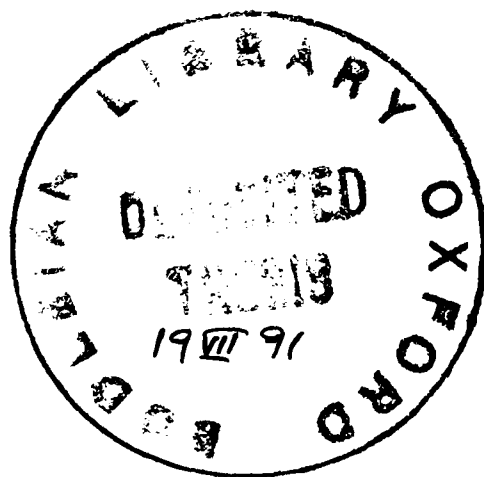


Formal Structures of Sensory/Perceptual Experience



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ABSTRACT

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Formal Structures of Sensory/Perceptual Experience

This thesis deals primarily with metaphysical issues concerning human sensory/perceptual experiences, and with questions about the formal representation of these experiences. In this respect it is similar to N. Goodman's The Structure of Appearance, which is discussed at some length. I establish a way of describing and formally representing certain structures which must occur in sensory/perceptual experiences, regardless of how the features of these experiences are categorized in terms of being *physical* or being *mental*. A special ("ontologically neutral") conceptual scheme which reflects the neutrality with respect to these categorizations, and which is particularistic in the sense of admitting sensory/perceptual individuals (*sensations*), is introduced for this purpose. The choice of a *particularistic* conceptual scheme in this context is supported by an argument which shows that the so-called *adverbial approach* is insufficient for describing sensory/perceptual experiences. To achieve the desired formal representation, I introduce an original generalization of the standard formalism for semantic 1st-order predicate theories which involves incomplete models, and a type of structured primitive predicates.

Based on a Kantian view of the function of concepts in experience, I then give an account of experiential colour-predicates (like *x looks red*) in ontologically neutral terms. This account, involving a special class of sensory/perceptual individuals (*colour-tokens*), has the particular advantage of avoiding the shortcomings of both sense-datum theories and the views held by C. Peacocke in Sense and Content. This is followed by an account of experiential intentionality (in ontologically neutral terms) which shows how intentionality, as occurring in the context of sensory/perceptual experiences, can have a relational nature, despite the well-known problems of substitutivity and intentional inexistence which are traditionally associated with intentional relations.

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GLOSSARY of FIRST-ORDER PREDICATE FORMALISM

The aim of this glossary is to give an appropriate description of the well-known semantic formalism for 1st-order predicate languages for the purposes of this thesis.

0.1 Linguistic Formalism

The linguistic formalism of 1st-order predicate languages is defined in terms of (denumerable many) characters¹ which are combined -- according to certain formation rules -- into finite strings Φ_n called well-formed formulae (or short formulae). A particular linguistic apparatus (L_m) is specified by a (non-empty) set of referential characters², say:

$$[1] \quad L_m = \{a_1, a_2, P_1(.), R_1(.,.), . =_1.\}.$$

Formulae themselves display a syntactic (logical) structure, which is in part given by the distinction between

[2.1] individual constants (referential characters occurring as logical subjects in formulae) and

[2.2] predicate constants or, short predicates (referential characters occurring as logical predicates in formulae).

¹ For a list of characters see 0.5

² see 0.5 [1]

The classical 1st-order predicate apparatus L_{cl} is based on the complete 1st-order predicate formalism with the exception that it is restricted to one single identity predicate =:

$$[3] \quad L_{cl} = \{ =, a_1, a_2, \dots, P_1(), P_2(), \dots, R_1(,), R_2(,), \dots \}.$$

0.2 Semantics

A 1st-order predicate semantics is a class of **semantically determined referent-structures**, say:³

$$[4] \quad \Sigma = \{ \langle \Sigma_1, \sigma_1 \rangle, \langle \Sigma_2, \sigma_2 \rangle, \dots \}.$$

The elements of this class are taken to be ordered pairs composed of **referent-structures** Σ_1, Σ_2 , etc., and **interpretations** σ_1, σ_2 , etc. Each interpretation σ_n is a function from a σ_n -specific set of referential characters ($L\{\sigma_n\}$) into the associated referent-structure Σ_n , i.e.:

$$[5] \quad \sigma_n : L\{\sigma_n\} \longrightarrow \Sigma_n$$

A semantics Σ_r is **adequate** for a given linguistic apparatus L_m , if $L_m \subseteq L\{\sigma_n\}$ for all σ_n occurring in Σ_r .⁴ If a

³ The particularity of a semantics shall, if necessary, be indicated as $\Sigma_r = \{ \langle \Sigma_1, \sigma_1 \rangle, \langle \Sigma_2, \sigma_2 \rangle, \dots \}$.

⁴ This simply means that all the formulae of L_m can be "meaningfully interpreted" in all the referent-structures of Σ_n .

semantics Σ_r is adequate for a linguistic apparatus L_m , then the elements of Σ_r are said to be **models** (for L_m).⁵

5 A particular semantics, being a set, is usually given intensionally, that is in terms of a general description of its elements. This involves a) a general description of the referent-structures, and b) general rules concerning the interpretation of referential characters.

10 The **standard semantics** Σ_{cl} for L_{cl} is defined in set-theoretical terms:

a) A referent-structure $\Sigma_H^c \in \Sigma_{cl}$ is a set-theoretic construct based on a (non-empty) **domain** $A_n = \{\alpha_1, \alpha_2, \dots\}$:

$$[6] \quad \Sigma_H^c = [A_n \mid P_1, P_2, \dots, R_1, R_2, \dots]$$

15 b) The elements $\alpha_1, \alpha_2, \dots$ of this domain (formal **individuals**) constitute the referents for individual constants, and the identity relation $=_{A_n}$ on A_n serves as referent for the identity symbol. Monadic predicates refer to subsets $P_1, P_2, \dots$ of A_n , diadic predicates to subsets of $A_n \times A_n$, etc. An example of a classical interpretation σ_H^c (semantically determining Σ_H^c) is the

20 **canonical interpretation:**

$$[7] \quad \sigma_H^c(a_k) := \alpha_k, \quad \sigma_H^c(P_k) := P_k, \quad \sigma_H^c(R_k) := R_k, \text{ etc.}$$

⁵ Chang, [1973], p.20

0.3 Meaningful Formulae

The notion of a "meaningful formula" is, roughly speaking, meant to refer to formulae as interpreted in the context of some semantically determined referent-structure. A meaningful formula τ is given by a formula Φ and the interpretation σ_n of the determined referent-structure $\langle \sigma_n, \Sigma_n \rangle$ from which τ "derives its meaning":⁶

$$[8.1] \quad \tau \equiv_m \Phi | \sigma_n].$$

Given the set-theoretical representation of functions as sets of ordered pairs, we can be more specific and describe τ by using just those elements of σ_n which contain referential characters occurring in Φ : Say if $\Phi \equiv P_1(a_1)$ and $\langle a_1, \alpha_1 \rangle, \langle P_1, P_1 \rangle \in \sigma_n$ then τ can be given as

$$[8.2] \quad \tau \equiv_m \Phi | \langle a_1, \alpha_1 \rangle, \langle P_1, P_1 \rangle],$$

where $\equiv_m$ is given by⁷

$$[8.3] \quad \Phi_i | \sigma_n \{ \Phi_i \}] \equiv_m \Phi_j | \sigma_k \{ \Phi_j \}] \text{ iff } \Phi_i \equiv \Phi_j \text{ \& } \sigma_n \{ \Phi_i \} = \sigma_k \{ \Phi_j \}.^8$$

⁶ The assumption here is that $\langle \sigma_n, \Sigma_n \rangle$ is adequate for Φ .

⁷ $\sigma_n \{ \Phi \} := \{ x \in \sigma_n \mid x \text{ contains a referential character of } \Phi \}$

⁸ Note that according to this definition it is possible that two different interpretations ($\sigma_n \neq \sigma_k$) give rise to the same meaningful formula.

Referential characters as occurring in meaningful formulae are called **reference-introducing symbols**. They are *symbols* -- in the sense of "standing for something", as opposed to being merely characters -- in virtue of the formal interpretations (**particular references**) within which they occur.

The function of reference-introducing symbols in a meaningful formula is, as the name suggests, to introduce the particular references in question. I ought to point out that they can also be seen as introducing **referents** (i.e. those items of referent-structures which are, or can be the image under interpretations). Contrary to the first case where the introduced particular references are taken to be genuine constituents of the meaningful formula, these referents-as-introduced are not. Nevertheless, the fact that referents do occur in meaningful formulae -- namely as constituents of particular references -- makes it possible to talk of "introducing referents" in this context.

Finally, let me call the string of characters (say $\Phi \equiv P_1(a_1)$), when it occurs in a meaningful formula τ , the **linguistic expression** of τ . The logical structure of this linguistic expression will accordingly be referred to as the **logical form** of the "expressed" meaningful formula.

[9]

linguistic expression

$$\tau \equiv_m P_1(a_1) | \langle a_1, \alpha_1 \rangle, \langle P_1, P_1 \rangle]$$

reference-
introducing
symbols

particular
references

0.4 Particular Languages & Propositions

A particular 1st-order predicate language $L(L_m, \Sigma_r)$ arises through the association of a particular linguistic formalism (L_m) with an adequate particular semantics (Σ_r) and is taken to be the set of all meaningful fomulae given through this association. More precisely, $L(L_m, \Sigma_r)$ is defined by:

[10]

$\tau \in L(L_m, \Sigma_r) \text{ iff } (E \Phi \in L_m) (E \langle \Sigma_n, \sigma_n \rangle \in \Sigma_r) \tau \equiv_m \Phi | \sigma_n \{ \Phi \}] .^9$

A **proposition** is a meaningful formula, say τ , to which the notion of **validity** (in the determined referent-structure, say $\langle \sigma_n, \Sigma_n \rangle \in \Sigma$, from which it "derives its meaning") can be meaningfully applied. The fact that τ is valid in Σ_n shall be denoted by

[11.1]

$\Sigma_n \models \tau$

or -- if it is necessary to specify the type of validity -- by

[11.2]

$\Sigma_n \models_r \tau .$

⁹ Note that the adequacy of Σ_r for L_m which is presupposed in the notion $L(L_m, \Sigma_r)$ ensures that $\sigma_n \{ \Phi \}$ exists.

In the case of

[12.1] $\tau \equiv_m P_1(a_1) \mid \langle a_1, \alpha_1 \rangle, \langle P_1, P_1 \rangle \in L_{cl},$

for example, the classical validity ($\models_{cl}$) is defined as

5 [12.2] $\Sigma_n \models_{cl} \tau \quad \text{iff} \quad \sigma_n^c(a_1) \in \sigma_n^c(P_1) \quad \text{i.e.:}$
 $\Sigma_n \models_{cl} \tau \quad \text{iff} \quad \alpha_1 \in P_1.$

0.5 List of 1st-order Predicate Symbols*[1] Referential Characters:

a_1, b_1, x_1, y_2 : Individual constants and variables;
 $P(.), R(.,.)$: Predicates;
 $. =_1 ., . =_2 .$: Identity predicates;

[2] Logical Characters:

[2.1] Logical Connectives:

$\&$: Conjunction (and set-intersection);
 $\vee$: Disjunction (and set-union);
 $\implies$: Material implication;
 $\iff$: Material bi-implication;
 $\neg$: Negation (and set-complement);

[2.2] Quantifiers:

(x) : Universal quantifier;
 $(\exists x)$: Existential quantifier;
 $(\exists!x)$: "There is exactly one x such that...";

[3] Meta-Symbols:

$\models_t$: Semantic turnstile of type t ;
 $\vdash_t$: Syntactic turnstile of type t ;
 L_n : Linguistic apparatus;
 Σ_n : Referent-structure;
 σ_n : Interpretation;
 $\in$: Set-membership relation;
 $\subseteq$: Subset relation;
 $\emptyset$: empty set;
 $A \setminus B$: Relative set-complement, $A \setminus B = A \& \neg B$;
 $A \times B$: Cartesian Product;
 $\langle \Sigma_n, \sigma_n \rangle$: Determined referent-structure (model);
 $\langle \Sigma'_n, \sigma'_n \rangle$: Model $\in \Sigma_t$;
 Σ_t : Semantics;
 $L(L_t, \Sigma_t)$ or L_t : Language formed by L_t and Σ_t .

* Note that a list of those symbols introduced in the main text is attached as an appendix.

I

INTRODUCTION & PRELIMINARIES

One of the advantages of writing an exegetical work is that one is generally not only able to draw upon an established conceptual scheme, but also, that a large part of the burden of motivation is carried by the original author. If, however, one thinks of giving what, for the lack of a better terminology, might be called an "original" account *A* of some subject-matter, one usually faces the threefold preliminary task of

- [1.1] specifying new terminologies to be used in *A*;
- [1.2] motivating the usefulness of *A*; and
- [1.3] providing a methodology for *A*.

Given the size of this introductory chapter, it should not be surprising that the analysis of sensory/perceptual experience which I shall undertake in this thesis is meant to be "original", at least in the sense which requires me to carry out the tasks specified in [1].¹

¹ I shall adopt the following conventions for cross-references:

- 1) If an numbered passage is itself subdivided into numbered phrases (like [1.1], [1.2] and [1.3]) and a reference is to the whole of the passage, then I shall simply use the passage number (i.e. [1]).
- 2) I shall use *see* (e.g. see 2.1 [1]) if the item referred to is the particular numbered passage (i.e. the first numbered passage in section 2.1).
- 3) I shall use *cf.* (e.g. cf. 2.1. [1]) if the item referred to can be found in the proximity of the numbered passage in question.

Whether it is original in any other sense is of course a different question, and remains to be seen.

5 4) If the cross-reference is to an item within the same sequence of numbered phrases, I shall omit a reference to the section within which it occurs.

1.1 Terminology, Motivation & Method

The aim of this first part of the present chapter is, as indicated by its heading, to carry out the aforementioned threefold preliminary task with respect to what I shall call "(ontologically) neutral accounts of sensory/perceptual experience".

1.1.1 T-Ontological Frameworks for S-Accounts of M

Of the technical notions which I shall use in this thesis, two deserve a special section, namely that of an account of sensory/perceptual experience on the one hand, and that of an ontological framework (for accounts of sensory/perceptual experience), on the other.

Explaining the notion of an "ontological framework" requires first a clarification of the kind of entities such a framework is supposed to "frame", that is, a clarification of "accounts of sensory/perceptual experience". It is useful at this point to abstract from the particular subject matter and focus on the more general notion of accounts of M, where "M" is meant to indicate some given the subject matter.

[1] To get a grip on this very general notion, let me assume that each account *A* of M involves a basic conceptual scheme (say *S*) constituted by those notions

used in *A* to refer to subjects of predication. This basic conceptual scheme determines what I shall call the **approach** of (taken in) *A* to *M*, namely the **S-approach** to *M*.

5 [2] Now, the minimal -- and, I think, undeniable² -- require-
 ment for a collection of statements based on *S* to be an
 account of *M* is that the notions of *S* can meaningfully
 be applied to individuals associated with *M*, something
 which I shall refer to by saying that the S-approach is
 10 **adequate** for *M* (or, in short, *S* is adequate for *M*). The
 claim that a conceptual scheme *S* is adequate -- as basic
 scheme -- for a given subject matter *M* is taken to
 amount to saying that for each *C* ∈ *S* there are individuals
 associated with *M* to which *C* can meaningfully be
 15 applied. By referring to the individuals associated
 with *M* as the **universe of *M***, we can rephrase this by
 saying that each of the concepts of *S* must have a non-
 empty "range of significance" in the universe of *M*.³
 Given this, let me introduce the convention that in

20 ² The reason why I explicitly "state the obvious" here will
 become clear in section 1.1.2.1.

25 ³ This "range of significance" should not be confused with
 the "extension" of a concept in a given universe: our criterion
 for adequacy does not require that there actually are individuals
 in the universe of *M* which fall under the concepts of *S*.

speaking of an S-account of M, I shall implicitly presuppose that S is adequate for M.⁴

[3] Let me also point out that by "conceptual scheme" I mean a range of notions which are all bona-fide meaningful. A conceptual scheme S is meant to be associated with ("given by") a collection of statements (theory of S) which characterize the "meaning" of the involved concepts.⁵ These statements are typically not only about the interrelations between the concepts of S but are also about the ties between these concepts and concepts of other schemes which are involved in "determining the meaning" of the concepts of S.

[4] In the context of S-accounts of M, this implies that we have a collection of statements about the nature of individuals of S-discourse -- namely those of the theory of S -- which are necessarily true. Naturally, an S-account of M will in general involve more than just these assertions which, from the point of view of descriptive content, are trivial. To see this, we only

⁴ The adequacy of an approach can of course in general not simply be postulated, but must be genuinely justified.

⁵ The term "theory" here is used in the purely technical sense of referring to a class of assertions.

need to consider that a basic conceptual scheme⁶ *S* will,
in general, be associated with certain notions which are
[4.1] meaningfully predicable of ("relevant to") individuals of
S-discourse,

5 and,

[4.2] describe characteristics of these individuals which are
"independent" of what can be attributed in terms of *S*.

Let me refer to these notions as being **ontologically
relevant** to individuals of *S*-discourse (or, short,
10 **relevant to S**).⁷

[5] An **ontological characterization/stipulation** (of indi-
viduals of *S*-discourse) is then meant to be either

[5.1] a subject-predicate assertion in which the subject of
predication is referred to by means of a concept from *S*,
15 and the quality by means of an ontological notion
relevant to *S*, or

[5.2] an assertion of the form "all *Cs* are *R*" -- where *C* ∈ *S*,
while *R* is ontologically relevant to *S* and *R* ∉ *S*.

The "independence" referred to in [4.2] is then meant to
20 ensure that these ontological characterizations/stipu-

⁶ The concepts of a basic conceptual scheme *S*, I may re-
emphasize, are meant to be used in accounts to refer to subjects
of predication (i.e. to "individuals of *S*-discourse", by which I
mean individuals to which concepts of *S* can meaningfully be
25 applied).

⁷ Given that notions which are taken to be ontologically
relevant to some basic conceptual scheme *S* are by definition
taken to be meaningful, I shall assume again that they are
characterized by a "theory" *T* in the technical sense.

lations do not derive their truth/falsity from conceptual necessity.

[6] To exemplify the terminology introduced so far, let me use the "group structure of natural numbers" as subject matter: The basic conceptual scheme which I shall consider is given as

$$S_{GN} = \{C_0, C_1, C_2, \dots, +, *, =\}$$

where the meaning of the involved concepts is given in statements -- collectively referred to as theory of S_{GN} -- like

[6.1] " C_0, C_1, C_2 etc. are unique proper names for natural numbers";

[6.2] " $+, *$ refer to two different operations on natural numbers"; and

[6.3] " $=$ refers to the identity relation of natural numbers".

This basic conceptual scheme is adequate for the subject matter in question, for we can justifiably describe the group structure of natural numbers as a complete identity structure ("set") serving as domain for two different operations. Accordingly,

[6.1*] $C_1 \neq C_2; C_1 \neq C_3; C_2 \neq C_3;$

[6.2*] $(\exists x)(\exists y) \ x + y \neq x * y;$

[6.3*] $(x)(y) \ x = x; (x)(y) \ x = y \iff y = x$

are typical examples of statements about individuals of

S_{GN} -discourse⁸ which, on the one hand, are necessarily true, but, on the other, trivial (qua assertions about the group structure of natural numbers).

To find examples of notions which are ontologically relevant to S_{GN} , I suggest that we consider the different types of mathematical structures which have been shown to be models of the subject matter in question.⁹ A well known example of such a model is the set of finite ordinal numbers.¹⁰ In this set-theoretical model, the individuals are sets which are recursively defined, and are based on the empty set ϕ which performs the rôle of the natural number zero. I therefore suggest that "being a set" and "being the empty set" are notions which are ontologically relevant to S_{GN} , and consequently use

[6.4] " c_0 is the empty set" and

[6.5] "all c_n are sets"

as examples of ontological characterizations/stipulations.¹¹

⁸ Let me emphasize here that the individuals of S_{GN} -discourse are not just the natural numbers, but also the two operations and the identity relation. Accordingly, [6.2*] is a statement about the operations, and [6.3*] about the identity relation.

⁹ "Being a model" of the group structure of natural numbers in this context is usually defined in terms of satisfying the so-called "Peano axioms".

¹⁰ Indeed, finite ordinal numbers are often denoted by exactly the same symbols which are standardly used to denote natural numbers, e.g. $0=\phi$, $1=\{\phi\}$, $2=\{\phi, \{\phi\}\}$, etc.

¹¹ Another example is "+ is ordinal addition".

Two points are worth mentioning in this context. The first one is that in this particular example, we have a case where, depending on the initial characterization of the subject matter in question, the statements given under [6] can be either ontological stipulations or ontological characterizations. The former is the case if the subject matter is introduced as a purely formal theory -- say in terms of derivability from the "Peano axioms" -- while the latter is true, say, if natural numbers are taken to be Platonic individuals.¹² The second point is that there will be statements in an account of the group structure of natural numbers which will neither be trivially true (like [6.4/6]) nor will they be ontological characterizations/stipulations (like [6.7/8]). Take, for example,

$$[6.6] \quad (C_N)(E x)(E y) \ x \neq 0 \ \& \ y \neq 0 \ \& \ c_N^3 = x^3 + y^3.$$

The truth/falsity of this statement is extremely non-trivial.¹³ At the same time it clearly lacks the "independence of what can be said in terms of S_{GN} " to be an ontological characterization/stipulation in the sense of [4].

¹² The difference between a characterization and a stipulation is, of course, that a characterization can be true or false, something which, strictly speaking, cannot be said of stipulations (see [9.2]).

¹³ If [6.6] is true then "Fermat's last theorem" is false.

With this description of an "account of some subject matter" I can now introduce the term of an "ontological framework" for accounts which all share the same basic conceptual scheme:

- 5 [7] By a (genuine) ontological framework *F* for *S*-accounts
 I mean a consistent collection of (correct¹⁴) ontological
 characterizations/stipulations which
 [7.1] involve some of the basic concepts as given in *S*, and
 [7.2] are given in terms of correctly analysed ontological
 10 notions relevant to the involved basic concepts.¹⁵

The reference in [7.2] to a "correct analysis" is, in essence, a reference to what we called a theory (say *T*) of the involved ontological notions, and this I propose to make notationally explicit by using the term "*T*-ontological framework for *S*-accounts" whenever suitable.¹⁶

This description of ontological frameworks is admittedly given on a rather general level, and one might wonder

20 ¹⁴ The "correctness" required of the ontological characterizations/stipulations in order to be a genuine ontological framework depends on the general type of the underlying basic conceptual scheme, which is why I shall relegate any further elaborations of this notion to the examples which are to follow.

25 ¹⁵ Note here that the "correct analysis" referred to in this requirement is a precondition to the correctness required of ontological characterizations/stipulations in genuine ontological frameworks.

¹⁶ Ontological frameworks are characterized in terms of a particular basic conceptual scheme, and not in terms of a particular subject matter.

why such a generality should be useful. There are two reasons why I believe this to be the case:

[7.3] The chosen level of generality allows me to illustrate the involved terminology with an example that is independent of the ontological notions which -- as we shall shortly see¹⁷ -- are typically involved in ontological frameworks for accounts of sensory/perceptual experience.¹⁸

[7.4] Moreover, this example will be of importance in its own right in the context of explaining the notion of a "neutral ontological framework".¹⁹

In accordance with [7.3], let me exemplify the notion of a "T-ontological framework for S-accounts" in the context of accounts which are about "formal 1st-order predicate semantics". The basic conceptual scheme S_{FS} which I wish to use in this example contains notions such as "model", "model-individual", "property of model-individuals", "belonging to" etc. These notions are meant to be given in the theory of S_{FS} as:

[8.1] "all the notions of S_{FS} refer to formal individuals";

[8.2] "'model', 'model-individual', 'property of model-individuals' refer to different types of individuals";

¹⁷ cf. 1.1.2.1

¹⁸ I take it as a methodological principle that in order to justify a definition/general characterization, one ought to give an example of a type which differs from the application in the actual argument one is engaged in.

