural event that occurs only because of a radically different set of assumptions. I have to remember that my goal here is not to claim to know the truth but to develop transformative opportunities, that my focus is not primarily on other cultures but on my own.

¹⁴Rouget's discussion of the process of initiation is consistent, both structurally and metaphorically, with the biogenetic structural explanation I am advancing here:

We know that initiation into the cult of a yodun or an orisha is a long process intended to produce profound modifications in the individual's personality structure, so that he or she will become a receptacle fit for the divinity. It is characterized by a sequence of phases during which the novice's head is subjected to a variety of treatments: in candomblé, the bori ritual intended to "strengthen

rhythm can be coded to induce possession by a particular deity. Finally, the lack of any memory by the individual of their possession can be accounted for by "blocked transference": some models can be accessed by the model of "normal" waking consciousness; other models cannot. For example, some people can learn to recall their dreams in great detail but others do not develop this capacity. We can learn to control and even cross warps.¹⁵

This explanation, although highlighting the role of physiology, provides a mechanism or causal process for Rouget's claim that culture is responsible for trance, not some intrinsic property of sounds such as those produced by drums. However, given that there are certain models hardwired into the human nervous system and other "universal" physiological traits, the research of Laughlin et al. does indicate that there are certain stimuli that can serve as particularly potent "drivers." Biogenetic structuralism counteracts the impulse of those like Rouget who want to search for

the novice's head"; in Haitian voodoo, the "headwash" (laver-tête); in the prisha cult the imposition of osu, a mystic preparation placed on the novice's shaved head at a certain stage in the initiation in order to aid reception of the prisha. (42)

¹⁵The ability to cross and control warps, to access and integrate other phases of consciousness into "normal" waking consciousness is far more common in cultures outside of the West. Euro-American culture in particular tends toward monophasic consciousness: all other phases, such as dreaming or drug-induced states, fail to count as "real." Recollection of dreams, for example, has to be learned and such investigations are generally limited to "therapy" or marginalized "New Age" practices. Many drug-induced warps, such as those created by hallucinogens like LSD, are declared illegal, immoral and a threat to the social order (see, for example, Stevens). In polyphasic cultures, dreams and other experiences are just as "real" as waking awareness and are often integrated into the total understanding of the world. These are the same kinds of cultures in which drumming is often prevalent, and adds yet another dimension to the explanation of the West's distrust of the drum and rhythm.

"purely" cultural explanations because this perspective blurs the lines between mind and body. A change in the body's physiological state will generally be accompanied by a change in the mind's state since mind is mediated by the physiology of the brain.

Many of the common attributes of mind-altering rituals (chanting, dancing, drumming, ingesting psychotropic drugs, fasting, and so on) are understood by Laughlin et al. "as driving mechanisms for retuning the ANS [autonomic nervous system] activity in participants. Retuning the balance of ANS functions may operate as a warp leading to alternative phases of consciousness" (146-147).¹⁶

¹⁶The role of drugs in these rituals, although not universal, is crucial. My experiences of mind-altering drugs suggest that they enable modes of thought--conceptual and affective connections--blocked by my "normal awareness." For example, the events reported on the news are no longer "news" but actual, concrete events taking place in the world. This information is no longer "bracketed off" as "information" about "world events" but becomes articulated--in powerful, affective ways--with other modes of theory, politics, art, experience, and so forth. The multiplicity and simultaneity of the connections become immediately present. If social control is enacted through the inscription of ideology and common sense into my neural pathways, drugs may help overcome such canalizations.

In The Doors of Perception, Aldous Huxley theorized (following Bergson and Blake) that the brain functions as a reducing valve, filtering out the immense amount of internal and external stimuli we are bombarded with at every moment in order to provide us with the minimal trickle of information that we can both cope with and use to survive. Hallucinogens such as mescaline, Huxley proposed, open up or bypass this filtering system, including language, allowing us to experience what is. Rewritten in the terms of biogenetic structuralism, some drugs may allow us to make new neural connections or activate atrophied synaptic pathways. They may enable multiphasic consciousness, the simultaneous activation of multiple neurognostic models, thereby allowing new meanings and connections to be made and potentially denaturalizing "common sense." Put simply, they help resist the socialized canalization of thought and experience. These may be

