Pre-amble

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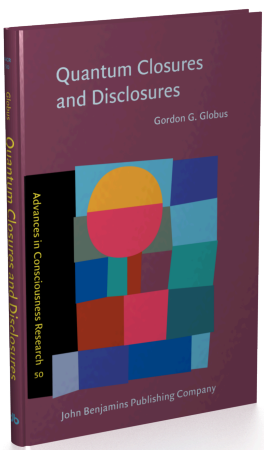

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Quantum Closures and Disclosures: Thinking-together postphenomenology and quantum brain dynamics
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Pre-amble

I try to think-together two communities of discourse which "have an attitude" toward one another generally ranging from utter indifference to disgust. Postphenomenological continental philosophy – my exemplars are Heidegger and Derrida – and quantum brain theory admittedly seem like unconnected, radically disparate discourses which are completely unthinkable together. It would be most surprising if postphenomenology and quantum brain theory turn out coherent.

If quantum theory joins up with postphenomenology, this leaves classical physical theory on the other side of the fence. In this case the usual postphenomenological critique of classical science no longer applies to quantum science (Pylkkö 1998). This opens the possibility of reconsidering – against both sides – whether there might be some inner resonance between postphenomenology and quantum neurophysics.

Such a reconsideration takes some *Sprung* against resistence, a certain leap. One motivation for such a *Sprung* would be a deep aconceptual uneasiness with the prevalent idea in brain science and Anglo-American philosophy that our brains really are a fancy wet version of computer. (See Hubert Dreyfus' 1992 great critique of this central idea of technoscientific modernity, entitled "What computers *still* can't do.") This contemporary belief that we are at heart "Turing's man" (Bolter 1984) will some day be seen as a profound failure of the *fin de millénium* mind. Human beings aren't living computers with better bods! What's left out – dare I say it? – *Geist*, Spirit. If quantum neurophysics were accommodating of Spirit, then the great split between science and Spirit would be healed, two mutually wary, great cultures of discourse peacefully united. Such a prospect pumps motivation for the effortful *Sprung*.

I will show that the brain with quantum degrees of freedom can do much much more than compute and that what it is to be such a body-embedded living quantum system is to exist, to always find oneself already thrown amidst a world, and even to write. Here the wet computer idea soddenly crashes and we make an incision into an infinitely dessicated abyss. We shall see that local *default* takes on profound ontological significance. Default is not the "not" of

not this, not that, but the "not" in which all objectuality is annihilated, *das Abgrund* of Heidegger (CP), abground. This book cheerfully leaps toward that null yet addressible place of default.

Incision

My incision cuts to *das Abgrund* of the Heidegger epigraph above, the "abground," which is also "unground" and a primitive "urground" (Emad & Maly 1999: xxx–xxxii). This is a strange "ground" that is a radical and originary other, a default in the familiar ground of metaphysics. This is abground *for* presence as such, and explains how there is something rather than nothing at all. Abground is Heidegger's concession to the transcendental, the condition for the possibility of Being, of presencing, a profound *creation ex nihilo* – allegedly without metaphysical baggage. (When "being" is used in the sense of presence, I shall capitalize it, Being.)

Heidegger wants to describe this abground without falling back into the Cartesian duality of *res cogitans* and *res extensa*. Our condition is that we find ourselves thrown amidst the presencing world; we always find ourselves already "there" in world encounter, as *Da-sein*. Can we conceive of this human condition without positing subjectivity? Abground is middle Heidegger's way to avoid Cartesianism. His enterprise depends on the ur-un-ab-ground.

Incision at the Heidegger epigraph has immediately opened to our existential case. Is there an abground to our existence as lived through, abground to a non-Cartesian existence of finding oneself always already thrown amidst the presencing affordances of the life-world? Let's consider the abground's characteristics.

The abground is a ground that is profoundly other, *alter*, never present, indeed, abground withdraws in giving the presence that it grounds. The abground dynamic is presencing/withdrawal. Abground is nothing like the ground at your feet; it is itself incapable of presence whilst grounding it. This abground over which Heidegger implores is not atomistic, not composed of elements (particles), nor is it a continuum carrying waves. Nor is the abground a complementarity of particle and wave. None of these quantum physical concepts are sufficient for abground.

