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***Ge-stell* and the Specters of the Spectrum**

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No more than a few hundred meters separate the site where Guglielmo Marconi first witnessed the extraordinary effects of Hertzian waves in 1895, and the site where armored vehicles crashed through barricades in order to put down a riot allegedly incited by local radio station, Radio Alice, in 1977.¹ When considering that the former represents the point of departure for one of the most important inventions of the 20th century and the latter represents one of its most paradigmatic instantiations, we might question whether their proximity is something other than coincidental. Affirming that this is more than a coincidence, however, carries with it the necessity and responsibility to demonstrate some causal relationship between Marconi's invention and its appropriation, circa 80 years later, by a group of students and activists in search of means to communicate, organize, experiment and play.

In a speech given at the Archiginnasio di Bologna on the 30th anniversary of his patent, Marconi paid tribute to his mentor, Professor Augusto Righi, by noting that Righi's work had led to an invention that would "permanently benefit mankind" (Hawks 189). Instead of seeing signs which might have gestured towards the realization of Marconi's lofty assertion concerning wireless, however, the interim between his speech and the turbulent 70s witnessed the technical refinement and miniaturization of radio in and for war and the exceedingly monopolistic control of the ether by governments and corporations to the detriment of the masses. Keeping this firmly in mind, we might view Radio Alice as the point of rupture that demands that we critically reexamine how and

why radio's democratic potential passed away under the weight of a history of advances designed to benefit the few and not the many. But is it really appropriate to speak of death considering that we are discussing a potentiality that was never actualized, that is, a life never lived, and therefore not subject to death? If not, we require a register that moves beyond the binary of life/death to encompass those phenomena that are present only in their effects. The figure of the specter appears well suited to this task as it is neither alive as we conceive of it, nor it is dead in the sense that it continues to exercise agency. Thus, radio's democratic potential never died, rather it was made spectral by a history of militaristic and capitalistic instrumentalizations. "[A] ghost never dies", Derrida explains, "it remains always to come and to come back" (123).

The close proximity of Marconi's laboratory and Radio Alice appears less coincidental if we view the latter through the critical optic of the specter. On the one hand, Radio Alice can be thought of within the immediate socio-historic context of the student-worker movements of the late 60s and 70s, in which case its relation to Marconi is purely coincidental: Radio Alice was a radio station operating in Bologna where Marconi began his experiments in wireless. On the other hand, Radio Alice can be thought within a larger spectral context of the voice(s) of disenfranchised masses which has/have arrived, or, returned, to demand that Marconi's promise be realized. Just as ghosts return to haunt the site of the injustice which rendered them spectral in the first place, the voices of Radio Alice filled the ether above Bologna demanding a wholesale reevaluation of a system benefiting a few while the restless many toil silently.

In *Emergency Broadcasting and 1930s American Radio*, Edward D. Miller offers his reading of Martin Heidegger's *The Question Concerning Technology*, and observes

that our contemporary understanding of and relation to technology is haunted. Whereas technology, as it is commonly understood by its current usage, refers to the sciences and the inventions and innovations they produce, a prior conception of the term extended beyond scientific know-how to include the arts as well. This prior understanding is the *technē* of the Greeks. *Technē*, Heidegger explains, is a mode of revealing, making present, or, bringing-forth akin to *physis* (nature's revealing modality) and subsumed under the general category *poiēsis* (12-14). That this other conception emphasizes process over and above products – machines, or more generally, any technical implement – is important in Miller's view. Modern technology, he writes, "bears the trace of its more process-related meaning" and this trace haunts our current understanding of it (18). In other words, whereas the Greek *technē* named dynamic processes of becoming in which the human is not the central causal force and to which (s)he attends caringly and curiously, our contemporary notion of technology myopically focuses on the finality and utility of technical implements. The result of this perspectival shift is that we are no longer humbly attendant to the origins of the technical objects that augment our agency to superhuman proportions, and as a result our mode of being with technology shifts towards a careless will to mastery. But if modern technology is indeed haunted, as Miller claims, is the responsible specter merely the trace of a past notion that has not fully passed, or, it is something else, something more? Specters arrive, or return, unexpectedly and demand recompense for wrongs done and buried. If the "ghost is the voice of technology," what then is the logic of its demands on us (19)?

