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CHAOS AND CRITICAL THEORY

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In general, chaos theory is considered to refer to the economy betweenorder and chance, determinism and unpredictability, clarity and aporia.However, from an epistemological and a critical point of view, it mightbe interesting to assess the local and global perspectives rooted intothe interdisciplinary body of chaos theory. Such an assessment is meaningfulnot only in understanding the various claims about the validity of chaosin different scientific fields, but also in clarifying the cultural andpolitical context of chaos theory. The latter is what Hayles in the ChaosBound (1990) calls the "politics of chaos."

The common direct way to distinguish between “local” and “global” character of knowledge (either scientific or experiential) sets the stage to the range of applicability and the domain of methodology involved in the discourse into which this knowledge is embodied. Of course, such an approach is not only sensitive but also pertinent to the adopted organization and articulation of the examined body of knowledge; for example, the opposing presuppositions of social constructivism and positivist realism might imply different characterizations of local/global. Nevertheless, from the standpoint of an external observer, the local or global attribute hinges upon the degree of “visibility” of the way different pieces of knowledge are related to each other. Apparently, this is a question of identifying differences and coarse graining similarities, which necessitates the construction of a virtual space of all possible and contingent configurations of knowledge. Although analogies, shifts, and other transfers between separate theories quite often occur (usually at the initial level of the intuitive theoretical formation), they can generically smoothly be appropriated into the internal structure of a knowledge. At least, this is what happens at the regime of a normal science, i.e., far from the uprising conditions of scientific revolutions, when the interior coherence of a theory is maintained by her epistemological autonomy (Kuhn, 1962).

External strains between theories can develop as a result of a varietyof reasons. Some of them may reflect an intrinsic tendency towards a theoreticalexpansion, in some cases due to the high generality or abstract potentialityof the assumed means of analysis. Others may simply have socio-politicalor cultural connotations, and correspond to existing tensions at the sociallevel. In this respect, as a rule, the social controversies are the onesto be induced onto the scientific ground: questions of power are oftenat the heart of certain theoretical disputes. Even if this fails to betrue some times, more often it can be seen on the way and the conditionsunder which the theoretical antagonisms are usually committed.

Under the action of such a multiplicity of internal and external determinations,the resulting local or global characterizations are quite intricate. Althoughit is not one of the most crucial epistemological questions, subsuminga theory to the label of either locality or globality sometimes turns outto be something more than a conforming convenience; it becomes a matterof belief, which is a rather political and questionably scientific attitude.This culpable ambiguity may penetrate even at the level of methodology.In this way, one may wonder whether scientific reductionism might be consideredas a local interpretation disguising a global disposition, and whetherscientific holism might be considered as a global settlement assemblinga local inducement.

The fact is that chaos theory is undoubtedly establishing a mainstreamparadigm to many scientific fields. What remains to be seen, and it isstill at stake, is whether this is a paradigm shift. On the one side, chaosis providing a source of methodological intuition for those working ina variety of disciplines. On the other side, the interdisciplinarity institutionsdo possess the tools to articulate a novel arrangement over an existingbody of a scientific field. However, these events are often misunderstood;the way to conceive the resulting rearrangement is not by employing a simplisticappendage of a predefined condition of knowing in order to organize thebody of some knowledge. In other words, chaos being a paradigm neithermeans that chaos is just an instrument of knowledge nor that a paradigmis just an interchangeable or scalable passive theoretical formation. Inthis sense, those globalizing claims for chaos need to be reconsidered.

In fact, Gleick's popular book, Chaos (1987), hasfueled an abundant pool of statements claiming the globalizing value ofchaos theory. For example, Gleick says: "Chaos breaks across the linesthat separate scientific disciplines. Because it is a science of the globalnature of systems, it has brought together thinkers from fields that hadbeen widely separated. ... It makes strong claims about the universal behaviorof complexity. ... They (chaos theorists) believe that they are lookingfor the whole" (p. 5).

Contrary to these rather absolute claims and though there are a lotof opposite arguments carrying the case for locality, the local/globalconstitution of chaos theory raises many delicate questions. Both in practiceand in theory, for example, the occurence of a chaotic behavior resultsfrom the nonlinear interactions between different parts of the system.Therefore, it is a local coordination subordinating the global flow ofthe dynamics in a strange way, ie, extremely sensitive to fluctuationsand thus completely unpredictable. However, one has to suspect this argument,when one realizes that a lot of chaotic systems reveal a universal characterof transition in their processes. Taking into account the previously discussedprecaution to respect the relative autonomy of scientific disciplines,this almost ubiquitously emerging globalization in chaos should not passunexplored.

In any case, the problematic relation between local and global in chaostheory is part of a wide-ranging debate about local and global in contemporarythought. Hayles in the Chaos Bound (1990) remarks someastonishing similarities between the sciences of chaos and critical theory.According to her, "In the new scientific paradigms, the global subsumesthe local, but at the price of reconceptualizing the global as constitutedby locality. Within critical theory, the claims of the local are expandeduntil the local itself becomes a new kind of globalizing imperative. Thesetwo impulses mirror each other, for in the sciences of chaos the globalis localized, and in critical theory the local is globalized" (p. 213-4).

Actually, Hayles' concern (in the last chapter of her book, the ChaosBound) was to confront critically and refute the assumptions that localknowledge is progressive, politically libertarian, while global theoryis oppressive, politically totalitarian. Such a political connotation ofthe local/global scheme has been quite popular among some critical theorists.For example, particularly important are Foucault's (1970)archaeological analyses of the totalizing theories of the Enlightenment,from grammar to biology, and to penology, and their association with totalitarianpolitical practices. Now, by considering an intermingle between local andglobal, Hayles argues that "it is wrong to assume thatglobal theory is always politically more coercive than local knowledge"(p. 214). But she realizes that such a balance between local and globalis extremely paradoxical, "for to answer it one must put forward generalizations,yet generalizations are precisely what are at issue" (p. 214).