Here we are, each in our world, moving along our respective world lines over time, all courtesy "abground," which we struggle to fathom in the abyss opened by our textual incision. We will come to see, in the textual workings that follow, that there is a kind of "bottom" to the abyss, the strangest of bottoms,

a bottom that is a peculiar mirror described by Derrida (1981). The mirror at the bottom of the abyss does not reflect back to us in our universe but reflects to the universe of the unpresent abground. This wierd mirror returns a mirror image to an *alter universe*! So the mirror in the bottom of the abyss leaves our universe bottomless, defaulted.

The abyss, then, is a kind of "black hole" that hides an alter universe, as if a Lem-ian "Dorothy" might slide through the defaulting singularities to an alter-Oz. The bottomlessness of the abyss is not due to never reaching the bottom but is a shift into abground where "bottom" no longer has ontological significance.

The abground is an originary dynamical ground that is *utterly alter*, beyond even no-thing (which remains objectual, dependent on "thing" for its signification). Thingness is completely annihilated in the abground. The absolute altereity of the abground derives in its double movement of gifting/withdrawal; it withdraws as it gifts the presencing world . . . and leaves the questioner yearning and seeking, unable to escape the abground's defaulting silence.

The image of "yearning" for abground, the *liebte*, the love for the abground, is a Hölderlinian mood I do not share – Hölderlin a great and deeply German poet, the peer of Hegel. My conception of abground is much drier, like the California clime. Heidegger (1999) elevates the yearners to the role of "grounders of the abyss" (Sallis 2001), thinks of them as "the rare" and "the few" who actually face the abground. Heidegger believes the German language has a unique role as the only truly philosophical language. Such self-importance is, perhaps, a slippery slope inclined toward Heidegger's Nazism. To my mind the abground can be adequately appreciated through democratic toil.

In the Derrida epigraph, the abground is "the night that other theatre" [spacing original] which knocks from without, expressing itself. The other theatre plays in a different universe. The knocks seem to be coming from just beyond our theatre's external boundary walls, but this is a stance of commonsense metaphysics. The knocks derive from the *alter universe*. " – But maybe it's just a residue, a dream, a bit of dream left over, an echo . . . " of that other theatre, abground. The Derrida (1981) of *Dissemination* is more concerned with the abground of writing; not worldly presence but textual Being. Derrida, too, yearns – yearns playfully, neither wet nor dry – for the abground, the abground of text.

Umezawa introduces an alter universe to the universe we know, an inaccessible universe whose closure is for us absolute. He labels this alter universe the "tilde universe," and achieves it by means of a matter-of-fact doubling of quantum field theoretical degrees of freedom into two modes: tilde (∼) and nontilde (non∼). (The non∼ mode is the mode of conventional unimode quantum

theory.) Umezawa thus provides another physical universe, an alter ~universe, which we will see plays the role of abground. The ~universe knocks on our universe in the near-zero energy quantum vacuum states, and our universe knocks back. Even though we might never partake of the alter universe, it can strangely be traced within our mode of universe, in the form of vacuum holes or defaults. Umezawa's ~abground is profoundly *alter*, incapable of presence, nonetheless describable mathematically, and the location of its traces marked – Derridean "re-marks" – by addresses of defaults in our universe.

!*!

The preceding incision into discourse may well not make much sense to many readers. I can empathize with the feeling. The first time I read Heidegger (in rebellion) I understood nothing. *Nichts.* The first time I read of quantum brain theory (out of respect for Karl Pribram) I didn't have a clue. Yet somehow I felt drawn to study Heidegger and later drawn to study quantum brain theory, aconceptually tugged (since I had essentially no concept of what I had incomprehendingly tried to read). Only after deconstruction of my assumptions and a lot of hard bushwhacking did any conceptual understanding begin to develop, and a dawning possibility of thinking postphenomenology and quantum neurophysics together.