Given the power of entrainment and the ANS's responsibility for regulating the body's rhythms (e.g., pulse), it is not surprising that rhythmic stimuli--whether photic, sonic, or somaesthetic--are particularly powerful "tuners." In addition, according to Laughlin et al. the most profound alterations in consciousness result from the simultaneous discharge of both of the major components of the ANS: the excitation (fight-flight) and relaxation (growth and repair) systems. "The range of driving mechanisms that may result in simultaneous discharge. . . includes drumming, chanting, dancing, and other rhythmic stimuli" (147).¹⁷ By activating the ANS, some drivers have the potential to activate long-dormant models, even "paleoneurognosis"--that is, models encoded in the reptilian and early mammalian portions of the human brain (Laughlin et al. 197). In this sense, there is a (frightening) grain of truth in hearing heavily rhythmic music as "primitive."

Despite the commonalities in some ritualistic forms, grounded in physiological universals, cultural diversity is crucial. According to Laughlin et al., all "higher animals" (who?) have some degree of openness to "learning," i.e., our neural systems are open to environmental influence. "Generally speaking, the higher the network in the hierarchy of neurophysiological functioning, the more open to modification entrainments will be" (57). In humans (which is not to say "in exclusion of other organisms"), the relative plasticity of the neural system is compensated

the "intrinsic" (chemical) potentials of some drugs, but these states would also be open to conditioning: hence the importance of set and setting. I can use drugs to passify myself, or I can use the same drugs to activate certain neurognostic potentials by means of contemplation, conversation or musical immersion.

¹⁷An interesting link to Barthes' conception of jouissance is that orgasm also activates both systems.

for by ritual. The lack of an "intrinsic" order in large portions of the human brain, particularly at birth, opens up the possibility for the inscription of orders into the structures of the brain. This would be accomplished by performing those orders in the individual's environment: the brain's neural rhythms and patterns entrain with the rhythms and patterns of the physical environment as well as those of language, music, ritual and other forms of social organization (including the mode of production). Our bodies are entrained at the levels of both biology and consciousness (since the latter is structured by the former) into a particular set of orders (rhythms). We then perform those orders, individually and collectively, creating stimuli that entrain, disentrain and reentrain neural networks. There is a bio-social dialectic at the basis of human organization that problematizes the individual/collective distinction.

Following this model, exposure to radically different forms of order and rhythm would seem to require alterations both at the level of neurophysiology and consciousness. These alien orders would go against the grain, as it were, of the existing patterns of canalized synaptic pathways that form the neurological foundation for consciousness, perception, and experience. Laughlin et al. argue that a neurognostic model, whether genetically inscribed or learned, can--within the constraints of the "genetic envelope"--be reentrained, adapted to changing environmental conditions to become, in a sense, isomorphic with external stimuli. Hence, various levels of organization--from the cellular to the synaptic to the organismic to the social, from the biological to the phenomenological to the cultural--can be entrained, exhibiting varying degrees of isomorphism. This not only links these various levels but questions the empirical validity of the analytic distinctions between them.¹⁶ It also emphasizes that

¹⁶These ideas take on additional significance in the light of advances in quantum physics. In essence, it increasingly appears that there is no

humans are not "beings" but "becomings," on both an individual and conceptual (i.e., species) level. Grounding consciousness and culture in neurophysiological structures is not equivalent to biological or genetic determinism. Structure is process.

"matter"--as we reach each, smaller level of subatomic particles we discover that there is no particle but "only" fields of force, energy and movement: i.e., rhythm. Leonard draws out the implications in terms of the human body:

it is possible to conceive of each human individual as consisting of pure information expressed as rhythmic waves that start as the infinitesimal vibrations of subatomic particles and build outward as ever-widening resonant hierarchies of atoms, molecules, cells, organs, organisms, families, bands, tribes, nations, civilizations, and beyond. At every step along the way, every entity is connected to the great web of information that is the universe. (86)

In this context, the links between a belief in solid particles, the individual, visualism and definite boundaries become apparent. Walter Ong argues that alphabetic cultures put "a premium on visualist qualities such as sharp outline and clear-cut sequence" (47). Yet, to take just one example, with the increasing sophistication of computers and printing technology computer designers are intentionally creating "fuzzy fonts," blurring the edges instead of achieving the ideal character with clear, sharp edges. The "perfect" font has been found to be a hindrance to reading comprehension (Eisenberg). If we are fields of rhythmic force and energy, whose boundaries are (at best) "fuzzy," where can the lines between self and environment, self and other be drawn? My language and conceptualization in this essay is called into question: how can I distinguish between the individual and our "environment" (social, biological, physical, and so forth)? Perhaps the concept of "haecceities" is more appropriate, although a bit too alien for me to "work with" very much: "relations of movement and rest. . . , capacities to affect and be affected" (Deleuze and Guattari 261). The distinctions hold only at a distance and are taken to be absolutely real: what Leonard suggests calls way too much into question.