¹⁹ cf. 1.1.3.2

[8.3] "'belonging to' refers to a relation";

[8.4] "the only type of individuals which entities belong to are models";

[8.5] "model-individuals belong to models";

5 and so forth.²⁰

This basic conceptual scheme is adequate for the description of any formal 1st-order predicate semantics. The most important statement here is [8.1], for this is meant to imply that

10 [9.1] ontological statements in question have the nature of stipulations rather than characterizations;

[9.2] the correctness of ontological stipulations is a matter of conformity with the theory of the underlying basic conceptual scheme: the "basic nature" of the individuals
15 of discourse given by the theory of the basic conceptual scheme in question -- say the fact that "belonging to" refers to a relation -- must be reflected in correct ontological stipulations; and

[9.3] any ontological notion of a consistent formal theory can
20 be taken both as correctly analysed and relevant (to S_{FS}) in the sense of [7.2].²¹

25 ²⁰ Let me emphasize here that the theory of S_{FS} is really only concerned with the "meaning" of the involved notions as basic concepts, and should not be confused with a normative description of some subject matter of S_{FS} -accounts.

²¹ The "meaning" of formal notions is defined by the formal theory which they are taken to be part of. The correctness of the analysis of the meaning of a formal notion -- as required by [7.2] -- will hence be given by the consistency of

Consequently, an ontological framework for S_{FS} -accounts is a consistent collection of stipulations concerning the nature of some (sorts of) individuals of S_{FS} -discourse, stipulations which are to be given in terms of a consistent formal theory, and which are to conform to the theory of S_{FS} . The formal theory which in this context has proven to be most popular is set-theory (T_S), but this is by no means the only one which has been used.²² An example (say F_1) of a "set-theoretical" (i.e. T_S -) ontological framework for S_{FS} -accounts is given by the ontological stipulations that

[10.1] "model-individuals are *ur*-elements" -- that is set-theoretical individuals which are not sets -- and

[10.2] "properties of model-individuals are sets of *ur*-elements".²³

As a final point in this section let me now turn to an issue which so far has not explicitly been addressed, namely the way in which a framework F is supposed "to frame" an S -account A . The answer is, of course, based on the assumption that S -accounts themselves contain ontological characterizations/stipulations, which means

the theory in question.

²² e.g. v.Neumann, [1925]

²³ These stipulations conform to the basic ontological theory of S_{FS} because *ur*-elements and sets of *ur*-elements are different types of set-theoretical individuals.

that we can reduce the issue in question to a conformity between the characterizations/stipulations in F and those in A :

- [11] An S-account A of some subject matter M is given within ("framed by") a T-ontological framework F if the ontological characterizations/stipulations in A conform to F .

Thus, we have as examples of accounts which are given within the above introduced framework F_1 the so-called "standard" S_{FS} -account (A_{cl}) of the formal semantics for classical 1st-order predicate logic, on the one hand, and the "standard" S_{FS} -account (A_{ts}) of the formal semantics of two-sorted 1st-order predicate logic, on the other. The attribute "standard" here is not only taken to indicate that the models of the respective semantics are set-theoretical constructs -- i.e. that the respective accounts are ontologically specified in set-theoretical terms -- but also that the ontological statements in either account conform with the stipulations given in F_1 . What distinguishes an account from an ontological framework is that the former typically contains subject-specific statements -- like

- [11.1] "every model contains exactly one domain", in the case of A_{cl} , and

- [11.2] "every model contains exactly two domains", in the case of A_{ts}

-- in addition to ontological characterizations/stipulations which make up frameworks in the sense of [7].

1.1.2 Ontological Motivations

To turn to the task of motivating the envisaged (onto-
logically) neutral accounts of sensory/perceptual ex-
perience at this point might seem somewhat premature
-- especially since I have not yet specified what such
an account is meant to be. Given that much of what I
intend to put forward in this section in support of the
usefulness of the said type of accounts is necessary to
understand their very nature, the following discussion is
in a first instance simply meant to set the scene for the
introduction of the distinction between "determined" and
"neutral" accounts of sensory/perceptual experience. The
question as to whether this discussion actually motivates
the usefulness of such a distinction is meant to be left
open until section 1.1.3. Having said this, let me
nevertheless just suggest the motivating force of what I
am about to discuss by anticipating that

[1] the attribute "determined" will, roughly speaking, be
used to denote accounts/frameworks which involve
certain "traditional ontological notions", while "neutral"
-- as an antonym to "determined" -- is to be used for
accounts/frameworks which abstract from the associated
traditional ontological qualities.

1.1.2.1 Traditional Ontological Notions

Let me use the term **Reality** for the structure formed by the totality of concrete individuals.²⁴ **Traditional** ontological notions are then meant to be notions like that of being "intentional", "phenomenal", "mental", "physical" and "material"; that is, notions which historically have been used to characterize the nature of Real individuals. These notions are technical in that they are used in the context of theories of Reality with respect to which they obtain a theory-specific "technical meaning". Thus, one ought to distinguish, say, between the physicalist and the phenomenalist (technical) meaning of these traditional ontological notions. What enables us to speak of the physicalist and the phenomenalist (technical) meaning of one and the same traditional ontological notion is that the theory-specific explanation of the (technical) meanings are, in both cases, based on a set of intuitively grounded judgements applying these notions to certain types of Real items which themselves are judged to be Real on intuitive grounds. The idea here is that any theory-specific (technical) meaning of these traditional ontological notions will typically be based on an "intuitive core", given in terms of what I shall call **traditional basic notions** -- like that of "belief", "sensation", "occurrent

²⁴ The attribute **being Real** will accordingly be used to refer to "parts of Reality".

thought", "mental image", or "apple" -- which, in my view, allow at least the possibility of being judged to be adequate²⁵ for Reality on intuitive grounds. To be more precise, I take it that the statements

5 [2.1] "beliefs are intentional";

[2.2] "sensations are phenomenal";

[2.3] "occurrent thoughts and mental images are both intentional and phenomenal";²⁶

[2.4] "apples are physical";

10 [2.5] "apples are material";

are "intuitively normative" in the sense that they determine the intuitive core of any (possible) technical meaning of the involved traditional ontological notions. As such, they are meant to be analytically true. According to this view it would, for example, be a necessary condition for a (technical) predicate M to capture the meaning of being "material" that apples -- or any other sort of "intuitive material objects" -- are M.

20 The question remains, of course, whether the given traditional ontological notions are truly meaningful. The special "normative" character of the statements given in [2] allows us to approach this issue in terms of whether the involved basic notions are really adequate for

²⁵ see 1.1.1, [2]

25 ²⁶ [2.1-3] have been taken from Rorty, [1980], p.24

Reality, i.e. whether they can meaningfully be applied to concrete individuals.²⁷ The advantage of this approach is that it transfers the issue in question to a domain where justification on intuitive grounds appears to be feasible: all the traditional basic notions which I mentioned are at least sufficiently linked to "issues in daily life" to withstand an objection analogous to the one brought forward by Rorty against intuitive justifications of significance of what he calls "mental notions":²⁸

"I think that this so-called intuition [about the meaning of 'mental notions'] is no more than the ability to command a certain technical vocabulary -- one which has no use outside philosophy books and which links up with no issues in daily life, empirical science, morals, or religion."²⁹

The reason I mention Rorty here is because of his distrust in philosophical intuitions -- which I think is somewhat biased.³⁰ He argues that mental notions are

²⁷ For example, if it is *bona-fide* meaningful to speak of sensations (qua concrete individuals) then being "phenomenal" will, in virtue of [2.2], have at least the meaning of being "a sensation" (i.e. being "sensory").

²⁸ The mental notions in [2] are those of being "phenomenal" and "intentional".

²⁹ Rorty, [1980], p.22. Note in this context that if the proposed view of traditional ontological notions is correct, then Rorty's objection would itself be refuted by a demonstration of the adequacy say of "sensation" for Reality.

³⁰ Why should intuitive reasoning only be doubted in the context of "mental notions"? Indeed, Rorty's intuition that "[...] it is hard to see more in the notion of being 'physical' than being 'material' or 'spatio-temporal' [...]" (op. cit. p. 20) seems itself rather questionable, for according to it we would have to conclude that a solar eclipse, which is undoubtedly physical, would also be material.

meaningless qua predicates which purport to be applicable to Real individuals. According to the suggested view of traditional ontological notions this claim would, in particular, imply that

- 5 [2.6] the notion of "sensation" cannot meaningfully be applied to concrete individuals.

10 Now, in the course of this thesis, I shall argue against a type of theory of sensory/perceptual experience³¹ which espouses [2.6]. This argument will, I believe, provide sufficient support for the intuitive justification of the adequacy of "sensation" for Reality, and hence for the *bona-fide* meaningfulness of the intuitive notion of being "phenomenal":³² Philosophical intuitions can be misleading, but they need not be.

15 1.1.2.2 Ontological Motivation I

A line of thought which specifically lead me to the investigate the formal structures of sensory/perceptual experience -- and which I shall refer to as "ontological motivation"³³ -- involves two types of "constructive"

20 ³¹ cf. 1.3 and 4.3

³² Let me emphasize at this point that the intuitive meaning of being "phenomenal" as given in [2] is perfectly compatible with assumptions like "all phenomenal items are physical," and also with its converse.

25 ³³ The attribute "ontological" here is meant to distinguish this line of thought from logical considerations which I shall discuss in section 7.2.

theories concerned with Reality, namely those referred to by Goodman as "phenomenalistic" and "physicalistic systems".³⁴ Any such "system" is meant to be what was called an account of Reality. Let me assume here that physicalistic (phenomenalistic) systems all involve the same basic notions, collectively denoted by S_1 (S_2). Moreover, since they are all meant to be accounts of Reality, I shall assume that both S_1 and S_2 contain the collection S_r of those traditional basic notions which indeed are adequate for Reality.

Physicalistic (phenomenalistic) systems are "constructive" in the sense that they are based on the assumption that, on the one hand, all *bona-fide* meaningful traditional ontological notions can be reduced to that of being "physical" ("phenomenal"),³⁵ and, on the other,

³⁴ Goodman distinguishes "phenomenalistic" and "physicalistic systems" by "whether the basic units are phenomenal elements such as qualia, presentations, etc., or physical elements such as things, processes etc." (Goodman, [1951], p.101)

³⁵ Let me emphasize here that I shall use the notion of a "system" in analogy to Goodman as implying that we are dealing with an account based on a constructive theory of the above-mentioned type, as opposed to the notion of a "partial system" which would be based on a constructive theory involving only some of the traditional ontological notions.

that all the individuals of discourse are "complexes"³⁶
of physical (phenomenal) individuals.

At this point I ought to mention that the universe of
discourse of such constructive systems may extend
5 beyond Reality: In Goodman's phenomenalist system,
for example, we have that

"the range of individual variables [is] restricted so that
only sums of one or more qualia are admitted"³⁷

which means that, if we identify Real individuals with
10 Goodmanian "concreta", we are dealing with a universe of
discourse which extends beyond Reality, since Goodman's
qualia are abstract and not concrete individuals.³⁸ The
basic individuals of a physicalistic (phenomenalistic)
account *A* of Reality need hence not be Real, but since
15 S_T is taken to be part of S_1 (S_2), it follows from *A*'s
constructive nature that in *A*, all Real individuals are
taken to be complexes of physical (phenomenal)
individuals.

20 ³⁶ One way of specifying this notion of a "complex" can be
found in Goodman's account where he bases this notion on the
primitive "overlapping relation" of his individual calculus.
(cf. Goodman, [1951], pp.46-56 & p.180)

³⁷ Goodman, [1951], p.173

³⁸ cf. op.cit. pp. 199 ff

Thus, in physicalistic systems it will be claimed that³⁹

[3.1] "sensations are complexes of physical individuals";

[3.2] "apples are complexes of physical individuals";

5

while in phenomenalistic systems the claim will be that

[4.1] "sensations are complexes of phenomenal individuals";

[4.2] "apples are complexes of phenomenal individuals".⁴⁰

10

In physicalistic systems it will also be asserted that

[3.3] "sensations are complexes of phenomenal individuals";

while in phenomenalistic systems it will be claimed that

[4.3] "apples are complexes of physical individuals".⁴¹

As final examples of ontological characterizations which

15

I think will in general be part of constructive systems,⁴²

let me mention, in the physicalistic case, the assertion

that

20

³⁹ It is assumed here that "sensation" and "apple", as basic notions, are adequate for Reality, i.e. that they are elements of S_T .

⁴⁰ In Goodmans system, for example, "things" are taken to be complexes of sensations which are complexes of qualia. (cf. Goodman, [1951], p.93)

25

⁴¹ Physicalist systems, we may recall, are based on the assumption that the notion of being "phenomenal" can be defined in terms of the predicate of being "physical", and *vice versa* in the case of phenomenalist systems.

30

⁴² This, I believe, follows from what I consider to be an intuitive non-synonymity between being "physical" and "phenomenal".

[3.4] "apples are not complexes of phenomenal individuals";

and, in the phenomenalist case, the assertion that

[4.4] "sensations are not complexes of physical individuals".

The statements given in [3] ([4]) are ontological characterizations implied by the general character of constructive systems, and, as such, form a determined ontological framework F_1 (F_2) for S_T -accounts.⁴³ In order to be genuine, both F_1 and F_2 must be based on a correct analysis of the involved traditional ontological notions.

The correctness of such an analysis is in this case given by its correspondence to the presupposed intuitive meaning of these notions. To simplify matters, let me assume that we are dealing with just one physicalistic and one phenomenalist analysis of these notions (denoted, in accordance with our previous notation⁴⁴ by T_1 and T_2 respectively). The **physicalistic** framework F_1 (**phenomenalist** framework F_2) is meant to be a T_1 -ontological (T_2 -ontological) framework for S_T -accounts. A question which remains is of course:

[5] Are F_1 and/or F_2 indeed genuine ontological frameworks?

At first sight it might seem that the alternative considered in [5] ought really be formulated in terms of an

⁴³ cf. 1.1.1, [7] and 1.1.2, [1]

⁴⁴ cf. 1.1.1, [7]

exclusive disjunction, for it appears that F_1 and F_2 are incompatible due to the fact that they contain claims -- like [3.4] and [4.2], or [3.1] and [4.4] -- which seem to be logically inconsistent. Thus, we would have to conclude that:⁴⁵

- [6] At most one of the two collections of statements F_1 and F_2 can be a genuine ontological framework.

Contrary to this, I believe that there is a way in which both the physicalistic and the phenomenalistic ontological framework can be "unified" and hence that it is possible that both of them are genuine ontological framework. At this point, let me briefly pause and sketch why I think that such a unification would be worthwhile: Phenomenalistic and physicalistic systems are, as accounts of Reality, both of the so-called monist type. They thus avoid trivially what I consider to be the most serious problem in dualist accounts, namely to give a satisfactory explanation of the interaction between the two types of items postulated in these accounts. This, in my view, makes these constructive systems highly attractive. The drawback however is that, at least as far as I can see, both phenomenalistic and physicalistic accounts themselves fail in fully describing Reality. Phenomenalistic systems are

⁴⁵ The basis for this conclusion is of course our stipulation in 1.1.1 [7] that genuine ontological frameworks are to contain only correct ontological characterizations.

essentially solipsistic and, as such, incapable of giving a complete account of "non-mental" Real individuals (like apples),⁴⁶ and physicalist systems, in my view, ultimately fail in giving a complete account of "mental" Real individuals (like sensations).⁴⁷ Apart from these, admittedly serious, shortcomings, constructive theories do have explanatory strengths which ought not be dismissed, in particular since the strengths and weaknesses of the two types of constructive systems are mutually complementary. Indeed, it was this complementarity which led me to the idea that by "unifying" F_1 and F_2 , it might be possible to balance out the shortcomings of phenomenalist systems with the strengths of the physicalistic ones (and *vice versa*),⁴⁸ without having to resort to dualist assumptions.

Now, the main difficulty with this idea is, of course, that -- according to [6] -- such a "unification" appears to be logically impossible. In order to overcome this

⁴⁶ "The physicalist's charge that phenomenalist bases are essentially inadequate for a universal language rests chiefly on the admittedly grave difficulties of defining physical things in terms of phenomena." (Goodman [1951], p.103)

⁴⁷ Hence, I think the desire in some physicalists to show that such "mental" Real individuals cannot exist, in accordance with the German aphorism "da nicht sein kann was nicht sein darf".

⁴⁸ "Systems of different types [...] do not themselves necessarily conflict, but may be regarded as answering different problems: in the one case the problems of explaining everything or at least as much as possible in terms of phenomenal elements; in the other, the problems of explaining as much as possible in terms of physical elements." (Goodman [1951], p.102)

problem I then considered the following "perspectival paradigm" as possible metaphor:

In the case of the assertions that

[8.1] "M looks circular"; and

5 [8.2] "M does not look circular";

-- where M is taken to refer to some observed material object -- we also face what appears to be an inconsistency, but in this case it is incontestable that they can both be true.⁴⁹ The reason for this compatibility is that
 10 the truth-conditions associated with "looking circular" are tied to the relative position of the observed object and the observer, and hence implicitly to the observer's point-of-view (or "perspective"). Accordingly, I suggest that "looking circular" is what might be called **perspectively ambiguous**, in the sense that it can only unambiguously be used as "looking circular from p_n ", where
 15 " p_n " is taken to refer to some point of view.⁵⁰ Consequently [8] is meant to be analysed as

[8.1*] "M looks circular from p_n ";

20 [8.2*] "M does not look circular from p_m ";

⁴⁹ More precisely, I ought to say that the conjunction of [8.1] and [8.2] can be true.

⁵⁰ This means, in particular, that if $p_n \neq p_m$ then "x looks circular from p_n " and "x looks circular from p_m " must, strictly
 25 speaking, be different predicates.

that is as two statements which -- assuming that $p_n \neq p_m$ -- are unproblematically compatible: They involve related,⁵¹ but nevertheless different predicates. To be quite clear, the intention here is not to give a complete analysis of the notion "looking circular" but merely to show how it is possible that what seems to be an inconsistency need not be one.

To say that the incompatibility between F_1 and F_2 can be dissolved in an analogous way would amount to attributing a specific type of ambiguity to our traditional ontological notions. If this were the case, then it would be conceivable that the physicalistic (phenomenalistic) analysis of these notions -- previously denoted by T_1 (T_2) -- manages to grasp correctly their "physicalistic meaning" ("phenomenalistic meaning"). Accordingly, we could then distinguish between the **physicalistic version** of the traditional ontological notions ("physical₁", "phenomenal₁", "intentional₁", "material₁", etc.) and their **phenomenalistic version** ("physical₂", "phenomenal₂", "intentional₂", "material₂", etc.)

With this distinction, our initial ontological characterizations could then -- in analogy to our perspectival paradigm -- be analysed as

⁵¹ The relation between the two predicates could be described as their being "perspectival versions of 'looking circular'".

- [3.1*] "sensations are complexes of physical₁ individuals";
[3.2*] "apples are complexes of physical₁ individuals";
[3.3*] "sensations are complexes of phenomenal₁ individuals";
[3.4*] "apples are not complexes of phenomenal₁ individuals";
5 [4.1*] "sensations are complexes of phenomenal₂ individuals";
[4.2*] "apples are complexes of phenomenal₂ individuals";
[4.3*] "apples are complexes of physical₂ individuals";
[4.4*] "sensations are not complexes of physical₂ individuals".

10 Analysed in this manner, these statements would clearly
no longer exhibit the sort of inconsistency which we
found with the original assertions.

One can, of course, not simply stipulate that our per-
spectival paradigm is, as metaphor, applicable in this
way. To justify such an application, one would, first
15 of all, have to be more specific about the involved type
of apparent inconsistencies, on the one hand, and the
features in the paradigm which are essential to their
dissolution, on the other. There are at least two points
which ought to be mentioned in this context. The first
20 one is that "M looks circular" and "M does not look
circular" only display an apparent logical inconsistency
if "M" refers in both cases to numerically the same
individual. Since it is specifically this kind of apparent
inconsistency we are interested in, we can restrict the
25 metaphorical use of the perspectival paradigm to those
cases in which objects can be observed from all the

relevant points of view.⁵² This, I think, can be expressed by the following **identity condition**: If an individual M_1 is observable from a point of view p_1 , then there is -- for every other relevant point of view p_n -- an individual M_n which can be observed from p_n , such that $M_1 = M_n$.

The second point which I think is essential to our perspectival paradigm is that the type of ambiguity which we found in the notion of "looking circular" is only possible within a conceptual scheme containing ontological notions (like that of "being circular") which are independent of perspectives. What I have in mind here is in essence the intuitive thesis that "apparent" features can only occur in the context of "non-apparent" ones: one cannot speak meaningfully of the former without being able to speak meaningfully of the latter. For the sake of reference, let me call this second point the **independence condition**.⁵³

⁵² In some sense, this restriction is simply a stipulation concerning the sort of perspectival set-up which we wish to consider for our purposes.

⁵³ In terms of the semantic components of such perspectively ambiguous notions, we can paraphrase this independence condition by reflecting the initial ambiguity as a "perspectival tie" between these components, in which case it reads: perspectival ties between predicates are only possible in the context of predicates with truth-conditions which are independent of perspectives.

The perspectival metaphor -- in this more specific form -- will hence only be applicable as a means of "unifying" the (traditional) physicalistic and phenomenalist frameworks F_1 and F_2 if it is possible to embed them in a **perspectival theory of Reality**, that is an account of Reality which can be said to conform to both the identity and independence condition.⁵⁴ In particular, such a perspectival theory of Reality would have to contain a description of S_T -individuals in terms which could properly be seen as a metaphorical analogue to the perspectivally independent predicates required by the independence condition. Given the status of these predicates in the perspectival paradigm,⁵⁵ it seems to me that the principle task in finding such a perspectival theory of Reality would be to give this sort of perspectivally independent description. Given that the statements under [3*] and [4*] would be analogues to "appearance statements", the first step towards such a perspectivally independent description would, in my view, have to be a "neutral account" of the individuals in question: the traditional ontological qualities would be

⁵⁴ A perspectival theory of Reality would hence be a theory which -- on the basis of the perspectival metaphor -- manages to unify phenomenalist and physicalistic accounts of Reality. In particular, it would provide an explanation how it is possible that both of these types of constructive accounts can be correct.

⁵⁵ In the perspectival paradigm, these independent predicates are those which refer to "real qualities" of observed objects, i.e. those predicates which describe the proper nature of the individuals of discourse.

apparent qualities, and the best chance to find non-apparent features is to give an account of Reality -- or parts thereof (say of sensory/perceptual experience)-- which abstracts from these appearances. Although it will not be within the scope of this thesis to investigate the implications of neutral accounts of sensory/perceptual experience as concerning the feasibility of a perspectival theory of Reality, I hope that this discussion has provided an initial motivation for this project.

1.1.2.3 Ontological Motivation II

The type of motivation which I have just offered is based on a potential support for what I called the perspectival theory of Reality. Certain ontological commitments which can be associated with this theory reveal, I believe, a further motivation for the project of this thesis. What I have in mind is the potential to yield a theory/ontology of the kind which according to Kampe⁵⁶ is required to make intelligible the so-called "mind/body-identity theory". Just to give an idea of what Kampe had in mind, let me use his Morning Star-Evening Star paradigm: Kampe claims that in the context of a pre-scientific conception, one would be dealing with

"two sets of phenomena (appearances) -- the Morning Star phenomenon and the Evening Star phenomenon.