As the voices of Radio Alice remind us, to conspire means to breath together, and in order to unpack the logic of the demand made on us by technology's ghost, we will

have to do precisely this (Collettivo A/traverso 27). The present essay sketches an answer to these questions concerning technology's haunting, using radio as the medium in question. This should come as no surprise, since specters appear right around the birth of radio. From its inception, radio, as well as those ancillary technologies from which it developed into its own, has been associated with the ethereal, understood as both the otherworldly medium through which wireless messages traveled, as well as the other worlds into which it was believed to tap (Sconce). Although our common assumption might hold that the advent of radio, along with other tele-technologies, served to dispel prior superstitions associated with telepathic communication, the reverse was the case. Radio is, of course, not the only technology to be closely associated with spirits, as Jeffrey Sconce, Avital Ronell, Nicholas Royle and others have shown, but it will be useful here to keep this association in mind as we move to address its spectral residue.

Even as the spectral character of radio provides my point of departure, it is nevertheless important to note the limitations of the specter. As a heuristic, specters aid us in thinking situations in which two or more ostensibly opposing forces occupy the same state or space. In this way, the spectral logic is the logic of interstices, borders and margins. There are other situations, however, when the desire to conjure (up) the specter exceeds the necessity to do so. For example, Lawrence C. Soley, in his *Free Radio: Electronic Civil Disobedience*, categorizes non-commercial/governmental radio transmission, or free radio, into four basic categories: 1) clandestine, 2) pirate, 3) micro-power, and 4) ghost stations. The definition he gives for 'ghost stations' is "any unlicensed transmissions that surreptitiously interrupt the broadcasts of licensed stations, providing an alternative view to that expressed by government-licensed stations" (3).

Even as the link to a form of haunting is here not only obvious, but also perhaps rhetorically attractive, the technical term ‘jamming’ is more commonly employed and more descriptive as well. For this reason, it is useful to restrict our use of spectral logic to those instances in which we arrive at the limits of our cognitive recognition and require a different register which accounts for this epistemological breakdown. Therefore, when, in the course of his questioning, Heidegger forces us to the limits of our relation to and understanding of technology, it becomes productive to employ a spectral logic which takes this rupture into account and aids us in moving beyond it. Moreover, when we discuss how pirate/free radio transmissions puncture both the regulated spectrum as well as the listening models which reign in commercial radio, it will again prove useful to speak of/to/with specters.

§ Spectral technics, or, Spectrics

The essence of modern technics, Heidegger explains, is itself nothing technical (20).² Instead of analyzing and critiquing the machines we use, Heidegger is more concerned with our mode of being *with* modern technics. At its core, this ontological modality is characterized by the inability of the subject to allow anything to maintain its objectivity apart from it. In this view, any object cannot remain in its dignity as object, or simply, as an object in and of itself. Everything is potentially, more, inevitably a source of raw material or energy that must be extracted, refined, packaged and set aside on standing-reserve. These operations have as their sole aim the creation of a storehouse, in which all the energies of nature are preserved in the name of human preservation, and are enabled by endless calculations and rationalizations that render the whole of the real in numerical values. Heidegger names this mode of being *Ge-stell* and identifies it as the

essence of modern technics: “*Ge-stell* means that way of revealing which holds sway in the essence of modern technology and which is itself nothing technological” (20).³