Transition

Rodney Needham observed that percussion accompanies various transition events (rites of passage) in every known culture: birth, death, initiation, marriage, sacrifice, declaration of war, accession to office, harvest, eclipses, lunar rites, and so on. He hypothesized a connection between percussion and transition but had no explanation for the link. Biogenetic structuralism provides one such explanation: rhythm as a powerful tool for entrainment, transformation, reorganization (see also, in this regard, Turner). The parallels between descriptions of the neural system as "grooved," "hardened," "canalized" and Hart's musical description of "the groove drawing them in and hardening" can be attributed to coincidence, common cultural metaphors, or an interchange of metaphors between different discourses (e.g., science and music). Or they can be heard as isomorphic structural relationships between a social ritual of rhythmic entrainment and the entrainment of neural structures. Ritual inscribes itself onto our neural pathways. Cultural patterns are, often literally, drummed into our heads.

Given that, those who have the knowledge for manipulating these rhythms, for entraining and disentraining particular models, would have substantial power. This could explain the value placed on the techniques of master drummers and the association between drums and royalty in many African cultures, not to mention the value accorded to (i.e., the price paid for) muzak in contemporary North America. In many cultures, there is a name, an identifiable role, for the person who carries such knowledge: the shaman. The shaman, by journeying to other (spiritual) planes of existence, may heal, foretell future events, guide the dead to their ancestors, converse with deities. How?

Ritual is the driving force behind the shaman's flight, the engine of ecstasy. It is the shaman's stock-in-trade. It is on the wings of ecstasy that the shaman flies to worlds unseen by most, and ritual is its source. Often interwoven with symbols, augmented by drugs, and possessing various forms, ritual is the behavioral component inducing the shamanic trance. Ritual behavior is patterned, repetitive, and structured to produce generally inter- and intraorganismic coordination. (Laughlin et al. 276; emphasis added)

"Shamans are drummers--they're rhythmists, they're trance masters who have understood something fundamental about the nature of the drum" (Hart, Drumming 163).

Taylor and Ford: Industrial Shaman?

I hesitate to make the connection, but the parallels between these descriptions of the shaman and the disciplinary technologies used by Taylor and Ford are just too strong: scientific management and the assembly line create environments in which behavior is "patterned, repetitive, and structured to produce generally inter- and intraorganismic coordination." Taylor and Ford were the shamans of their era, a time characterized by Attali's network of representation: power as localized spectacle, e.g., management and the assembly line. According to Laughlin et al., the repetition of shamanic ritual "serves to turn off the conceptual mind" and the symbols utilized activate nonanalytic modes of knowing (278): the disenfranchisement of one neurognostic model and the reentrainment of another. Here is a direct link to muzak: the elimination of lyrics because words lead to analytic thought; the smoothing out of jarring rhythms, melodies and instrumentation, thereby increasing the repetitive qualities of the music; the coding of tunes with a "stimulus value," i.e., to what degree they activate what type of autonomic functions; the use of previously-popular songs in order to massify (i.e., nullify) their symbolism. Befitting the

network of repetition, shamanic ritual is no longer visible and localized: muzak is *everywhere and nowhere*, lacking a specific location or an identifiable figurehead, invisible yet totalizing. Muzak also represents the shifting of ritual out of the realm of production and into the realm of consumption: consumption as repetitive ritual, with the mall as its rationalized site (Yelanjian).¹⁹

What modes of consciousness are being induced via the rhythmic manipulations such as those of muzak, advertising and the mall? As John Berger put it,

All hopes are gathered together, made homogenous, simplified, so that they become the intense yet vague, magical yet repeatable promise offered in every purchase. No other kind of hope or satisfaction or pleasure can any longer be envisaged within the culture of capitalism. (153)

An emphasis on rhythm and consciousness takes me in a somewhat different direction. Chernoff recounts a legend about some African stevedores who used songs to accompany their work of loading and unloading ships. Upon encountering a machine used by Westerners to assist in a similar task, they assumed the machine was the white man's music. According to the approach I am trying to develop here, their perception was not the result of