⁵⁶ Kampe, [1974]

5 These two classes of phenomena *ex hypothesis* would be
judged to be conceptually distinct in the sense in which
it is inconceivable how one could be identical with the
other, for, the predicate 'a morning phenomenon' is
incompatible with 'an evening phenomenon'. [...] Once a
little knowledge of astronomy is acquired, it is quickly
realized that the planet Venus will sometimes be visible
as a Morning Star and sometimes as an Evening Star. [...] The
two phenomena, i.e., the Morning Star and the
10 Evening Star, which at one time are spoken of as being
distinct, lose this distinctness by being identified with
some third thing, viz. the planet Venus. [...] To make the
Morning Star-Evening Star identity claim intelligible, we
have had to alter our ontology."⁵⁷

15 To show what I mean by the above-mentioned potential,
let us assume that the perspectival theory of Reality is
feasible, i.e. that it is possible to embed physicalistic
and phenomenalist systems in a theoretical framework
which -- on the basis of the perspectival metaphor--
20 would explain how it is possible that both F_1 and F_2 can
be genuine ontological frameworks. We saw in the
preceding section that such a perspectival theory would
have to contain what was called a perspectivally
independent description (of S_T -individuals) as the meta-
25 phorical analogue to the characterization of observed
objects in terms of "real"⁵⁸ qualities. Now, in the
perspectival paradigm these characterizations are clearly
taken to be "ontologically significant" in the sense that
they are taken to specify the "real" nature of the
30 individuals which they are about. This makes it con-

⁵⁷ Kampe, [1974], pp. 65 f

⁵⁸ The term "real" here is used in the sense of "not apparent."

ceivable that the explanatory merits which justify the introduction of the ontology of observable "real" objects in the perspectival paradigm might be analogously applicable to justify the introduction of a **perspectivally independent ontology** for the perspectival theory.

Such a justification would, in particular, have to contain an explanation of how the purported perspectivally independent nature of S_T -individuals is connected with their "system-specific natures"⁵⁹ as given in the assertions listed under [3*] and [4*]. This explanation, together with the fact -- imposed by the identity condition⁶⁰ -- that the perspectivally independent ontology must be a unified identity structure ("set"), would, in my view, ensure that such a perspectival theory of Reality is of the kind required by Kampe to make the identity theory intelligible.⁶¹ Thus, we might for example use the (intuitive) basic notion of a

⁵⁹ This system-specific nature of S_T -individuals in a perspectival theory of Reality corresponds to the apparent nature of observed objects. Depending on how strictly the perspectival metaphor would apply, it might hence be possible to read the assertions listed under [3*] and [4*] as "appearance claims", say by interpreting "being a (complex of) phenomenal₁ individuals" as "appears physicalistically as phenomenal", etc.

⁶⁰ Let U_1 be the relevant physicalistic universe, and " $a \in U_1$ " be read as "a is observable from the physicalistic point of view" (and analogously for the phenomenalistic universe U_2), then it follows directly from the identity condition that $U_1 = U_2$:

$$[(a \in U_1)(\exists b \in U_2) a = b \ \& \ (b \in U_2)(\exists a \in U_1) b = a] \implies U_1 = U_2.$$

⁶¹ Indeed, the proposed perspectival theory of Reality could simply be regarded as the consequence of taking seriously Kampe's Morning/Evening Star metaphor with its reference to "appearances".

"brain-state" to formulate the following identity-hypothesis:

[9] "all sensations are brain-states".

Now, while a reading of [9] in the "common idiom"⁶² might -- in accordance with Kampe -- be considered as committing a category mistake, an interpretation of [9] in the context of the proposed perspectival theory of Reality would take both "sensation" and "brain-state" as referring to sorts of individuals of the perspectivally independent ontology, and consequently render [9] intelligible.

⁶² Kampe [1974], p.64

1.1.3 Accounts of Sensory/Perceptual Experience

1.1.3.1 Determined Accounts/Ontological Frameworks

One of the main points in section 1.1.1 was to introduce basic conceptual schemes as determining approaches to subject matters. The type of accounts of sensory/perceptual experience which I shall consider in this thesis are those using what I call a **particularistic approach**. That is to say, for the purposes of this thesis, I shall use notions like "sensory/perceptual manifold", "sensory/perceptual individual" etc. as basic concepts for accounts of sensory/perceptual experience, and refer to them collectively as **particularistic basic conceptual scheme** (S_P). Two of the main points in the theory of S_P are taken to be that

- [1.1] "sensory/perceptual manifold" and "sensory/perceptual individual" refer to different types of individuals, and
[1.2] all the notions of S_P refer to types of Real entities.

This choice of approach must of course be justified. It must be shown that these particularistic notions are indeed adequate for sensory/perceptual experience. However, due to the introductory nature of this present discussion, let me postpone such a justification,⁶³ and

⁶³ The task of justifying the particularistic approach to sensory/perceptual experience will be taken up in sections 1.3 and 4.3.

assume the adequacy in question as a temporary working hypothesis.

The fact that S_P -individuals are taken to be Real ([1.2]) implies first of all that the range of ontological notions relevant to S_P must contain what we called the *bona-fide* meaningful traditional ontological notions. Any S_P -account ("particularistic account") of sensory/perceptual experience will contain "traditional" ontological characterizations,⁶⁴ i.e. qualifications of S_P -individuals in terms of traditional ontological notions. Being Real, the individuals of S_P -discourse are furthermore taken to display a well-defined ("determined") character with respect to the relevant traditional ontological qualities. To reflect this terminologically, let me use the attribute **determined** both for S_P -accounts and for ontological frameworks for S_P -accounts. In this context it is important that this determined character might be "account-specific":⁶⁵ Given, for example, our discussion in 1.1.2.2, I take it to be possible that *bona-fide* meaningful traditional ontological notions are correctly analysable in two quite different ways, which are given by the physicalistic and the phenomenalist theory (i.e.

⁶⁴ The fact that the involved basic concepts are all taken to refer to Real entities entails that we are dealing with ontological characterizations, as opposed to ontological stipulations.

⁶⁵ Note that in the relevant passage it is not implied that the "well-defined character" of these S_P -individuals is unique.

T_1 and T_2), respectively. This possibility would leave us with a "physicalistic nature" and a "phenomenalistic nature" of S_P -individuals, given in the ontological frameworks of what would be the physicalistic-particularistic (T_1 - S_P -) account of sensory/perceptual experience, and the phenomenalistic-particularistic (T_2 - S_P -) account of sensory/perceptual experience, respectively.

1.1.3.2 Neutral Accounts/Ontological Frameworks

To introduce the notions of a "neutral account of sensory/perceptual experience" (A_N), on the one hand, and the derivative "neutral ontological framework" (F_N) on the other, let me return to the anticipatory remarks made in the introduction to section 1.1.2 -- in particular to the points that

- [2.1] "neutral" and "determined" are supposed to be antonyms of some sort, and that
- [2.2] it is this neutral account of sensory/perceptual experience which is supposed to be motivated by the suggested "ontological motivations".

The first thing which becomes evident in light of what has just been said about determined accounts is that accounts which are really about sensory/perceptual experience must be "determined" and hence (cf [2.1]) cannot be "neutral". Indeed, my referring to a neutral

account A_N as an "account of sensory/perceptual experience" is, strictly speaking, misleading, for it is not sensory/perceptual experience itself, but rather a "formal structure of sensory/perceptual experience"-- that is, roughly speaking, a formal structure Σ_N taken to represent certain aspects of sensory/perceptual experience -- which constitutes the subject-matter of A_N .

Like any account of some subject matter, a neutral account A_N must involve a basic conceptual scheme, say S_N . We have also seen⁶⁶ that A_N -- qua S_N -account of Σ_N -- must be given in terms of some consistent formal theory (say T_N) which usually gives rise to the reference to Σ_N as a " T_N -structure".⁶⁷ Let me now try to explain how I see the connexion between A_N and sensory/perceptual experience which is implied by calling A_N an "account of a formal structure of sensory/perceptual experience".

To do so, I must first point out a potential ambiguity: given the possibility of different (correct) accounts of sensory/perceptual experience, references to sensory/perceptual experience are potentially incomplete without a specification of the particular account one

⁶⁶ cf. 1.1.1

⁶⁷ Say if A_N is given in the terminology of set-theory, then Σ_N will naturally be referred to as a set-theoretical structure (construct).

has in mind. In other words, proper references to sensory/perceptual experience ought to be made as references to sensory/perceptual experience as given by such and such an account thereof. Although this ambiguity need not exist, the mere possibility that it does, in my view, requires us to analyse the notion of a "formal structure of sensory/perceptual experience" by using references to particular accounts of sensory/perceptual experience. With this in mind, let me call a determined account A_m of sensory/perceptual experience a **determined version** of A_N if it is possible to interpret some sub-structure Σ^* of Σ_N as a (formal) representation of a sub-structure of sensory/perceptual experience as given by A_m . In this case Σ^* will be said to be **interpretable** in A_m . This allows me to define the following **general interpretability requirement**: Σ_N is a **formal structure of sensory/perceptual experience** if there is a sub-structure Σ_N^* of Σ_N which is interpretable in all (correct) S_P -accounts of sensory/perceptual experience.

The **general representational character** of Σ_N as formal structure of sensory/perceptual experience hence minimally implies a ("token-token") correlation between the individuals of Σ_N^* and those S_P -individuals taken to be represented by the former. In addition to this, I shall assume that this general representational charac-

ter (of Σ_N) extends to the involved sorts⁶⁸ of individuals.

The sort of individuals given by a (neutral) basic concept $C_N \in S_N$ which pertains to Σ_N^* is to represent a sort of individuals given by an S_P -notion. An immediate consequence of this additional requirement is that each $C_N \in S_N$ which pertains to Σ_N^* must have a "correlate" in S_P .⁶⁹

After these elaborations on the nature of A_N qua account of a formal structure of sensory/perceptual experience, let me now turn to the classification of A_N as being "neutral". The idea here is based on the assumption that in order for Σ_N to be a representation of sensory/perceptual experience, Σ_N must -- in addition to the "ontological correlation" mentioned in the last paragraph -- also display some correlation of a structural kind. This means, in particular, that certain qualities and relations attributed to the individuals of Σ_N^*

⁶⁸ I shall say that an individual α of a universe U "belongs to a sort given by a concept C " if α falls under C . However, I shall make a (terminological) distinction between the extension of C and the sort which it determines, because I believe one must leave open the possibility of referring to the "sort C " even if the extension of C happens to be empty. In this spirit I take it that a notion N determines a sort of individuals (in a given universe U) if it is meaningfully applicable to individuals (of U), i.e. if the "range of significance" of N (in U) is non-empty.

⁶⁹ Note in this context that, on the one hand, it need not be the case that all of the formal basic concepts have such correlates in S_P -- the universe of S_N -discourse can contain sorts of individuals which are not meant to represent anything -- while, on the other, not all S_P -sorts need to be represented in Σ_N^* .

must be taken to represent qualities and relations of S_P -individuals. The neutrality of the envisaged S_N -account of Σ_N is then meant to refer to the fact that none of the traditional ontological qualities are represented in Σ_N .⁷⁰ This restriction of the representational character of Σ_N^* becomes necessary if the ontological motivations described in 1.1.2 are taken seriously: the assumption which led to the formulation of the perspectival theory of Reality would, for example, imply that there are physicalistic and phenomenalist accounts of sensory/perceptual experience displaying the sort of incompatibility which would make the required general interpretability of Σ_N^* impossible if traditional ontological qualities were represented in Σ_N^* . In this context let me also point out that the envisaged neutral account A_N cannot, and is not meant to be a "perspectivally independent" account of -- in this case -- sensory/perceptual experience. The link between these two types of accounts which I put forward in section 1.1.2 is merely that an explicit description of Σ_N might lead to the conception of what we called a Kampeian ontology.⁷¹

⁷⁰ This means, in effect, that Σ_N^* could be regarded as representing an abstraction of sensory/perceptual experience, a fact which provides an additional meaning to A_N 's constituting an account of a "formal structure of sensory/perceptual experience". In some sense, the term "neutral account of sensory/perceptual experience" refers to accounts of neutral formal structures representing sensory/perceptual experience.

⁷¹ Indeed, the structure of Σ_N might lend itself to a "concretion" in the sense that it might be possible to justify the claim that all the individuals of Σ_N^* represent Real individuals.

As a final point in this section, let me briefly turn to the notion of a "neutral ontological framework". I can deal with this notion more summarily because I shall only use it in the context of the ontological framework of A_N . More precisely I shall use the notion of "neutral ontological framework" (" F_N ") to denote collectively those ontological stipulations occurring in A_N which are interpretable in all determined accounts of sensory/perceptual experience. In this context, I shall use the phrase that a determined ontological framework (for S_P -accounts of sensory/perceptual experience) is a "determined manifestation of F_N ", in analogy to my usage of "determined version of A_N ".

1.1.3.3 Methodology

The particularity of a neutral account A_N is meant to be given by the particular nature of the associated formal structure Σ_N . Giving a neutral account of sensory/perceptual experience is therefore fundamentally a task of "constructing" a formal structure ("formal model") which satisfies the general characterization put forward in the preceding section. This might seem straightforward, but the actual construction of such a "model" poses considerable difficulties. These difficulties are mainly due to our ignorance with respect to many of the "tools" which were used, implicitly or explicitly, in the general

characterization of Σ_N . Except for containing the notions of a "sensory/perceptual manifold" and a "sensory/perceptual individual", it is, for example, not clear what exactly belongs to the particularistic basic conceptual scheme S_P . Similarly, it is by no means self-evident which of the many proposed theories of sensory/perceptual experience are indeed correct, nor is it clear whether there is a plurality of such correct theories (accounts) or not.

In light of the rôle of these "tools" in the characterization of Σ_N , it is easy to see that these uncertainties are a considerable obstacle for the actual construction of such a formal model: for instance, how is one to judge whether a given formal construct fulfils the "general interpretability requirement",⁷² if we do not know what the genuine account(s) of sensory/perceptual experience is(are)?

The quickest way to overcome this obstacle would, of course, be to eliminate these uncertainties; it seems, however, doubtful whether this solution is practicable -- in particular as one of the motivations for the present enterprise was to yield a method for justifying

⁷² "There is a sub-structure Σ_N^* of Σ_N which is interpretable in all genuine accounts of sensory/perceptual experience."

that certain theories⁷³ are indeed accounts of sensory/perceptual experience in our sense. This leaves us, in my view, with only one solution, namely to "outflank" the obstacle by means of suitable working-hypotheses. To
 5 get the construction of Σ_N off the ground, I shall put forward the initial working-hypothesis that the conceptual scheme which is used to describe "formal semantic
 1st-order predicate theories" has natural language correlates which are adequate for the description of
 10 sensory/perceptual experience.⁷⁴ The desired effect of this working hypothesis will be the provision of an "initial skeleton" for the envisaged neutral account. This will not only give us a core of well-defined basic
 15 concepts (like "particular language", "logic of a language") for both S_N and S_P , but also a specific consistent formal theory -- namely the one providing the ontologically relevant notions for the conceptual scheme
 20 chosen in the initial working hypothesis -- which will serve as the basis for the required theory denoted by T_N in the preceding section.

Given this "initial skeleton", the construction of Σ_N will essentially be a process of putting on the "structural flesh" by introducing either additional sorts of individuals or structural features as components of the

25 ⁷³ What I have in mind are the "phenomenalistic" and "physicalistic" theories of perceptual experience.

⁷⁴ cf. 2.1

desired model. To exemplify the method by means of which I intend to execute these constructive steps, let us look at the case of adding a new sort of individuals -- say, given by the description⁷⁵ D_N -- to what we referred to as the representational sub-structure Σ_N^* . From the stipulated general representational character of Σ_N^* , it follows that such an addition can only be justified if it can be shown that there is a sort of Real individuals -- say given by some concept CS_P -- which can properly be said to be represented by the sort given by D_N .

To simplify matters somewhat, let me assume that the involved description D_N lends itself to be interpreted as a description D_P -- taken to be about Real individuals -- which, if indeed satisfiable by Real individuals, would ensure the existence of the required representational tie to the sort given by D_N . With this simplification, our task then becomes that of finding a method for justifying the claim that

[3] there is a sort of Real individuals (given by a concept CS_P) which complies with D_P .⁷⁶

⁷⁵ Note here that D_N is a description of the individuals which belong to the sort "given by D_N ", and not a description of the sort itself.

⁷⁶ A sort of individuals given by a concept C is meant to "comply with" a description D if $C(x) \implies D(x)$. Note that in this sense, every sort complies trivially with the description by means of which it is given.

If we knew explicitly what notions belong to S_P , that is, if we knew all " S_P -sorts", then our task would simply become a matter of checking whether there is one amongst them which complies with D_P . However, the way things are makes this method obviously impracticable. I therefore suggest that we focus our attention instead on finding a method which allows us to demonstrate that a given notion does belong to S_P , for such a method would provide us with the tool to demonstrate that D_P^* -- by which I mean D_P construed as basic notion -- is a *bona fide* particularistic basic concept. To demonstrate then that $D_P^* \in S_P$ is to show that D_P^* is adequate for sensory/perceptual experience,⁷⁷ and thus that D_P^* determines a sort of "sensory/perceptual individuals" which would trivially comply with D_P . The method which I suggest we ought to be looking for would hence clearly suffice to justify [3].

As it turns out -- I suppose not surprisingly -- the way to find this method is again obstructed by problems arising from the uncertainty about accounts of sensory/perceptual experience. The fact that all accounts of sensory/perceptual experience are meant to be S_P -accounts implies that a notion C can only be part of S_P if it is adequate for sensory/perceptual experience as given by each account thereof. But how can one justify this

⁷⁷ see 1.1.1, [2]

type of adequacy if one does not know which theories constitute accounts of sensory/perceptual experience in our sense?

The only practicable way to overcome this specific problem is to adopt a second working-hypothesis, based on the assumption that

- [4] any (determined) account of sensory/perceptual experience must admit phenomenal and/or physical individuals, i.e. treat "phenomenal" and/or "physical" as bona-fide meaningful notions.⁷⁸

I must point out, first, that assumption [4] is only introduced to make the constructive method in question work. It is only a methodological tool and not part of the foundations for the type of accounts I intend to give.⁷⁹ Secondly, I ought to mention that it would be sufficient in this context to assume that

- [4*] there is a class of traditional ontological notions such that each account of sensory/perceptual experience treats at least one of them as relevant to S_p -- i.e. as meaningfully applicable to concrete sensory/perceptual individuals.

⁷⁸ Note that this is weaker than the assumption that both "physical" and "phenomenal" are *bona-fide* meaningful notions.

⁷⁹ The incorrectness of this assumption would only imply the failure of the said method, but not mean that neutral accounts cannot be given.

Given the discussion in 1.1.2.1, I think one can reasonably retain the more specific version given in [4]. Any (determined) account A_n of sensory/perceptual experience is then taken to contain what I shall call a **phenomenal** (ontological) framework⁸⁰ $phen-F^n$ and/or a **physical** (ontological) framework $phys-F^n$, by which I mean the totalities of ontological characterizations of the individuals classified in A_n as being "phenomenal_n", in the first case, and being "physical_n" in the second case.

These two types of frameworks are meant to enable us to introduce some order into the (potential) plurality of accounts of sensory/perceptual experience. This will help us overcome the involved uncertainty problem. Is this idea practicable? In light of our discussion of phenomenalistic and physicalistic systems in section 1.1.2.2, we clearly must allow for the possibility that the notion of being "phenomenal" ("physical") is analysed differently in different theories of sensory/perceptual experience.⁸¹ This might give rise to the thought that we are facing much the same degree of potential diversity -- and ultimately of uncertainty -- with respect to these frameworks as we found with the accounts of sensory/perceptual experience themselves. But then we would

⁸⁰ Note the terminological difference to "phenomenalistic"/
 25 "physicalistic framework".

⁸¹ This is why I have used "phenomenal_n" and "physical_n" in the preceding paragraph.

be failing to recognize a type of "sameness" which I take must exist amongst physical frameworks on the one hand, and amongst phenomenal frameworks on the other. Let me try to explain this by looking at the "phenomenal case". It might be that "phenomenal" is correctly analysable in different ways -- as suggested in 1.1.2.2 by the notions "phenomenal₁" and "phenomenal₂" -- but each of these analyses can only be correct if it is compatible with the sort of (normative) intuitive assertions -- like

[5] "sensations are phenomenal"

-- which determine the intuitive meaning of "phenomenal".⁸² If "phenomenal₁" and "phenomenal₂" are indeed versions of the intuitive notion "phenomenal", then [5] must be "reflected", on the one hand, in any phenomenal framework *phen-F₁* based on the physicalistic analysis of "phenomenal", i.e. it must be true that

[6.1] "sensations are phenomenal₁" $\in$ *phen-F₁*,

and, on the other hand, in any phenomenal framework *phen-F₂* based on the phenomenalistic analysis of "phenomenal", i.e. it must hold that

[6.2] "sensations are phenomenal₂" $\in$ *phen-F₂*.

⁸² see 1.1.2.1, [2]

This is the kind of "sameness" between phenomenal frameworks (in this case between *phen-F₁* and *phen-F₂*) which I have in mind.

The second working hypothesis which I shall consequently adopt is that

- [7] it is possible to characterize an intuitive phenomenal (physical) framework *phen-F₁* (*phys-F₁*) which, in the above sense, is "reflected" in all theories of sensory/perceptual experience that treat being "phenomenal" ("physical") as *bona-fide* meaningful.

Provided that this hypothesis is tenable, it is not difficult to see how it can be used to overcome the uncertainty problem arising in the context of justifying the adequacy of some notion C to sensory/perceptual experience: If *phen-F₁* (*phys-F₁*) allows a meaningful application of C, then C will be meaningfully applicable within any account of sensory/perceptual experience which treats being "phenomenal" ("physical") as a *bona-fide* meaningful notion,⁸³ and hence C will be meaningfully applicable to sensory/perceptual experience as specified by any account which contains a phenomenal (physical) framework. According to [4] it will then be sufficient to show the adequacy of C to sensory/percep-

⁸³ An account of sensory/perceptual experience is simply a correct theory thereof.

tual experience, if C is meaningfully applicable both within $phen-F_I$ and $phys-F_I$.⁸⁴

This leads us to the final question: how can we justify that a given notion C is meaningfully applicable within these intuitive ontological frameworks? The issue here is, of course, how one can justify the applicability of a notion C within any given ontological framework F (in this case for S_P -accounts). The intuitive nature of $phen-F_I$ and $phys-F_I$ is, in this context, quite irrelevant. There are two possible alternatives of how such an applicability can be demonstrated:

[8.1] The first one is that C can be shown to be applicable to the individuals belonging to one of the sorts given by the involved basic conceptual scheme (in our case S_P).

[8.2] The second alternative would be that -- on the basis of the characterizations given in F -- it is possible to justify the introduction of a new sort of individuals to which C can then meaningfully applied.⁸⁵

It might, of course, well be that this method of constructing $\Sigma\tilde{\Sigma}$ is too restrictive and might not be applicable to justify the addition of some sorts of individuals

⁸⁴ I ought to point out here that this method does not rest on any assumptions as to whether $phen-F_I$ and $phys-F_I$ are genuine ontological frameworks or not.

⁸⁵ An introduction of a new ontology would, as the introduction of any ontology, have to be justified by its explanatory merits.

which actually could be added to Σ_N^* . However -- provided that the above argumentation is correct -- its obvious merit is that it will not justify the addition of sorts which do not satisfy the general interpretability requirement.

As for the second type of constructive step which I mentioned initially, namely the addition of structural features, I shall use the same method of introduction in conjunction with references to "explanatory merits". To justify the introduction of a feature (into our neutral model Σ_N) by an explanatory merit is meant to appeal to its playing a decisive rôle in an explanation of some problematic issue. But, due to the desired neutrality of Σ_N , there are certain constraints on the type of problematic issues that can be brought in to serve in such a justification. Issues, for example, which can only be formulated in terms of traditional ontological notions are not suitable for this purpose. The issues which are most likely to be of the kind that can be used in our construction of Σ_N are those which are in some sense of "logical nature". Let me now turn to describe a particular logical problem which at a later stage I shall use in the above-mentioned manner.

1.2 Intentionality

1.2.1 The Peculiarities of Intentionality

Intentionality, or "aboutness" as it is sometimes called,⁸⁶ is a notoriously difficult notion. This is a fact reflected in its usually being described by means of examples. Say the example that a belief can be about a piece of wood, but a piece of wood cannot be about anything. It was first used in its logical meaning of "direction of the mind to an object" in 16th century translations from medieval Latin of the work of the Arab philosopher Ibn Sina (980-1037) known as Avicenna.⁸⁷ Etymologically, the notion derives from the Latin verb *intendo*, meaning 'to point at', or 'to aim at', or 'to extend towards'. One aspect about intentionality which seems to be uncontested is that its occurrences are described in relational terms: something is about, or points at, or refers to something.