Ge-stell encompasses all of the obvious cases of frenzied resource accumulation – the extraction, refinement, and storage of fossil fuels, minerals, ores and food stuffs. But it also extends to things that we might not normally consider in this manner, for example, the section of the electromagnetic spectrum employed in radio transmission. The distinctions between radio waves, microwaves, infrared or ultraviolet radiation, x-rays and gamma rays are nothing more than orders set upon something that is otherwise a single, uninterrupted phenomenon: the electromagnetic continuum. With radio, a section of this spectrum has been rationalized into frequencies and then rigorously regulated by federal legislation, licensing agreements and fees, transmission protocols, etc. These operations ‘legitimize’ a certain mode of being with the spectrum, while confining others to illegality and silence. Here, electromagnetism is not a miraculous phenomenon that allows us to surpass earlier spatio-temporal limitations on our communications, but rather a raw material that must be secured in standing-reserve. This is the radiophonic *Ge-stell*. In this view, the crackling static listeners encounter between stations is not free space on the spectrum, instead it represents the standing-reserve of electromagnetism awaiting the moment when someone willing to abide by the logic of its orderability will instrumentalize it to suit his/her ends. In this way, the radiophonic *Ge-stell* constrains all activity around the energy in question to its own logic, even ordering those engaged in acts of regulation.

The *Ge-stell* mode of being does not end with the ordering and securing of radio waves, but extends beyond to set upon the listening audience as well. The radiophonic

Ge-stell cannot merely organize the energies that enable transmission, but it must also expand to include the orderability of what is transmitted and those to which it is transmitted. That is to say, the radiophonic *Ge-stell* further consolidates a public in an organization of the subjective energies of listeners. Heidegger uses the example of a forester in order to illustrate the jump from the ordering of inert materials, like cellulose, to the ordering of subjective energies, such as public opinion:

“[The forester] is made subordinate to the orderability of cellulose, which for its part is challenged forth by the need for paper, which is then delivered to newspapers and illustrated magazines. The latter, in their turn, set public opinion to swallowing what is printed, so that a set configuration of opinion becomes available on demand.” (18)

Here, *Ge-stell* takes shape in the innumerable forecasting operations that set upon the public and order it into target markets and political constituencies based on consumption patterns and demographical information, themselves the product of highly rationalized polling activities. The extension of the *Ge-stell* mode of being into the domain of consciousness marks the point when man “comes to the very brink of a precipitous fall; that is, he comes to the point where he himself will have to be taken as standing-reserve” (Heidegger 27). At this point, as listener, ‘man-the-orderer’ slips imperceptibly into the position of the thing ordered and seen ever more exclusively from the perspective of its orderability.

The ostensible goal of the *Ge-stell* mode of being is to command and control the means of humankind’s continued existence. The storehouse generated by the ceaseless processes of extraction assures us that, in times of crisis, the energies placed on standing-reserve will vouchsafe our survival. This, however, does not fully state the case. Instead of eliminating threats to survival altogether, the activities geared towards energy

accumulation push nature, and man along with it, towards the brink of ecological collapse. What is more, as we erect structures to extract resources, we effectively exteriorize and materialize the *Ge-stell* mode of being into these same structures. Our will to mastery and dominion over the real returns to confront us and threatens to set upon us. The orderability of the public and public opinion in terms of calculable patterns of action and thought evince how the human will to mastery can foil easily and quietly back onto the human. Neither of these dangers – neither ecological collapse nor the standing-reserve of humanity – make themselves visible to us, and move as the undercurrent to modern technics and our mode of being with them. Our efforts, Heidegger explains, function only to alienate us from our ecological embeddedness and our human essence – in the pursuit of life, we merely succeed in laying the preconditions of our death (27). To extend and radicalize this position, we might say that, by this logic, we are dead already.

