

## APPENDIX

### THE THEORY OF EMERGENCE AND CONTEMPORARY ANALYTIC CRITICISM

The answer to the crucial question that I have suggested appeals in some sense to the notion of emergence similar to that advocated by Alexander, but with the qualification that the emergent quality is the dialectical product of its predecessor in the scale of forms in which the concrete universal principle of organization immanent throughout the universe specifies itself. This metaphysical concept is that of the universe as a whole of systematically inter-related parts, each of which is a provisional specification of the ultimately complete and comprehensive totality. It is the holistic nature of every form that issues in the emergent characters, and for this reason they are new and different from those of the elements that make up the whole.

Latterly the idea of emergence has come, once again, under scrutiny by philosophers who have been educated in the Analytic tradition. Logical Positivism and the Analytic philosophy that succeeded it has persistently adopted a physicalist metaphysic (unacknowledged as metaphysical); and in recent years a number of analytic philosophers have, as is not surprising, come to confront the question of fitting the body-mind relation into this physicalist outlook. The solution they have adopted is what has come to be called “nonreductionist physicalism”, that is, the postulation of universal physicalism: the belief that everything in the real world is basically material and subject to physical laws, with the qualification that certain physical complexes “realize” special properties, said to be “supervenient”, that are inexplicable by those laws or in terms of the basic properties of their components.

Some contemporary commentators<sup>1</sup> have seen this position as a revival of the doctrine of Emergence advocated by Lloyd Morgan and Samuel Alexander early in the twentieth century, which they trace still further back to forerunners such as John Stuart Mill, Alexander Bain, and G.H. Lewes, and in the work of a number of other writers who followed, to culminate in the exposition of the doctrine given by C.D. Broad in his *Mind and its Place in Nature*. These later commentators have offered a symbolic analysis of the concepts of emergence, irreducibility, supervenience, realization, and the like, to demonstrate that the last two are insufficient substitutes for emergence, and in the final outcome that neither emergence nor nonreductive physicalism can free their advocates from the unavoidable reduction of higher level emergent properties of special complexes to the lower level properties of the constituents on which they are held to depend.

This final denouement results from the notion of “downward causation” which the emergentists hold to be important and the critics say conflicts with the way in which emergent properties are held to be generated.

The most notable of these writers and the one to whom most of the others defer is Jaegwon Kim, so I shall confine attention for the most part to his arguments. Kim and those who argue similarly recognize that theories of emergent evolution were attempts to explain life and consciousness admitting the existence only of material entities, without appealing to either Cartesian dualism or the postulation of hypothetical non-physical influences such as *entelechy*. They were, therefore, ontologically materialist, but sought to avoid reductionism by contending that such properties as those of living beings and conscious minds were inexplicable simply in terms of physical laws or laws regulating entities on lower levels of emergent evolution. Emergentism, consequently, is closely convergent with the nonreductionist physicalism advocated by a number of contemporary Analysts.

The essential characteristics of emergentism, according to Kim are:

- (1) Ultimate Physicalist Ontology, the doctrine that the basic entities of the world are material and non-emergent, having non-emergent properties.
- (2) Property emergence: the contention that when basic entities combine at a certain level of structural complexity (“relatedness”), genuinely novel properties emerge characterizing these structural aggregates, and do so *only* when the appropriate basal conditions are present.
- (3) The Irreducibility of emergents, the view that the emergent properties are “novel” in the sense that they cannot be explained in terms of the conditions out of which they emerge (Cf. C.D. Broad, *Op.cit.*). This irreducibility, Kim explains, is not simply that defined by Ernest Nagel as the reduction of one theory to another with the help of “bridge laws” (to overcome differences of terminology), but is due to the absence of possibility of explanation of the bridge laws themselves. Such laws as govern the emergent properties differ fundamentally from those governing the lower level entities that enter into the structured complexes from which the emergent properties arise.

Further, Kim points out, the emergentists admitted that the higher level complexes also displayed properties that were not emergent but were called “resultant”, or “additive”, being simply the result of collating the lower level properties of the entities involved (e.g., mass). Emergent entities were held to have new and important causal properties, affecting both entities on their

own level and entities on lower levels. In fact, Kim argues that they cannot have effects on their own level unless they concurrently produce effects on the level next below. This is because it is generally agreed (he claims) by emergentists and nonreductive physicalists that emergent properties can arise *only* if the basal conditions occur, and depend upon the lower level entities having their own characteristic properties and being in the appropriate relations to one another. For instance, if the light reflected from a photograph affects my optic nerve and causes it to transmit an electric impulse to my occipital lobe so that I see the picture and that causes me to visualize mentally the house where I was born, that can occur only if at the same time the physico-physiological conditions of my recollection are produced.<sup>2</sup> In such a case, Kim asks, what are we to think of the causal efficacy of the first mental experience, since its basal conditions are sufficient to cause any further mental effect supposedly produced by it. The implication is that the emergent property is purely epiphenomenal, a conclusion that Samuel Alexander and the present-day neuro-physiologist, Roger Sperry, emphatically reject.