Although it is uncontested that we use relational terms to describe intentionality, it has been questioned whether intentionality really has a relational nature. The main reason for this doubt seems to be that

"the normal logic of relations cannot accommodate the

⁸⁶ cf. Dennett, [1987]

⁸⁷ Oxford Dictionary of English Etymology [1983]

presumed relation between an [intending] state and its intentional object."⁸⁸

Dennett, for example, puts forward three peculiarities of intentionality to exemplify this incompatibility, namely

- 5 [1] "one and the same [particular] belief cannot at one moment be about a frog (that it is green, say) and in another moment be about a house (that it is green). The latter is a different belief. What a belief is supposed to be about is crucial to which belief it is.
- 10 [2] Second, for ordinary relations, each of the things related must exist (or have existed); but as we have seen, intentional 'relations' can be to non-existents. [The example referred to involved the reference to a 'ten ton diamond'.]
- 15 [3] Third, ordinary relations obtain between things regardless of how they might be specified. If I am sitting next to Jones, and Jones is the Mad Strangler, then it follows that I am sitting next to the Mad Strangler. But if I believe that Jones is harmless [...] it does not at all
- 20 follow that I believe the Mad Strangler is harmless."⁸⁹

It will be one of the aims of the following investigations to show that the failure of the "normal logic of relations" to accommodate these peculiarities does not necessarily imply the non-relational character of intentionality. Instead, I shall suggest that intentionality involves a special type of relations ("internal relations") which allows us to explain Dennett's peculiarities. Just to give an idea of what I have in mind, let me roughly sketch the difference between "internal" and

30 "external" relations.

⁸⁸ Dennett, [1987], p.385

⁸⁹ op.cit. p.384

1.2.2 External and Internal Relations

I shall call a relation **external** if it can be taken as, in some sense, "introduced from outside" into an independently existing ontology. An external relation is hence one which is defined on the basis of a pre-existing ontology of individuated objects. Identity and nature of the relata -- here seen as the individuals of the variable ranges of the relation in question -- are independent of the relational context. The relation "x is sitting next to y" is external (in this sense) because both x and y are taken to be identifiable regardless of whether they happen to be thus related or not. This "ontological dependence" of external relations comes out most strikingly in their semantic representations in formal logic: Relations in a model of 1st-order predicate calculus are simply sets of pairs of individuals from the model.⁹⁰ Given Dennet's elaborations, it can, I think, plausibly be assumed that his "normal logic of relations" is nothing but the usual first-order predicate logic, and thus a logic of external relations.

⁹⁰ It is not difficult to see that this kind of representation of relations presupposes an identity relation between the related entities: the identity of relations is that of sets; which is based on the identity of its elements; which, being pairs of individuals, is based on the identity of the domain of individuals.

Internal relations, on the other hand, are meant to be relations in which the identity of the relata (in this case referring to the individuals-as-related) crucially depends on the particular relational context within which they occur. That is to say, the particular instantiations of internal relations determine the identity and nature of the involved relata.⁹¹ It must be stressed that this notion of an "internal relation" differs from the homonymous concept defined by:

"if an individual X has a property which is such that, by virtue of having that property, X necessarily has a relation R to a certain thing or things, then R is an internal relation."⁹²

The paradigm example for this latter notion is that, under the assumption that X is a wife, the relation of X being married to someone is an internal relation. The necessity referred to in the definition of this second notion is analytic in nature. It is taken to be part of the meaning of the person-characterizing concept of 'being a wife' that there is a person the predicated individual is married to. However, 'being a wife' in this sense is not a quality which is essential to the identification of the person in question. The person X of the above example can be identified without refer-

⁹¹ That this is not the case for external relations is readily seen in their formal representations where a particular instantiation of a relation R is simply a pair <a,b> (belonging to R).

⁹² Dictionary of Philosophy, [1979]

ence to the quality of "being a wife" which means that the identification of X does not depend on the relation of being married to someone. In contrast to this, our notion of an "internal relation" makes any identifica-
5 tion of relata which are subject to an internal relation dependent on this relation. Internal relations, in the sense proposed here, can hence be seen as performing an ontological function. This is why our internal relations might be specified as being "ontologically
10 internal". For our purposes let me simply introduce the convention that the notion of an internal relation is to be used as referring to this ontologically internal kind.

1.3 The Adverbial Approach to Visual Experience

As mentioned in 1.1.3.1 [1], I shall describe sensory/perceptual experience in terms of "sensory/perceptual manifolds" which are taken to be structured collections of "sensory/perceptual individuals". This means that the statement that a person P has a sensory/perceptual experience is interpreted as there being such a manifold Σ which is tied to P in the manner necessary for it to be a sensory/perceptual experience of ("had by") P . In short,

[1] " P has a sensory/perceptual experience "

is to be interpreted as

[2] "There is a sensory/perceptual manifold Σ which constitutes an experience of P ."

This particularistic account of sensory/perceptual experience is by no means novel: sense-datum theories, for example, are fundamentally tied to "sensory individuals" which make up sensory manifolds.⁹³ Given the history of this particular exponent of a theory of sensory/perceptual experience using a particularistic approach, it cannot be surprising that alternative

⁹³ Note, however, that just by choosing a particularistic approach we do not commit ourselves to a sense-datum theory, as will become clear from our discussion of colour-tokens vs. sense-data.

approaches have been put forward. What I have in mind are "adverbial approaches to sensory/perceptual experience", of which I shall now give a brief exposition. My source for this exposition is Tye's paper on "The Adverbial Approach to Visual Experience",⁹⁴ in which he aims

"to investigate the semantic and the metaphysical foundations of the adverbial approach [to sensory/perceptual experience]."⁹⁵

According to Tye, the adverbial approach was developed as a response to certain problems arising in sense-datum theories. This is significant insofar as it leaves open the possibility that these problems are not so much problems of the particularistic approach in general as they are problems arising from additional specifications involved in sense-datum theories.

Tye introduces the general adverbial approach as follows:

"According to the adverbial theory, having a visual experience is a matter of sensing in a certain manner rather than sensing a peculiar immaterial object. This position is arrived at by reflecting on the fact that, on standard views, appearances, after-images, and so on cannot exist when not sensed by some person. The explanation the adverbial theorist offers for this fact is that statements which purport to be about appearances, after-images, and so on are in reality statements about the way or mode in which some person is sensing. Hence, a statement of the general form

- (1) P has an F-sense-impression
or
(2) P has an F-sensation

⁹⁴ Tye, [1984]

⁹⁵ op.cit. p.197

is reconstructed adverbially as

(3) P senses F-ly."⁹⁶

The main types of adverbial approaches discussed by Tye are the "event approach" and the "structured predicate approach". The basic idea of the event approach

"is that statements about how persons sense are to be analyzed as existential quantifications over particular, concrete sensings or sensory events."⁹⁷

That is to say

"statements seemingly about after-images or appearances are reconstructed, on the event version of the adverbial theory, as statements about sensory events."⁹⁸

Although different from the specific conceptual scheme adopted in sense-datum theories, I am not quite sure whether the conceptual scheme adopted in this event approach is not an instance of -- or, at least, closely related to -- the particularistic scheme; after all, Tye himself rejects the event approach on the grounds that "with respect to some important issues, the event theory stands or falls with the sense-datum theory."⁹⁹

The structured predicate approach on the other hand seems to me to be a genuine alternative to the particularistic type:

⁹⁶ Tye, [1984], pp.195 f

⁹⁷ op.cit. p.201

⁹⁸ ibid. p.205

⁹⁹ ibid. p.209

"According to the structured predicate version of the adverbial theory, statements of the type

(3) P senses F-ly

are to be analyzed as quantifier-free subject-predicate statements, the predicates of which are semantically compound. The general idea here is that sensory adverbs are to be treated as operators added to a standard first order predicate calculus. Syntactically, these operators precede well-formed formulas thereby forming more complicated well-formed formulas. Semantically, they can be viewed as functions which take the properties expressed by the well-formed formulas they modify onto new properties."¹⁰⁰

To demonstrate what exactly the structured predicate approach proposes to do, let us look at the following example of a "commonsense" statement and the way in which Tye suggests its adverbial reconstruction:

"Consider the statement

[3] Jones has exactly one red after-image.

Speaking commonsensically, we may say that [3] is true if, and only if, exactly one portion of Jones's visual field is red. This leads to the idea that [3] is to count as true if, and only if, (a) Jones has a sensation of a red expanse within his visual field, (b) Jones does not have a sensation of a red expanse spatially separated within his field from any other such expanse. On an adverbial analysis, this amounts to equating [3] with

[4] Jones senses redly but it is not the case that Jones senses (redly-spatially separated from-redly)-ly."¹⁰¹

According to our particularistic interpretation, [3] is to be read as there being an individual α_1 in a sensory manifold Σ which is experienced by Jones (" $exp(J, \Sigma)$ ") such that

¹⁰⁰ Tye, [1984], p.210

¹⁰¹ op.cit. p.222

$$[5] \quad \Sigma \models [\text{red}(a_1) \ \& \ (y)(y \neq a_1 \implies \neg \text{red}(y))].^{102}$$

Using the "purely universal" formula

$$\Phi(x) \equiv \text{red}(x) \ \& \ (y)[y \neq x \implies \neg \text{red}(y)]$$

this can be redescribed as

$$5 \quad [5.1] \quad (E \ \Sigma)(E \ c_1)[\text{exp}(J, \Sigma) \ \& \ \Sigma \models \Phi(c_1)].$$

The aim of the structured predicate account is the construction of a structured people-characterizing predicate " $\Phi^s(y)$ " such that

$$[6] \quad (E \ \Sigma)(E \ c_1)[\text{exp}(J, \Sigma) \ \& \ \Sigma \models \Phi(c_1)] \quad \text{iff} \quad \Phi^s(J).$$

10 This equivalence is the reason why the subject-predicate statement $\Phi^s(J)$ is said to be a reconstruction of [5.1]. The explicit reconstruction of [5.1] as suggested by Tye in [4] is formally expressed as:

$$[7] \quad \Phi^s(J) \equiv R(S(J)) \ \& \ \neg R \text{Sep} R(S(J)),$$

15 where S stands for the person-characterizing property of sensing, while R ("redly") and Sep ("spatially separated") are adverbial operators.

My aim in describing Tye's reconstruction of [3] in our particularistic terminology is to highlight a feature
20 which I believe is general to all his reconstructions, namely that the statements which are considered for reconstruction are all of the form

¹⁰² $\Sigma \models \Phi$ here is meant to be read as " Φ is the case for (holds in) Σ ". Moreover, a_1 is meant to be an individual constant
25 referring to $\alpha_1 \in \Sigma$.

$$[8] \quad (E \Sigma)(E \underline{c})[exp(P, \Sigma) \ \& \ \Sigma \Vdash \Phi(\underline{c})]$$

-- where Σ is a sensory manifold experienced by the person P , $\underline{c}$ is an array of individual constants and $\Phi_n(\underline{x})$ a purely universal formula pertaining to individuals of Σ .

5 Moreover, it emerges clearly from the examples of adverbial reconstructions given by Tye that he sets out to demonstrate that there is an adverbial, structured people-characterizing predicate $\Phi_n^s(y)$ for every purely universal formula $\Phi_n(\underline{x})$ of the particularistic scheme such that

$$10 \quad [9] \quad (E \Sigma)(E \underline{c})[exp(y, \Sigma) \ \& \ \Sigma \Vdash \Phi_n(\underline{c})] \text{ iff } \Phi_n^s(y).$$

This means that, from a logical point of view, $\Phi_n^s(y)$ is uniquely determined by $\Phi_n(\underline{x})$.¹⁰³

Given this exposition, it is clear that the structured predicate approach is conceived by Tye as a rival to
15 what we have called the particularistic approach. However, as we will see in 4.3, even if we assume that Tye succeeds in his adverbial reconstructions, his approach remains inappropriate for accounts of sens-

20 ¹⁰³ To be more precise, we can interpret the universal closure of [9] as an "adverbial explanation" relation $\mathcal{A}$ between logical equivalence classes of purely universal particularistic formulae (" $[\Phi_n]$ ") on the one hand, and structured people-characterizing predicates Φ_n^s , on the other. Tye's reconstructive efforts can then be seen as the attempt of showing that

25 $([\Phi_n])(E \Phi_n^s) \mathcal{A}([\Phi_n], \Phi_n^s).$

If this is the case, then it follows directly -- provided that the structured predicates are identified extensionally -- that $\mathcal{A}$ is functional in its first argument.

ory/perceptual experience.¹⁰⁴ Consequently I shall retain for our investigations what I consider to be the only plausible alternative, and that is the particularistic approach.¹⁰⁵

5 ¹⁰⁴ cf. 4.3

10 ¹⁰⁵ It seems to me that theories of sensory/perceptual experience really can only be particularistic or genuinely adverbial, in the sense that sensory/perceptual experience must either be described in terms of individuals being related to the experiencing subject, or in terms of qualities of this subject. With regards to the second option let me point out that these qualities need not be based on a "primitive" like Tye's quality of sensing. Thus, one might want to base one's account on an attribute like "having the disposition to act", but it seems to
15 me that such an approach would be subject to exactly the same shortcomings as the one suggested by Tye.

II

TERM-INTRODUCTION in the SUBJECT MODE

2.1 Natural Language & Formal Representation

In section 1.1.3.3 I mentioned that in order to get the
 5 envisaged discussion of neutral accounts of sensory/per-
 ceptual experience off the ground, I shall use the general
 structure of the semantic 1st-order predicate formalism
 as an "initial skeleton" for the required formal repre-
 sentation of sensory/perceptual experience. The idea
 10 which led me to this approach is that

[1] certain (formal) concepts used in the general description
 of formal semantic 1st-order predicate theories have
 natural language correlates¹ which are adequate² for
 sensory/perceptual experience.

15 To explain the line of thought which led to this idea, I
 must return to our preliminary discussion of inten-
 tionality in 1.2, in particular to the statement that

20 [2] "the normal logic of relations cannot accommodate the
 presumed relation between an [intending] state and its
 intentional object."³

25 ¹ By "having a natural language correlate" I roughly mean
 that the formal item in question can genuinely be regarded as a
 representation of a non-formal feature associated with "natural
 language". A more precise account of "finding natural language
 correlates" will be will be given in section 2.1.1.

² cf. 1.1.1 [2]

³ Dennett, [1987], p.385

An analysis of (experiential) intentionality can hence only be satisfactory if it includes an explanation of [2]. Such an explanation, however, presupposes that one knows what precisely is meant by "normal logic of relations". My idea then was to make use of the clarity inherent in the conception of formal semantic 1st-order predicate theories to specify this notion. The general conception of this formalism seemed to be a correct formal representation of certain natural language notions and could be used to give a precise meaning to "normal logic of relations". Specifically, I took it that the use of "sentence", "reference", "truth", etc. in expressing the formal concepts in question is not completely arbitrary, but reflects a (representational) correlation between them and the homonymously expressed concepts used in the context of natural language.⁴

This way of specifying the "normal logic of relations", in conjunction with the view that intentionality occurs in the context of sensory/perceptual experience, led me to the idea expressed in [1], for it seemed to me to be a

⁴ To be quite clear, this correlation was only meant to extend to certain general features of the 1st-order predicate formalism -- features which I have tried to bring out in the glossary preceding this text. The fact, for example, that the classical 1st-order predicate formalism treats formal predicates as extensional was not meant to be of this general nature, i.e. natural language predicates are not necessarily meant to be extensional.

prerequisite for discussing [2] in the context of "experiential" intentionality.

The principal aim of this chapter will now be

- [3.1] to justify [1] by describing explicitly the envisaged
5 natural language correlates,
and
- [3.2] to suggest certain modifications in this formalism to
make it more appropriate for representing sensory/per-
ceptual experience.⁵

10 2.1.1 Particular Propositional Thoughts

To begin the task set in the preceding section, let me
first consider a type of formal items -- namely refer-
ential characters -- which I think can be directly cor-
related to natural language in the desired way. From
15 the glossary of the 1st-order predicate formalism it
emerges clearly that the function of these referential
characters is given in their capacity to occur as refer-
ence-introducing symbols in meaningful formulae.⁶ It
was also said that, in this capacity, referential characters

20 ⁵ Due to the fact that this formalism was devised to
represent the logical structure of natural language, it is not
able to explain certain features which are essential to natural
language. The most prominent of these features are those per-
taining to the notion of "establishing reference". In semantic
25 1st-order predicate formalisms, references are not established,
but simply presupposed.

⁶ cf. 0.3

could be seen as "introducing referents" into the respective meaningful formulae. They do so in a specific logical mode, given by their being classified either as predicates or individual constants.

5 Strawson puts forward that it is
 "useful to have another way of speaking of [the] feature
 common to both 'Socrates' and 'is wise' in the remark
 'Socrates is wise'.[...] Let us say that the expression
 10 'Socrates' serves to introduce the particular person
 Socrates into the remark,⁷ and that the expression 'is
 wise' serves to introduce the quality, wisdom into the
 remark."⁸
 According to Strawson, term-introduction is also tied to
 a logical mode: The term-introducing expression "is
 15 wise" serves to introduce the quality *wisdom* in the
 predicate mode ("as predicated"⁹) into the remark
 "Socrates is wise", while the term-introducing expression
 "wisdom" serves to introduce the same quality in the
 subject mode ("as subject of predication") into the
 20 remark "Wisdom is desirable".

Clearly, there is an analogy between the function which Strawson attributes to term-introducing expressions (in the context of natural language), and the function of

25 ⁷ In anticipation of certain questions concerning the
 "introduction of an individual into something" (like a
 "remark"), let me just say that this is of course not meant
 to make the individual a genuine part of the remark. For a more
 detailed exposition of my use of "introduction" see section 2.1.2.

⁸ Strawson, [1951], p.146

30 ⁹ op.cit. p. 181

referential characters (in the formal context). This suggests that

[1.1] referential characters can be seen as formal representations of Strawson's term-introducing expressions.

5 This is why I shall adopt the "working stipulation" that

[1.2] referential characters are to be seen as formal representations of Strawson's term-introducing expressions.

10 My use of "working stipulation" is meant to emphasize first, the stipulatory component inherent in any formal representation and second, that the basis for this stipulation (namely [1.1]) is not yet fully established.¹⁰

15 The second working stipulation which I shall now discuss is concerned with the representational character of what we called meaningful formulae. This hypothesis will be to regard meaningful formulae as formal representations of particular thoughts. To demonstrate the feasibility of this correlation,¹¹ I must first of all specify what I mean by "particular thought".

20 ¹⁰ Indeed, a justification of [1.1] can, in my view, only arise "holistically" in the context of all the other envisaged representational correlations.

25 ¹¹ Note again that the issue here is not that the proposed representational association is the only possible one, but merely that meaningful formulae can be regarded as formal representations of particular thoughts.

A particular thought -- in the technical sense -- is, roughly speaking, meant to be a state a thinker finds himself in when thinking, say "This apple is red". More precisely, I take particular thoughts to be (numerically distinguishable) individuals which

[2.1] are each attributed to some thinker as states in which he, or she is in,

[2.2] are created by thought-producing processes ("**thought-processes**"), also attributed to the respective thinkers, and which

[2.3] can be sententially expressed.

Before turning to discuss these points individually, let me use this initial description of "particular thoughts" to show how the task we are presently engaged in fits into the general description of giving a neutral account of perceptual experience. For this purpose, let us recall that in section 1.1.3.2, a neutral account A_N was said to be an S_N -account of Σ_N . S_N denoted a formal basic conceptual scheme adequate for the formal structure Σ_N , which itself was taken to contain a sub-structure Σ_N^* representing certain aspects of perceptual experience. Being an account of a formal structure, A_N was furthermore associated with a consistent formal theory T_N , used to characterize S_N -individuals ontologically.¹²

¹² cf. 1.1.1

Our present task can now be described as that of transforming the purely formal account A_F of the semantic 1st-order predicate formalism -- given in terms of a formal basic conceptual scheme S_F ("referential character", "referent-structure", etc.) and ontologically characterized largely in terms of T_S (set-theory) -- into an S_N -account, which can be used as the envisaged skeleton for our neutral account of perceptual experience. Our present attempt to find natural language correlates for certain S_F -sorts will in particular be an attempt to furnish us with a core for the envisaged scheme S_N . To see this, let us look at the statements given in [2]. These statements are primarily meant to describe a sort of individuals -- say "particular-thoughts_L" -- which are taken to have a function in the natural language. Due to the deliberate omission of any traditional ontological notions in these statements, it is, however, also possible to see them as the characterization of a formal notion "particular-thought_N" $\in S_N$ which is meant to be the formal correlate to "particular-thought_L", and which refers to a sort of Σ_N -individuals. By substantiating the claim that meaningful formulae can be seen as performing the same function in the formalism given by A_F as the one performed by particular-thoughts_L in the natural language context, the

ontological stipulation¹³ that "particular thought_N" is to refer to meaningful formulae will be justified. This, in effect, amounts to the introduction of meaningful formulae into Σ_N (indeed into Σ_N^*), or, to be more precise, into the initial skeleton thereof. After this brief digression into the nature of our current task, let us now turn to discuss each of the statements made in [2].

Let me refer to the case where a particular thought τ_1 is a state of a thinker P (in the sense of [2.1]) as "P **having** τ_1 ", and similarly say that a thought-process is "a thought-process of P" if it is attributable to P in the sense of [2.2]. This is specifically meant to imply that two different thinkers cannot have numerically the same particular thought,¹⁴ nor can a particular thought-process be one of two different thinkers.

The principal idea behind characterizing particular thoughts as "states of thinkers" was to fit, in ontologically neutral terms, the relevant materialist conception involving brain-states as created by brain-proces-

¹³ see 1.1.1, [5]

¹⁴ The emphasis here must be on the numerical identity of particular thoughts, since there is obviously a sense in which two thinkers can have the same thought, say if they both are thinking that a certain apple is red.

ses.¹⁵ The rôle of this materialist conception as paradigm also extends to what I have in mind when talking of "a particular thought being created by a particular thought-process". I must point out that my conception of physical states created by (physical) processes is that of "dated occurrences"; and this implies that the time when these particular states come into existence is essential for their numerical identity¹⁶. This conception will be reflected in the proposed ontologically neutral account by postulating that particular thoughts are the product of particular thought-processes.¹⁷ By "particular process", as opposed to a "type of process", I mean

[3] a sequential transformation of an "initial manifold" into a unique "product-manifold" (or, simply "product").

¹⁵ The rationale for using brain-states as paradigm ontologically determined manifestations of "particular thought_N" -- which is in essence what is done here -- is to support the existence of Real particular thoughts. As will emerge clearly from our discussion of [2.3], claiming this amounts to accepting a "folk/commonsense" conception of psychology, a conception which admittedly is not uncontroversial. However, I believe that the primary issue involved in this controversy is whether "particular (propositional) beliefs" -- in the sense of functionally discrete (memory) states with a specific semantic/logical structure -- are involved in the paradigm cognitive activity of "drawing inferences". In other words, I take it that the controversy in question is about the nature of thought-processes and not so much about the Reality of particular thoughts.

¹⁶ Two such states, created at different times, can hence be, in the relevant sense, qualitatively indistinguishable (i.e. "of the same type") even though they are numerically different.

¹⁷ The term "thought-producing process" might be more appropriate in this context, but for the sake of terminological economy, I shall simply use "thought process".

The particularizing rôle played by the time-of-creation for dated occurrences is, in the context of our neutral conception of particular thoughts, taken up by the identity of particular thought-processes. One particular thought-process generates a unique particular thought.

An direct implication of this is that particular thoughts, in this technical sense, can only be had once, since any particular thought can only be created once. Another question is whether -- and in what form -- such a particular thought can outlive its generating process. It is intuitively plausible to assume that particular thoughts must be capable of "leaving some trace in memory", but since it is not the aim of this thesis to give an account of memory, I shall not advance any claims about how this is achieved.

Concerning the sentential expressibility of particular thoughts -- [2.3] -- I wish to make two points.

[4.1] First of all, by "a particular thought τ is sententially expressed" I mean that τ is expressed by a particular sentence S .