Even if the preceding does not make much sense to the reader, hopefully there is some aconceptual attraction, perhaps just a feeling of intrigue with the idea of *alter*, even a penchant for mystery and shadows, perhaps a vague yet compelling intuition of a hidden alterity. Or perhaps in experiencing the depersonalization of *Angst*, and in that state "hearing" the knock from the other side, *alter* has been briefly acknowledged, and so my incision may tug at the interest, even while uncomprehended.

Ontological Pay-Off: If postphenomenology and thermofield quantum brain dynamics can, indeed, be thought together, their success would be based on a symmetrical ontology across Heidegger, Derrida, and Umezawa. Deep down in all three there is a dynamics that is *dual mode* and these dual modes have a *between*. The dynamics are called respectively: *Ereignis*, arche-writing and thermofield dynamics. Such a dual mode ontology gives you something that particles, waves and their complementarity can't offer: *the between – das Zwischen* in Heidegger (1999), for whom Da-sein is the Being of the between (1962: 170); the between as the *tain* of Derrida's (1981) strange mirror; the between as Umezawa's (1993) vacuum state that nontilde and tilde universes share. *Dual modes and their between underlie both postphenomenology and quantum brain dynamics*. This opens a way toward rapprochement. The "closure" of my title is ~mode whereas "dis-closure" is a function of the between.

"Closure" here is radical, not a block to reaching something on the other side, as when a store is closed, containing goods that are "there" whether or not anyone is perceiving them. This very radical "closure" can never be opened, only re-marked, as we shall see.

Bonus Pay-off: Quantum theoretical descriptions are statistical. The presencing worlds these statistics are about are taken for granted, indeed, require observers – metaphysical subjects – who stand outside of quantum theory. Quantum theory on its own is blind, led by observers who compensate for quantum theory's incompleteness. Quantum theory, like all science, is subject to *Seinsvergessen,* Heidegger's "forgetting of Being" that pervades all science. So the lack in quantum theory is not really felt. But in thinking quantum thermofield theory together with postphenomenology, we will see quantum theory expand to a complete theory that breaks its opacity and lets the *lumen naturale* flood in. If the attempt is successful, then the quantum revolution of the 20th century is extended in a most surprising way – all the way to our very existence.

Widening the incision: Throughout his path of writing Heidegger is deeply concerned with what "is," *Sein*, "Being." His inquiry is fundamentally ontological. "Being" has traditionally meant presence, like the way this book is physically present to you right now. Is = presence, both mental (e.g. conscious thoughts about this book) and physical (the book sitting right there in your lap). In his middle period (1936–1938) Heidegger (1999) admits a second sense of "being" which *is not*, an unpresent "being." He calls this unpresent "being" *Seyn*, since Old German better conveys his intent; the corresponding Old English translation of *Seyn* is "beyng."

Seyn is *dynamical*, a welling-up, a continual eruption, an *Ur-sprung* primitively springing forth. *Seyn* is characterized by autorhoesis, a spontaneous, self-flowing dynamics. Heidegger calls this welling autorhoetic process *das Ereignis*. So there are two forms of being for Heidegger, two senses of "is": presence in the form of the world at hand *and* an unpresent autodynamical process that continually wells up. Heidegger's view is accordingly quite distinct from Descartes' *res extensa* and *res cogitans*, which both presence; nonetheless, we shall later see some tacit metaphysical assumptions in Heidegger's philosophy.

In a development seemingly at great distance from Heidegger, Umezawa and coworkers (1967, 1978, 1979) developed an abstract theory of quantum brain functioning in the late sixties and seventies. Jibu and Yasue (1995) gave a physical realization of this theory, which they called "quantum brain dynamics" (QBD). Vitiello (1995, 2001; Celeghini, Rasetti, & Vitiello 1992), applying Umezawa's (1993) thermodynamical quantum field theory, developed a dissipative quantum brain dynamics (thermofield QBD). Thermofield the-

ory greatly enriches ontology by admitting an unreachable quantum ∼universe that is the time-reversed mirror image of the ordinary (non∼) quantum universe of quantum mechanics and quantum field theory. In Umezawa, *ontology gains two modes of one dynamics, dual modes with their between*. Umezawa's innovation brings a fundamentally different kind of "duality" than the Cartesian, not two interacting substances that are incompatible, nor dual aspects of a neutral Spinozan *tertium quid*, not the incompatible uncertain duals of complementarity, but two interacting modes of one dynamics *which opens a between*. We shall see that presence – Being – is derivative of the between of dual quantum modes, in the case where the between is a special kind of match.