¹⁹Certainly there are counterhegemonic "shaman" as well. Timothy Leary stopped in Salt Lake City in 1992 to give a lecture followed by a "rave"--using lights, strobes, sounds and other multimedia forms to electronically alter consciousness. It should be no surprise that Leary has written his own version of biogenetic structuralism with the added element of an explicit political program: Neuropolitique. Theodore Roszak, in his analysis of the counterculture of the sixties, contrasts traditional and scientific "shaman," identifying the latter as practitioners of "bad magic"--hence his dis-ease with LSD. Stevens, in the epilogue to Storming Heaven, discusses a fusion of the two: the contemporary "scientific underground" that uses mind-altering chemicals to explore the "neuroconsciousness frontier."

a primitive misunderstanding, a lack of awareness of Western technology, but of their possession of a different awareness about the role and importance of rhythm in organization. Many of the dominant rhythms in contemporary Western culture--and they are quite consistent with the Western musical sensibility and epistemology I have discussed in the earlier essays--are mechanistic: our clocks, our work, our transportation, our electrical currents. We have entrained, to some degree, with the machine. Are we then cyborg? Have the dominant rhythms of our lives--our bodies, our organizations, our musics--become machine-based and machine-driven? Have we managed to isolate ourselves, to a significant degree, from the rhythms of the earth?

Rhythm, Consciousness and the Mode of Production

Rhythm is one important factor underlying or influencing, as well as connecting, social organization, epistemology, consciousness, and physiology. Our consciousness, for example, is not only influenced by "nonordinary" rhythms, such as those used in shamanic rituals for spiritual journeying, but by "everyday" (common sense) rhythms that are performed as an intrinsic part of any form of social order (language, ritual, work, music, et cetera). Why would the rhythms and breathing patterns of Western European choral music, the speech patterns of middle-class American English, the machinic rhythms of the assembly line or the 60 hertz cycle of the power lines running overhead affect our consciousness any less than the African rhythms of Babatunde Olatunji affected Mickey Hart's Western friends or the music of the candomblé affects its dancing adepts? How could we not be cyborg-subjects (body-machine complexes) in our mechanized and computerized environments?

Let me sketch a model that closely parallels Volosinov's materialist

argument for how the form of economic production determines consciousness through signs. Volosinov argues that "production relations and the sociopolitical order shaped by those relations determine the full range of verbal contacts between people" (19). In other words, the material conditions within a society establish a limited range of "speech genres" through which people can engage in communication (the use of signs). Each of these speech genres (e.g., the performance review, the business letter, the grievance hearing, the family argument over finances, the criminal trial, idle parlor talk, computer networking) carries conventions that enable the production of certain types of utterances and constrain the production of others. Hence, material conditions, through speech genres, establish limitations on the kind of signs used, the meanings attached to these signs, and how these signs and meanings can be organized into systems of sense-making (ideologies). In turn, consciousness for Volosinov is composed of these same signs and ideologies. Individual consciousness is not only a "socio-ideological fact" (because it is composed of signs, which are both social and material) but is (over)determined by the socioeconomic structures in which it is formed.²⁰

The socioeconomic structures of a given social formation are embodied in and performed through various organizations (the family, the workplace, religion, ritual, entertainment, etc.) as well as the attendant technologies (disciplinary, machinic, electronic). These organizations and technologies provide, impose and produce order, one form of which is rhythmic (patterns through time). These rhythms, as discussed above in terms of "ritual," become encoded in the pathways of our brain and nervous system

²⁰I do not wish to present this model as too deterministic and lacking in dialectics. Although not my explicit project here, see Williams' "Base and Superstructure" essay and Jameson's Political Unconscious for complications of base-superstructure relations.

(biogenetic structuralism), disciplining and channeling the body's presocial drives (Kristevan psychoanalysis). Certain patterns of neural pathways exist as "neurognostic models" that are cued by external rhythms, providing the biological basis for a particular mode of consciousness; the harnessing and repression (canalization) of the body's drives constitutes the subject.