§Enter the specter

Towards the close of the essay, Heidegger returns our attention to the fact that the danger of modern technics is itself nontechnical. A response to the destructive movement of *Ge-stell* cannot, therefore, take the form of Luddism, as this would miss the point altogether. Our technical implements are not in themselves destructive; they only become so when employed in or deployed to destructive ends. Take the example of the stockpile of thermonuclear weapons on standing-reserve in submarines and missile silos across the world. What determines them as weapons is merely the present configuration of their technical elements. Nothing technical necessarily precludes their reconfiguration into something else, say, nuclear power plants capable of lighting homes.⁴ Of course,

this is not to say that this reconfiguration would not be difficult – we need only reflect on the widespread belief that wholesale nuclear disarmament is tantamount to the suicide of an entire population to appreciate how ideologically embedded a set configuration can be. The point here is that nothing *technically* impedes an alternate configuration.

In addition to this explanation, this example poignantly represents Heidegger's claim, which he makes by way of citing Hölderlin, that we must recognize the saving-power immanent to the very thing that most threatens us: "But where danger is, grows / The saving power also" (28). Destruction and salvation, Heidegger explains, are not separable from one another in modern technics. Immanent to any technical ensemble bent on command and control is the capacity to use it otherwise. Modern technics, therefore, are simultaneously death-bringing and life-giving – they are spectral.

The specter is neither alive nor dead, but something in between the two – its logic bridges an otherwise insuperable ontological gap. As such, the specter incorporates the logic of the interstices. Miller's claim – "the ghost is the voice of technology" – stills holds, but more than by the "trace of [their] process-related meaning": modern technics are always haunted by the spectral presence of an alternative technical configuration (18). Consequently, if we wish to survive, if, along with Derrida, we declare we want to learn to live, finally, we must "learn spirits" (xvii). A spectral analysis of modern technics – a spectrics – focuses on identifying the life-bringing potentialities of technical assemblages configured for control. Underlying such an investigation is the firm belief that we cannot afford to demonize technics based on the ends to which we presently put them to use: "What is dangerous is not technology. There is no demonry of technology, but rather there is a mystery of its essence" (Heidegger 28). If we shrink from a direct

confrontation with the complete ‘technization’ of our world and ourselves, which within the logic of *Ge-stell* amounts to the same thing, those most deeply invested in the present arrangement will not cease to improve their technical understanding, leading to a more deeply rooted and refined control. Heidegger explains that this investigation/confrontation must be artistic insofar as art, itself a making present modality, is akin to technics (is a form of technics) and yet fundamentally different from the essence of modern technics (35).

In this essay, I propose to view pirate radio transmissions as this artistic and confrontational investigation into technically reconfiguring control assemblages. On the one hand, pirate radio often, if not by definition, departs from the formulas of commercial radio to present listeners with a more free-form, free-flowing and creative listening experience. The voices heard in pirate radio ‘programs’ do not arrive to us from the clean room but the gallery space, or the graffiti murals on the streets. In so many words, pirate radio is radio art. On the other hand, if we extend the spectral logic to them, we see that pirate radio stations are the *specters of the spectrum*: they occupy the interstices between life, understood as the life granted by the power structure to broadcasters willing to abide by its logic; but also death, understood as either a complete alienation from communication media or simply a mode of passive media consumption. As specters, pirate radio stations explode boundaries and draw attention to ruptures and fissures in the real. Additionally, they provide us with a valuable example of how we might look danger in the face (calculated and ordered consumption of the mass media) in order to discern the place and manner in which a life-bringing technics grows (multiform community radio taking steps towards a sound democracy). Returning momentarily to

Heidegger, I want to underscore the botanical metaphor that pervades the close of his questioning concerned with technics. Although Heidegger never expands on the specific root-structure he has in mind, it isn't difficult to assume that, if we are concerned with a centralized control structure, the radical analogue is arboreal. If this is so, might we characterize the structure of the saving-power as decentered, horizontal-flowing, in a word, rhizomatic?