Of course, contemporary brain science has been so successful and remains so sanguine that most practitioners see no need for quantum degrees of freedom in brain functioning. If the quantum brain theorists prove correct, then this would be truly revolutionary. At a more fundamental level than neural networks there would be a "cryptic brain," as Jibu and Yasue (1995) call it, that has been conventionally overlooked, a previously unrecognized level of brain functioning that might (finally, truly) be worthy of us as Dasein. If quantum brain theory turns out right, then brain science has been barking up the wrong tree, at least when it comes to the most profound level of brain functioning. (Catastrophes to convention – opposition to the technoscientific *Gestell*, the overarching framework of our times – are of course vehemently resisted.)

Quantum brain theory, it should be noted, only appears more speculative than good old neural networks consisting of local neurons richly interconnected by axonal and dendritic branchings. There is in fact no proof that at heart the brain computer. Thus Daugman (1990) states,

> While the computational metaphor often seems to have the status of an established fact, it should be regarded as an hypothetical, and historical, conjecture about the brain. (15)

Enraptured by silicon achievements – lost in techno-*māyā* – belief in the sweet device of a computer-like processing brain is never deconstructed and so the speculation is not discerned. Furthermore, conventional thinking about the brain has been deluded by the practical successes of the metaphysical *Gestell* into believing that powerful enough Hal-like computers can do what we can – might pass the Turing test – and so be essentially like us. And even when the computer succeeds in indistinguishably simulating our behavior, it doesn't get there in the same way. In the famous chess match the computer Big Blue used brute computational force against Kasparov's insights.

The admitted lack of direct experimental demonstration of quantum brain functioning is simply not relevant at this juncture, since theory typically long-leads experiment in physics. (See Hameroff 2000 for a review of the experimental literature.) It took some seventy years from the theoretical prediction in the mid-twenties of Bose-Einstein condensation for such coherent quanta to be experimentally demonstrated – and the demonstration was awarded a Nobel prize! Physical theory, as elaborated by quantum field theoretical biodynamics, provides an account of the water molecules inside the tiny-tiny microtubules (ten billionths of a meter in diameter) within the neurons. These water molecules that fill the microtubules are slightly polarized – are dipoles – and accordingly form themselves into a delicate crystalline structure, a water quasi-crystal whose nodes are spinning oscillating dipoles. Under these biological conditions, quantum theory calls for a macroscopic quantum field to be formed, an electric dipole field that (contra Tegmark 2000) robustly resists thermal disruption and decoherence (Hagan, Hameroff, & Tuczyinski 2002). Is the resulting quantum brain dynamics, as the dipole field interacts with the quantum field theoretical form of the electromagnetic field, anything like "consciousness"? – no, strike that metaphysics out – anything like "existence"?

The physical reality that quantum theory describes is unpresent, like *Seyn*, and also dynamical like *Seyn*. There are other crucial ways in which Heidegger and thermofield QBD are near. For example, in the *Ereignis* dynamic of *Seyn*, something very peculiar happens: What wells up is two-fold, *Sein* (Being/presence) and *Zeit* (time). *Es gibt Sein. Es gibt Zeit.* The *es* here that gifts Being and time is *das Ereignis*. Furthermore, the folds of the two-fold belong together (*Zusammengehören*); *Sein* and *Zeit* "enown" each other (Emad & Maly 1999). But so does the thermofield QBD developed by Vitiello have a two-fold: the ordinary quantum (non∼) universe and the quantum ∼universe. Given certain (Hermitean) assumptions, the quantum universe and the quantum ∼universe are mirror images, belong-together, like the belonging-together of *Sein* and *Zeit*. Thus both Heidegger and thermofield QBD converge on something so unconventional as an unpresent dynamics of a two-fold whose folds can belong-together in their between. The between is ontological, supports the presencing of Being; presence is derivative of unpresent dual modes, one mode of which is abground. Presence is *dis-closed* in the dual modes between. The dual modes belonging together – they press each other rather than bypassing, unnoticing and unnoticed – expresses light.