In biogenetic structuralism, as with Kristeva, an individual's knowledge, experience, consciousness and identity are the products of a dialectical interplay, in this case between neurological structures and various social and physical environments. At any point, a dialectic exists between existing models (neurological structures, the product of previous models and environmental factors) and the environment. For Kristeva, this dialectic is between presocial drives and social forces, primarily the Symbolic. Both perspectives have the advantage of recognizing the absolute importance of enculturation while also seeing the body as an active player in the process.²¹ The mind is not a blank slate to be passively inscribed with cultural patterns; at the same time, hard-wired, a priori biogenetic structures are not made deterministic.

The dominant forces within any social formation will be imperfect in their entrainment of subjects for at least three reasons. First, they must contend not only with the limitations of the plasticity of the human organism but, if we are to hear the relationship between society and body as a dialectic instead of a simple determination, they must also engage in a

²¹Gendlin critiques the concept of the body used by Freud and Marcuse and his argument could readily be extended to Kristeva. He questions the value and accuracy of setting up the body as intrinsically chaotic, lacking in structure, and thereby open to social inscription. Kristeva makes the body active, but does not necessarily grant the body its own "knowledge" as Gendlin (or, in some sense, biogenetic structuralism) does. Gendlin's ideas about the body-sense and its manifestation in language could also be used to flesh out my model of the body and consciousness, though perhaps with different implications.

constant struggle against the body and its drives as an active force. Second, in our increasingly complex--that is, multicultural, fragmented, stratified--society, we are overdetermined, creating the possibility for gaps and contradictions in our subjectivity. Subjects are entrained into various rhythms, some simultaneously, that may not exist harmoniously, creating dischord, conflict, chaos or simply cancelling one another out like two off-set wave patterns. Third, rhythm can be used as a counterhegemonic force, creating alternative pleasures, neurognostic structures, modes of consciousness and subjectivities.

Here, we return to Ebert's critique of ludic politics and the criteria for materialist critique. To demonstrate how Kristeva's account of the body and subjectivity, biogenetic structuralism's linkage of physiology, consciousness and ritual, and my rhythmic revision of Volosinov's model of base-superstructure relations respond to Ebert's challenge, follow me through another speculative excursion.

Fractals and Self-Similarity

Let me work for a while by analogy. Hold on, bear with me.

Scale. I am talking about scale: changes in consciousness versus collective action that changes social structure. To focus on the alteration of consciousness as a revolutionary practice is to be an idealist, individualist, bourgeois. "Real" social change occurs through collective action to change socioeconomic conditions: structural inequalities, modes and relations of production, styles of organization.

Benoit Mandelbrot's work with fractal geometry questions (my) Western, scientific common sense about the nature and importance of scale. Take the task of measuring a coastline. What will the scale be? If the "ruler" is a mile long, a particular coastline may measure 10 miles. If the ruler is a

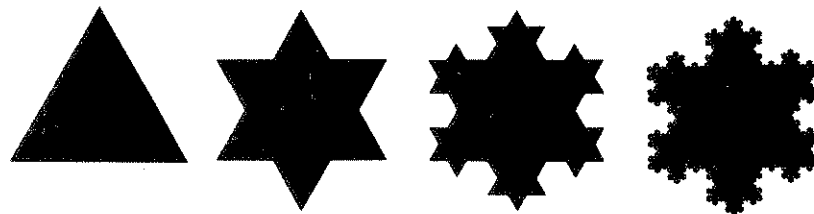
yardstick, however, it will be far more attuned to the variations in the coastline. Bumps, curves and inlets that would not have been measured with a mile-stick are now included, and the length of the coastline therefore explodes: 500 miles, say. Then a foot-long ruler: 1500 miles. Then an inch-long stick: 5000 miles. Each diminution in scale leads to greater attention to the minutiae of the coast and increases the "length" of the coastline. Theoretically, therefore, the length of the coastline is infinite. The only factor that might limit its length would be the existence of a fundamental particle, e.g., the atom. Then a ruler of the appropriate type could (theoretically) measure all the variations, the peninsulas and inlets, the curves and jagged edges, and arrive at the "true" length of the coastline. Of course, physics keeps trying to find such a fundamental particle and only manages to find more fields of force (probability) at smaller and smaller levels.

The coastline problem has a number of implications. First, it demonstrates the limitations of classical geometry. Geometric shapes such as circles and triangles and spheres and cones have a definite size: computable volumes, surface areas, boundaries, and so on. But mountains are not cones, clouds are not spheres, and lightning does not travel in a straight line (Gleick). Coastlines are not composed of discrete curves and angles. The analogy breaks down: geometry is a platonic, idealist project.