The main reason for including a sentential expressibility in our characterization of particular thoughts is, as we shall see shortly, to "gain access" to a certain type of internal structure of these states. The focus of these

investigations will be on those particular thoughts where it is the case that

[4.2] (part of) their internal structure is/is revealed in¹⁸ the grammatical structure of their sentential expression.

5 The second point is concerned with the potentiality expressed in [2.3], i.e. that particular thoughts "can be sententially expressed". There are two ways in which this statement could be read:

[5.1] First, it can be regarded as requiring a linguistic
10 capacity in thinkers: the proposed notion of a "particular thought" is only to be used in the context of thinkers who have the capacity to express particular thoughts linguistically. In general, such a restriction of the notion of a "particular thought" seems to be too
15 stringent,¹⁹ and thus we ought to regard [2.3] as a defining condition for a type of particular thought, which might be called the type of "sententially expressible" ("mature") particular thoughts. As I shall only be concerned with such mature particular thoughts, let me
20 for the sake of terminological economy adopt the convention that

¹⁸ The reason for this deliberate ambiguity here is simply that I do not wish to commit myself as to whether particular thoughts and sentences are ontologically the same or not.

25 ¹⁹ In 3.2 I will try to support the view that there are states of cognitive agents which are not sententially expressible -- in this first sense -- but which nevertheless ought to be counted as particular thoughts.

[5.2] the notion "particular thought" is henceforth to be used as an abbreviation for "sententially expressible particular thought".

[5.3] The second possible reading of [2.3] is that particular thoughts -- in the sense of [5.2] -- can, but need not actually be sententially expressed by the thinker in question. Given this reading, it might indeed be possible to identify non-sententially expressed mature particular thoughts with what Neisser²⁰ refers to as particular "plans for speaking".²¹ These, he describes as being responsible for the fact that

"we know what we are going to say before saying it, but only in the rather general way that we know what we are going to see before seeing it."²²

Since I shall only use sententially expressed particular thoughts, I propose that we modify the convention given in [5.2] by exchanging "sententially expressible" with "sententially expressed". Accordingly, it will be the case that

[5.4] for any particular thought τ_1 there is meant to be a

²⁰ Neisser, [1976]

²¹ I mention this view here because it does, I believe, lend some support to the claim that particular thoughts -- as conceived in [2.3] -- can be attributed a function in the natural language context, even if one considers them to be ontologically distinct from (uttered) sentences.

²² op.cit. p.170

unique sentence of natural language (the **sentential expression** of τ_1) expressing it.

After this initial characterization of what I mean by particular thoughts, let me now explain more precisely my assertion that meaningful formulae are to be treated as formal representations of particular thoughts. Certain particular thoughts (let me call them "propositional") are meant to have a type of internal structure which is adequately represented in the structure of meaningful formulae. My choice of notation for meaningful formulae, namely

15

linguistic expression

$$\tau \equiv_m P_1(a_1) \mid \langle a_1, \alpha_1 \rangle, \langle P_1, P_1 \rangle]$$

reference-introducing symbols

particular references

was meant to bring out the structural features which I deem to have (natural language) correlates in particular thoughts.

Thus, I shall take it that in correlation to the formal linguistic expressions -- which were seen as providing the logical form of meaningful formulae --

[6.1] propositional particular thoughts display what I shall call a **logical structure** which is translatable into a unique formal 1st-order predicate representation.

As anticipated in [4.2], I shall also assume that

[6.2] the grammatical structure of the sentential expressions of particular propositional thoughts reveal the logical structure of the expressed particular thoughts.

That is to say, "propositional" is meant to apply only to sententially expressed particular thoughts whose sentential expression might be called "logically transparent". The aim of restricting the scope of "propositional" in this way is -- as anticipated -- to enable us to gain access the logical structure of such propositional thoughts by means of their sentential expression. Say, for example, a particular thought τ_1 is expressed by the sentence

[7.1] $S_1 \equiv$ "This apple is red".

From a 1st-order predicate point of view, this sentence has a unique logical structure, namely that of an elementary subject-predicate proposition, representable in our formalism as $R(a)$ -- where $R(x)$ represents the predicate x is red and a the subject term given by the expression "this apple".²³ Given this "1st-order

²³ Two things must be mentioned in this context. First of all, particular thoughts ought not be confused with "propositions". In creating a propositional thought one "produces a proposition" (cf. 2.1.2), but one and the same proposition can be produced repeatedly, something which is not the case for particular thoughts. Secondly, I shall say more about the function of expressions like "this apple" and its connexion to the concept 'apple', later in our discussion. At this point, all I wish to do

predicate transparency" of S_1 , we can, by virtue of [6.3], use S_1 in representing the logical structure of τ_1 . In particular, S_1 can be used in denoting the logical structure of τ_1 in analogy to our notation for meaningful formulae, namely

$$[7.2] \quad \tau_1 \equiv \text{"This apple is red"} | \dots] .$$

Having thus suggested a natural language correlate for formal "linguistic expressions", let us now turn to the question whether it is possible to associate a natural language correlate with "reference-introducing symbols". It should not be surprising that my stipulations so far -- especially those concerning the internal structure of particular thoughts and the logical transparency of their sentential expressions -- were chosen so that we can assign this rôle to certain structural components of particular thoughts. These stipulations enable us to say that

[8.1] the term-introducing expressions occurring in the sentential expression S of a particular thought τ can themselves be taken to express certain components of τ , in the same way as S expresses τ .

Considering our initial correlation of formal referential

is to use the sentence "This apple is red" as an example of a sentence with a grammatical structure of the desired "logical transparency".

characters with term-introducing expressions,²⁴ it is plausible that the components (of particular thoughts) which are expressed by term-introducing expressions-- and which accordingly I shall refer to as **term-intro-**
5 **ducing (thought) components** -- perform the same function in the natural language context as that of reference-introducing symbols in our formalism. Accordingly, I shall take it that

[8.2] term-introducing components are the natural language
10 correlates of reference-introducing symbols.

One of the main characteristics of these term-introducing components is -- apart from being expressed by term-introducing expression -- that they are meant to be genuine parts of the particular thoughts to which they
15 belong. Given our initial description of particular thoughts as states of thinkers, this can justifiably be taken to imply that

[8.3] the particularity of term-introducing components is dependent on the identity of the particular thoughts to
20 which they belong.²⁵

²⁴ see [1.2]

²⁵ While it is possible that two distinct material objects share (say over time) certain parts, I think that a "sub-state" can only be identified as being a (functional) part of the state
25 by which it is contained. Indeed, I take it that when a particular state ceases to exist, then so do all its "parts".

To illustrate this, let me point out that (according to [5.4] and [8.1]) for every term-introducing component there is meant to be exactly one term-introducing expression which expresses it. This means that term-introducing components can be denoted by adding a particularizing index to the term-introducing expressions which express them: ["Socrates"]_n (or, simply "Socrates"_n) will be the notation for a particular term-introducing component, expressed, in this case, by "Socrates".

Examples of the dependency described in [8.3] can now be given: Say, if my thought that Socrates is wise involves the term-introducing component "Socrates"₁, then a particular thought of someone else expressed by the same sentence will have to involve a term-introducing component "Socrates"₂ -- numerically different from "Socrates"₁ -- given that two different thinkers cannot have numerically the same particular thought.

[9] Another example -- in a notation based on [7.2]²⁶ -- is that if

$$\tau_1 \equiv \text{"Socrates is wise"} \mid \text{"Socrates"}_1 \dots], \text{ and}$$

$$\tau_2 \equiv \text{"Socrates is wise"} \mid \text{"Socrates"}_k \dots],$$

are the same -- i.e. $\tau_1 \equiv \tau_2$ -- then

²⁶ The notation "Socrates is wise" | "Socrates"₁...] for τ_1 is meant to reflect that the term-introducing component "Socrates"₁ is involved in the relevant particular reference of τ_1 .

$$\text{"Socrates"}_i = \text{"Socrates"}_k.$$

In our discussion of [6] we concentrated thus far on implications concerning the nature of particular thoughts. However, our initial characterization of particular thoughts has, by virtue of [6], also certain implications concerning the nature of our formal entities. To see this, we only need to consider that a term-introducing component is taken to be dependent in its identity on that of the particular thought to which it belongs. So, [6] can only be satisfied if the identity of reference-introducing symbols -- which so far has not been discussed -- is analogously taken to be dependent on the identity of the meaningful formulae in which they occur.

Take, for example, the following two different meaningful formulae

$$\begin{aligned} [10] \quad \tau_1 &\equiv_m P_1(a_1) \mid \langle a_1, \alpha_1 \rangle, \langle P_1, P_1 \rangle], \quad \text{and} \\ \tau_2 &\equiv_m P_1(a_1) \mid \langle a_1, \alpha_1 \rangle, \langle P_1, P_2 \rangle]. \end{aligned}$$

Since $\tau_1 \not\equiv_m \tau_2$,²⁷ the reference-introducing symbol a_1 -as-occurring-in- τ_1 must be numerically different from the reference-introducing symbol a_1 -as-occurring-in- τ_2 , if our meaningful formulae are really to represent particular

²⁷ $\langle P_1, P_1 \rangle \neq \langle P_1, P_2 \rangle$; see 0.3, [8.3]

thoughts.²⁸ To achieve a more adequate formal representation let me therefore use, whenever necessary, the notation $[X]_m$ for X -qua-reference-introducing symbol. In this stricter notation (chosen, of course, in analogy to our notation for term-introducing components) the formulae under [10] would then be given as

$$[10^*] \quad \begin{aligned} \tau_1 &\equiv_m [P_1]_n([a_1]_m) | \langle [a_1]_m, \alpha_1 \rangle, \langle [P_1]_n, P_1 \rangle, \text{ and} \\ \tau_2 &\equiv_m [P_1]_i([a_1]_k) | \langle [a_1]_k, \alpha_1 \rangle, \langle [P_1]_i, P_2 \rangle; \end{aligned}$$

with $[P_1]_n \neq [P_1]_i$ and $[a_1]_m \neq [a_1]_k$, in virtue of $\tau_1 \neq_m \tau_2$.

Having considered these examples, I shall now leave term-introducing components and turn briefly to the only remaining genuine components of meaningful formulae which so far have not been correlated with natural language, namely to formal particular references. Later in this discussion I shall try to show that propositional particular thoughts contain components which--in the context of natural language -- fulfil an analogous rôle to the one performed by particular references in the formal account.²⁹ Let me, for the moment, refer to these putative thought-components likewise as "particular references". A description of these particular references which goes beyond their being functional

²⁸ The same holds, of course, for the involved predicate-introducing symbols.

²⁹ Indeed, this formulation is not quite correct, for eventually I shall restrict this assumption to perception based particular thoughts, but at this point I shall leave it as it is.

correlates to their formal namesakes, or even a justification of their existence, is at this point not feasible. In the hope that in the course of this investigation both these points will be satisfactorily dealt with, let me just highlight two characteristics implied by the nature of formal particular references. The first one is that particular references (in particular thoughts) will have to be regarded as genuine components of the relevant particular thoughts, and the second that they must have a relational nature in some sense.

Hoping to have motivated the feasibility of my second working stipulation -- namely that meaningful formulae are to represent particular (propositional) thoughts-- let me round off this discussion by introducing a notational simplification. In [7] we have seen how particular thoughts can be denoted by using sentential expressions. For convenience I propose to use these sentential expressions, whenever feasible, in analogy to how term-introducing expressions are used in denoting components of particular thoughts, i.e. I shall simply add a particularizing index and use these particularized sentential expressions as names for the expressed particular thoughts. Thus, I shall use "This apple is red"₁ as an abbreviation for $\tau_1 = \text{"This apple is red"} | \dots]$.

2.1.2 Term-Introduction & Sensory/Perceptual Experiences_p

The aim of the next step in these investigations will be to establish the rôle of particular thoughts in the context of sensory/perceptual experiences. To achieve this, I must first of all explain what I mean by "term-introduction". The expressions "term" and "introducing a term into something" are taken from Strawson's essay on Individuals. To give the spirit of Strawson's use of these notions let us look at the continuation of the passage which I quoted in this context:

"Let us say that anything which is introduced, or can be introduced, into a remark by an expression is a *term*. This piece of terminology has an obvious connexion with some of our earlier lists. By conjoining certain items from the functional distinctions of List I, we obtained such phrases as 'referring to something and predicating something of it' [...]. These phrases yielded the distinction of List III, between the *term referred to* and the *term predicated*."³⁰

To understand this "obvious connexion" we must consider how the notion of a term is introduced in the context of List III:

"[...] we bring together or connect, in some way, two different non-linguistic items, or *terms*, in producing the unified thing, the proposition. The two items are that which we ascribe and that to which we ascribe it; and to say that we 'bring them together' in producing the proposition is to say no more than that we predicate one of, or ascribe it to, the other. The non-linguistic items [*terms*] which are thus brought together have sometimes been spoken of as the 'constituents' of the propositions.

³⁰ Strawson, [1951], p.146

The literal implications of the word are, in this connexion, logically grotesque."³¹

5 Strawson's use of "term-introduction" is based on the activity of producing propositions, an activity described as that of "predicating something of something". Strawson chose to analyse this activity in linguistic terms -- i.e. he chose to look at how we produce propositions in the context of "making remarks"³² -- but I believe that we are equally justified in describing the
10 production of propositions in the context of creating (forming) particular thoughts, in our sense.³³ Let me now begin to explain why I think the notion of "term-introduction" is appropriate for our purposes.

15 Let me first of all look at the possibilities of applying this terminology to the proposed formal representation of particular thoughts. Given our assumptions concerning the nature of these representations -- for example, that in the formal representation of a particular thought

$$[1.1] \quad \tau_1 \equiv_m [P]_1([a]_1) \mid \langle [a]_1, \alpha_1 \rangle, \langle [P]_1, P_1 \rangle,$$

20 ³¹ Strawson, [1951], p.140

³² This is not surprising considering that one of the main aims in his essay is to give an account of identifying a particular in the speaker/hearer context.

25 ³³ This is even more the case as we have not explicitly ruled out the possibility that thinking is only a linguistic activity, i.e. that it amounts to the creation of "silent remarks".

[a]₁ and [P]₁ represent term-introducing components expressed by term-introducing expressions which in turn are formally represented by a and P, respectively -- and given Strawson's use of "term", it seems to me clear that,

[1.2] if anything is to represent terms in our formalism, it must be formal referents (e.g. α_1 , P_1) as given in referent-structures.³⁴

So, the justification of my use of the Strawsonian terminology will have to be based on a discussion about natural language correlates for these two purely formal sorts of items.

However, I must make a cautionary remark concerning a possible misconception.

[2] It would be equally grotesque to say that terms are constituents (components, parts) of particular thoughts -- or, for that matter, of remarks -- as it would to take them as literal constituents of propositions.

Admittedly, the mere possibility of interpreting "term-introduction" in this way could be considered a drawback to Strawson's terminology, but it is, I believe, wrong to say that this type of interpretation is the only one there is. As I have tried to show in our initial

³⁴ cf. 0.2

discussion of meaningful formulae,³⁵ it is quite possible to say, for example, that α_1 is introduced into τ_1 , without implying that α_1 is a part of τ_1 .³⁶

In accordance with [1.2], I shall now adopt the (rough) working stipulation that

- [3] Strawson's terms are the natural language correlates for formal referents.

To be more specific, let me introduce the notion of **experiential** particular thoughts, whereby I mean particular thoughts

- [4.1] which are each formed in the context of some particular sensory/perceptual experience, and

- [4.2] which only involve what I shall call (**purely**) **experiential** terms.

This brings me to an important point concerning the scope of this thesis, namely that

- [5] the notion of a "sensory/perceptual experience" is taken to be primitive,

in the sense that it is presupposed that we know (say on intuitive grounds) whether some given item constitutes a sensory/perceptual experience or not. To use a set-

³⁵ cf. 0.3

³⁶ This belief is based on the idea that 'x is a part (a constituent) of y' is not necessarily a transitive relation.

theoretical metaphor, the aim of this thesis is not to delineate the boundary of the set of all (actual or possible) sensory/perceptual experiences, but rather to investigate the "internal structure" of this set and, in particular, of its elements. The main implication of this, in the present context, is that both "purely experiential term" and "experiential particular thought" are meant to be given by paradigm examples. Thus, I take

$$\tau_n \equiv \text{"This apple is red"}_n$$

to be a paradigm example of an experiential particular thought, for, on the one hand,

[5.1] particular thoughts with "indexical" term-introducing components are characteristically formed in the context of sensory/perceptual experiences

and, on the other,

[5.2] apples and the quality of being red are meant to be purely experiential terms.

As an example of a particular thought which I would not consider to be experiential in the sense in question, I suggest

$$\tau_n \equiv \text{"This apple weighs five kilograms"}_n$$

for, although it might have been formed in the context of a sensory/perceptual experience (say one which involves looking at a scale), the quality of weighing five

[6.2] referent-structures represent parts of actual (possible) Reality(-ies).³⁹

[7] Two points must be emphasized here. First, by saying that a referent structure -- like the classical paradigm⁴⁰

$$\Sigma_{\mathcal{R}}' = [A_n | P_1, P_2, \dots, R_1, R_2, \dots]$$

-- represents a part of Reality, I do not mean to imply that all the features of $\Sigma_{\mathcal{R}}'$ must have representational character. For example, one might reject the view that, say, P_1 's being a set has a representational function ("is representationally relevant") -- on the grounds that one rejects "sets" as Real (concrete) individuals-- without having to give up $\Sigma_{\mathcal{R}}'$ as a representation of (a part of) Reality.

The second point is whether the "classical" conception of referent-structures is indeed suitable for such a representation. One particularly problematic feature is that

[8.1] classical referent-structures and their constituents are taken to exist independently of both linguistic apparatuses and formal interpretations, as conceived in 0.1 and 0.2 respectively.⁴¹

³⁹ cf. 1.1.2.1

⁴⁰ see 0.2, [6]

⁴¹ Indeed, the fact that formal interpretations were defined as functional classical relations -- which meant that particular references (cf. 0.3) occurring in meaningful formulae were given

I believe that it would not be possible to use classical formal referent-structures in any natural way for the envisaged representation without assuming that [8.1] is representationally relevant. This would imply that

5 [8.2] all Real items which experiential particular thoughts can be about are referents -- where

[8.3] a **referent** is meant to be a Real item which exists, in some sense, independently of particular thoughts.⁴²

10 The reasons why I consider this implication to be problematic will become clear when I discuss the appropriate modifications of the classical conception of referent-structures for our purposes.⁴³

At this stage, let me give an outline of my conception of
15 "sensory/perceptual individuals_P" and "sensory/perceptual manifolds_P", the two notions which in a particularistic⁴⁴ approach to sensory/ perceptual experience are at the basis of accounts of this subject matter. Sensory/per-

20 as ordered pairs -- brings out that formal referents as given in our formalism so far, must be treated as ontologically more basic than formal interpretations. This, in due course, will lead us to a modification of the present formalism.

25 ⁴² The strongest way of implementing this independence in a determined ontological framework would be to say that these referents exist "objectively" in the sense of existing independently of thought in general.

⁴³ See, for example 3.3

⁴⁴ cf. 1.1.3.1

ceptual manifolds_P are, roughly speaking, structured collections of sensory/perceptual individuals_P, which is why I shall start by focusing on the latter. The first two points which must be mentioned here follow directly from the chosen nomenclature. As I consider sensory/perceptual experiences to be Real, the attribute "sensory/perceptual" is meant to imply that

[9.1] sensory/perceptual individuals_P are Real.

Furthermore, since my use of "individual" is analogous to that of Strawson,⁴⁵ we find that

[9.2] sensory/perceptual individuals_P can occur as introduced (into particular thoughts) in the subject mode.

Naturally, these two points do not exhaust the characteristics of these individuals. In particular, I take it that

[9.3] sensory/perceptual individuals_P are tied to "sensing/perceiving (experiencing) subjects" by ties which are usually expressed as the individuals "being sensed/perceived (experienced) by" the respective subject.

Turning the focus to the particularistic notion of a "sensory/perceptual experience_P", let me now specify a type of sensory/perceptual experience which I shall

⁴⁵ Strawson characterizes "being an individual" as being able to appear as a logical subject. (cf. Strawson, [1951], p.227)

address by "sensory/perceptual experience_P" in these investigations. Given the preceding discussion of particular thoughts, I shall assume that

[10.0] sensory/perceptual experiences_P are experiences of
5 thinking (thought-gifted) experiencing subjects.

This allows me to introduce three different types of ties which could be referred to as "a subject *P* experiencing an individual α ":

[10.1] *P* experiences₁ α iff _{α} *P* is in a position to form an
10 experiential particular thought about α .

This characterization is meant to be a generalization of the following case:

[10.1*] *P* visually experiences₁ an apple α iff _{α} *P* has normal
15 vision and looks in the direction of α , which lies unobstructed at arm's length in front of him.

[10.2] *P* experiences₂ α iff _{α} *P* experiences₁ α and is capable of forming an experiential particular thought about α .⁴⁶

[10.3] *P* experiences₃ α iff _{α} *P* has an experiential particular thought about α .⁴⁷

20 ⁴⁶ Note here that the capacity referred to is not that of forming experiential particular thoughts, but that of forming such a thought about α .

25 ⁴⁷ Each of these definitions is a definition of a technical notion ("to experience_i") in terms of the primitive notion of an experiential particular thought.

It seems to me that, on the one hand, the tie characterized in [10.1] reflects a minimal reading of "P experiences α ", in the sense that this must mean that P is in the respective position. On the other hand, [10.3] reflects a maximal reading, meaning that it must be implied if P has the described thought. Given [4.1], each of the three definitions listed in [10] can be extended by including a reference to the particular sensory/perceptual experience e_n in the context of which the experiential particular thought referred to is/is meant to be formed: i.e. it is possible to define (for $i=1,2,3$) that

[10.i#] P experiences_i α in e_n iff_{def} P ... in the context of e_n .

Accordingly, we can introduce a (hierarchical)⁴⁸ classification of sensory/perceptual experiences of a thinking (thought-gifted) subject P:

[10.4] $\text{type}_i(e_n)$ iff_{def} $(\exists \alpha)$ P experiences_i α in e_n .

In view of this classification, I propose to adopt the convention that

20 [11.1] sensory/perceptual experiences_P are type₃-experiences.

I am adopting this convention in order to discuss experiential intentionality in terms of experiential particular thoughts. Considering that my arguments will

⁴⁸ I take it that: $\text{type}_3(e_n) \implies \text{type}_2(e_n) \implies \text{type}_1(e_n)$.

be based on the idea that experiential intentionality (in the context of an experience e_n) is due to the formation of experiential particular thoughts (in the context of e_n), the choice involved in [11.1] becomes, I believe, self-explanatory. Another, and I think more controversial line of thought which led me to adopt [11.1] is based on a wish to

[11.2] associate a unique ("unambiguous") **propositional content** (of a certain type) with each sensory/perceptual experience_P.

By "propositional content" I mean the sort of content which lends itself to be described by sentences of the sort

[11.3] P experiences (in e_n) that Φ

-- where e_n is meant to be the experience associated with the propositional content in question. More precisely, [11.2] is concerned with the type of propositional content which arises through the formation of experiential particular thoughts (in the context of e_n).⁴⁹ Now, I cannot see how the uniqueness-requirement in [11.2] can be satisfied except by considering only actual experiential particular thoughts. This means that in the context of the given classification, the

⁴⁹ This type, I think, corresponds to the restriction of Φ in [11.3] to sentential expressions of experiential particular thoughts formed/formable in the context of e_n .

choice made in [11.1] becomes a necessary requirement to satisfy [11.2].

Up to now, this line of thought is not (very) controversial. Indeed, the type of propositional content considered here is simply a type of Peacocke's "content of judgements constitutively linked to [...] experiences".⁵⁰ This, however, changes when I mention the idea behind [11.2], namely what I shall call the "propositional content conjecture":

10 [11.4] Propositional content of the mentioned sort is a type of experiential content.

This conjecture is controversial because it implies that there is a type of conceptual content of experiences.⁵¹ My defense of this conjecture will crucially depend on my views of the nature of concepts, which I shall discuss in the following chapter. At this stage let me just point out that neither the propositional content conjecture, nor my views on the nature of concepts, are essential to the overall project of this thesis. Even if both should turn out to be wrong, the envisaged neutral accounts of sensory/perceptual experience will survive with only minor modifications.