God is a Lobster, as Deleuze and Guattari (1987: 40) say, a totem with powerfully clamping claws that pinch our attention to the "between-two." But we

must shift from the "between" of two-pronged objects like lobster claws to the between of dual unpresent modes. God is a Lobster deconstructed.

Reading tips: The progress of this book is not sequential and logical but nonlinear and repetitive in shifting contexts. I do not present the foundations of postphenomenology and independently the foundations of QBD, map correspondences between them, and move on. The methodology of thinking-together is quite different, a Derridean *symplokē*, a weaving of different strands into a locally unified but never totalizable discourse. The text is rhizomatic (Deleuze & Guattari 1987), a budding interconnectivity.

There is no implication of a full translation between these two discourses, only the claim that there are significant regions of discourse space where the discourses dock well to each other. Plotnitsky (1994, 2002) and Pylkkö (1998) have gone to the border of this undiscussed place in thinking-together postphenomenology with the first quantization of quantum mechanics. I take a further step to the second quantization of quantum field theory and try to think together quantum field theoretical *neuro*physics with the postphenomenology of Heidegger and Derrida.

The work of thinking-together – a kind of two-way translation – is arduous, to be sure. The wrench of appropriation must be applied at times. Each discourse must be deeply understood before their docking places can be wrenched together. Undocked regions of discourse are left respectfully bracketed. At times one side of the docking place is blank and the other structured side guides the filling in, calls forth what belongs to it in the blank region of discourse. Thus, postphenomenology forces an extension of quantum brain dynamics to admit "∼recognition traces," potential in the quantum physics but undeveloped … and a "sweet" symmetry with postphenomenology when elaborated. From the other side, the postphenomenological metaphor of "dissemination" as seed-scattering will be reframed to "dissemination" as the recruitment of quantum coherences, a call to resonantly belonging-together. So in thinking together we procede as if climbing two ladders – one leg on each – two ladders in discourse space, with missing rungs both sides along the way. Sometimes we have to *Sprung* over gaps both sides at once – and catch back on the two-sided climb. As I said, thinking-together is hard work.

The reader lacking background in postphenomenology or quantum brain theory, or both, will likely need to reread and ponder – as I have done with the texts under discussion. The moment of lean comprehension marks conceptual symmetry across the texts thought-together. The movement of my text is guided not by logic but mainly by aesthetics. Successful thinking-together is not provable, always open to the charge that it is forced. Clearly much lies in

the eye of the beholder in judging the success of thinking-together. The test of thinking-together is application to fresh texts, and experiencing the surprise as their docking comes into focus. Surprise, to a significant extent an aconceptual bodily experience, marks the docking of discourses. Of course, the texts to be surprisingly thought together ought to be of great insight and richness, so that being able to think them together counts for something.

The fruit of this surprising rapprochement between postphenomenology and QBD is a theory of presencing (*Sein*). Why is there something rather than nothing? The dual modes bring a between-two, and in their special form of match the two of the between disclose lighted world. If this is so, then our true condition begins to dawn on us. The parallelism of monadic world-thrownnesses across Daseins is a horrific blow to common sense with its one world there and parallel cognitions of it.

Ambling: Section I focuses on thinking together Heidegger and quantum brain dynamics, though his presence hovers throughout the subsequent discussions. Section II extends the discussion to the postphenomenological work of Dreyfus, Pylkkö and Plotnitsky. The third section shifts thinking-together to Derrida.

In thinking-together disparate texts, I *amble* through the releasement of incision and widening dissection:

> From the OFr. *ambler,* to go, came Fr. *Aller, alleé*, which gives us Eng. *Alley* … To *sally* forth, however, is not aphetic for L. *ex* + *aller*, but from Fr. *Saillir, saille,* to rush, from L. *salire, saltus,* to leap, as in *insult* and *somersault, qq.v.* Many a leap leads to an *ambulance*. (Shipley 1945)

In the unpredictable disseminating *Ursprung* of assault to conventional modernity with playful postmodern somersault – risking the ambulance and white coats of academe! – I shall leap: