

## Positive Feedback in Stability and Emergences

There are two clear tasks involved in these researches.

The **first**, and most important, concerns the role of positive feedbacks in the transforming Events that we call **Emergences**. For it is there that such avalanches of change are precipitated, and can transform situations both **radically** and *creatively*.

Yet these significant transformations take place over extremely short periods of time – so short are they, in fact, that in the record of the rocks they are often impossible to detect, and Change is regularly misallocated to the long intervening and apparently successive periods of Stability.

The **second** role occurs when such processes are no longer part of these episodes of revolutionary change, but have become integrated into **Complex Moderated Systems** *within* Stability.

In these circumstances, though still positive feedbacks, they are no longer self-*contained* Events that are first initiated, then run through, and are finally terminated in a finally wholly transformed situation (an **Emergence**). They have, instead, become essential parts of controlled and maintained integrated systems that **persist**.

In these cases, the usual inevitable terminations of the episodic versions do not occur, for these have become essential ingredients within a new Stability, and their continuing survival has been ensured by the systemic institution of Essential Replenishment. For with continuing supply of resources and necessary catalytic agents, along with their established positions as parts of Sequences and even Cycles of closely related and similar feedbacks, these become self *maintaining* systems and continue throughout the persistence of the new Level in which they have come to play a crucial part.

As it happens, in addition to the necessary presence of accelerating *catalysts*, there are also necessary *inhibitors* (or decelerators) for many of the component processes, and the survival and persistence of such systems are guaranteed by the inclusion of these **controllers**, as essential additions to the main **producers**.

Indeed, instead of the avalanches of uncontrolled positive feedbacks, we have in these new circumstances arrived at systems of inter-related, mutually conducive and controlling elements, which together *tame* positive feedback into both *persisting* and *flexible* means of production.

Clearly, these are **not**, and could never be, mere collections of processes. To ascend to this new level of association, the individual elements had to form productive associations, first into sequences of processes and ultimately into Cycles!

And, of course, the whole Level could only continue to persist if embedded within an almost inexhaustible environment of primary resources.

The important Change in this second case of positive feedback is that it is no longer a radically transforming element, but, on the contrary, it has become a stable and mutually maintaining nexus of processes. It has become part of a Stable situation! Indeed, it is actually a crucial element in that stability: it plays the major role in maintaining the new Level in constant self-maintaining action.

(477 words)