⁵⁰ Peacocke, [1986], p.2

⁵¹ For an opposing view see Evans, [1982], p.227

To elucidate this, I must first of all mention why I consider [11.2] to be important in the context of the propositional content conjecture. In my view,

[11.5] experiential content is a factor in determining the identity of the involved particular sensory/perceptual experience_P.

Sensory/perceptual experiences_P are to be individuated such that if e_n and e_m have different (experiential) contents -- of some type -- then $e_n \neq e_m$.⁵² The propositional content conjecture for sensory/perceptual experiences_P hence clearly presupposes [11.2].

Having singled out the type of sensory/perceptual experience which is to be referred to as "sensory/perceptual experience_P", let me now give a description of these experiences which does not involve traditional ontological notions. It is also meant to do justice to the "identity-correlation" [11.5] (in particular with respect to the propositional content conjecture) and, for that matter, to the fact that

[11.6] the identity of the experiencing subject is a factor in

⁵² Formally, this implies that

$$(E C_1 \in T_k) A(C_1, e_n) \implies (E! C_1 \in T_k) A(C_1, e_n),$$
where $A(C_1, e_n)$ stands for " C_1 is associated with e_n ", and T_k represents a type of experiential content.

determining the identity of the experienced experiences.⁵³

This description is that

[12] a particular sensory/perceptual experience_P e_n is a
 5 complex structure containing both a particular sensory/
 perceptual manifold Σ_{e_n} and the experiential particular
 thoughts which determine the relevant propositional con-
 tent.⁵⁴

Should the propositional content conjecture be false,
 10 then all we need to do to adapt the neutral accounts
 which I am about to describe is to drop the experiential
 particular thoughts as genuine constituents of sens-
 ory/perceptual experiences_P.⁵⁵

In the context of giving the envisaged neutral accounts,
 15 the description given in [12] is meant to have the same
 function as the one discussed earlier in the context of
 2.1.1 [2] qua description of particular thoughts. What we
 said about particular thoughts in the preceding section

20 ⁵³ If e_n is an experience of P_1 and e_m one of P_2 and
 $P_1 \neq P_2$ then $e_n \neq e_m$.

⁵⁴ The identity of the experiencing subject is reflected in
 such a complex e_n by the implicit assumption that all the par-
 ticular thoughts given in e_n are thoughts of this subject, while
 the propositional content of e_n will be given by the totality of
 25 particular thoughts in e_n .

⁵⁵ The effect of such a failure of the propositional
 content conjecture for our neutral accounts would primarily be
 a reduction in the total number of experiences imposed by a
 different way of identification.

together with the point made in [6.2] then suggests not only that

[13.1] the sensory/perceptual manifold Σ_{e_n} referred to in [12] can be formally represented as a referent-structure $\Sigma_{e_n}^f$,

5 but also that

[13.2] by conjoining $\Sigma_{e_n}^f$ with the set of meaningful formulae $T_{e_n}^f$ which represents the collection of particular thoughts given in e_n , we get a formal representation e_n^f of e_n .⁵⁶

10 Depending on the context, $\Sigma_{e_n}^f$ may, of course, be regarded as embedded in a larger referent structure Σ^f , which itself represents a part of Reality that contains Σ_{e_n} . This, however, need not be so, because implicit in [13.2] is the assumption that the meaningful formulae in $T_{e_n}^f$ involve formal referents of ("refer to features in") $\Sigma_{e_n}^f$.
15 In order to adopt [13.2], we must assume that

[14] all individuals-as-introduced (into experiential particular thoughts formed in the context of e_n) are sensory/perceptual individuals $p \in \Sigma_{e_n}$.

20 To see whether this is a tenable assumption or not, let me first of all point out that [14] is a statement about a relation between two technical notions, which is perfect-

25 ⁵⁶ The notion "sensory/perceptual experience_N" ($\in S_N$)-- i.e. the neutral correlate to "sensory/perceptual experience_P" -- is meant to refer to formal structures of the type given by conjoining $\Sigma_{e_n}^f$ and $T_{e_n}^f$.

ly consistent with the preceding characterizations of these notions. It is therefore possible to consider [14] as a stipulation involved in determining their intended technical meaning. The tenability of [14] then becomes a question of whether its implications are desirable or not.

A first, and I think desirable consequence in this context would be that those individuals which are "thought about" in experiential particular thoughts, would be genuine parts of the relevant sensory/perceptual experiences_P. In other words, the phrase "-as-introduced" could also be interpreted as indicating an introduction of a genuine part into a sensory/perceptual experience_P. This, I think, should make the notion of "term-introduction" somewhat more palatable to someone who objects to it in the context of particular thoughts.

A second, and more complex consequence of adopting [14] (and hence [13.2]) arises in the context of referents,⁵⁷ but to discuss this let me begin a new section.

⁵⁷ see [8.3]

2.1.3 Referents vs. Referents-as-Introduced

The issue which I am about to discuss here arises from the precondition for the proposed formal representation of sensory/perceptual experiences_P that⁵⁸

- 5 [1] $P \text{ experiences}_3 \alpha \text{ in } e_n \implies \alpha\text{-as-introduced is part of } \Sigma_{e_n}$

-- where α is meant to be an individual which experiential particular thoughts (formed in the context of e_n) can be about, and Σ_{e_n} is the sensory/perceptual manifold_P of e_n . More precisely, my concern here is to discuss the implications of [1] with respect to the tie between α and α -as-introduced, considering, in particular, what I shall call the "**experience-specific characteristics conjecture**" ("ESC"):

10

- 15 [2] Any part of a sensory/perceptual experience_P (e_n) must display some experience-specific (i.e. e_n -specific) characteristics -- whereby I mean characteristics which are only had in virtue of being part of e_n , and which, as such, reflect the identity of e_n .

20 I must admit that I have as yet not found a conclusive argument to validate this conjecture, but since it will only be used to suggest a certain technical reading of " α -as-introduced", it is sufficient for my purposes that

⁵⁸ see 2.1.2, [10], [13], [14]

ESC is not completely implausible.⁵⁹ Let me also emphasize that ESC does not require that all characteristics of a part of experience must be experience-specific in this way. This brings me to the issue about the tie between α and α -as-introduced.

[2.1] In the case where α is what might be called a "purely experiential" individual, in the sense that all its characteristics are experience-specific, the tie between α and α -as-introduced is meant to be that of numerical identity: " α " and " α -as-introduced" refer to one and the same item. This is, of course, the "natural" reading of the term " α -as-introduced". Should ESC turn out to be correct, then we would be faced with cases where this "natural" reading would fail to be appropriate. To show this let us look at what I take to be a conceivable theory of perception, namely

[3] a theory which explains perception in terms of creating cerebral representations -- within an intuitive physical framework in which "subjective" is roughly treated as "physiological", and "being a referent" as "not being subjective".

The paradigm perception based particular thought

⁵⁹ Let me also point out that the only effect of adopting [2] would be -- as we shall shortly see -- to exclude certain theories of perceptual experience from being represented by our neutral accounts.

$\tau_n \equiv \text{"This apple is red"}_n$

-- which I suppose would be seen as a particular brain-state in this theory -- would typically be related, on the one hand, to a physical object, say a particular apple α , and, on the other, to a cerebral representation of α , say r_α . Of these three items $(\tau_n, \alpha, r_\alpha)$, only the apple α would have the non-physiological character which -- in the chosen framework -- is necessary to be a referent. Now, as r_α is cerebral, it can safely be said to satisfy ESC (in the given ontological framework). Consequently, r_α can be part of the perceptual experience in the context of which τ_n is formed, something which clearly is not the case for the apple. If therefore ESC is correct then we have, in my view, no alternative but to identify r_α as " α -as-introduced". The referent α (the apple) would hence be numerically distinct from α -as-introduced, and the tie between the two would be representational.

[4] To be able to accommodate such a situation I propose to use " α -as-introduced" in a technical sense which is ontologically flexible as it is neither meant to imply that α and α -as-introduced are numerically identical, nor that they are different. To illustrate this further, let me briefly suggest possible interpretations of "referent" and "referent-as-introduced" in the context of three specific theories of (visual) sensory/perceptual experience.

[5] The first of the three theories I have in mind is the one proposed by Marr in his book Vision.⁶⁰ This theory is of the type characterized in [3], which means, in particular, that "referents" would be physical in nature. To give a precise interpretation of "referent-as-introduced" in Marr's theory, and also to place Marr's theory in the context of the envisaged account of referent-introduction, let me make two remarks concerning the general nature of Marr's theory. First, Marr bases his description of visual processes deliberately on a conceptual scheme which is neutral with respect to the type of physical system within which these processes are taken to evolve. His intention is to give what he calls a "computational theory" of vision which is independent of how these computational processes are physically implemented. Marr's theory is, in a sense, a generic account of vision, but it is not ontologically neutral in our sense: it is a generic account of vision within a determined ontological framework. One must keep in mind that Marr's perceptual processes are physical in nature, in particular when reading their generic description in terms of "being a mapping from one representation to another"⁶¹ -- where "representation" is meant to refer to "a formal system for making explicit certain

⁶⁰ Marr, [1982]

⁶¹ op.cit. p.31

entities or types of information, together with a specification of how the system does it."⁶²

The second point arises from the fact that visual-processes -- in Marr's sense -- are hierarchical transformations of an initial representation. This initial representation

"in the case of human vision [...] consists of arrays of image intensities as detected by the photoreceptors in the retina."⁶³

He describes this initial representation as an "image" and justifies this by explaining that:

"the items that are made explicit [in this image] are the image intensity values at each point in the array, which we can conveniently denote by $I(x,y)$ at coordinate (x,y) . In order to simplify our discussion, we shall neglect for the moment the fact that there are several different types of receptor, and imagine instead that there is just one, so that the image is black-and-white. Each value of $I(x,y)$ thus specifies a particular level of grey [occurring at (x,y)]"⁶⁴

Marr's description of the transformations of such images occurring in the process of vision suggests that the task which I shall associate with "individuating/identifying-processes"⁶⁵ is carried out by these transformations.

This means -- as we shall see when we discuss these individuating/identifying-processes -- that, in Marr's

⁶² Marr, [1982], p.20

⁶³ op.cit. p.31

⁶⁴ ibid. p.31

⁶⁵ cf. 2.2.1

Table 1. Representational framework for deriving shape information from images. (Marr, [1982], p.37)

Name	Purpose	Primitives
Image(s)	Represents intensity.	Intensity value at each point in the image
Primal sketch	Makes explicit important information about the two-dimensional image, primarily the intensity changes there and their geometrical distribution and organization.	Zero-crossings Blobs Terminations and discontinuities Edge segments Virtual lines Groups Curvilinear organization Boundaries
2½-D sketch	Makes explicit the orientation and rough depth of the visible surfaces, and contours of discontinuities in these quantities in a viewer-centered coordinate frame.	Local surface orientation (the "needles" primitives) Distance from viewer Discontinuities in depth Discontinuities in surface orientation
3-D model representation	Describes shapes and their spatial organization in an object-centered coordinate frame, using a modular hierarchical representation that includes volumetric primitives (i.e., primitives that represent the volume of space that a shape occupies) as well as surface primitives.	3-D models arranged hierarchically, each one based on a spatial configuration of a few sticks or axes, to which volumetric or surface shape primitives are attached

framework , "referents-as-introduced" will have to be used to refer to items in what he calls the "3-D model-representations".⁶⁶

[6] The second theory which I wish to consider is that of
 5 J.J.Gibson as discussed in his book The Ecological Approach to Visual Perception.⁶⁷ As in Marr's case, Gibson clearly describes his theory within an intuitive physical framework, that is to say, he presupposes for his account an intuitive physical reality. Embedded in
 10 this physical reality, there is -- according to Gibson-- a higer-order sub-structure, which he describes in terms of a "medium"⁶⁸ carrying (optical) "information", a term itself described as a structured "array of ambient light".⁶⁹ Gibson distinguishes between material objects
 15 and these higher-order physical entities, and these he sometimes refers to as "invariants"⁷⁰. Material objects are taken to stand in a relation with these invariants which Gibson describes as the invariants specifying the corresponding material objects. Moreover, this higher-
 20 order structure given in the optical array is defined in terms of "points of observation", and thus can accom-

⁶⁶ cf. Table 1

⁶⁷ Gibson, [1986]

⁶⁸ op.cit. Chapter II

25 ⁶⁹ ibid. Chapter IV

⁷⁰ "[...] there are no material objects in an array but only the invariants to specify objects [...]"(ibid. p.102)

moderate a certain subjectivity of higher-order elements. This suggests that in Gibson's theory, the notion of a "referent" would have to be applied to material objects qua (lower-order) physical entities, while that of a "referent-as-introduced" could -- if at all -- only be used to refer to the higher-order invariants as "picked up".⁷¹ The tie between referents-as-introduced and referents in the Gibsonian account would hence essentially be that between a specifying higher-order invariant and the specified material object.

[7] Finally, in Goodman's phenomenalist theory of experience, "things" -- which I suppose would be the natural interpretation for our "referents" -- are complexes of actual and possible presentations, each of which meant to be a complex of concreta ("smallest distinguishable particle[s] of phenomena"⁷²). In Chapter V, I shall return to this phenomenalist conception of "things", for the moment let me just suggest that in this system, "referents-as-introduced" would have to be interpreted as actual presentations/appearances. In this case, the tie between referent-as-introduced and referent would simply be the part-whole relation.

⁷¹ I believe that Gibson's higher-order invariants (even "as picked up") lack the necessary "subject-specificity" to satisfy ESC, and consequently I do not believe that this theory is satisfactory. For similar reasons I also reject the so-called "naive realist" theories of perception.

⁷² Goodman, [1951], p.148

2.2 Referent-Introduction

2.2.1 Introduction of Particulars

When I pointed out⁷³ that adopting the propositional content conjecture has no essential consequences for the overall project of giving neutral accounts of sensory/perceptual experience, I did not mean that this conjecture would leave no trace in the way in which these neutral accounts will actually be described. Indeed, in the conception of sensory/perceptual experiences_P as given in 2.1.2 [12] we have, for example, that certain experiential particular thoughts are meant to be constituents of these experiences, due to this conjecture. In this section I shall begin to discuss a theory of experiential term-introduction which is ultimately meant to show how the formation of such experiential particular thoughts can be a part of creating the relevant sensory/perceptual experiences_P. The general aim of this theory will be to support the propositional content conjecture (and with it our conception of sensory/perceptual experiences_P), but at the same time it will be meant to provide a more detailed description of the structure of these experiences, in view of the envisaged neutral accounts.

Let us first of all look at the case of (experiential) term-introduction in the subject mode. Given the

⁷³ cf. 2.1.2, [11.5]

account of the preceding section, I also suggest that we focus on the introduction of referents.⁷⁴ In keeping with our previous practice, let us first see whether our formal account gives us any clues as to the nature of this type of referent-introduction. Even though the 1st-order predicate formalism is not concerned with how formal interpretations are achieved, it emerges clearly from the classical conception of formal referent-structures that the only relevant aspect of those formal referents which can be introduced into meaningful formulae in the subject mode (namely formal individuals) is taken to be their identity. This, I believe, points towards one of the fundamental features of referent-introduction in the subject mode -- and indeed of term-introduction in general: referents-as-introduced must be what, for the lack of a better term, I shall call

- [1] **logical objects**, by which I mean items which are subject to an identity-relation.⁷⁵

Thus, it is reasonable to say that

- [2] a term-as-introduced (in the subject mode) must be thought of (by the relevant subject) as being a logical object.

⁷⁴ see 2.1.2, [8.3]

⁷⁵ It might be objected that this notion of a "logical object" is meaningless in the sense that it does not exclude anything. However, in 6.1.1 I shall argue that this is not the case.

The consequence which I wish to draw from [2] for the envisaged theory of experiential referent-introduction can be described on two different levels.

[3.1] On the **personal level** -- that is in terms of "capacities of thinkers" -- [2] can be read as implying that in order to establish reference⁷⁶ to a given referent α , a thinker P must "grasp the particularity of α ".

By this I roughly mean that P becomes aware of α as being an item which falls under some particular identity-relation applicable to α .⁷⁷

[3.2] On the **sub-personal level** -- that is the level of processes which create (experiential) particular thoughts -- [2] can analogously be read as implying that, in order for a particular thought process to introduce a referent α , it must involve an "**identifying-(sub-)process**", meant to bring about the state of affairs described in [3.1].

More precisely, for an individual-as-introduced (into an experiential particular thought τ) β to be a particular referent-as-introduced, say α -as-introduced, the iden-

20 ⁷⁶ "Establishing reference" to a given referent α is here taken to correspond to "creating a particular thought involving α -as-introduced".

25 ⁷⁷ In the course of these investigations, I shall suggest an intimate link between such identity-relations and type/category-concepts like 'material object' or 'event'; a link which will make it possible to paraphrase the statement that P is grasping the particularity of a referent α -- say an apple -- as P experiencing α as an individual subject to the identity-criteria of material objects.

tifying-process involved in creating τ must first of all be "capable of identifying α " (i.e. it must be applicable⁷⁸ to referents of the sort of α) and, secondly, it must have identified (picked out) α in the sense required for τ to be a particular thought about α .⁷⁹

Given that particular processes are meant to be "rule"-governed,⁸⁰ particular identifying-processes can be classified according to the "identifying-rule" which governs them. Accordingly, the capacity of a thinker to be involved in identifying-processes of a certain type requires that he "possesses" the relevant identifying-rule. How then are these identifying-rules, and identifying-processes linked to sensory/perceptual experiences_P? The idea here is that the introduction (into an experiential particular thought τ) of a referent α amounts, in some sense, to the "creation" of α -as-introduced, at least insofar as α -as-introduced is meant to be a part of the sensory/perceptual experience_P in the context of which τ

⁷⁸ Say, for example, if we use an objective interpretation of the independence of referents, these criteria must be compatible with the objective identity relation holding between referents of the sort of α .

⁷⁹ To avoid misunderstandings, let me emphasize that the notion of "identifying α " in this context is not meant to imply that, due to this identifying process, the thinker ought to become aware of some non-trivial particular identity relation involving α .

⁸⁰ Note in this context that I use the notion of a "rule" in a very general sense, namely that the transformation involved in the relevant particular processes are subject to (display) regularities of some sort (cf. 3.1).

is meant to be formed.⁸¹ Thus, I shall assume that "identifying-rules" can also be seen as referring to sorts of procedural regularities involved in bringing about sensory/perceptual experiences_P, themselves containing parts which are experienced as individuals subject to the relevant "rule"-specific identity criteria.

In the context of particulars,⁸² Strawson appears to equate the possession of something like identifying-rules with the possession of sortal concepts: He stipulates that a sortal concept supplies

"a principle for distinguishing and counting individual particulars which it collects. It presupposes no antecedent principle, or method, of individuating the particulars it collects."⁸³

Two remarks are necessary in this context: First, that the "collective tie" referred to here is the one between sortal concepts and their instantiations.⁸⁴ Second, Strawson uses the notion of a "sortal concept" exclusively as collecting particulars, and he describes sortal

⁸¹ According to the ontological flexibility which was attributed to the tie between α and α -as-introduced (cf. 2.1.3, [4]) this "creation" might be the creation of an individual numerically distinct from α , or simply a transformation of α , say in accordance with ESC (cf. 2.1.3, [2]).

⁸² Strawson characterizes "particulars" as individuals which can only be introduced in the subject mode.

⁸³ Strawson, [1951], p.168

⁸⁴ The (empirical) extension of a sortal concept can hence be defined as the set of all particulars (sortally) collected by this concept.

concepts as roughly those concepts which are introduced, in his sense, by common noun phrases.

If Strawson's view is correct, then we are justified in concluding that

- 5 [4] identifying-rules are, in some sense, components ("functional aspects"⁸⁵) of concepts of a certain type, a type which, for the sake of reference, I shall call **term-introducing concepts**⁸⁶.

10 A consequence of this is, on the one hand, that identifying-processes now occur as guided by concepts⁸⁷ and, on the other, that each introduction of a particular α will be tied to a specific concept by means of which α is identified. Considering this conclusion, it seems reasonable to assume that if an individual-introducing concept, 15 say 'C',⁸⁸ is employed in the identification of a particular α , then this must somehow be reflected in the (experiential) particular thought into which α is meant to

⁸⁵ cf. 3.1

20 ⁸⁶ Strawson's account is solely concerned with particulars as individuals, and thus I shall accordingly reserve the notion of a "sortal concept" to individual-introducing concepts with particulars as instantiations.

⁸⁷ This supports their being (constituents of) "thought"-processes in the sense used on the personal level of description.

25 ⁸⁸ To distinguish concepts from natural language expressions, I shall denote the former by single quotation marks.

be introduced. Otherwise the tie between identifying-rules and concepts suggested in [4] would seem to be rather *ad hoc*. I therefore suggest that, in the above-mentioned context, α will be thought of as being a C.

5 In accordance with the propositional content conjecture, this is meant to be the same as saying that α is experienced, as being a C.

Given the necessity of identification for referent-introduction, this entails that

10 [5] a referent α which is introduced into thought/experience must be thought of/experienced, by the subject, as an instantiation of a term-introducing concept 'C' which can be used to identify α .

15 This statement does not imply that, intuitively speaking, α is a C, since the requirement for establishing reference to a particular, say α , by means of a concept 'C' is not that α actually is a C, but merely that the "identifying-rule" given with 'C' is applicable to α . For example, my thinking of/experiencing a funnily shaped bush at a
20 distance in front of me as a camel does not mean that reference to the bush has not been successfully established, but merely that we are dealing with an incorrect referent-introduction.

Another consequence of this account concerns the specification of what we have referred to as "term-introducing thought components": Given the rôle attributed to term-introducing concepts in the context of referent-introduction, it seems reasonable that the concept by means of which a particular referent is introduced ought to be reflected in our terminology for the involved items.

[6] Therefore, if a particular referent is introduced by means of the concept 'camel', I shall refer to the involved term-introducing component as a "'camel'-introducing" one.

Normally, I shall assume that this sort of specification is implicit in our notation for term-introducing components in that we use the expression "C" to denote 'C'-introducing components (e.g. in the above case "This camel"_n) but it must be emphasized that this need not be the case. There can be situations where "This camel"_n must be taken as denoting, for example, an 'animal'-introducing component, say, in cases where a thinker misuses linguistic expressions. However, in order not to complicate matters unduly, I shall in general focus on the above-mentioned normal case.

The theory of referent-introduction (in the subject mode) emerging from these remarks appears to be -- at least in its description on the personal level -- of the "sort-

alist", ("conceptualist") type which Ayers⁸⁹ objects to. Let me therefore end this introductory account of experiential term-introduction with a brief discussion of the more relevant of these objections.

5 The first of the objections which I wish to discuss is introduced by Ayers with the following statement:

10 "it is [...] indisputable that if a speaker indicates something, e.g. demonstratively, then in order for other people to catch his reference, and to understand what he is indicating, they must know, at some level of generality what kind of thing he is intending to indicate. They must know what category of thing it is: whether it is an event, a physical object, a quality or whatever. It is [...] impossible to think about something without knowing that much about it. [...] Must it also be known [...] that [the object of reference] is specifically an explosion, a cricket-match or a fit of anger?"⁹⁰

20 Ayers does answer this question affirmatively in the context of events,⁹¹ but he rejects the claim (which he attributes to sortalist theories) that this must be the case in general. More precisely, he rejects the specific version of this claim (say "claim_T") arising in the context of physical objects, or "things" in the narrow
25 sense.

⁸⁹ Ayers, [1974]

⁹⁰ op.cit. pp. 113 f

30 ⁹¹ "If someone says no more than 'It will be over in one hour's time,' he would naturally be taken to speak of an event or process, but it will be impossible to know whether his assertion is true unless we know more: e.g. that he was referring to the bombardment rather than to the battle or to the war. Likewise we cannot count *events* merely, we must know what sort of event to count." (ibid. p.114)

My answer to this objection is that, at least in the sortalist theory arising from our account of referent-introduction, claim_T is never made. To show this, we need only look at what claim_T would amount to in the framework of our theory: Ayers' exposition of claim_T is given in epistemological terms involving a speaker-hearer context. With respect to experiential referent-introduction, claim_T would seem to imply⁹² that the introduction of a referent α presupposes, in general, the possession (by the thinker) of a term-introducing concept which collects α (in Strawson's sense). Given our discussion of [5], this is clearly not the case,⁹³ which means that claim_T does not hold in our conceptualist theory of experiential referent-introduction.