§ Molecular Poltergeists

In a short piece originally published in *La Nouvelle Critique* and *Rouge*, Félix Guattari explains that the development of the means of mass communication tends simultaneously in opposite directions. On the one hand, media tend “toward hyper-concentrated systems controlled by the apparatus of state, of monopolies, of big political machines with the aim of shaping opinion and of adapting the attitudes and unconscious schemas of the population to dominant norms” (Guattari, “Free” 85). Without framing this tendency in the rhetoric of *Ge-stell*, orderability and standing-reserve, Guattari is nonetheless involved in describing and addressing the same pernicious forces by another terminology. On the other hand, Guattari explains that media technics also tend “toward miniaturized systems that create the possibility of a collective appropriation of the media, that provide real means of communication, not only for the ‘great masses,’ but also to minorities, to marginalized and deviant groups of all kinds” (ibid.). Focusing his treatment of the media on radio, Guattari notes that the same technical advances that have led to more efficient and powerful radio transmissions, and to the greater control of these, have also lead to cheap, miniaturized and simple transistor radios. In the opening paragraph of in his book, *Free Radio*, Lawrence C. Soley notes that, in terms of global

diffusion at the time he was writing – circa 1996 – radio was, and still is by far the most accessible and common of all media.⁵ Guattari's views on radio proved useful to several pirate/free radio movements in France, Italy and Japan inasmuch as they demonstrated how pirate transmission punctures the hegemony of the spectrum to haunt its stranglehold on communication. The Guattarian influence on pirate/free radio is pertinent because it demonstrates the translation, or, implementation of an interpretation of Heidegger's questioning after technics into practice at a grassroots level. The examples sketched out below provisionally answer questions like: what does the notion of the radiophonic *Ge-stell*, attentive to the potential saving-power of media technics, offer those engaged in artistic subversion of the mass media?

In his article, *Toward Polymorphous Radio*, Tetsuo Kogawa reflects on the European free radio experience and notes those reasons why Guattari's thoughts on radio are so appealing to the Japanese mass media in the early 1980s. They identify the manner in which the mass media instrumentalize forecasts to generate programming, and they stress that an alternative radio format would instead approach a local listenership ('a molecular public') in a manner that would unsettle previous communication models. Additionally, Guattari's notion of the transversality is provocative for its eagerness to defy borders in the process of opening new channels of communication, as well as for its capacity to display and deconstruct political intentions lurking at the technical level of communication apparatuses. Running through their many vicissitudes, explorations in pirate radio transmission resist the already established communication routes in their movements to reach a public. In so doing, they draw attention to the fact that the technical configuration of radio, long accepted as static and singular, is capable of radical

modulation.⁶ These notions are markedly isomorphic with the spectral logic I sketched earlier insofar as the specter upsets boundaries – it walks through walls and time – and sheds light on wrongs done. Both Guattari and Kogawa stress micro-FM’s capacity to traverse the socio-economic partitions dividing neighbor from neighbor, and to establish, amongst difference, something which is common to everyone: to hear and be heard.

Running parallel to these reflections, Kogawa discusses a decisive find he made concerning an alternative to commercial radio: radio transmission is only regulated above 1 watt, which remains unrestricted to allow for small radio controlled devices. Where others saw an obstacle to transmission, Kogawa discerned the saving-power in the danger. In his view, not only was this unregulated gap not an impediment, but it represented a true source of community change for several reasons. First and foremost, because a small coverage area is only really an issue if you are attempting to duplicate mass media broadcasting models, and, as Kogawa explains, the ‘purpose was *not* broadcasting but *narrowcasting*’ (287, original emphasis). The point is not to scatter information to atomized consumer-citizens (the centrifugal model), but to link people together at the local level (the centripetal model), in some cases as local as a couple of square blocks.⁷ Second, the micro-FM transmitters used in narrowcasting are cheaply made and readily multiplied. This second strength saliently evinces the miniaturization that results from technical advancements, or, returning to the Heideggerian rhetoric, the saving-power immanent to and co-extensive with danger. The micro-FM model appeals to a category that is oftentimes effectively concealed and yet underpins all other: shared space. I might live no farther than a dozen yards from my nearest neighbor and yet, we might never cross the racial, economic, political or other gap that divides us. Micro-FM

reconfigures local community ecologies by way of redefining the media ecologies that create and sustain them. The rupture between the emergent ecology and the dominant model from which it departs stirs specters which remain to haunt the former.⁸

