

Husserl on Foundation

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ABSTRACT

In the third of his *Logical Investigations*, Husserl draws an important distinction between two kinds of parts: the *dependent parts* like the redness of a visual datum or the squareness of a given picture, and the independent parts like the head of a horse or a brick in a wall. On his view, the distinction is to be understood in terms of a more fundamental notion, the notion of *foundation*. This paper is an attempt at clarifying that notion. Such attempts have already been undertaken (separately) by Peter Simons and Kit Fine, and the paper also contains elements of comparison of our three sets of views.

This paper is about Husserl's approach to ontological dependence in the third of his *Logical Investigations*.¹ The third investigation is chiefly concerned with the distinction between two kinds of parts: the *dependent parts* or "moments" or "tropes" or "particularized properties", like the redness of a visual datum or the squareness of a given picture (both taken as peculiar to the corresponding object), and the *independent parts* or "pieces", like the head of a horse or a brick in a wall. It is Husserl's view that the distinction is to be understood in terms of the more fundamental notion of foundation, a form of ontological dependence.

Section 14 is central to the third investigation. In this section, foundation is explicitly defined, and six theorems about wholes, parts and foundation are stated and given informal justification. The short section 14 constitutes a sketch of the beginnings of a formal theory of wholes and parts – one of the different "formal ontologies" Husserl considered important to set up (§24). This is why in the present paper I shall focus especially on this section.

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¹ In this paper all references to Husserl are to the English translation Husserl 2001. All references to Simons are to Simons 1982, and those to Fine are to Fine 1995 except when explicitly mentioned.

Section 14, as well as the rest of the third investigation, is tainted with many imprecisions and ambiguities which sometimes affect the proper understanding of what Husserl wants to say. The aim of this paper is basically to clarify section 14, to determine what Husserl is trying to say there and, where necessary, to make some corrections which, I think, preserve the core of Husserl's thought. In the last part of the paper, though, I shall argue that Husserl's approach to foundation is flawed and subsequently present a sketch of my favorite approach to foundation.

The clarification of Husserl's thought on foundation and dependence is a job which has already been undertaken in Simons 1982, and then in Fine 1995. Yet both works, though very insightful, contain certain inadequacies I shall pinpoint in due course.

1. *Foundation*

At the beginning of section 14, Husserl characterizes two notions of foundation, which I shall call, following Fine's terminology, *species foundation* and *objectual foundation*. Species foundation is a binary relation connecting species, or kinds of objects; and objectual foundation is a binary relation between objects. Husserl explicitly takes the notion of species foundation to be more fundamental than that of objectual foundation: the latter is to be understood in terms of the former.

Several problems arise when reading Husserl's characterizations. One is that it is not clear how to make precise sense of Husserl's characterization of species foundation. Another problem is that, regardless of how that characterization is understood, Husserl's characterization of objectual foundation does not appropriately capture the notion he has in mind – or so it seems to me. As far as I can see, in order to get an adequate account of objectual foundation in terms of species foundation in more or less the way Husserl recommends, Husserl's characterization of the latter notion has to be emended in some way. In the first part of the paper I will try to show why, and suggest how this can be done.

1.1. *Species Foundation*

Let us start with species foundation. At the beginning of section 14, Husserl says:

If a law of essence means that an *A* cannot as such exist except in a more comprehensive unity which connects it with an *M*, we say that an *A* as such requires foundation by an *M* or also that an *A* as such needs to be supplemented by an *M*.

On the face of this definition, a first question arises: What precisely is the *definiendum*? There are two options. The first is that it is a two-place relational

predicate expressing a binary relation between species – the relation a species *A* bears to a species *M* iff a law of essence means that an *A* cannot as such exist except in a more comprehensive unity which connects it with an *M*. The second option is that it is a three-place relational predicate expressing a ternary relation between an object, a species the object belongs to, and another species – the relation which holds between an object *x*, a species *A* and a species *M* iff a law of essence means that *x* as an *A* cannot exist except in a more comprehensive unity which connects it with an *M*. Later parts of section 14 offer quite clear evidence that Husserl intended to define a binary relation between species.

What is that relation? The first thing to do is to get clear about what Husserl understands by ‘law of essence’, and this is by no means obvious. As far as I can see, Husserl uses ‘law of essence’ and ‘synthetic a priori law’ interchangeably. He characterizes these laws in terms of the notion of a material concept and of the notion of analytic necessity. Material concepts (e.g. “House, Tree, Color, Tone, Space, Sensation, Feeling etc.”) are those which “express genuine content”, and are opposed to formal concepts (e.g. “Something, One, Object, Quality, Relation, Association, Plurality, Number, Order, Ordinal Number, Whole, Part, Magnitude etc.”) which do not (§11). An analytic necessity is a specification of an analytic law (§12). An analytic law is a true “unconditionally universal” proposition which is “free from all explicit or implicit assertions of individual existence”, and which involves only formal concepts (§12). A specification of an analytic law is a “special case” of that law which involves material concepts and/or reference to particular objects; for instance ‘if something is so-and-so, then so-and-so-ness pertains to that thing’ is an analytic law, and ‘if this house is red, then redness pertains to this house’ is a specification thereof (§12). Finally, a synthetic a priori law is an a priori law – i.e., as far as I understand Husserl, a true “unconditionally universal” proposition which is “free from all explicit or implicit assertions of individual existence” – which involves material concepts and which is not analytically necessary (§12). As I previously emphasized, Husserl seems to use ‘law of essence’ and ‘synthetic a priori law’ interchangeably. Husserl would have a good motive for that: for him, an essence is a species or genus or differentia under which an object may fall, and the material concepts are those which correspond to essences (§11).²

² Some material concepts correspond to accidental “species” (e.g. RED OBJECT), i.e. species which some objects instantiate but could exist without instantiating them. Thus, it seems, Husserl uses ‘essence’ in a very broad sense here.