In this context, let me just point out that Ayers' initial claim (concerning the impossibility to think about something without knowing what category of thing it is), is satisfied by our theory of experiential referent-introduction: it follows from [5] that the introduction of an referent α presupposes the possession (by the thinker) of an identifying-rule which is applicable to α , and it will also emerge from our discussion in 6.2 that the

⁹² My assumption here is that a thinker cannot know that something is C, without possessing the concept 'C'.

⁹³ All that is necessary is the possession of a term-introducing concept by means of which α can be identified.

identifying-rule associated with an individual-introducing concept reflects, or even determines, the category of items which this concept applies to.

5 The second type of objection which Ayers puts forward is based on what he considers to be an unjustifiable concept-based arbitrariness in the conceptualist's account of the identity of material objects, and consequently he proposes what he calls a "realist" alternative to conceptualism. Ayers' objections in this
10 context are concerned with the question whether the identity of material objects is the product of conceptualization or whether it is what he calls "real", that is independent of any such activity. Ayers clearly rejects the first alternative in favour of the second,⁹⁴ and sees
15 this as a rejection of conceptualism in general. However, even if one succeeds in demonstrating that the identity of material objects is not the product of conceptualization, one has by no means shown that conceptualist accounts in general are incorrect: All that
20 such a demonstration could succeed in showing is that conceptualist accounts are incorrect if they are "ontologically committed" to the thesis that the identity of material objects is the product of a conceptualization. The fact, however, that our conceptualist theory of

25 ⁹⁴ Ayers' "realist alternative" amounts, in essence, to adopting a determined ontological framework which treats referents as objective items.

experiential referent-introduction can without reservations be interpreted in terms of objectively existing referents, shows that the ontological commitment which Ayers argues against is not a necessary component of conceptualist theories in general. Thus, even if Ayers succeeds in showing that his "realist" ontological commitment is the correct one, he is in no position to reject conceptualism in general.

Another question is, of course, whether Ayers' argument against the conceptual nature of the identity between material objects are indeed conclusive. Let me briefly sketch why I believe Ayers' argument is inconclusive: In 6.1, I shall argue that "identifying-rules" can only be applied to features which already display some kind of unity.⁹⁵ It should therefore not be surprising that the nature of this unity can limit the degree of freedom for defining identifying rules which are meant to be applicable to such units of a given sort, and hence limit the arbitrariness of the conceptual introduction of identity. Even if we adopt the ontological commitment that the identity of material objects is the product of conceptualization, our conceptualist theory will not subscribe to the kind of arbitrariness which Ayers attacks. Again, it

⁹⁵ In the case of material objects, this unity can, as I shall argue, be described in terms of spatio-temporal coherence, boundedness and substantivity, features which as such are essential to the formulation of the identity criteria for material objects.

seems to me, Ayers has based his arguments against conceptualism on incorrect assumptions about the general nature of conceptualist theories.

2.2.2 Elementary Identity Thoughts

5 In this final section of Chapter II let me now bring
together some of the features so far introduced by
exemplifying them in the context of what I shall call
elementary identity thoughts. As the terminology
suggests, elementary identity thoughts are meant to be
10 (experiential) particular thoughts with a logical form
which can be formally represented by elementary identity
propositions, i.e. by formulae of the sort $a_1=a_2$. In
terms of the notation introduced in section 2.1.1, this
type of thought will typically be of the form

15 [1] $\tau_1 \equiv "A \text{ is identical with } B" \mid "A"_{1\dots}, "B"_{1\dots}].$

My aim in this section will, in particular, be to
illustrate that our theory of experiential referent-
introduction suggests certain results concerning the
"meaningfulness" of these thoughts.

20 For this purpose, I shall adopt the temporary working
hypothesis that τ_1 can only be "meaningful"

[2.1] if both "A"₁ and "B"₁ succeed in introducing a particular reference⁹⁶ into τ_1 , and

[2.2] if there is a decision procedure concerning the identity/non-identity of the two individuals-as-introduced.

5 If we assume that "A"₁ introduces a referent α (and likewise with "B"₁ and β) and that the introduction of α is achieved by means of the term-introducing concept 'A' (resp. 'B' in the case of β), then I suggest that

10 [2.2*] the second of the above-mentioned requirements simply amounts to a requirement concerning the compatibility between the identifying-rule associated with 'A' on the one hand, and that associated with 'B' on the other.

Let me illustrate this with two examples. First, take the particular thought

15 [3] $\tau_2 \equiv$ "This camel is identical with this animal"₂,
with "This camel"₂ taken to be a 'camel'-introducing component of τ_2 , and "This animal"₂ taken to be an 'animal'-introducing one. Since we can also legitimately assume⁹⁷ that

20 ⁹⁶ Let me emphasize here that this requirement is described in terms of "introducing a particular reference" -- as opposed to "introducing a particular referent" -- for only the former type of description admits the possibility of meaningful
25 particular thoughts about so-called "intentionally nonexistent" entities.

⁹⁷ cf. 6.2.1

[3.1] the identifying-rule associated with 'camel' is indeed
the same as the one associated with 'animal',

we can conclude that τ_2 is a perfectly meaningful
 thought, for it will be possible (for the thinker) to
 5 apply the involved identifying-rule to the two refer-
 ents-as-introduced into τ_2 . This remains the case even
 if neither of the referents is actually an instantiation
 of the sortal concept by means of which they have been
 introduced, as long as the identifying-rule in question is
 10 applicable to both of them. Thus, if both "This camel"₂
 and "This animal"₂ refer to the same bush it would
 probably be the case that the thinker concludes that τ_2
 is true, i.e. that it correctly describes a state of
 affairs. This would obviously be a misjudgment, but
 15 nevertheless a meaningful one.

The second example, namely

[4] $\tau_3 \equiv$ "This sunset is identical with this chair"₃

would, on the grounds of [2], have to be "meaningless".
 Even if we assume that both references are successful
 20 and correct, it will not be possible for the thinker (and,
 for that matter, for anyone else) to decide whether the
 (putative) identity-assertion holds or not, because

[4.1] the event-identifying-rule is not applicable to material
 objects and neither is the material-object-identifying-
 25 rule to events.

One might wish to say that the assertion produced in τ_3 should simply be classified as being false, but this would not do justice to a fundamental difference between τ_3 and τ_2 -- a difference which would hold even if

- 5 [4.2] "This camel"₂ and "This animal"₂ introduce two different referents.

This difference (given by [3.1] and [4.1]) emerges clearly if one adopts what might be called the "principle of experiential variance", namely that

- 10 [5] experiential elementary identity thought of the type⁹⁸ given in [1] can only be "meaningful" if, for any sensory/perceptual experience e_n it holds that an experiential term-introduction (in the context of e_n) by means of 'A' is possible iff an experiential term-introduction by means of 'B' is possible (in the context of e_n).

- 20 Now, while τ_2 appears to satisfy this principle, τ_3 certainly doesn't, for if e_n is a purely tactile experience, it is, in principle, possible to establish reference by means of 'chair', but impossible to do so by

⁹⁸ The "type" here is determined by the involvement of the term-introducing concepts 'A' and 'B' (respectively their identifying-rules).

means of 'sunset'.⁹⁹ If one believes that [5] is intuitively plausible (as I do) then one can conclude that τ_2 (as described in [4.2]) is meaningful but false/incorrect, while τ_3 is simply meaningless.

5 On the basis of this discussion of elementary identity thoughts it might be objected that our theory of referent-introduction is plainly circular. After all, the association of truth-values to such thoughts presupposes (in the context we are considering here) the
10 introduction of referents, which in turn was said to involve an identification of the involved referents. My reply to this objection is to re-emphasize a distinction which I have already tried to make in the description of identifying-processes,¹⁰⁰ namely that "identifying a
15 referent α " must be seen as grasping the particularity of α , and not be confused with forming a (non-trivial) elementary identity thought about α . The identification of α achieved in the introduction of α need not be more than the elementary self-identification of α by means of
20 the relevant identifying-rule. That is to say, in the terminology associated with the personal level, the identification of α need not be more than the thinker's being aware of α as being identical with itself as a C.

25 ⁹⁹ The idea here is that any experiential particular thought about sunsets formed in the context of purely tactile experiences must be meaningless due to referential failure.

¹⁰⁰ cf. 2.2.1

As a final point in this context, let me just make one remark with respect to a passage in Ayers' paper where he describes a dispute between conceptualists concerning the function of the "covering concept" in identity-statements. This passage reads:

"Some hold that the 'covering concept' completes, in each proposition, the incomplete concept of identity, determining, as it were, the kind of sameness involved; while others strongly deny that identity itself is an incomplete concept, preferring to locate the function of the covering concept within the acts of reference necessary to any identity statement. On the latter view, simply in order to have something definite in mind, we must know what kind of thing it is essentially."¹⁰¹

Ayers attributes the first view to Geach¹⁰² and the second one to Quine.¹⁰³ This passage -- which confirms my view that our account of referent-introduction must be "conceptualist" in Ayers' sense -- raises the question concerning the position of our account of elementary identity thoughts with respect to this controversy. All that I can say here is that our account offers a third alternative: While the "covering concepts" -- in our account referred to as "term-introducing concepts" -- are definitely assigned a rôle in the acts of reference, our account also takes them to determine the "kind of

¹⁰¹ Ayers, [1974], p.113

¹⁰² Geach, [1967]

¹⁰³ Quine, [1961], pp. 67 f

sameness" involved, and thus also takes the concept of identity to be incomplete in some sense.¹⁰⁴

¹⁰⁴ In our second example, i.e. [4], we have a case where the view that the rôle of "covering concepts" is restricted solely to acts of reference fails to explain why τ_3 is fundamentally meaningless.

III

TERM-INTRODUCING CONCEPTS

3.1 Concepts

In section 2.1.2, I mentioned that my defense of the
5 propositional content conjecture crucially depends on my
views of the nature of concepts. Having already used
concepts in the preceding chapter, let me now explain
these, in some respects, unorthodox views. My aim here
is not to give a definition of concepts, but merely to
10 describe some of their general characteristics.¹

In section 2.2.1, I suggested that the identifying-rules
which govern identifying-processes ought to be treated
as being "in some sense components of concepts of a
certain type".² Although this was meant to elucidate the
15 nature of these identifying-rules, it can equally be read
as a characterization of the nature of concepts of the
type referred to. More than that, this second reading
suggests the conception which says that:

[1] Concepts are complex functional items. They consist of

20 ¹ To use the set-theoretical metaphor of 2.1.2 [5], I shall
not attempt to delineate the boundary of all (actual/possible)
concepts, but only try to describe certain characteristics of
items which are meant to be given as elements of this set.

² cf. 2.2.1, [4]

different "rules" governing particular processes which shall be referred to as **concept-guided** processes.³

This means that a concept 'C' is meant to be an item which has different rules as constituents (hence the attribute "complex"). Each of these constituents can be associated with a specific type of function of 'C' (hence "functional"), namely that of guiding (governing) particular processes of the respective type.⁴ Amongst the different types of functions of concepts, it is possible to discern at least the following three:

[2] A linguistic function, which can be characterized in terms of "linguistic rules" governing the use of linguistic expressions.

[3] A logico-inferential function, which can be given by general rules of inference -- say, in the case of the concept being one of a logical connective -- or by inference-rules given in terms of the "position" within the lattice of semantic subordinations in the relevant conceptual scheme.

[4] A term-introducing function, by which I mean the rôle played by concepts in the (experiential) introduction of

³ As in the case of concepts, my aim here will not be to define these concept-guided processes.

⁴ The (minimal) connexion between a rule *R* and a particular process *p* referred to as "*R* governs *p*" is here meant to be that "*R*" denotes a type of regularities which, as such, is instantiated in *p*.

terms into thought. According to our discussion in 2.2, this term-introducing function is meant to involve what we referred to as identifying-rules.

This conception of the nature of concepts, and the above
5 list of what I shall call **functional aspects** of concepts, are in need of some clarifications. First, I must emphasize that this list is not meant to be "complete" in the sense that concepts could not be credited with other types of functions. Neither is it my claim that every
10 concept must have all the functional aspects occurring in the list. If, for example, we are dealing with a concept of a logical connective -- like 'and' -- it is plausible to say that such a concept does not have a term-introducing function in the sense of [4]. In section 3.2, on
15 the other hand, I shall try to show that it is reasonable to assume that there are **term-introducing concepts** -- by which I now mean concepts with such a term-introducing function -- which are pre-linguistic, i.e. which do not have a linguistic function in the sense of [2].⁵

20 The second remark concerns the nature of the rules associated with the functional aspects of concepts. The rules associated with a concept are not independent, but are, in some sense, "interactively tied" to one

25 ⁵ So, if there is a functional aspect in our list which is essential to concepts, it can only be the logical one, but this must remain a conjecture at this point.

another. This interactive tie might even be regarded as the "source of unity" of concepts, unifying them as complex functional items.⁶ I must emphasize that the notion of a "rule", as employed in the above conception, is not tied to either the personal or the sub-personal level of description.⁷ All functional aspects (of concepts) can -- at least in principle -- be described on both levels.

To support the proposed conception further, let us briefly look at some passages from Toulmin's article "Concepts and the Explanation of Human Behaviour":

- [5] "In the course of learning about colors, a child picks up a complex constellation of associated skills [my emphasis]. Some of these involve overt linguistic acts; others (on the surface at least) are nonlinguistic in character. He learns to *match* blocks, or crayons, or fabrics by color; to *discriminate* objects of nearly the same color; to *name* the colors of objects; to *label* them; to *report from memory* the colors of objects he is no longer looking at; to *point out* objects in response to color words; to *arrange* them by hue shade or intensity, and so forth. All these skills commonly go together, and a child who learns most of them usually catches on to the remainder, with minor qualifications to cover such defects as red/green color blindness. Once the child has learned them all, we do not hesitate to say, "Now he knows about colors (has the concept of 'color')"; and we might even agree, though with some reservations, to say, "Now he has the concepts 'red', 'green', 'blue', 'yellow', and so on." But what if he does not pick up all the relevant skills? The operative question then is: "What proportion (or selection) of these skills must be acquired before we can agree that someone 'has the concept'?"⁸

⁶ This interconnexion between the rules -- and hence between the functions -- of a concept was the reason why I chose to use the term "functional aspect" in this context.

⁷ cf. 2.2.1, [3]

⁸ Toulmin, [1969], pp. 76 f

Even though the issue in this passage is not explicitly what concepts are, but what it is "to possess them", the view expressed clearly fits [1] insofar as concepts can be described as "complex constellation of rules".⁹ Toulmin furthermore claims that:

[6] "[...], successive stages in the acquisition of a concept are differentiated by characteristic language games; and what 'makes sense' in terms of the language games available at one stage may well be nonsense at another. Thus, the young child first learns to choose; that is, to perform an overt speech-act whose effect is to select one of a number of items, using (e.g.) the words 'I choose *this* one'. At this initial stage the instruction, 'Choose, but do not show which you have chosen' [...] will be unintelligible to him, since initially the acts of 'choosing' and of 'showing ones choice' are one and the same. Subsequently, new and more sophisticated language games are superimposed on the earlier and simpler ones: the child learns to defer the overt expression of his choice, or even to suppress it -- so creating the distinction, which had no sense for him previously, between the choice itself and its overt expression."¹⁰

This view suggests that concepts would have to be seen as stratified items in the sense of displaying a hierarchy in complexity, something which I shall also endorse in my conception of concepts. To make a final point in this comparison between my conception and Toulmin's (Wittgensteinian) views, I must emphasize a terminological difference: whereas Toulmin's notion of a rule ("rule_T") is used to make the distinction between the

[7.1] "rule-conforming character of [certain types of] be-

⁹ If a rule *R* (in our sense) is described on the personal level then it is possible to interpret the acquisition, possession or loss of *R* as the acquisition, possession or loss of a specific skill, and thus to accommodate what Toulmin says in our conceptual scheme.

¹⁰ Toulmin, [1969], p.82

haviour and the *law-governed* character of natural phenomena"¹¹

my notion of a "rule" is meant to be a generalization of both Toulmin's conception of a rule (i.e. "rule_T") and that of a law (say "law_T").

[7.2] A rule *R*, in my sense, is meant to be (a description of) a type of regularities, namely the type of those regularities which occur in particular processes "governed by *R*".

To illustrate this, let us consider the particular physical process which has as initial manifold ("initial state") the spatial configuration of material objects described as "an apple hanging from a tree", and which transforms this manifold in the way usually described as "the apple falling to the ground". Given the theory of gravitation, this particular physical process can be described as being governed by the rule known as "law of gravity". Of course it is important to make the distinction put forward by Toulmin, but

[7.3] in our conceptual scheme, this distinction is one between two sorts of rules, namely **normative rules** (for rules_T) and **law-like rules** (for laws_T).

Keeping in mind this terminological difference, let us then look at what Toulmin says about rules_T and laws_T:

[8] "Even today, many tough-minded academic psychologists regard human behaviour as comprising just one more type of 'natural phenomenon'; one that (to be sure) operates

¹¹ Toulmin, [1969], p.86

with its own mechanisms and is governed by its own laws, yet all of which (in principle) is capable of being analyzed scientifically by extending the simple physiological models involved in Pavlov's original work on conditioned reflexes. We are now in a position to challenge this assumption, and to question whether the program could be consistently carried through. As we shall see, in certain crucial respects the rules to which linguistic behaviour conforms differ from the laws of the physical sciences, and the learning by which linguistic skills are acquired is essentially more complex than conditioning by which law-governed reflexes are established. In the case of linguistic and language-associated behavior, then, any attempt to generalize the theory of conditioning threatens to destroy the essential character of language. And this same complexity must be respected also in the case of all those other skills, actions, and modes of behavior whose learning procedures in one way or another involve the use of language."¹²

Toulmin rejects the view that any of the skills, whose learning procedures involve the use of language, could be explained in terms of what I call law-like rules. My reasons for including [8] here is that it might be misinterpreted as implying a conflict with the conjecture which I shall put forward in the following section, namely that law-like rules can be constituents of concepts. To see that such a conflict does not arise, we only need to consider that Toulmin's account is exclusively concerned with skills which can be learned in some way or another. Accordingly, it is clear that his findings do not exclude the possibility that

[9] the acquisition and possession of concepts could involve -- in an essential way -- the possession of skills which cannot be learned, because they are associated with law-like rules as exemplified in [7].

¹² Toulmin, [1969], p.86

Indeed, I think that in the case of the concept of 'colour', this possibility must seriously be considered. In this case there is a skill, say S_v , which must be associated with a law-like rule and for which we can justifiably ask the (slightly modified) "operative question":¹³ "Can someone who does not possess S_v acquire the concept of colour?" This skill is, of course, the capacity to have visual sensory experiences.

¹³ cf. [5]

3.2 Thought and Perception

In this section I shall introduce, and try to give some grounds for a (possibly controversial) conjecture about the rôle of term-introducing concepts in experiential term-introductions. The conjecture is that this rôle goes beyond what we described as governing identifying-processes, because term-introducing concepts are also meant to govern what I shall call **individuating-processes**. By this I mean particular processes which, in a sense yet to be determined, are more fundamental than the identifying ones, and which are governed by law-like rules. This conjecture will have the effect of blurring, if not erasing, the traditional dichotomy between "thought processes" and "perceptual processes".¹⁴

The cognitive psychologist Elisabeth Spelke has conducted a series of experiments on object-apprehension in infancy which, in my view, supports the blurring of this dichotomy.¹⁵ Spelke's paper can be divided into two parts. In the first one she suggests that experimental evidence refutes the traditional theories of object apprehension.

¹⁴ The point here is that certain processes -- like the ones involved in S_v (cf. 3.1, [9]) -- which traditionally would be classified as "sensory", are meant to be concept-guided.

¹⁵ This view is based on some of the conclusions which Spelke draws from her experiments. The experimental basis for these conclusion is a matter of cognitive psychology, and hence cannot be the concern of this thesis.

In particular, she claims that her experiments refute Quine's view

- [1] "that the construction of objects begins with the acquisition of language and especially the emergence of activities such as naming and expressing quantification and identity."¹⁶

In the second, Spelke puts forward the thesis that objects are products of thought, and more precisely that "infants apprehend[...] objects by virtue of an object concept."¹⁷ The experiments by means of which she investigates this thesis are based on a proposal by Piaget that

"a true object concept enables one to keep track of the existence, the behaviour, and the location of objects that are fully hidden and to predict, to some degree, the future course of events involving those objects."¹⁸

She concludes that

- [2] "young infants have a four-fold conception of the physical world. Infants appear to endow the world with entities that are cohesive, bounded, substantial and spatio-temporally continuous."¹⁹

Whether or not Spelke's arguments against all the traditional theories of object-apprehension are conclusive is in my view questionable. For example, the alternative she proposes does not exclude Quine's thesis as put forward in [1], namely that the construction of

¹⁶ Spelke, p.4

¹⁷ op.cit. p.28

¹⁸ ibid. p.22

¹⁹ ibid. p.27

objects (and hence their apprehension) begins with the acquisition of language and specifically with the emergence of activities such as naming and expressing quantification and identity.

5 Quine's thesis is, according to Spelke, refuted by
experiments which show that infants must be credited
with object apprehension before the age of five months,
that is, well before they acquire the language skills
in question. Is this argumentation conclusive? I believe
10 not, for Spelke's refutation can be invalidated simply by
introducing a distinction between "infant-object-appre-
hension" as a precursor to "mature-object-apprehension",
and this can be achieved without harm to Spelke's thesis
that object-apprehension in general is concept-guided.
15 Let me try to illustrate this within our theory of
experiential individual-introduction.

To achieve the desired distinction between the two types
of object-apprehension in this framework, we must first
of all take seriously the distinction between mature and
20 non-mature particular thoughts.²⁰ To admit infant-
object-apprehension in our framework, we must allow the
possibility of there being particular thoughts which are
not sententially expressible by the thinker in question.
Furthermore, it seems reasonable to allow for the

25 ²⁰ cf. 2.1.1, [5]

possibility that these non-mature particular thoughts have "degenerate" logical structures, by which I mean that their logical structure deviates from what we considered to be the conventional logical structure of particular propositional thoughts.²¹ After all, it seems unlikely that infants have subject-predicate thoughts.²²

In 6.1, I shall try to explain why our account of individual-introduction into mature thought in terms of identifying-processes alone is incomplete. I shall argue that identifying-processes presuppose what I shall call individuating-processes, the function of which will roughly be to make the perceiver aware of the unity inherent in the items experientially apprehended by him. The emphasis on the notion of "items" here is supposed to reflect that the perceiver need not be aware of them as logical objects,²³ for this status is taken to be conferred upon the individuated units only by identifying-processes.²⁴ In 6.1 I shall say more about the distinction between individuated units and identified objects. For the moment let me just mention that

²¹ cf. 2.1.1, [6]

²² It might even be that these infant thoughts are constituted by a single particular reference.

²³ cf. 2.2.1, [1]

²⁴ Whereas identifying-processes enable the thinker to apprehend a referent as being subject to the associated identity-relation, individuating-processes enable a perceiver simply to apprehend the referent as a unit.

I consider the apprehension of mere units to be a type of interaction "between the world and the experiencing subject" which is fully sufficient to enable a re-action on the part of these subjects to what they have thus apprehended.

The way in which Spelke describes the apprehension of objects as observed in infants -- viz. in terms like "the infant [experiencing an] object as one connected unit"[p.6] -- suggests that the cognitive processes involved in Spelke's object-apprehensions are of this individuating type. This means that we can easily separate mature-object-apprehension from infant-object-apprehension in our theory of experiential individual-introduction: the mature type involves identifying processes as well as individuating ones, while infant-object-apprehension is achieved by means of individuating-processes alone.

Given this, it follows that Spelke's main thesis -- namely that the apprehension of objects in infancy is "achieved by means of concepts" ("involves the application of concepts") -- can be interpreted as the claim that

[3] individuating-processes, in the above sense, are concept-guided.