Pirate radio or micro-FM narrowcasts function by this spectral logic inasmuch as both unsettle the familiarity of commercial broadcasts and force us to recognize the spectrum as larger than its commercial use. At the level of technics, free radio displays the fact that radio need not be highly specialized and lorded over by an elite of the tech-savvy. Kogawa himself dispels his misconception by leading groups through the process of soldering together a micro-FM transmitter. At the level of their programming, pirate radio stations completely deconstruct and redefine the listening models that dominate commercial radio programming. Earlier I wrote that pirate radio is radio art. This comment does not specifically refer to the programming pirate radio stations offer their listeners, however, the evidence of this claim is nowhere more visible, or should I say, audible, than at this level. Consider for a moment Happy Harry Hard-on's rants and raves in *Pump Up the Volume* (1990). Here I choose a fictional example not in the lack of another real example, but because the chances that the reader has seen this film are perhaps greater than the chances that (s)he listens to pirate radio with any regularity. (Re)turning our attention to Radio Alice, we find just how radically different and dynamic the listening practices can be once released from the commercial formulas that anchor them to a fixed order.

§ Specters of Alice

On February 9, 1976, Radio Alice began her first broadcast with Jefferson Airplane's "White Rabbit" approaching crescendo in the background (Collettivo

A/Traverso 10). Although not fully reducible to this origin, Radio Alice was an outcropping of the many media experiments set into motion by the Bolognese group, *A/traverso*. For the reader familiar with Italian, it shouldn't be difficult to discern the Guattarian influence in this name: the name comes from the word 'attraverso' (meaning 'across' or 'through') and the slash that traverses it. *A/traverso*, as a dynamic between the original word and the traversing slash, connotes a traversal force itself open to being traversed. To the frustration of some of the founders, the motif of transversality did not remain at the level of their rhetoric, but extended well beyond to effect a drastic reorganization of Radio Alice's initial structure. Whereas Radio Alice, in the first months of operation, offered two distinct programmed broadcasts daily, invitations extended to listeners to participate resulted in complete collective appropriation of the station. Within the course of several months, Radio Alice represented a media space in which listeners could phone-in, talk on radio, visit the radio station, and once there, they could broadcast their own material and receive calls from other listeners. This organization, or lack thereof, led to a listening experience marked by frequent rupture: it wasn't uncommon for nonsensical poetry and laughter to interrupt a serious political debate (Guattari 1984). For this reason it seems more accurate to describe Radio Alice as a space rather than a programmed station characterized by a genre, or a few genres, of music and marketed towards a specific audience. It was a space in which the margins collapsed and converged and its sound evinced this fact. We might playfully term Radio Alice a 'molecular poltergeist': 'molecular' in the Guattarian sense because Radio Alice insinuated itself and was organized at the level of the community; 'poltergeist' in the sense of a presence that is not fully present other than in its mischievously disruptive

effects. Poltergeists make small noises, moves objects from one side of the house to the other; they disrupt the *oikos* not in order to do violence but in order to force the occupants to recognize their legitimate presence.

§ Conclusion

Heidegger tells us that questioning builds a way, that it is a way-making. In his questioning concerning technics, he sought to build a way toward, and then away from, the essence of modern technics identified as *Ge-stell*. In this essay, we have also been involved in a way-making that departed from the path laid down by Heidegger in order to carry his concepts into the domain of radio. In way-making, we found how spectral logic provides a critical optic with which to analyze any technical assemblage configured for control, and, more specifically, how pirate radio puts into practice strategies gleaned from the spectral analysis of modern technics. The spectral effects of pirate radio are not solely disruptive to the political regulation of the spectrum and the commercial formats shaping consumption, but also productive of the creation of autonomous community media circuits by way of which we might begin to take our first steps towards a sound democracy. At the beginning of his paper, Kogawa quotes Heidegger as he muses on the understanding of the end and asks the question: if we understand the end as the point at which “the whole of [a] history is gathered in its most extreme possibility”, what is the most extreme possibility resulting from the ‘end’ of radio (287)? The examples given in this paper gesture towards a grass-roots form of radical democracy, and if this is so, then it appears that a specter is poised to haunt the control societies busily ordering our world.