Further, Kim maintains that Lloyd Morgan and Roger Sperry (whom he quotes) believe in what he calls “synchronic reflexive downward causation” where the emergent property produces a modification of the lower level constituents of its own basal structure. This, of course, should be impossible and self-defeating, for if the basal structure is modified the emergent property should not occur. Kim concludes:

“If these considerations are correct, higher-level properties can serve as causes in downward causal relations only if they are reducible to lower-level properties. The paradox is that if they are so reducible, they are not really “higher-level” any longer.”<sup>3</sup>

In that case we should have abandoned emergentism. Nevertheless, he concedes that downward causation may be saved by giving it a conceptual interpretation: that is, as referring to concepts rather than phenomena or properties in the real world; by describing them in different languages. That, however, would be to give up emergentism as an ontological doctrine and would run counter to the convictions of the writers on whom Kim is commenting.

It would seem that the ultimate object of Kim’s analysis, like that of other writers in the same vein, is to demonstrate that the doctrine of emergence cannot save us from downright physicalism, to which so-called non-reduction can make no essential difference.

What this critique overlooks (apart from occasional incidental mention) is that the central condition for the emergence of new qualities (Alexander's term) is the *holism* of the configuration from which they emerge. Alexander himself (cf. *Space, Time, and Deity* II, pp. 45ff) was clearly aware of this condition, although he fails to acknowledge it explicitly and masks it with "natural piety" (what Broad calls "metaphysical jam"). Others emphasise it explicitly, as does Sperry when he asserts:

"...the molecules of higher living things are moved... not by molecular forces or quantum mechanics but by the specific holistic vital and mental properties - aims, wants, needs - possessed by the organisms in question."<sup>4</sup>

Kim and the contemporary Analytic critics represent the basal constructs of emergent properties as micro-constituents in relation thus: [C1,...Cn; R], but the R is treated as merely incidental, the presumable tacit assumption being that all relations are external, making no difference to the singulars [C1,...Cn], whereas the assumption (tacit or overt) of the emergentists is that the relations are internal to their terms, which are mutually adjusted to create a systematically co-ordinated whole.<sup>5</sup> Internal relations affect the nature of their terms, so that, within the whole that they create, the constituents will have new properties, as the whole itself evinces new capabilities. It is these that Alexander and those who adopt a similar doctrine regard as emergent.

That the emergent properties are the result of those of the several components of the configuration from which they emerge, the properties they display on the lower level, is what the emergentists insistently deny. The basal condition of what emerges is the structural integration of the complex. The solvent propensities of water, for example, are not evinced by any of its constituent elements in isolation (oxygen or hydrogen), only by their combination in the special structural order that constitutes the molecules of the liquid. Likewise, regarding mentality as a quality emergent from a special configuration of organic processes, it is only the *organized system* of the living body as a whole that gives rise to the sensations experienced when certain brain states are activated, not simply the firing of neurons, whether individually or in concert (cf. Ch.9 above). That is why the emergent quality cannot be "reduced" to or explained in electro-chemical terms as can those of the singular components of its matrix or any casual collocation of them.

As to downward causation, this never occurs so as to affect or modify the relatively limited whole from which the particular emergent property

proceeds, but produces only a further integral interaction of lower-level components from which subsequent higher-level qualities emerge. Nor does this restrict the causal efficacy to that of the lower level constituents, for once they combine in the required constellation their lower level causal properties go into obedience, and that of the higher level constellation would not take place apart from the new structure and special inter-relations of the parts that has arisen.

In fact, downward causation never occurs except in the sense of *final* causation, which, properly understood, is the regulation and determination of the parts or elements of a complex structure and the process of their development by the configuration of the whole,<sup>6</sup> as the generation of a living embryo is proleptically regulated and determined by the organized anatomy and metabolism of the mature adult, without eliminating the operation of efficient causation at prior stages. In this kind of development what emerges at the end governs and directs the course of the process teleologically, so the causation operative at each stage is at once efficient (consequent upon the prior stage) and final (governed by what the mature organization requires). If, as Stuart Kauffman surmises, natural selection is guided by a principle of self-organization, this kind of “downward causation” characterizes all evolution.

Kim and his Analyst followers, therefore, have simply missed the main point of the Emergenstists’ doctrine: that special configurations of entities at one level of development give rise to new wholes on a higher level, in which the interlock of the constituents modifies them so as to cooperate to produce a new entity with new properties inexplicable by the laws that govern those at the lower level. And these emergent properties are characteristic only of their own level. The lower level constituents are necessarily involved, but in the new configuration are transformed so as to cooperate according to higher level laws to which they are not subject in isolation, or in casual collation, at their own original stage of development.<sup>7</sup>

I, myself, have gone somewhat further than the theorists of emergence and have applied this principle to the entire universe, as one all-inclusive whole. Thus I have maintained that the emergence of new qualities at higher levels is the result of the complementation of structures on the lower levels so as to constitute wholes more adequate to the generic principle universal to all natural things, due to the dynamic tendency throughout Nature to fulfil the ultimate principle of wholeness which governs the Universe at large - a whole that manifests itself in the scale of forms which these various levels of increasing integration and organization instantiate. This self-

specification of the universal principle of organization pervading the whole is thus *teleologically* progressive and is the only way that it can realize its potentialities, which are not fully actualized in any of its separate component parts or temporary phases.

The universal principle of organization - the concrete universal - is no mere formula or abstract mathematical ratio; nor is it a static patterned totality, but is perpetually realizing itself in and through its self-development as a dynamic system. I have indicated above how and why this process of self-realization occurs and why self-conscious cognition must emerge as a late phase in the process. It is because the relations that interconnect the constituents of the whole are not fully realised as long as they are only implicit and unite the complex *in itself* only provisionally; but if the whole is to be complete, as it must be if it is to be whole, it must be an explicit totality *for itself*. That requires cognition and the recognition of the relational order which must, therefore, be brought to self-awareness in and as a mind.

The difference between the view I have adumbrated and the theory of emergent evolution developed in the early 20th. century is simply the contention that the emergent qualities are formal qualities *dialectically consequent* upon the structural complexity of the ultimate totality and the inadequacy to it of the prior stage - a form that the material substrates assume when they enter into more intricate and more intensely integrated dynamic systems, remembering always that form is not confined to spatio-temporal pattern but extends in progressive stages to dynamic, autonomic self-maintenance. Thus consciousness is the formal quality of the body as an integrated organism at a critically high degree of complex unification.

#### NOTES

- 1 See *Emergence or reduction?: Essays on the prospect of nonreductive physicalism*, edited by Ansgar Beckermann, Hans Flor, Jaegwon Kim (Berlin, New York, Walter de Gruyter, 1992).
- 2 The example is mine, not Kim's.
- 3 *Philosophical Studies*, v. 95, p. 33.

- 4 *The Omni Interviews* (New York, Ticknor and Fields, 1984), p.201.
- 5 Cf. C.D. Broad (quoted by Achim Stephan) from *The Mind and its Place in Nature* (London, Routledge and Kegan Paul, 1925) p.61: "Put in abstract terms the emergent theory asserts that there are certain wholes, composed (say) of constituents  $A, B$ , and  $C$  in a relation  $R$  to each other; that all wholes composed of constituents of the same kind as  $A, B$ , and  $C$  in relations of the same kind as  $R$  have certain characteristic properties; that  $A, B$ , and  $C$  are capable of occurring in other kinds of complex where the relation is not of the same kind as  $R$ ; and that the characteristic properties of the whole  $R(A, B, C)$  cannot, even in theory, be *deduced* from the most complete knowledge of the properties of  $A, B$ , and  $C$  in isolation or in other wholes which are not of the form  $R(A, B, C)$ . The mechanistic theory rejects the last clause of this assertion."
- 6 Cf. my *Foundations of Metaphysics in Science* (London, G. Allen and Unwin, 1965; Routledge, 2002; Atlantic Highlands NJ, Humanities Press 1992), Chs. XIII and XXIII,3, especially pp.474ff., and *Cosmos and Anthropos* (Atlantic Highlands NJ, Humanities Press, 1991), Ch 12.
- 7 The recognition of holism in living beings has recently been re-emphasised by Humberto Maturana and Francisco Varela with their doctrine of "autopoiesis". This by itself is no new discovery, but can be traced back as far as Aristotle. They rightly contend that the living organism cannot be explained simply analytically by attending exclusively to its component parts, but only in terms of its total organization, the invariance of which it is designed to maintain. Maturana, however, relies on the idea of autopoiesis to develop a doctrine of cognition that turns out to be admittedly relativistic, and so becomes suspect insofar as it is itself subject to its own prescriptions. See *Autopoiesis and Cognition*, Dordrecht, Boston, USA, London, Reidel Publishing Company, 1980.

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