Not all of this is perfectly clear, but these explications will be enough for our purposes. How are we, then, to understand Husserl's definition of species foundation? One option is to construe its definiens as follows:

- (1) It is a law of essence that every member of *A* is in a more comprehensive unity which connects it with a member of *M*.

But it is not clear that this is what Husserl wanted to say. Parallel to the distinction between analytic laws and analytic necessities stands the distinction between laws of essence (i.e. synthetic a priori laws) and necessities of essence (i.e. synthetic a priori necessities): necessities of essence are specifications of laws of essence (§12). Now why not construe Husserl's definiens as:

- (2) It is a necessity of essence that every member of *A* is in a more comprehensive unity which connects it with a member of *M*

rather than as (1)? Arguably, (1) entails (2) – this may be derived from Husserl's characterization of necessities of essence on the assumption that a law of essence counts as a (degenerate) specification of itself. But of course the converse does not hold. Some clues from the text (see e.g. §7, and what appears to be an alternative characterization of species foundation in §21) suggest that (2) should be preferred to (1). Beside exegetical matters, anyway, it is quite reasonable to prefer (2). Yet, it seems to me, we are still not at home.

Laws of essence are propositions which involve material concepts, concepts which correspond to essences. It is then quite natural to think that any such law is "rooted in", in the sense of "holding in virtue of", certain essences as opposed to other essences. For instance, one may argue that the proposition that whatever belongs to the species *MAN* belongs to the species *ANIMAL* – a law of essence, or let us suppose so – is true in virtue of what it is to be a member of the species *MAN* (i.e. in virtue of what it is to be a man), but not in virtue of what it is to be a member of the species *ANIMAL* (i.e. in virtue of what it is to be an animal). Similarly, of course, one may think that any necessity of essence is in the same sense "rooted in" certain essences as opposed to other essences, inheriting the sources from the law of essence of which it is a specification.³ There is some evidence that Husserl thinks of laws of essence and necessities of essence in this way (see e.g. §7).

Under that conception, there are two ways of expressing necessity of essence, depending on whether the sources are mentioned or not. Reference to

³ Of course, one may hold similar views about analytic laws and analytic necessities.

sources may be achieved by means of indexed sentential operators of type ‘it is true in virtue of what it is to be an A , and of what it is to be a B , and ... that’ ($\square_{A, B, \dots}$, for short). Under that policy, which I shall follow in this paper, necessity of essence simpliciter may be defined by de-relativization: ‘it is a necessity of essence that p ’ can be defined by $\square_{A, B, \dots} p$.

(2) involves necessity of essence simpliciter. But my view is that Husserl’s *definiens* is better rendered by making reference to sources, as follows:

- (3) It is true in virtue of what it is to be a member of A that every such member is in a more comprehensive unity which connects it with a member of M .

That is to say, species A is founded upon species M iff the proposition that every member of A is in a more comprehensive unity which connects it with a member of M is a necessity of essence having its source in the species A . That (3) is closer to Husserl’s thought than (2) shows up – or so one may think – e.g. in §21, where Husserl proposes what he seems to take to be an alternative characterization of species foundation, and in §7, where he gives another characterization of that notion. One might even think that the very characterization in §14 suggests that reading.

Let us use $A \upharpoonright M$ for Husserl’s definiendum ‘an A as such needs to be supplemented by an M ’ – i.e. in our terms, for ‘species A is founded upon species M ,’⁴ ‘ ε ’ for species membership, and ‘ $zUxy$ ’ for ‘ x is in the more comprehensive unity z which connects it with y ’. My proposal is thus to render Husserl’s characterization of species foundation as follows:

- (SF1) $A \upharpoonright M \equiv \square_A \forall x (x \varepsilon M \supset \exists y, z (y \varepsilon M \wedge zUxy))$
 (A is founded upon M iff it is true in virtue of what it is to be an A that every A is in a more comprehensive unity which connects it with an M).

One important question about (SF1) which needs to be settled is, of course, how the predicate ‘ U ’ is to be understood.

‘ $zUxy$ ’ holds when x is in a more comprehensive unity z which connects it with y . What does this mean? Obviously, that z is a unity which contains both x and y . Now (at least) two questions arise: (i) How is containment to be understood here? (ii) Can x and y coincide or, more generally, what are supposed to be their mereological relationships?

Husserl works with quite a wide notion of parthood: a part is anything which is “present” in an object, so that a head may be a part of a body and a color –

⁴ Here and below, I use Simons’ symbolism for the various foundational relations.

moment may be a part of a visual datum (§2). This being said, when in the present context Husserl talks of a unity containing two objects, must we understand containment as proper containment, i.e. must we exclude coincidence as a case of containment? The phrase ‘ x is in a more comprehensive unity which connects it with y ’ suggests that proper parthood is at work here, and as Simons argues (pp. 124–125), this is probably the correct way of understanding the phrase.

As to the second point, it seems that Husserl typically has in mind cases where neither of the two objects is a proper part of the other, and where they do not coincide either. This is also an assumption made by Simons (p. 125).

Thus my suggestion is to analyze ‘ U ’ according to the following equivalence:

$$(U) \quad zUxy \equiv x < z \wedge y < z \wedge \neg x \leq y \wedge \neg y \leq x,$$

where ‘ $<$ ’ is for proper parthood and ‘ \leq ’ for parthood. But whether the suggestion is acceptable in all details will not be of crucial importance in the sequel.

1.2. Objectual Foundation, and Some Problems

Immediately after having defined species foundation, Husserl goes on to characterize objectual foundation. Here is what he says:

If accordingly A_o, M_o are determinate instances of the pure kinds A or M , actualized in a single whole, and standing in the relations mentioned, we say that A_o is founded upon M_o .

The obvious way of rendering Husserl’s characterization is the following (‘ $x \uparrow y$ ’ is used for ‘object x is founded upon object y ’):

$$(IF1) \quad x \uparrow y \equiv \exists A, M (x \in A \wedge y \in M \wedge A \uparrow M \wedge \exists z zUxy)$$

(x is founded upon y iff x is a member of a species A and y a member of a species M which are such that A is founded upon M , and x is in a more comprehensive unity which connects it with y).

But there is a problem here: the characterization certainly does not capture Husserl’s concept of objectual foundation.

For assume unrestricted composition, i.e. the principle that every collection of objects make up a further object, their sum or fusion. Then by the proposed definition, for an object to be founded upon another object it is sufficient that (i) neither be a part of the other, and (ii) there be a species A and a species M such that the first object belongs to A and the second to M , and A is founded upon M . But this is surely not something Husserl would accept. Husserl takes the species COLOR (of a visual datum) to be founded upon the species EXTENSION (of a visual datum) (§16). By unrestricted composition and

the proposed definition of objectual foundation, any color-moment is founded upon any extension-moment whatsoever. Husserl would agree that any color-moment is founded upon some extension-moment belonging to the same visual datum, but he surely would deny that some color-moments are founded upon extension-moments belonging to wholly distinct visual data.

At this point, one may reply that when Husserl talks of objects connected into more comprehensive unities, he has in mind genuine unities, not mere mereological sums of scattered objects like the sum of the color-moment of a visual datum and the extension-moment of another visual datum. This may be the case. But the problem remains. For consider a visual datum consisting of a colored triangle, with one red side r and two blue sides b_1 and b_2 . Presumably, the triangle is a genuine unity. Husserl would take the color-moment c corresponding to r to be founded upon the extension-moment e corresponding to r , but neither upon the extension-moment e_1 corresponding to b_1 nor to the extension-moment e_2 corresponding to b_2 . Yet on the assumption that the species COLOR is founded upon the species EXTENSION, and by the proposed definition of objectual foundation, c is founded upon both e_1 and e_2 .⁵

I have just argued that the proposed characterization of objectual foundation does not capture Husserl's conception of objectual foundation, and I did this by arguing that the characterization predicts results which are incorrect by Husserl's lights. But the problem is even deeper. Husserl thinks of objectual foundation as follows: an object x is founded upon an object y iff y satisfies a certain need which x has by virtue of its belonging to a certain species, namely the need to be supplemented by an object belonging to a given species—more formally, iff there are two species A and M such that (i) x belongs to A , (ii) A is founded upon M , and (iii) y satisfies x 's need for an M . Characterization (IF1) results from that view by specifying what it is for y to satisfy x 's need for an M : the proposal is that y be a member of M and that x and y be together included in some more comprehensive unity. That proposal is incorrect given Husserl views, as the previous examples show: according to Husserl, it is not the case that c 's need to be supplemented by an extension – moment is satisfied by any extension moment whatsoever, nor is it true that it is satisfied by e_1 or by e_2 .

1.3. Alternative Characterizations

In order to get things right, I suggest a modification of both the characterization of species foundation and the characterization of objectual foundation. The modification is in two steps.

⁵ That example was suggested to me by Fine.

First, I suggest that if a species A is founded upon a species M , and if an object x is a member of A , then for an object y to satisfy x 's need to be supplemented by an M it is not enough that y be an M included with x in some more comprehensive unity; y must be an M included with x in some more comprehensive unity of a specific kind – that kind being determined by the species A . The suggestion, as applied to the COLOR/EXTENSION example, is that for an object to satisfy a given color-moment's need to be supplemented by an extension-moment, the object must be an extension-moment which is connected with the color-moment in a single visual datum.

More formally, instead of starting with a notion of species foundation as a binary relation, we start with a ternary relation: species foundation is relativized so that the kind of more comprehensive unity which is needed is explicitly mentioned. Our basic notion is thus not that of the members of a species needing to be supplemented by members of another species within more comprehensive unities; but rather the notion of the members of a species needing to be supplemented by members of another species within more comprehensive unities *of a certain species*. We put accordingly:

(SF2) $A \upharpoonright_B M \equiv \Box A \forall x (x \in A \supset \exists y, z (y \in M \wedge z \in B \wedge z U x y))$
 (A is founded upon M with respect to B iff it is true in virtue of what it is to be an A that every A is in a more comprehensive unity of type B which connects it with an M).

Unrelativized species foundation is then naturally defined by existential generalization upon B , and objectual foundation as follows:

(IF2) $x \upharpoonright y \equiv \exists A, M, B (x \in A \wedge y \in M \wedge A \upharpoonright_B M \wedge \exists z (z \in B \wedge z U x y))$
 (x is founded upon y iff x is a member of a species A and y a member of a species M which are such that A is founded upon M with respect to B , and x is in a more comprehensive unity of type B which connects it with y).

Some parts of the third investigation (§7, §10) suggest such moves.

Even though the new approach is superior to the old one, it is still not satisfactory. The triangle example is still problematic. Husserl takes the species COLOR to be founded upon the species EXTENSION. But with respect to which species? Presumably, the species VISUAL DATUM. By (IF2) it follows that the color-moment c corresponding to r is founded not only upon the extension-moment corresponding to r , but also upon both the extension-moment e_1 corresponding to b_1 and the extension-moment e_2 corresponding to b_2 . But as I previously stressed, this is an unwanted result.

In order to get round that difficulty I suggest the following move.⁶ Let us define the three – place predicate ‘ C ’ as follows:

$$(C_1) \quad x C_B z \equiv_{\text{df}} z \in B \wedge x < z \wedge \neg \exists t (t \in B \wedge x < t \wedge t < z).$$

‘ $x C_B z$ ’ just says that z is a minimal B which contains x , i.e. that it is a B which contains x , and that there is no strictly smaller B which does the same. Let us also define the following notion:

$$(S) \quad x S_B y \equiv_{\text{df}} \exists z (z Uxy \wedge x C_B z).$$

One may read ‘ $x S_B y$ ’ as ‘ x is B -supplemented by y ’. I then propose to re-define species foundation as follows:

$$(SF3) \quad A \upharpoonright_B M \equiv \Box_A \forall x (x \in A \supset \exists y (y \in M \wedge x S_B y))$$

(A is founded upon M with respect to B iff it is true in virtue of what it is to be an A that every A is B -supplemented by an M)

and objectual foundation as follows:

$$(IF3) \quad x \downarrow y \equiv \exists A, M, B (x \in A \wedge y \in M \wedge A \upharpoonright_B M \wedge x S_B y)$$

(x is founded upon y iff x is a member of a species A and y a member of a species M which are such that A is founded upon M with respect to B , and x is B -supplemented by y).

It is clear that under this approach the triangle example is no longer problematic. For the side r is a minimal visual datum which contains c , and so by our definition c is founded upon e . Moreover, r is the only minimal visual datum containing c . Given that neither e_1 nor e_2 is part of r , c is not founded upon e_1 , and is not founded upon e_2 either.

An alternative, natural way of dealing with the triangle problem is to adopt (IF3) but with a different definition for ‘ C ’, namely:

$$(C2) \quad x C_B z \equiv_{\text{df}} z \in B \wedge x < z \wedge \neg \exists t (t \in B \wedge x < t \wedge \neg t \leq z).$$

‘ $x C_B z$ ’ now says that z is a smallest B which contains x . Two smallest B s containing something must coincide (i.e. be parts of each other), while two minimal B s containing something need not. Being a smallest B containing something entails being a minimal B which contains that thing, but the converse does not hold. Accordingly, objectual foundation defined in terms of smallest unities is stronger than objectual foundation defined in terms of minimal uni-

⁶ Something similar was suggested to me by Fine.

ties. Why choose (C_1) instead of (C_2) ?

I did not manage to find in Husserl's text evidence in favor of one approach as opposed to the other. This is *prima facie* reason to choose the weaker approach. Another reason is that with respect to some rather plausible metaphysical views, the weaker approach predicts correct results while the stronger one does not.