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Notes

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² For an explanation of the term 'technics,' used in lieu of 'technology,' see Samuel Weber.

³ In addition to William Lovitt's notes regarding the nuances and subtleties of this concept, both Samuel Weber (in the aforementioned essay) and Wolf Kittler (in a forthcoming essay, "From Gestalt to Ge-Stell: Martin Heidegger Reads Ernst Jünger") offer further explanations that are extremely helpful for English speakers.

⁴ Here I have in mind the recently renewed interest in nuclear energy among some environmentalists. They argue that if our main concern is carbon emissions – a form of pollution that can be neither contained nor localized, and that interacts with the atmosphere in ways not yet fully understood – that we might consider an energy supply that produces containable waste, like nuclear energy. See, for example, "Jolly Green Heretic," *The Economist Technology Quarterly*. It is also pertinent that I note that a nuclear power plant is still an instantiation of the *Ge-stell* mode of being, however, we might all agree that cleaner/greener energy is better than the thermonuclear stockpiling that indexes the global arms race.

⁵ Soley calculated these statistics for 1996 and while the audience size and listening patterns might have shifted in some countries, notably those in which internet usage has dramatically increased over the last 12 years, radio surely still outperforms other media for the same reasons Soley cited at the time he wrote the book: 1) radio is an economic and technically simple communication medium that, unlike print media for example, does not require constant restocking in order to transmit, and 2) radio, being an audio media, does not discriminate along lines of literacy, which invariably increases its sphere of influence. Ideally, I would like to update these figures, but in the interest of time and a viable draft, this recalculation will have to wait. For an idea of the amount of work that might be involved in such an operation, see the CIA World Fact Book 2008 section on Radio Broadcasting Stations by country.

⁶ Bertolt Brecht and Walter Benjmain, among many others, made the astute observation very early on that every receiver is, at the level of its circuitous constitution, potentially also a transmitter. The idea that radio is intrinsically a two-way communication medium flies in the face of the general understanding of radio throughout the 20th century. This is precisely what Guattari means when he discusses the political decisions concealed within technical assemblages.

⁷ Kogawa's model bears the mark of its context – densely populated metropolitan Japan – to the extent that it begins to function less and less effectively as the separation between listeners decreases. At this point, it may become necessary to operate illegally (above 1 watt) in order to reach an adequate listenership.

⁸ In its simplest articulation, ecology is the study of relationships between things. In an ecology, the things themselves are multivalent and multiplicitous – a thing, after all, has many different uses (the one is many). The ecological bond determines a thing in relation to another thing, and in doing so submerges their multivocality under a single determination (the many become one). The potential for the thing's other determinations, however, is never completely erased in being submerged under and yoked to a single determination. Relations determined discursively are subsequently inscribed materially in the things set in

co-relation/interrelation – the relation that defines one radiophonic apparatus as a transmitter and another as a receiver, even if both are capable of either configuration, attests to this fact. After they are determined, the relations between things are normalized and ultimately naturalized, so a single relation is no longer one configuration among others, but rather the natural relationship linking the things. The sense of the natural ecological relationship over time leads to a familiar, *heimlich* feeling – let us note that ecology derives from the Greek *oikos*, meaning home or dwelling. We register the return of submerged configurations as uncanny (*unheimlich*), as spectral, because they explode the *oikos* and render it larger than previously imagined. In this sense, the specter demands that we recognize the oecumene as the known world and not as the entire world. This is the power of spectral technics in emergent ecologies.