DUALITY THEORY III. INTRODUCING THE USE OF COUNTERPARITY DIAGRAMS TO DETECT AND DEFINE EMERGENT HIERARCHICAL LEVELS

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The experimentally proven mechanisms that cause integration of parts into the units typical of many of the conventional natural sciences can be generalized into a single isomorphic mechanism, that of opposing, but equal forces. The various hierarchical levels of manifestation of this generalized mechanism were defined as counterparities (systems-level dualities) in previous papers of this series. These papers enumerated and analyzed some fifty-five specific examples of these primitive dualities across several disciplines and described their common characteristics.

This paper will introduce a method for DIAGRAMMING selected empirical measurements for natural units (objects) typical of sciences like astronomy, chemistry, and biology to show that these units and some of their most important scalar characteristics result from the interaction of local counterparities. The X and Y axes of these COUNTERPARITY DIAGRAMS are the dual opposing forces active on a particular scalar or hierarchical level as recognized by scientists working on that level. The diagrams will, therefore, demonstrate in terms of conventional mechanisms how the natural objects "emerge" for that level to the satisfaction of disciplinary specialists. However, the resulting COUNTERPARITY DIAGRAMS also have some important transdisciplinary similarities. Their comparison reveals a detailed and empirically-based mechanism with systems-level features of its own. This systems mechanism becomes then a candidate isomorphy useful to established isomorphies like hierarchy theory, emergence theory, and self-organization.

Features common to several COUNTERPARITY DIAGRAMS include the following: (i) each object defined by a science appears to result from a dynamic balance between the two forces rendering it stable, (ii) the balance achieved for the objects is not identical; each has its own complementary ratio of the two forces which results in a diversity of objects for each scalar level built on the same "body plan" typical of the natural sciences, (iii) only a very small number of the combinations made possible by the opposing forces actually appear in nature, (v) the ratio of stable to unstable combinations appears to be approximately constant across many scalar levels, (iv) these "stable" combinations are restricted to a narrow band of possibilities no matter what the scalar level, although the slope and value of the band differs for each level, (vi) there is a distinct upper limit beyond which the band of stable objects disintegrates - no objects appear in nature beyond this limit even though possible combinations exist according to the counterparity diagram, and (vii) the counterparity diagrams are very similar to graphs of object distributions that are so well known in some of the sciences as to be classic textbook results, although they are not usually compared across disciplines to elucidate their transdisciplinary nature. This presentation will use case studies of counterparity diagrams from atomic physics, astronomy, and ecology as examples.

This paper will also evaluate several alternative uses of counterparity diagrams. For example, one of the persistent problems in hierarchy theory is the plethora of levels that may be compared to find what is common across natural hierarchies. In past papers we have presented empirical evidence that there are distinctly different "kinds" of hierarchies which frustrate attempts to find comparisons when fundamental distinctions are ignored. Counterparity diagrams appear to be useful for distinguishing emergent from specialization-based hierarchical levels in nature. It appears that many of the dualities that can be observed in the natural sciences do not influence the origins of natural objects on their scalar level at all, so the CP diagrams can be used filter out less fundamental, candidate dualities. Further, CP diagrams could improve our recognition and definition of truly emergent qualities providing an empirically-based demonstration of them. Finally, this paper will discuss prospects for applying CP diagrams to the less empirically-based disciplines of the social sciences and areas of human systems design.

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