Here is an example involving universals and states of affairs. Let a monadic state of affairs be a structured entity consisting of a universal and an object, the first occupying a designated "predicate" position in the structure and the second a designated "subject" position. Assume a view according to which (i) something is a proper part of a monadic state of affairs iff it occupies one of the two positions in the structure, (ii) there are no distinct but coinciding monadic states of affairs, and (iii) two such states of affairs are identical if they have the same constituents at the same positions. Suppose now that it is true in virtue of what it is to be a monadic universal that any such entity enters into some monadic state of affairs in predicate position (together with some object exemplifying it). The species MONADIC UNIVERSAL is thus founded upon the species OBJECT with respect to the species MONADIC STATE OF AFFAIRS. Then take the universal Redness, two distinct red concrete things a_1 and a_2 , and the state of affairs s_1 of a_1 's being red and the state of affairs s_2 of a_2 's being red. By (IF3)+(C₁), Redness is founded upon both a_1 and a_2 ; s_1 is a minimal state of affairs which connects a_1 and Redness, and likewise for s_2 and a_2 . And intuitively, this is as it should be. But by (IF3)+(C₂), Redness is founded upon no red thing. For take e.g. a_1 . By the account of objectual foundation, for Redness to be founded upon a_1 there must be a monadic state of affairs s such that (i) s connects Redness and a_1 , and (ii) s is a part of every state of affairs containing Redness. But there is no such state of affairs. For by (i), $s = s_1$; and s_2 contains Redness while s_1 is not part of s_2 (it is not an improper part since $s_1 \neq s_2$, and it is not a proper part since $s_1 \neq a_1$ and $s_1 \neq$ Redness).

The above reconstruction of Husserl's theory of foundation is the best I could achieve.

1.4. Simons and Fine on Husserl on Foundation

Let me now compare the views presented in the previous section with Simons 1982 and Fine 1995.

Fine does not address the question of how objectual foundation is to be understood in terms of species foundation; he simply works with objectual foundation and tries to reconstruct Husserl's theory in terms of that notion. This is not a mistake of Fine's: he does recognize Husserl's view about which of the

two notions is prior to the other. Fine just deliberately chooses to deal with what he takes to be a simpler task – which, as he claims, is still compatible with the reduction of objectual foundation to species foundation (p. 465).

Yet even if Fine is not mistaken about Husserl's view, I think he may be so about objectual foundation. In fact, he suggests that 'x is individually founded upon y' may be understood as 'y is not a part of x, and it is true in virtue of the essence of x that x exists only if y does' (pp. 471 and 473). But it is not clear that this is faithful to Husserl's view on these matters. For a consequence of Fine's suggestion is that whenever an object is founded upon another object, it is (metaphysically) impossible that the former exists and the latter does not.⁷ What is not clear to me is whether Husserl thinks that no founded object can exist without that upon which it is actually founded. If he does not, Fine is wrong, and if he does, Fine may be right. Independently of Husserl's view on these matters, however, one may have good reasons to reject the consequence of Fine's proposal. Consider once again the view about monadic universals presented above. On this view, the universal Redness is actually founded upon every actually existing red thing. But it would be very implausible to say that Redness necessitates all of them.

Simons, unlike Fine, does address the question how objectual foundation might be defined in terms of species foundation. He proposes a characterization of species foundation roughly in the style of (SF1) (p. 125), which is inadequate (see below). He then argues that the natural way of characterizing objectual foundation following Husserl's suggestion is subject to grave difficulties (pp. 129–130). At this point he gives up and introduces a new foundation relation as a primitive, a four-place relation connecting two objects and two species – the relation which holds between objects *x* and *y* and species *A* and *M* iff "x, qua *A*, is founded upon y, qua *M*". He then analyzes objectual foundation in terms of this new notion (by existential generalization with respect to species), and finally rests content with giving some axioms governing the relationships between his new notion of foundation and species foundation (pp. 132–133).

There are three problems with Simons' approach. The most obvious is that he does not follow Husserl's idea according to which objectual foundation is to be defined in terms of species foundation. The second problem concerns his new concept of foundation: his new primitive concept of foundation is rather obscure – in fact, too obscure to be taken as a primitive. Finally, there is a problem with

⁷ This follows from the common view according to which what is true in virtue of the nature of something is necessarily true, or at least, necessarily true if the thing exists – a view which Fine himself endorses (see e.g. Fine 1994, p. 4).

respect to species foundation. I previously said that he proposes a characterization of that notion in roughly the style of (SF1). The qualification ‘roughly’ is important, for two reasons. First, instead of using an indexed necessity operator, he uses the operator of necessity of essence *simpliciter*. I do not take this as a serious problem, since my preference for an indexed operator is based on an exegesis which I myself take to be subject to criticism. The second point is more important. Simons’ characterization says that species A is founded upon species M iff as a matter of (essential) necessity, every member x of A is such that there is a member y of M such that neither x is part of y nor vice versa (p. 125). In that characterization no reference is made to more comprehensive unities, while reference to them is central to Husserl’s conception of species dependence. It cannot therefore be taken to be a faithful rendering of Husserl’s characterization.

2. The Six Theorems

Let us now turn to the six theorems about wholes, parts and foundation which Husserl presents in section 14. Before going into the details, it is useful to define a certain number of notions:

- (D1) $x \rfloor_B M \equiv_{\text{df}} \exists A (x \in A \wedge A \rfloor_B M)$
 (x requires to be founded on an M with respect to a unity of type B iff_{df} x belongs to a species which is founded upon M with respect to B);
- (D2) $x \rfloor M \equiv_{\text{df}} \exists B x \rfloor_B M$
 (x requires to be founded on an M iff_{df} x requires to be founded on an M with respect to a unity of a certain type);
- (D3) $x \rfloor (M, y) \equiv_{\text{df}} y \in M \wedge \exists B (x \rfloor_B M \wedge x S_B y)$
 (x ’s requirement to be founded on an M is satisfied by y iff_{df} y is an M , and x requires to be founded on an M with respect to a unity of a certain type B , and x is B -supplemented by y).