A second interesting implication of the coastline problem takes us back to scale: if I look at a series of pictures of a coastline taken from one hundred miles, ten miles, a mile, ten yards, ten feet, and ten inches away, each picture does indeed look different. However, when given only the shape of the coastline--absent such scaling clues as trees, houses, people --I cannot tell which picture is taken from which scale. The details are different but the structure is similar (remember the city and the computer chip from Koyaanisqatsi). "Self-similarity is symmetry across scale. It

implies recursion, pattern inside of pattern" (Gleick 103). Euclidean geometry fails when faced with the task of modelling such self-similarity. That is where fractals enter the picture. Fractals, or fractional dimensions, become a way of measuring qualities that cross scale: instead of length, for example, fractals characterize the degree of roughness of a coastline.

Take the example of the Koch curve. Start with an equilateral triangle. Now take the middle-third of each side and attach a new triangle, identical in shape but one-third the size of the original. We now have a star of David, a shape with twelve sides of equal length. Take each of these twelve sides and repeat the transformation: attach an equilateral triangle to the middle-third of each side. This single "code" or operation can be used to add to and complicate the shape infinitely.



What we get has some fascinating characteristics. First, it was produced by a very simple code repeated many times, potentially to infinity. Second, if I were to draw a circle around the original triangle such that its three points intersected with the outside of the circle, I could perform the transformational operation infinitely without ever exceeding the boundaries of the circle. At the same time, however, the shape would come to have infinite length. Third, this kind of structure exhibits self-similarity: any one level of detail (scale) of the theoretically-infinite structure would appear isomorphic with any other level of detail. Fourth, this kind of construct is far better, though admittedly still imperfect, for

modelling things in nature such as coastlines. James Gleick explains that

It is hard to break the habit of thinking of things in terms of how big they are and how long they last. But the claim of fractal geometry is that, for some elements of nature, looking for a characteristic scale becomes a distraction. Hurricane. By definition, it is a storm of a certain size. But the definition is imposed by people on nature. In reality, atmospheric scientists are realizing that tumult in the air forms a continuum, from the gusty swirling of litter on a city street corner to vast cyclonic systems visible from space. Categories mislead. The ends of the continuum are of a piece with the middle. (107-108)

Let me bring this into the body. The human body is exceptionally complex yet all of the "information" required to produce it is "encoded" in a single piece of DNA existing in every cell (or so one story goes). The body is a compact, relatively "efficient" entity. Take the circulatory system: blood vessels branch and divide again and again in a manner that can be modelled fractally, with each scalar level appearing as self-similar to every other. In most types of tissue, any cell is never more than three or four cells away from a blood vessel: their fractal character allows for their ubiquity while only taking up about five percent of the body's space. Or take the lungs: in order to be able to absorb more oxygen the surface area of the lungs must be increased, but there are spatial constraints to doing so. In a fashion analogous to the Koch curve and coastlines, the surface area of a tennis court is packed into the space of our lungs. This means that they achieve their "efficiency" while taking up little space, that their structures are self-similar across scales, and that as a result they (theoretically) require only a small amount of information to be so structured. As Gleick explains, "DNA surely cannot specify the vast number of bronchi, bronchioles, and alveoli or the particular spatial structure of the resulting tree, but it can specify a repeating process of bifurcation and development" (110; emphasis added).

Although what I am suggesting is not a truth claim but a heuristic, an intriguing analogy, a means for conceiving transformational possibilities, William Condon's research on conversational rhythms adds something of an empirical dimension to these ideas.²² Neither critical nor chaotic theorist, Condon is on the faculty of the Boston University School of Medicine. He makes high-speed films of conversation and then painstakingly codes all of the recorded behaviors, breaking down both the vocal productions and various elements of "body language" in a frame-by-frame analysis. In doing so he has demonstrated the existence of "self-synchrony": that a speaker's verbal utterances and nonverbal cues are precisely entrained, down to time-units of 1/96 of a second.²³ In addition, a listener's nonverbals and a speaker's verbal utterances are also highly entrained with as little as 1/48 of a second lag-time between the production of speech and corresponding nonverbal responses in the listener. Condon has found that dysfunctions such as autism and dyslexia are characterized by a profound lack of entrainment at this microlevel, perhaps caused by a four-part "echo" in nonverbal responses to utterances and a discrepancy between the entrainments of the right and left sides of the body. These echoes may create a degree of chaos that can account for the inward-turn made by autistics: conversational entrainment may be close to impossible, blocking "normal" modes of communication. Communication thus relies not simply on common "meanings" with signifiers as media, but on a rhythmic synchrony as well.

