Limits and Colimits in Categories of Biological Systems, Automata and (M,R)- Systems

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It's very interesting to me that, although we proved the existence of limits and colimits in Organismic Supercategories, Categories of (M,R)- Systems and Categories of Automata, it took 34 years since we proved such theorems on limits and colimits for others outside our small group (Rashevsky, Rosen, George Karreman and I, ...) to gain a concrete appreciation of their functional/biological importance for the emergence of Life and its subsequent Evolution. A possible explanation may come from the manner in which the theory of categories has been taught. Yet another factor may be the lengths to which 'computational physicists', cellular automata theoreticians, and/or random network specialists have gone to ignore, or even play down -of course, with some exceptions-- the substantial potential of the theory of categories and functors, algebraic topology and algebraic geometry for speeding up the progress in qualitative dynamics of complex biological systems and gaining understanding of Life's complexity. On the positive side, the increasing involvement and interest of scholars of Logics and Semantics may have turned the tide to the sudden revival, and widespread interest in applications of the theory of categories outside the small circle of category theoreticians. Last-but-not-least, the spreading and massive use of the web network for rapid communication is playing a very significant, and I hope, only a positive role, as well. I'm also enjoying Tim Gwinn’s vivid visualization of specific colimit representations of dynamic patterns in organisms, and the new aspects and questions that are being brought up at the Robert Rosen Discussion Group site, but one should not not forget that categorical limits are just as important in representing

biological Evolution. The duality of limits and colimits -- and their preservation by Adjoint Functors-- are fundamental in modeling Life, as it is so aptly explained by Robert Rosen in his last book "Life Itself" where he described so vividly the need for modeling complex systems with adequate tools and his distinctive , new approaches to understanding complex biological systems. Several selected examples of such applications are presented in the next PDF file also attached to this archived document.