Here are three properties of foundation which we shall refer to in the sequel:

1. $x \rfloor y \equiv \exists M x \rfloor (M, y)$
 (x is founded upon y iff y satisfies a certain foundational requirement of x ’s);
2. $x \rfloor M \equiv \exists y x \rfloor (M, y)$
 (x requires to be founded on an M iff x ’s requirement to be founded on an M is satisfied by something);

3. $x \upharpoonright M \supset \exists y (y \in M \wedge x \upharpoonright y)$
 (x requires to be founded on an M only if x is founded on an M).

The first derives from quantificational logic, and the proofs of the second and the third make use of the principle that necessities of essence are truths. Let us now go into the details.

Husserl formulates his first theorem as follows:

If an A as such requires to be founded on an M , every whole having an A , but not an M , as a part, requires a similar foundation.

The theorem may be naturally expressed by:

THEOREM 1. $[A \upharpoonright M \wedge \exists x (x \in A \wedge x \leq z) \wedge \neg \exists y (y \in M \wedge y \leq z)] \supset z \upharpoonright M$.

I.e. if A is founded upon M , then every whole having an A , but not an M , as a part, requires to be founded on an M .

Theorem 1 is provably equivalent to the following simpler proposition:

PROPOSITION 1. $[x \upharpoonright M \wedge x \leq z \wedge \neg \exists y (y \in M \wedge y \leq z)] \supset z \upharpoonright M$.

I.e. if x requires to be founded on an M , then every whole having x , but no M , as a part, requires to be founded on an M .

We shall discuss the basis for this theorem in a moment.

Simons' rendering of theorem 1 is slightly different from mine: he takes the theorem to state that if species A is founded upon species M , then the species consisting of the objects containing an A but not an M is founded upon M (p. 127).⁸ Simons' version is stronger than mine, and it is not clear to me why he proposed it. He claims that theorem 1 follows from the transitivity of parthood plus basic modal predicate logic. This is true of his version of the theorem when foundation is understood the way he proposes, but as we saw in section 1.4, his characterization of foundation cannot be accepted.

Fine's version of theorem 1 really departs from Husserl's initial formulation, in part because of Fine's decision to work with objectual foundation as the basic notion, but also for other reasons which are opaque to me (see p. 466). Anyway, a comparison with my rendering of the theorem as well as with Simons' is for these reasons quite difficult.

⁸ Here and below, when comparing Simons' and Fine's renderings of the six theorems with mine, I will of course leave aside the fact that their analyses of the corresponding notions of foundation are different from mine.

Husserl formulates his second theorem as follows:

A whole which includes a non-independent ‘moment’, without including, as its parts, the supplement which that ‘moment’ demands, is likewise non-independent, and is so relatively to every superordinate independent whole in which that non-independent ‘moment’ is contained,

and claims that it is a corollary of the previous one. In order to formulate theorem 2 in a precise way, we need to define the following notions:

- (D4) $\text{DEP}x \equiv_{\text{df}} \exists y (x \upharpoonright y)$
(x is dependent iff_{df} x is founded on something);
- (D5) $\text{INDEP}x \equiv_{\text{df}} \neg \text{DEP}x$
(x is independent iff_{df} x is not dependent);
- (D6) $\text{DEP}xy \equiv_{\text{df}} \exists z (z \leq y \wedge x \upharpoonright z)$
(x is dependent relatively to y iff_{df} x is founded upon something which is a part of y).

Theorem 2 is ambiguous between two readings – the generic reading and the objectual reading:

THEOREM 2.

- (1) *Generic reading*
- (a) $[x \upharpoonright M \wedge x \leq z \wedge \neg \exists y (y \in M \wedge y \leq z)] \supset \text{DEP}z$;
- (b) $[x \upharpoonright M \wedge x \leq z \wedge \neg \exists y (y \in M \wedge y \leq z)] \supset \forall t (\text{INDEP}t \wedge x \leq t \supset \text{DEP}zt)$.
- (2) *Objectual reading*
- (a) $(x \upharpoonright y \wedge x \leq z \wedge \neg y \leq z) \supset \text{DEP}z$;
- (b) $(x \upharpoonright y \wedge x \leq z \wedge \neg y \leq z) \supset \forall t (\text{INDEP}t \wedge x \leq t \supset \text{DEP}zt)$.

Theorem 2(1)(a) directly follows from theorem 1. But neither of the other theorems follows from the same basis. However, all parts of theorem 2, under any reading, are consequences of the following nice proposition:

PROPOSITION 2. $(x \upharpoonright y \wedge x \leq z \wedge \neg y \leq z) \supset z \upharpoonright y$.

I.e. if x is founded upon y , then every whole having x , but not y , as a part, is founded upon y .