²²For a review of research along similar conceptual lines, see Douglis.

²³This unit is not determined by the behavior but by the limits of Condon's technology: high speed film operates at 96 frames per second. This methodological issue could certainly be used to critique Condon's conclusions.

In addition to exhibiting the importance of entrainment in everyday conversational patterns, Condon's work connects with issues of self-similarity and the implications of biogenetic structuralism. Condon has found, for example, that certain types of nonverbal movements are cued to certain structural features of verbal productions. In other words, just as Laughlin et al. describe neurons as entraining into level upon level upon level of hierarchical organization, there is a hierarchy of levels of entrainment in conversation. Some nonverbal movements are entrained with the smallest sound units (phones), others with words, and still others with phrases or "sentences" (i.e., somewhat complete/isolatable "utterances").

The characteristic form of order of the organizational flow of speaker behavior is thus quite clearly revealed to be that of an on-going process which is formed of several levels of waves emerging simultaneously. The behavior forming the longer wave begins at the same moment that the smaller wave forms begin. The smaller waves are integrated with the larger wave but are not added together to form it. Metaphorically, it is as if the organism were constantly generating an integrated, multi-level wave hierarchy which behavior necessarily followed. All behavior appears to be integrated together as the function of a basic, organized rhythm hierarchy, e.g., the speaker's eye blinks, which might seem to occur randomly, actually occur synchronously with the rest of the behavior and tend to occur at articulatory change points, primarily at phone boundaries. (Condon 64)

These behavioral cycles are not only hierarchically entrained, but show some striking similarities to brain wave patterns.

One of the tendencies Condon observes, if he excludes utterances such as "yes" and "uh-huh," is that the utterances in his films average one second in length with relatively little deviation (from about .75 to 1.25 seconds). On this basis, he hypothesizes a connection between conversational behavior and brain wave patterns. Each level of self-synchronous conversational

behavior roughly coincides with brain wave periodicity: Delta waves (1-3 hertz) with sentence-length utterances; Theta waves (4-7 hertz) with words; Alpha waves (8-13 hertz) with vowels, syllables and rapidly-spoken short words; and Beta waves (14-40 hertz) with basic phone types. He further speculates that since a listener's nonverbals entrain with the speaker's verbal utterances, "the brain wave organization of a listener may entrain with the structure of the incoming speech of a speaker" (65).

Rhythm as Structural Coding

To recap: fractal geometry models very complex structures, isomorphic across scales, requiring a small amount of information to produce. Biogenetic structuralism theorizes a process whereby external rhythmic patterns entrain certain neurognostic models, which are in turn composed of multiple, hierarchical levels of organized neurons: in other words, there are isomorphic structures at various levels within the organism and between the "organism" and various aspects of its "environment" (remember the fictional nature of these distinctions). An example could be the similarities between the performances of the Tiller Girls, muzak, and the conditions of the factory. The implication is that the rhythms of the factory, as well as that of "music" in the traditional sense, are forming our neural structures and activating alternative behaviors and experiences, both somatic and cognitive.

What makes each of these levels isomorphic? What is the "code"? At least in some cases the answer can be understood to be rhythm. Therefore, if we alter the rhythm--which I am hearing as analogous to changing the information encoded in the molecular structure of DNA--the basic information that reproduces the structures at all levels has been disrupted and a new structure suggested. A key difference from the situation with

DNA is that I am not suggesting an ultimate foundation for these levels of organization. In other words, certain traits of the human organism lend themselves to certain kinds of external (environmental and social) organization. At the same time, the plasticity of the neural system allows for entrainments with (external) natural and social orders. In at least some cases, what connects or mediates or forms these dialectical entrainments is rhythm.²⁴ But there is no hard-wired structure, in human DNA or in the natural environment, which necessitates one particular rhythm or style of rhythm (i.e., one rhythmic sensibility).²⁵ From my perspective, a statement such as Storr's, that "music originates from the human brain rather than the natural world" (51), is ridiculous. The bifurcation is untenable, not only in the sense that the human brain is a naturally-occurring organism, but because the distinctions are as problematic as those of scale. Rhythm not only connects but in-forms social organization, consciousness and physiology.

