

PART II

Functional Entailment

Gegen den Positivismus, welcher bei den Phänomenen stehbleibt »es gibt nur Tatsachen,« würde ich sagen: nein, gerade Tatsachen gibt es nicht, nur Interpretationen. Wir können kein Faktum »an sich« feststellen: vielleicht ist es ein Unsinn, so etwas zu wollen.

»Es ist alles subjektiv« sagt ihr: aber schon Das ist Auslegung. Das »Subjekt« ist nichts Gegebenes, sondern etwas Hinzu-Erdichtetes, Dahinter-Gestecktes. — Ist es zuletzt nötig, den Interpreten noch hinter die Interpretation zu set zen? Schon Das ist Dichtung, Hypothese.

Soweit überhaupt das Wort »Erkenntniss« Sinn hat, ist die Welt erkennbar: aber sie ist anders deutbar, sie hat keinen Sinn hinter sich, sondern unzählige Sinne. — »Perspektivismus.«

[Against positivism, which halts at phenomena — ‘There are only facts’ — I would say: No, facts are precisely what there are not, only interpretations. We cannot establish any fact ‘in itself’: perhaps it is folly to want to do such a thing.

‘Everything is subjective,’ you say; but even this is interpretation. The ‘subject’ is not something given, it is something added and invented and projected behind what is there. Finally, is it necessary to posit an interpreter behind the interpretation? Even this is invention, hypothesis.

Insofar as the word ‘knowledge’ has any meaning, the world is knowable; but it is interpretable otherwise, it has no meaning behind it, but countless meanings. — ‘Perspectivism’]

— Friedrich Nietzsche (1901)
Kritische Studienausgabe 12:7
Der Wille zur Macht [*The Will to Power*]

The stage is now set for the next movement, in which I shall explicate relational biology in the language of set-valued mappings. In this part, we shall see how the formalism of the general theory of set-valued mappings specializes into functional entailment in a category.

Functional entailment is the entailment of a mapping:

$$\vdash f.$$

Robert Rosen considered the biological realization of functional entailment his deepest insight. The innovation is that the processes themselves may be treated like any other material. Rosen arranged the relational organization in his (M,R)-systems in such a way that repair is a mapping that produces as output metabolism that is itself also a mapping: for the 'R' part, instead of just producing an entity on which to operate, it could produce an operator, the 'M' part. The essence of an (M,R)-system is the

‘repair \vdash metabolism’

functional entailment.

A happy happenstance was when Rosen found the connection of this relational theory of biological systems to the algebraic theory of categories, thus equipping himself with a ready-made mathematical tool. While it may not always be immediately apparent, it may be said that almost all of Rosen's scientific works are consequences from a consideration of problems arising in the study of (M,R)-systems. Every time one looks at (M,R)-systems, they have something new to offer.

The definitive exposition on (M,R)-systems remains the now-classic Rosen [1972]. Some of the formal treatments that I undertake in Part II have been suggested in Rosen [1962, 1963].