Proof. As we saw, ‘ $x \upharpoonright M$ ’ entails ‘ $\exists y (y \in M \wedge x \upharpoonright y)$ ’. Now given this result, it is clear that 2(1)(a) follows from 2(2)(a) and 2(1)(b) from 2(2)(b). So in order

to get what we want, it suffices to prove that proposition 2 entails the objectual reading of theorem 2. The first part, i.e. theorem 2(2)(a), immediately follows from proposition 2 and definition (D4). As to the second part, suppose that $x \upharpoonright y \wedge x \leq z \wedge \neg y \leq z$. Then by proposition 2, $z \upharpoonright y$. Let t be any object. Suppose first that $y \leq t$. Then by definition (D6), $DEPzt$, and so trivially $(INDEPt \wedge x \leq t) \supset DEPzt$. Suppose now that $\neg y \leq t$. Then by proposition 2 once again, $x \leq t \supset t \upharpoonright y$, and so by definition (D5), $x \leq t \supset \neg INDEPt$. So once again, $(INDEPt \wedge x \leq t) \supset DEPzt$.

Unfortunately, theorem 1 cannot be proved on the same basis. But interestingly, both theorem 1 and proposition 2 are consequences of the following proposition:

PROPOSITION 3. $(x \upharpoonright (M,y) \wedge x \leq z \wedge \neg y \leq z) \supset z \upharpoonright (M,y)$.

I.e. if x 's requirement to be founded on an M is satisfied by y , then every whole having x , but not y , as a part, is such that its requirement to be founded on an M is also satisfied by y .

Proof. Proposition 3 entails theorem 1 because $x \upharpoonright M \equiv \exists y x \upharpoonright (M,y)$, and it entails proposition 2 in virtue of the fact that $x \upharpoonright y \equiv \exists M x \upharpoonright (M,y)$.

Simons gives an objectual reading of theorem 2, and claims that it follows from proposition 3 (p. 144).⁹ His formulation of the theorem is, however, different from mine. His reading of the first part of the theorem is roughly the same as (2)(a). But he is mistaken about the second part, which he renders as follows:

$$(x \upharpoonright y \wedge x \leq z \wedge \neg y \leq z) \supset \forall t (y \leq t \supset DEPzt).$$

Instead of writing ' $x \leq t$ ', Simons puts ' $y \leq t$ ' and he eliminates the condition 'INDEPt'. The first move, i.e. the replacement of ' x ' by ' y ', is clearly incorrect, since, following Husserl's formulation, it is the 'moment' which is supposed to be contained in the superordinate whole, not the object on which the 'moment' is founded. The elimination of the independence condition is harmless once the above mentioned mistake is made, since, as Simons himself notes, proposition 3 ensures the truth of the second part of theorem 2 as he understands it.

Fine also gives an objectual reading of theorem 2, and he considers proposi-

⁹ Simons defines $x \upharpoonright (M,y)$ in terms of his primitive four-place foundation relation, by existential generalization with respect to the first species-position: $x \upharpoonright (M,y)$ iff there is a species A such that x , qua A , is founded upon y , qua M .

tion 2 as a reasonable basis for it (pp. 467–468). His rendering of theorem 2 is almost the same as mine. The only difference is that he imposes a further, superfluous condition on the superordinate whole, namely that it contains z as well as x .

In order to formulate the remaining theorems, the following notions need to be defined:

- (D7) $\text{DEPP}_{xy} \equiv_{\text{df}} x \leq y \wedge \text{DEP}_{xy}$
 (x is a dependent part of y iff_{df} x is a part of y and is dependent relatively to y);
- (D8) $\text{INDEPP}_{xy} \equiv_{\text{df}} x \leq y \wedge \neg \text{DEP}_{xy}$
 (x is an independent part of y iff_{df} x is a part of y and is not dependent relatively to y).

Husserl's formulation of these theorems is relatively clear. Here are the theorems:

THEOREM 3. $\text{INDEPP}_{xy} \wedge \text{INDEPP}_{yz} \supset \text{INDEPP}_{xz}$.

THEOREM 4. $\text{DEPP}_{xy} \wedge y \leq z \supset \text{DEPP}_{xz}$.

THEOREM 5. $\exists y \text{DEP}_{xy} \supset \text{DEP}_x$.

THEOREM 6. $\text{INDEPP}_{xz} \wedge \text{INDEPP}_{yz} \supset (\neg \text{DEP}_{xy} \wedge \neg \text{DEP}_{yx})$.

Theorem 5 follows from the definitions; theorems 4 and 6 follow from the transitivity of ' \leq '; finally theorem 3 follows from the transitivity of ' \leq ' and proposition 2. Simons' and Fine's renderings of these four theorems are essentially the same as mine (for Simons see pp. 144–146, and for Fine pp. 468–469).

So all six theorems follow from the transitivity of ' \leq ' and proposition 3. Thus given that (plausibly) proper parthood as well as parthood in the wide sense are both transitive, it is not important in which sense ' \leq ' is understood above. Anyway, choosing the wide sense – as both Simons and Fine do – seems to be the most natural move and is, I think, quite faithful to Husserl's intentions. On the other hand, it would be nice to find simple axioms from which one may derive proposition 3, but I did not succeed in finding such a base.

