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HOW CARNAP SHOULD BITE GOODMAN'S BULLET

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It is sometimes thought that Nelson Goodman provided decisive reasons to reject Rudolf Carnap's construction in the *Aufbau* on the grounds of the logical failure of the method essential to the project, quasi analysis. We will show that Goodman's criticism relies on a misunderstanding of the enterprise undertaken by Carnap in this monumental work, and that the logical failures Goodman notes have the potential of actually enriching Carnap's system.

1. The system of Aufbau: a sketch

One of the most important aims of *Aufbau* is to demonstrate that the apparently multifarious domain of science is unified. Carnap proposes to do so by offering one possible reconstruction of the objects of our experience, and so of science – those immediate (colors, shapes, etc.) and those distant (stones, minds, societies). In addition, he sets out to reconstruct the very process by which they come to be the objects of our experience.

"...[The] system is intended to reflect the epistemological hierarchy of objects." (Carnap, 1969, p. 87)

What is at stake is not, of course, a psychological account of cognition but rather a rational reconstruction designed to capture the logical essence of the phenomenon.

The constructional system is a rational reconstruction of the entire formation of reality, which, in cognition, is carried out for the most part intuitively. (p. 158)

Rational reconstruction of a phenomenon (here: the process of cognition) is most broadly conceived as the postulation of some rules by means of which the kinds of inputs characteristic of a phenomenon in question can be transformed into the corresponding kinds of outputs. The closer the logical reconstruction of such a process to the scientific account of it the better, although it is sufficient that the products be preserved. So to the extent that the phenomenon of cognition is psychological, Carnap thinks it is appropriate that the reconstruction he undertakes be informed by the developments in empirical psychology. This is most evident in the peculiar starting point of Carnap's system. Influenced by the Gestalt movement, Carnap chooses the holistic elementary experiences as primitives of his system rather than sense-data as was customary at that time.

Modern psychological research has confirmed more and more that, in the various sense modalities, the total impression is epistemically primary, and that the so-called individual sensations are derived only through abstractions, even though one says afterward that the perception is "composed" of them... These psychological investigations have frequently been undertaken in connection with Gestalt theory. (p. 109)

This choice leads to a substantial problem. Since elementary experiences are unitary (have no parts) and holistic (not more than one elementary experience can be experienced at a time), it is hard to see how we can ever experience anything determinate within the stream of our experience at all. Atomists starting with sense-data do not have this problem. Since in their view our total experience at a moment is a complex arrangement of sense-data, some of which can persist or change as the time passes, it is clear that we can experience something determinate within our total experience. But this avenue is not open to Carnap. The only way to solve the problem would be to divide the unitary elementary experiences; but what is truly unitary does not have parts – especially if its unity has to do with its status as a logical primitive. (Just this inconvenience, which Carnap intentionally forces

on himself, ought to provide a reason to think that he takes the developments in psychology seriously.)

Carnap's suggestion is to use the method of (proper) analysis, which is capable of discerning the constituents of complex entities, as a model for a method that would discern the analogues of constituents of simple entities. This latter method has received the name "quasi analysis," and the "elements" discerned by it are referred to as "quasi constituents." The method of proper analysis singles out quality classes (similarity circles) given the knowledge about the extent to which complex entities are similar to one another.¹ Since the relation of similarity is not very precise Carnap approximates it by the relation of part-identity.² Two rules define quality classes: (1) all members of a quality class are part-identical to one another, (2) an entity part-identical to all members of a quality class is a member of that class. In other words, quality classes comprise all and only entities part-identical to one another. To illustrate how this method works, Goodman (1977) considers entities composed of three elements: *b*, *g* and *r*. Given the following group of entities: *br*, *b*, *bg*, *g*, *r* and *bgr*, and the relation of part-identity (where two entities are part-identical if they share a common element) – the analysis on the basis of rules (1)~(2) renders three quality classes: {*br*, *b*, *bg*, *bgr*}, {*br*, *r*, *bgr*}, {*bg*, *g*, *bgr*}, i.e. classes of all *b*-things, *r*-things and *g*-things, respectively. Analogically, the method of quasi analysis would yield sets of appropriately related elementary experiences – the quasi constituents of holistic elementary experiences.

2. Goodman's criticism

In his well-known critique, Goodman has demonstrated that the method of proper analysis is fallible. In some circumstances, it gives too few "quality" classes (the companionship problem), in others – too many (the problem of imperfect communities). He accordingly claims to have undermined the very foundation of Carnap's construction.

The problems are indeed fundamental. On occasions when one element is systematically related to others, the method of analysis will not single out the proper constituents: the systematically involved element will not be assigned its own quality class. For instance, when the following group of entities is given: *br*, *b*, *bg*, *g* and *bgr*, the

quality classes of *b*-things $\{br, b, bg, bgr\}$ and *g*-things $\{bg, g, bgr\}$ will be obtained as before. However, the class of *r*-things will not be discerned because *r* is systematically correlated with *b*: whenever *r* occurs *b* occurs. The class of all *r*-things $\{br, bgr\}$ does not qualify as a quality class because it fails to satisfy (2): there are other entities that are part-identical to the members of this class. This is the companionship problem.