To play with alternative rhythms is not simply to alter consciousness, it is to fuck with the code, with the (re)production of isomorphic--self-

²⁴Given these connections, why would the Kung's use of rhythmic singing, clapping and dancing both in order to alter consciousness and to activate a healing energy (num) be so unreasonable? If rhythm activates neural systems governing both consciousness and other somatic systems, why should rhythm not be a powerful force for healing? If it has the potential to set us to vibrating--from the atomic (even subatomic) level on up, to the molecular, cellular, organismic and communal. . . .

²⁵Some research suggests that physiological constants such as the heartbeat do inform musical rhythms across the world (Rosenfeld). I think that is an oversimplification, though: even if the average human heartrate sets a basic tempo, that is only a small part of any rhythmic structure and rhythmic sensibility. The heartbeat, for example, bears little resemblance to Western metronome time; it has been, in fact, a key site of chaos research.

similar, hierarchically-imbedded (nested), dialectically-interpenetrating--structures. A change in the rhythm of music or work (or any other form of social organization) would require an alteration in physiology and, potentially, consciousness. A change in music changes consciousness and physiology which then puts the subject and her/his body into a mode potentially incompatible with the mode of economic production. This would not make that mode of production magically disappear, but to alter the individual's internal rhythms is to simultaneously mess with collective rhythms, or visa versa. Put another way, it is not simply that an intervention at one level requires compensation or change at other levels because they are interconnected. What I am arguing is that rhythm is one of the basic "glues" that maintains each level and makes them interconnected. Rhythm, in this sense, is a powerful site both for the imposition and reproduction of an order, for the disruption of that order, and for the production of an alternative order.²⁶ Listen to the following research report, certainly not intended for the purposes for which I use it here but nonetheless fascinating in this context. Entitled "Danger: Different Drummer," it appeared in Psychology Today:

Neurobiologist Gervasia Schreckenber and physicist Harvey Bird at Fairleigh Dickinson University raised some mice in a relatively quiet environment and exposed others to soft sound 24 hours a day --either classical music, mostly Beethoven, or arrhythmic drumbeats.

When the mice were 2 months old, researchers began running

²⁶Recall Attali's explanation:

A network can be destroyed by noises that attack and transform it, if the codes in place are unable to normalize or repress them. . . . For despite the death it contains, noise carries order within itself, it carries new information. (33)

them through a maze to test their learning and memory abilities. At about 4 months there was little difference in performance between mice that had grown up on classical music and those that had enjoyed quiet. But mice that had had a steady diet of arrhythmic drumming had trouble finding their way around the maze and spent much of their time standing still or aimlessly wandering. They were also hyperactive and viciously aggressive. (Chance 24)

Wouldn't make very good workers, would they? And how, exactly, could drumbeats be arrhythmic?

My language here is not at all up to the task because I am trying to move outside of linearity and cause-effect relations. I am trying to indicate that the distinctions between material and ideational transformation, between the individual and the collective, are as arbitrary and artificial as biogenetic structuralism demonstrates the mind/body split to be and that Koyaanisqatsi demonstrates categories like solid, liquid and gas to be. Therefore, I would argue that rhythm as a site and means of intervention has the potential to meet Ebert's criteria: it can help us understand the existing forms of oppression, it can alter the subject and consciousness, and it can potentially disrupt existing structures of inequality and provide alternative forms of social organization. In grappling with the role of the intellectual in social change, Gramsci wrote that

The problem of creating a new stratum of intellectuals consists therefore in the critical elaboration of the intellectual activity that exists in everyone at a certain degree of development, modifying its relationship with the muscular-nervous effort towards a new equilibrium, and ensuring that the muscular-nervous effort itself, in so far as it is an element of a general practical activity, which is perpetually innovating the physical and social world, becomes the foundation of a new and integral conception of the world. (9)

I am arguing that rhythm has the potential to intervene simultaneously at the ideological and material levels precisely because of its transgression of such artificial boundaries. Rhythm is music and work, meaning and structure, aesthetic and technology: it is a medium for what has been understood as the dialectical relations between base and superstructure, individual and society, mind and body, organism and environment.

With Kristeva, biogenetic structuralism and the metaphor of self-similarity as a basis, I now feel somewhat prepared to get around to asking the direct political questions about drumming and world beat. What are the structures--physiological, cognitive, affective, social, economic, technological--that world beat and drumming may be reacting against and intervening in? What alternative possibilities do they create?