3. An Alternative, and More Satisfactory Approach to Foundation

With the notion of foundation, Husserl wants to capture a certain idea of ontological non-self-sufficiency: a founded object is one which cannot exist without other definite objects, or without objects of a certain kind.

It seems quite clear that Husserl thinks of foundation in such a way that no

whole is founded upon any of its parts: if x is founded upon y , then x is in a more comprehensive unity which connects it with y ; and as I have emphasized in a previous part of this paper, it seems that this latter condition excludes that y is part of x . Now wholes, or at least some of them, are in a sense ontologically non-self-sufficient “with respect to their parts”: they cannot exist without their actual parts, or at least without having parts of certain kinds. For instance, one might say, a visual datum must have a color-moment, a person must have a brain, a quantity of water must contain H_2O molecules, etc.

Thus there seems to be a wider notion of foundation – call it, following Fine’s terminology, *weak foundation* – which, intuitively, is more basic than the other notion: one is tempted to define foundation in terms of weak foundation by saying that an object is founded upon another object when it is weakly founded upon it, and the second is not a part of the first. Now it is hard to see how weak foundation could be defined in the spirit of Husserl’s analysis of foundation. As I will argue now, such a Husserlian approach to weak foundation cannot be found, and I shall subsequently propose an alternative approach to both weak foundation and foundation.

It is perhaps tempting to propose the following disjunctive analysis of weak foundation: an object is weakly founded upon another iff either the first is founded upon the second, or the second is part of the first. But such a proposal cannot be sustained.

First of all, the definition, though perhaps extensionally correct, goes against the idea mentioned above according to which foundation is to be defined in terms of the weak notion.

Secondly, one may argue that the proposed definition is even not extensionally correct. For, one might say, every creature is founded upon God in the weak sense we wish to characterize. But, one will go on, no creature is a part of God, and moreover, it is not true that God and, say, I, are connected within a more comprehensive whole. Of course, one may object to this argument, saying e.g. that all creatures are part of God, or that in virtue of the principle of unrestricted composition, God and I actually have a sum. But the correctness of an analysis of weak foundation should not turn on the truth-value of particular ontological theses such as the thesis that God contains everything he created, and the principle of unrestricted composition.

Finally, one may object to the proposal that weak foundation is not a mereological notion, in the sense that the notion involves no mereological concept.

If the proposed definition is not correct, then what else can be put in its place? The above proposal concerned a notion of objectual weak foundation. At the level of species, Husserl mentions a certain relation which, one might think, is

close to what we are looking for. The relation is defined in section 21 as follows:

A content of the species A is founded upon a content of the species B , if an A can by its essence (i.e. legally, in virtue of its specific nature) not exist, unless a B also exists.

Husserl actually seems to take this to be an alternative, equivalent characterization of the relation of species foundation he characterized in section 14. As Simons emphasizes, Husserl is certainly mistaken in this respect (p. 123). Anyway, it should be clear that the notion Husserl defines in the quoted passage is far from providing us with what we want. For it seems to be impossible to define objectual weak foundation in terms of the specific notion in more or less the way proposed by Husserl: the problems we encountered with Husserl's original notion of foundation are still present here, and the kind of solution I proposed is unavailable in the present case.

Thus, I take it that there is no Husserlian approach to weak foundation. In the rest of the paper, I wish to present a sketch of an alternative approach to foundation which I find appealing. The approach takes weak foundation as the basic concept.

Let us start with a notion we shall call for the moment *grounding*. An object is grounded in another object iff (part of) what makes the first exist is that the second exists. Thus, one might want to say, sets are grounded in their elements, concrete wholes in their parts, Aristotelian universals in their exemplifiers, or again tropes in their bearers. Grounding is obviously not a mereological notion. And a grounded object is in an obvious sense ontologically non-self-sufficient: it cannot exist without its grounds, or without objects of certain kinds its grounds belong to.

We then identify (objectual) weak foundation with grounding, and we define foundation in terms of grounding (expressed by ' G ') in the way suggested above, saying that an object is founded upon another object when the first is grounded in the second and the second is not part of the first:

$$x \upharpoonright y \equiv xGy \wedge \neg x \leq y.$$

Under this approach, species foundation is naturally defined in terms of objectual foundation as follows:

$$A \upharpoonright M \equiv \Box_A \forall x (x \in A \supset \exists y (y \in M \wedge x \upharpoonright y))$$

i.e.: A is founded upon M iff it is part of what it is to be an A that every A is founded upon some M .

It is interesting to note that within the present approach, Husserl's six theorems follow from fairly weak assumptions. Proposition 2 follows from our

definition of foundation, the transitivity of parthood, and two intuitively correct principles about grounding, namely (i) that grounding is transitive, and (ii) that wholes are grounded in their parts. Thus, using definitions (D4)–(D8), we have all the theorems 3–6, as well as theorem 2 under the objectual reading. In order to get theorem 1 and theorem 2 under the generic reading, it suffices to put:

$$x \upharpoonright M \equiv \exists A (x \varepsilon A \wedge A \upharpoonright M).$$

In fact, no extra assumption is then needed.

All this is only a rough sketch of an approach to foundation, for obviously more should be said on the topic. I will not go further here, but hope to do it elsewhere.¹⁰

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