Suppose that there are *n* elements. When among the group of entities there is a subgroup of all (*n*+1) possible combinations of entities all of which contain all the *n* elements (for example, *br*, *gr* and *bg*, or *abr*, *abg*, *brg* and *rga*), the class of all such entities will be classified as a quality class despite the fact that there is no one element that *all* the entities share. Furthermore, in absence of any other "disambiguating" entities the compound class of all these entities will be the only "quality" class rendered. This is the imperfect community problem.

Goodman argues that since the method of proper analysis is unable to fulfill its function, it cannot form a suitable basis for quasi analysis. But if the method of quasi analysis is not available Carnap's system cannot even start. It is only in virtue of the fact that certain sets of elementary experiences are to represent their quasi constituents that the objects of our experience are constructed, and that the system of *Aufbau* can begin at all. If quasi analysis is inadequate – and it must be if the proper analysis is – the system breaks down.

Before we suggest that there is a hidden potential in this logical failure, let us consider and reject one line of defense. Although Carnap was not aware of the imperfect community problem, he did note the companionship problem but thought that circumstances conducive to it should not arise by and large. Such a defense relying on the scarcity of unfavorable circumstances is not very good, however. For one thing, as Goodman notes, the estimation of such probability is a very complex issue. For another, Goodman doubts that the imperfect community situations have a low probability. More importantly, it is not at all clear what concept of probability is at stake here. Even if the most natural candidate, logical probability, could be applicable in the case of proper analysis, it could not be in the case of quasi analysis: there are no components to be counted. If, on the other hand, empirical

Carnap's system. We shall suggest that the "aberrations" should be welcomed as potential explicans of a range of perceptual phenomena.

Rational reconstruction of cognition, as Carnap suggests, must preserve at least one thing: it must allow us to transform certain kinds of inputs into certain kinds of outputs. In our cognitive lives (at this stage of Carnap's system: in our pre-perceptual lives), we are confronted with a multitude of inputs, which are processed by certain physiological and/or psychological mechanisms to produce various kinds of outputs. In particular, there are so-called normal perceptual situations where we discern quality classes from the stream of elementary experiences correctly. But there are also cases where our normal perceptual apparatus does not discern the right quality classes. These are the cases of perceptual illusion. If Carnap aims at rationally reconstructing the way in which we form quality classes from elementary experiences, where rational reconstruction is to – at the very least – preserve the input- output correlations, it would seem somewhat arbitrary for him to deal only with the first class of cases. It is thus that Goodman's demonstration of the logical inadequacies of quasi- analysis might be taken to be an asset rather than a vice for Carnap's construction. For it is conceivable to use these "failures" as explicans for perceptual illusions which we, on occasions, fall prey to.⁴

A word of caution is in order. We are not claiming that the problematic situations actually provide an explication of perceptual abnormalities. A far more detailed account, in fact a modification of Carnap's construction, would have to be provided. Our point is that such an account is possible. Moreover, there are grounds that indicate its plausibility. For instance, the "failures" of quasi analysis approximate perceptual illusions in that the latter do not arise from a dysfunctioning of the perceptual mechanism but rather from certain peculiar arrangements of data within the perceptual field.

4. Final comments

We should wonder why this point escaped Goodman's attention. Goodman took himself to have uncovered fundamental flaws in Carnap's system leaving no space for considerations of this sort. His final word on the fate of *Aufbau* is definitive and illuminating:

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the project of defining qualities in terms of some similarity relation of concrete elements remains unrealized. (p. 134)

Here it becomes evident where the roots of the misunderstanding lie. What cannot be emphasized strongly enough is the fact that Carnap was *not* trying to *define* qualities. His project was to reconstruct the process by which *we* come to discern qualities from the autopsychological elementary experiences that – according to the best available scientific theory – we are confronted with. Sometimes, we fail to discern them in the right way, falling prey to illusions. A good reconstruction ought to be able to capture this as well.

This Goodman does not understand, and he consequently misidentifies the fault of Carnap's system. The fault of Carnap's construction does not lie in the logical flaws of the method that is crucial to it, but rather in the fact that he did not exploit them in reconstructing certain sorts of perceptual failures. The "failures" of the method in question rather than impoverishing or even undermining the system *would* actually make it richer, displaying its capacity to explicate a wider range of interesting experiential phenomena.

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NOTES

- ¹ Carnap believes that some sort of impression of similarity among holistic elementary experiences is available to us at the pre-perceptual level.
- ² Carnap uses two relations: part-identity and part-similarity, where the latter is supposed to serve as a still better approximation of our impressions of similarity among elementary experiences. For simplicity, we will restrict the presentation to the former. As has been shown by Goodman, the problems pertain to both.
- ³ Cf. his (1987).

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- ⁴ As a matter of fact, Carnap seems to have just this line of thought in mind when he says:

[The presence of unfavorable conditions] would lead to irregularities in the derivation of quality classes and later on in the division into sensory classes and in the Sim-order within the sensory classes. However, a more detailed investigation, which we have to omit for lack of space, shows that these interferences in the concept formation through quasi analysis can occur only if circumstances are present under which the real process of cognition, namely, the intuitive quasi analysis which is carried out in real life, would also not lead to normal results. (1969, p. 133)

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