However, behind the political connotations of the local/global dialectic,there are certain ontological presuppositions favoring or disregardingthe adoption of the local or global perspective. It is not evident to amajority of contemporary theorists that the social and historical constructionof reality necessitates a tendency toward generalization, essentialization,unification, and universalization. Two opposite proponents are Rorty (1989) and Smith (1988), both of whom maintaining that allvalues are radically contingent on social, economical, institutional, andideological contexts; Rorty by means of an antirepresentationalist neopragmatismand Smith by a fecund axiological relativism.

Sometimes the valorization of local knowledge appears in extreme tones.Such might be considered the critisisms of Lyotard, who, according to Argyros(1991), even proceeds that far as to "define the urgetowards globalization as terrorism" (p. 213). In the concluding chapterof his Postmodern Condition (1984), Lyotard foreseesthat the coming of the information societies will strengthen the powerof the ruling elites having access to the information resources. He thinksthat this totalitarian danger can be confronted by the emergence and developmentwithin natural and mathematical sciences of such theories as fractal geometry,quantum mechanics, catastrophe theory, and Godel's theorem. Grouping themunder the label "paralogy," Lyotard suggests that they will let us "wagea war on totality; let us be witnesses to the unpresentable; let us activatethe differences and save the honor of the name" (p. 82).

Although Lyotard's arguments express a contemporary popular allergytoward globalization, his paralogies are rather biased and hardly convincing.Their problem, as Hayles (1990) has remarked, is thatthey are confusing scientific theories with social problems (a kind ofa social Darwinism) and that they all, despite of their local endorsement,encompass a redifined global quality. However, one might agree with Argyros'conclusion that at least one of Lyotard's themes merits special attention;this is, according to Argyros (1991), "the questionof whether the meaningfulness and pragmatic usefulness of language games,by which Lyotard means semiotic exchanges in general, are best describedas local or global phenomena" (p. 234).

What also seems to be very interesting is to compare and contrast Lyotard'semphasis on agonistics ("catastrophic antagonism is literally the rule"p. 59) with Prigogine's view about a cooperative andcommunicative behavior far from equilibrium. In their book Order Out ofChaos (1984) Prigogine and Stengers formulate this viewin discussing the molecular basis of nonlinear chemical reactions: "Atequilibrium molecules behave as essentially independent entities; theyignore one another. We would like to call them "hypnons," "sleepwalkers."... However, nonequilibrium wakes them up and introduces a coherence quiteforeign to equilibrium" (p. 180-81).

Thus, Prigogine's synergetic dialectic overcomes Lyotard's antagonisticalparalogies aiming to the possibility of renewing man's relation to nature.As Argyros (1991) sees it, "Prigogine's version of postmodernscience is not the cultivation of discontinuity and paradox, but a newdialogue with the natural world that respects both its otherness and ourfundamental continuity with it" (p. 235). Such an outcome being optimistic,there is a pessimistic one too: "This leads both to hope and a threat:hope, since even small fluctuations may grow and change the overall structure.As a result, individual activity is not doomed to insignificance. On theother hand, this is also a threat, since in our universe the security ofstable, permanent rules seems gone forever" (Prigogine and Stengers, 1984,p. 313). Prigogine's call to an ethical responsibility represents a braveuncompromised thesis in front of a changing chaotic universe.

Underlying the Prigogine/Lyotard contrast, there is a tangled relationbetween the nonlinear science of chaos and the postmodern discourse ofdeconstruction. First of all, there is a striking parallelism between chaosand deconstruction in a number of ways. For example, the initial focusof Derrida's work (1976, 1978)was the deconstuction of the Saussurian sign; this was an effort to establisha nonlinear relation between signifier and signified, or between sign andreferent, and to affirm the destabilizing effects of undecidability. Anothercommon characteristic refers to the openness and infinite disseminationof texts, which thus become susceptible to endless iterations; as a result,the boundaries inside and between text and context are not fixed so thatinfinite texts and contexts may permeate other texts and contexts. Accordingto Hayles, "both discourses invert traditional priorities: chaos is deemedmore fecund than order, uncertainty is privileged above predictability,and fragmentation is seen as the reality that arbitrary definitions ofclosure would deny" (Hayles, 1989, p. 314). The reasonthat the two theories seem to be perfectly congruent is, again accordingto Hayles, "not because they are derived from a common source or becausethey influenced each other, but because their central ideas form an interconnectednetwork, each part of which leads to every other part" (Hayles, 1990,p. 184).

Nevertheless, there are many severe differences between deconstructionand chaos. Following Hayles (1989, 1990),let us discuss a few. Chaos is a mathematical theory dealing with conceptsexactly defined, numerically computable and, up to some degree, subjectto a series of proven theorems and other results; deconstruction is concernedwith language and textual entities, which are hardly subject to formalization.One measure of these differences is the disagreement on how extensive chaosis: for Derrida, textual chaos is almost omnipresent, but, in chaos theories,islands of orderness are commonly acknowledged in oceans of randomness(or the other way). Moreover, while chaos often considers a transitionfrom orderness to randomness, deconstruction sees an apocalyptic breakwith logocentrism. Finally, although recuparation is a standard scientificpractice, as it is witnessed by Popper's (1965) falsifiability,to a deconstructionist, a "recuperator" is beyond salvation. So, Hayles(1989) concludes: "These differences are symptomaticof the different values the two camps place on chaos. For deconstructionists,chaos repudiates order; for scientists, chaos makes order possible" (1990,p. 184).

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