Spelke's main thesis can be seen as implying that there must be term-introducing concepts with an individuating

function. It also follows readily that Quine's thesis is compatible with this main thesis: Even though it is clear that the term-introducing concepts possessed by infants²⁵ cannot have a linguistic function, they equally clearly need not have an identifying function -- since infant-object-apprehension is taken to be achieved by means of individuating-processes alone. It is hence possible to assume (with Quine) that the identifying function of term-introducing concepts arises in the context of language acquisition, i.e. that mature-object-apprehension only comes about in this context.

In the final section of her paper, Spelke then draws some interesting conclusions concerning the traditional dichotomy between perception and thought. She starts by describing six traditional views on how these activities ought to be distinguished:

[4.1] "Perceptual systems are opaque to consciousness, [...] whereas systems of thought [are said to be] transparent."

[4.2] "Central cognitive systems are open to the influence of what we believe, [whereas] perceptual systems are *impenetrable* by explicit knowledge and thought."

[4.3] "Perception is partly innate whereas thought depends wholly on learning."

[4.4] "Perception is *passive* whereas thought is *active*."

[4.5] "Perception is *direct* involving no intermediate represen-

²⁵ To give an example of such infant concepts, I suggest that [2] is a description "in mature terms" of the infant-term-introducing concept of material object.

tations, whereas thought depends on representations and rule-governed inferences."

[4.6] "Perception is relatively simple whereas thought is complex."

5 Spelke individually rejects each of these proposals,²⁶
and instead concludes that:

10 [5.1] "if perception can be distinguished from thought, I
suggest, it is because human perceptual and cognitive
systems take different kinds of input and bring
different kinds of sense and order to experience. Human
perceptual systems appear to analyze arrays of physical
energy so as to bring knowledge of a continuous layout
of surfaces in a state of continuous change. We perceive
the layout and its motions, deformations and ruptures.
15 This continuous layout contains no spatially bounded
things and no temporally bounded *events*: Perceptual
systems do not package the world into units. The
organization of the perceived world into units may be a
central task of human systems of thought."²⁷

20 [5.2] "The parsing of the world into things may point to the
essence of thought and to its essential distinction from
perception. Perceptual systems bring knowledge of an
unbroken surface layout in an unbroken process of
change. Conceptual systems organize that layout into
25 things whose properties and relations specify where each
begins and ends, both within and beyond the immediately
perceivable world, and how different things are related
to one another."²⁸

Here, I disagree with Spelke insofar as she tries to
30 (re-) establish the traditional dichotomy between
perception and conception (thought). Of course, I do
not wish to negate the possibility of there being, on

²⁶ Again, I must leave the question open as to whether
35 Spelke's refutations of the six listed traditional views about the
dichotomy between thought and perception are correct.

²⁷ Spelke, p.30

²⁸ op.cit. p.31

the one hand, systems²⁹ which are experiential³⁰ but not conceptual, and, on the other, conceptual systems ("systems of thought") which are not experiential, but this does not mean that I have to embrace the traditional dichotomy. In accordance with my endorsement of the propositional content conjecture, my view here is that "thought permeates experience", meaning that there are certain systems of thought -- amongst them the ones described in [4]³¹ -- which are experiential. In hoping that I have managed to give some support for this view (and hence for propositional content) with this discussion of Spelke's findings based on the preceding account of concepts, let me now return to our construction of a formal representation of sensory/perceptual experiences_P.

²⁹ I assume here that Spelke's reference to "systems" can be translated as a reference to types of particular processes in our terminology.

³⁰ By "experiential" I mean here that the particular processes of the type in question contribute to sensory/perceptual experiences_P and, in particular, that their products are factors in determining the identity thereof.

³¹ The systems of thought described in [4] are, in my view, exactly of the sort which create experiential particular thoughts.

3.3 Many-Sorted Formal Referent-Structures

The "initial skeleton" of the formal representation of a sensory/perceptual experience_P e_n suggested in 2.1.2 [3] was given by a 1st-order predicate referent-structure $\Sigma_{e_n}^f$ (representing the sensory/perceptual manifold_P Σ_{e_n}) and a set of meaningful formulae $T_{e_n}^f$ (representing the experiential particular thoughts associated with e_n). In 2.1.1 [10], I mentioned that, strictly speaking, these meaningful formulae would have to be of a formalism which slightly differs from the one described in the introductory glossary. This formalism would have to distinguish between referential characters (like a, b, P) and reference-introducing symbols (say $[a]_1, [b]_2, [P]_3, [P]_4$). However, for the sake of notational economy, I shall henceforth assume that this is implicitly understood and continue to use just referential characters in the notation of meaningful formulae whenever the distinction in question is not crucial to the argument.

The aim of this section will be to adapt the "initial skeleton" to the account of experiential term-introduction as developed so far. In particular, the aim is to find a way of formally representing the fact that the identity of individuals-as-introduced is meant to be ("constructively") determined in using specific identifying-rules. My proposal to achieve this is to adopt a formalism which

- [1] allows a plurality of identity predicates as formal representations of identifying-rules, and
- [2] prescribes that any individual constant and -variable be associated with an identity predicate.³²

5 [3.1] If we choose to enumerate the identity predicates by means of natural number indices (i.e. $=_1, =_2, \dots$), then [2] can be given as:

10

$$\begin{array}{l} x_1, x_2, \dots : =_n\text{-individual variables} \\ / \\ x^n, y^n, \dots \\ =_n \backslash \\ c_1, c_2, \dots : =_n\text{-individual constants} \end{array}$$

[3.2] If the identity predicates are enumerated by capital Roman letters ($=_A, =_B, \dots$), then [2] is meant to be given by:

15

20

$$\begin{array}{l} a_1, a_2, \dots : =_A\text{-individual variables} \\ / \\ =_A \backslash \\ a_1, a_2, \dots : =_A\text{-individual constants} \end{array}$$

As for referent-structures, the proposed formalism is meant to allow a plurality of domains. The typical many-sorted referent-structure will be of the form

[3.3] $\Sigma = [A, B, \dots | \dots],$

25 ³² As such, this formalism is simply that of the so-called "many-sorted logics".(cf. Enderton, [1972], pp. 277 ff)

where $A=\{\alpha_1, \alpha_2, \dots\}$ and $B=\{\beta_1, \beta_2, \dots\}$ are domains (i.e. sets of formal individuals) which in their identity structure provide the interpretation for the different identity predicates. In this context we must adopt the convention that different identity predicates are assigned to different domains, for otherwise it seems impossible to make sense -- in a natural way -- of the notion of "different identity predicates". With respect to the notation given in [3.2], the formal interpretation³³ of identity predicates in the typical referent-structure will hence be:

$$[3.4] \quad \sigma(=A)=A, \quad \sigma(=B)=B, \quad \text{etc.}^{34}$$

The nature of our formalism is "static" as there is no formal notion of "creation" (or, for that matter, of "destruction", or "transformation") of features of referent-structures. An identifying-rule can only indirectly be represented in our formalism, namely by means of the products of the identifying-processes which are guided by the rule in question. An identity predicate, say $=A$, in this many-sorted formalism can only represent an identifying-rule R insofar as the formal interpretation $\sigma(=A)$ in any many-sorted referent-structure -- i.e. the domain A in the case of [3.3] -- can be

³³ cf. 0.2

³⁴ In accordance with this, I shall also assume the standard interpretation of individual characters: $\sigma(a_m)=\alpha_m$, $\sigma(b_m)=\beta_m$ etc.

regarded as a formal representation of a product of R -identifying-processes. Given then that in the context of experiential term-introduction, any element of such a product would have to be an individual-as-introduced (by means of R), we must adopt the formal convention that

[4] if a domain $\mathbf{X}$ in Σ_n^f (now taken to be a many-sorted referent-structure) contains an individual-as-introduced into a meaningful formula of $\mathbf{T}_n^f$ then all elements of $\mathbf{X}$ must be individuals-as-introduced (into $\mathbf{T}_n^f$),

if the envisaged formal representation of identifying-rules (and their tie to individuals-as-introduced) is to work.³⁵

³⁵ Note that this does not mean that all individuals of Σ_n^f must be introduced into meaningful formulae of $\mathbf{T}_n^f$.

IV

TOKEN-INSTANTIATIONS of TERM-INTRODUCING CONCEPTS

4.0 Introduction

At this stage in our investigations another auxiliary
argument, this time concerned with the nature of identity
relations, must be introduced. The aim of this auxiliary
discussion is, in a first instance, to show that par-
ticulars and types of particulars have identity relations
which are of fundamentally ("ontologically") different
types, and second, to characterize this distinction in
terms which make no reference to either particulars or
types thereof. In other words, the aim is to introduce a
distinction between what I shall call **token-identity**
relations and **type-identity relations** such that

[1] the identity between particulars falls under the first
category, and that between types of particulars under the
second one.

[2] Moreover, the identity relations mentioned under [1]
shall simply be paradigm examples of the introduced
categories.

To explain the aim of the second part of this chapter,
let us assume that this auxiliary aim has been achieved.
In this case we can justifiably say that

- [3] term-introducing concepts which can be used to introduce particulars (like the concept 'apple') are **type-token ambiguous**.

What I mean by this is that it is within the "scope of meaning" of, say, the sentence "This apple is sweet" that the term-introducing expression "This apple" can be used to refer to either a particular apple (a **token-individual**)¹ or a type of apple (a **type-individual**). To "disambiguate" the concept 'apple' in this respect, I propose to introduce two "ontologically determined versions" thereof, namely

- [4.1] the **sortal-concept** of apple ('apple^s'), meant to collect only particular apples, and

- [4.2] the **type-concept** of apple ('apple^x'), meant to collect only types of apples.

The aim of the second part of this chapter will be to support the claim that the term-introducing concept of 'colour', even though it is not collecting particulars, must nevertheless be credited with this sort of type-token ambiguity. Let us now begin the initially mentioned auxiliary analysis by looking at the nature of the identity predicate of the classical 1st-order predicate formalism.

¹ "Token- (type-)individuals" is obviously meant to refer to individuals subject to a token- (type-)identity relation.

4.1 Identity Relations

4.1.1 Quine's Account of Identity

A very clear exposition of the nature of the identity predicate as used in classical 1st-order predicate theories is given in the introductory chapter of Quine's book Set Theory & Its Logic.² The first part of § 1 in this book deals with what he calls "quantification theory". He defines as

"the logic of the outward forms of sentences which abstracts from all actual predicates of specific theories."³

My reasons for mentioning this are twofold: First it is important to see that Quine considers 1st-order predicate formulae not as representing sentences but "sentence schemata" with sentences as instantiations. Since we have chosen to take predicate constants (denoted by capital Roman letters) to represent the functions of actual predicates, I shall use capital Greek letters to denote Quine's schematic predicate letters.⁴ Although

"the atomic schema $\Phi(c)$ [my notation] may represent sentences of any degree of complexity [and] not merely [...] atomic sentences with simple explicit predicates in place of Φ ",⁵

² Quine, [1969]

³ op.cit p.12

⁴ This is simply an inversion of notation since Quine uses Greek letters to denote specific predicates.

⁵ ibid. p.10

the atomic formula $P_1(c_1)$, as occurring in a particular meaningful formula $\tau \equiv_m P_1(c_1) | \langle c_1, \alpha_1 \rangle, \langle P_1, P_1 \rangle |$, is taken to describe the particular logical form of this formula, which in this case is genuinely atomic. The second reason is to point out that Quine uses "quantification theory" to refer to the classical theory of quantification, which is based on the classical 1st-order predicate language L_c , with classical "truth function" $\models_{cl}$.⁶

Quine starts his account of the classical identity predicate by mentioning Gödel's result⁷ that an adequate axiomatization -- with respect to the classical theory of quantification -- of identity is given by:

$$[J_1] \qquad (x)x=x$$

and all instances of the schema

$$[J_2] \qquad (x)(y) \ x=y \implies [\Phi(x) \implies \Phi(y)].$$

Given this classical axiomatization, he goes on to discuss cases in which the classical identity predicate can be defined:⁸

"Each specific theory has its basic vocabulary of predicates. These are called *primitive*, to distinguish them from further predicates that may be introduced by definition merely to afford abbreviations of complex sentences. Usually the primitive predicates are finite in

⁶ cf. 0.4

⁷ Gödel, [1930]

⁸ Quine's account is based on Hilbert, [1934], pp.373 f

number. When they are, we never count = among them; we can define this in terms of the rest."⁹

I shall omit the details of how this definition of the identity predicate can be achieved, and point out only that the proposed definition

[1] is restricted to finite languages, and

[2.1] "imposes a certain identification of indiscernibles",¹⁰ meaning that

[2.2] "the sense of $x=y$ given by the [...] definition [...] may or may not really be identity; this will depend on the interpretation adopted for the primitive predicates and the universe of quantification."¹¹

To put this differently, let me use the notation L^n for the set of all well-formed L -formulae with n free variables, and introduce the 2^n -order predicate $\text{Id}_L(X)$ given by

[Ji] $(x) X(x, x)$

&

[Jz] $(\Phi \in L^1) [(x)(y) X(x, y) \implies (\Phi(x) \implies \Phi(y))]$

-- where X is a predicate variable ranging over L^2 . The point made by Quine can then be re-described: for any L (finite and without identity predicate) it is possible to define, explicitly and "in purely universal terms", a formula $\Phi \in L^2$ which "fulfils the axiomatic requirements

⁹ Quine, [1969], p.13

¹⁰ Quine, [1960], p.230

¹¹ Quine, [1969], p.14

to serve as an L -identity predicate" -- i.e. for which it is the case that

$$[3.1] \quad \text{Id}_L(\Phi_{\bar{L}}).$$

However, whether $\Phi_{\bar{L}}$ really manages to "grasp" the identity relation of a given domain A -- i.e. whether

[3.2] the extension of $\Phi_{\bar{L}}$ in A really is the diagonal¹² of A (or, in accordance with [Ji], a proper super-set thereof)

-- depends on the interpretation of the primitive predicates and on the nature of A .

As an example where the definition manages to grasp the identity relation of a domain, Quine proposes the universe of real numbers as described in the language $L_{<}$ with $x < y$ as only primitive predicate. In this case, the defining formula $\Phi_{\bar{L}_{<}}$ satisfies

$$\Phi_{\bar{L}_{<}}(x, y) \implies (z)[z < x \iff z < y],$$

a fact which Quine interprets as endowing $\Phi_{\bar{L}_{<}}$ with the sense of the genuine identity of real numbers.

"But if the universe is taken as that of persons, and the predicates are interpreted in ways depending on nothing but people's income, then the proposed manner of defining $x=y$ will equate any persons who have equal incomes."¹³

Finally, Quine gives an example of a theory where the identity predicate $x=y$ must be added as primitive predi-

¹² The "diagonal of A " is the set $\{ \langle \alpha_i, \alpha_j \rangle \in A \times A \mid \alpha_i =_A \alpha_j \}$.

¹³ Quine, [1969], p.15

cate if it is to be available at all, namely the theory whose primitive predicates are $P_1, P_2, P_3, \dots$ each of them monadic and such that for each n :

$$(\exists x)[P_1(x) \& P_2(x) \& \dots \& P_{n-1}(x) \& \neg P_n(x)].$$

5 The reason I mention these examples is because -- together with [1] and [2] -- they not only suggest the way in which I shall introduce the distinction between "token" and "type" identity relations, but they also show that this distinction is not empty. The crucial feature in
10 this context is that the proposed definition Φ_{Σ} induces an L -specific Law of Identity of Indiscernibles. This means that the identity relation $=_A$ of the domain A of a given classical referent-structure Σ is only "canonically definable" in the finite language L if the respective L -specific Law of Identity of Indiscernibles holds in Σ . Roughly
15 speaking, I shall therefore use the compatibility with a "maximal" Law of Identity of Indiscernibles as the criterion for my distinction between type-identity relations (the ones which are compatible) and token ones
20 (the ones which are not). Since the identity relations between particulars were supposed to be the paradigm examples of token-identity relations, it will be possible to use the failure in Quine's second example in support for our distinction, while the success of the first
25 example will provide us with a example of a type-identity

relation distinct from the identity between types of particulars.

4.1.2 Type & Token-Identity Relations

After this introductory exposition of the identity
5 predicate in the classical 1st-order predicate formalism,
let us now proceed to introduce the distinction between
type and token-identity relations. The preceding section
suggests that the distinction I have in mind could not be
introduced if one assumes the notion of an "identity
10 relation" to be defined by the "laws of identity" as
formalized by [J₁] and [J₂].¹⁴ I shall hence, like Quine,
assume that we know which relations are the identity
relations of given universes of quantification. Having
said this, our aim is to introduce a type-token dichotomy
15 into the class of identity relations such that

[1.1] particulars (such as material objects) will be classified
as having token-identity relations, and

[1.2] types of particulars as having type-identity relations.

To achieve this -- and, more precisely, to find an
20 adequate criterion by means of which the desired
dichotomy can be introduced -- we must first of all try

¹⁴ Indeed, as it turns out, those identity relations which can be defined by means of these "laws of identity" will exactly be those which make up the class of type-identity relations.

to find appropriate characterizations of the identity relations of the putative paradigm classes, i.e. particulars and types of particulars. In the preceding section it was suggested that some form of the doctrine of Identity of Indiscernibles ought to be sufficient as criterion in this context. Indeed, it seems to be conceivable that the identity relation(s) between types of particulars are subject to some form of this doctrine, but is it possible to characterize the identity relation(s) between particulars as defying it?

In the course of his analysis of Monads,¹⁵ Strawson sets up an argument which, I believe, amounts to an affirmative answer of this question:

Monads are taken to be individuals for which "a certain form of the doctrine of the Identity of Indiscernibles is said to hold",¹⁶ and Strawson concludes from this "that the individuals of the system [i.e. the monads] are not particulars".¹⁷

I shall return to Strawson's argument at the end of this section. For the moment let me just discuss the Law of Identity of Indiscernibles which he uses. Strawson thinks that the only form of this doctrine worth discussing is:

[2] "it is necessarily true that there exists, for every individual, some description in purely universal, or

¹⁵ Strawson, [1951], pp.117 ff

¹⁶ op.cit. p.120

¹⁷ ibid. p.124

general terms, such that only that individual answers to that description."¹⁸

In order to compare this version of the Leibnizian doctrine with others, let me try to formalize [2]. To do so, we must first specify domains for both of the involved quantifications. In the case of "for every individual" the domain is obviously a specific identity structure (set) which I shall denote by **A**. Let me introduce a particular formal 1st-order predicate language L_A , whose semantics contains only classical referent-structures with **A** as domain.

To find an appropriate domain for the second quantification ("there is a description in purely universal terms") we must remember that

"a description of this type was what he [Leibniz] sometimes called a 'complete notion' of an individual. It was characteristic of a description of this type that it was a description of an individual, but also, in a certain sense of the entire universe."¹⁹

In the context of the desired formalization, this means that everything that can be said in universal terms about an element of **A** has to be included in what is to constitute its description. Clearly, we must interpret the notion of a "description" in terms of well-formed formulae of L_A . The requirement that these descriptions are to be in purely universal terms can be formally reflected by stipulating that individual-constants are

¹⁸ Strawson, [1951], p.121

¹⁹ op.cit. p.120

not to occur in their formal counterparts. Finally, to do justice to the complexity of these descriptions qua "complete notions", we must adapt the classical formalism as follows:

5 [3.1] Since we must be able to address all properties and relations of elements of A , we must allow the possibility that the linguistic apparatus L_A of L_A is infinite (indeed, non-denumerable).

10 [3.2] Given that, in general, complete notions can involve infinitely many universals, their formal counterparts cannot simply be open formulae. They can, however, be represented as sets (or "lists") of open formulae.

15 Let me represent **monadic descriptions** -- i.e. the kind which Strawson seems to have had in mind -- by sets of monadic open formulae $\Phi_n(x) \in L_A$, and denote these sets by Δ_n^1 , where the superposed index is taken to reflect the monadicity of the element-formulae. An individual $\alpha_0 \in A$ (as occurring in an L_A -referent-structure Σ) will be said to **answer** the L_A -description Δ_n^1 if and only if
20 $(\Phi_n \in \Delta_n^1) \Sigma \models_{cl} \Phi_n(\alpha_0)$. By adopting the conventions that

[3.3] $\Sigma \models \Delta_n^1(\alpha_0) \text{ iff}_{df} (\Phi_n \in \Delta_n^1) \Sigma \models_{cl} \Phi_n(\alpha_0)$, and

[3.4] $\Sigma \models (E \Delta_n^1) \Delta_n^1(\alpha_0) \text{ iff}_{df} (E \Delta_n^1 <_{\in} L_A) \Sigma \models \Delta_n^1(\alpha_0)$

it becomes possible for us to translate [2] into a formal statement, namely:

[4] *Necessarily* $(a_i)(\exists \Delta^1_h)(a_j)[\Delta^1_h(a_i) \ \& \ (\Delta^1_h(a_j) \implies a_i =_A a_j)]$.

Provided Strawson's argument -- or a suitable adaptation thereof -- is correct, we can conclude that if A is a domain of particulars, then [4] will not hold (for L_A).
 5 Using [4] as defining the type-token dichotomy would therefore satisfy our first desideratum ([1.1]), namely that particulars ought to have token-identity relations. But would the second desideratum ([1.2]) be fulfilled in this case?

10 One way of dealing with this question is by "approaching the type-token dichotomy from the side of the identity relations between types of particulars". This can be achieved by adapting the results of the preceding section concerning the definability of identity predicates to the
 15 formalism we have used above. To do so, let me introduce Quine's distinction between two kinds of discernibility of individuals in a classical language L :²⁰

[5] He calls two individuals α_1 and α_2 **absolutely discernible** (in L) iff_{def} there is a monadic formulae $\Phi_n \in L^1$ such that
 20 $\neg[\Phi_n(\alpha_1) \iff \Phi_n(\alpha_2)]$.

This notion can be directly adapted to our formalism by saying that

²⁰ Quine, [1960], p.230

- [6] α_1 and α_2 are absolutely L_A -discernible (in an L_A -referent-structure Σ) iff_{def} there is a monadic L_A -description Δ_A^1 such that

$$\Sigma \models \neg[\Delta_A^1(a_1) \iff \Delta_A^1(a_2)].$$

5 Quine then defines two individuals α_1 and α_2 to be **relatively discernible** in a given language L

- [7] "if some open sentence [from L] with two free variables is fulfilled by the two objects in only one order"²¹

$$\text{i.e.: } (E \Phi_n \in L^2) \neg[\Phi_n(\alpha_1, \alpha_2) \iff \Phi_n(\alpha_2, \alpha_1)].$$

10 To adapt this notion in terms of descriptions let us say that a set Δ_A^2 of diadic, purely universal L_A -formulae with $(\Phi_n \in \Delta_A^2) \Sigma \models \Phi_n(a_1, a_2)$ is a **relational description** (within Σ) of the ordered pair $\langle \alpha_1, \alpha_2 \rangle$. This enables us to define the "relative discernibility" (in Σ) of α_1 and α_2 as there being a relational description, describing $\langle \alpha_1, \alpha_2 \rangle$ but not $\langle \alpha_2, \alpha_1 \rangle$ (within Σ) or *vice versa*, that is:

- [8] α_1 and α_2 are relatively L_A -discernible (in Σ) iff_{def} there is a relational L_A -description Δ_A^2 such that

$$\Sigma \models \neg[\Delta_A^2(a_1, a_2) \iff \Delta_A^2(a_2, a_1)].$$

20 These two types of discernibility -- of which the former is stronger than the latter (i.e. [6] $\implies$ [8]) -- lead directly to two different versions of the Law of Identity of Indiscernibles, namely

²¹ Quine, [1960], p.230

[9] The Law of Identity of absolutely Indiscernibles:

Necessarily $(a_i)(a_j)[(\Delta^1)(\Delta^1(a_i) \iff \Delta^1(a_j)) \implies a_i =_A a_j]$.

[10] The Law of Identity of relatively Indiscernibles:

Necessarily $(a_i)(a_j)[(\Delta^2)(\Delta^2(a_i, a_j) \iff \Delta^2(a_j, a_i)) \implies a_i =_A a_j]$.

5 Of these two versions, the former is clearly the stronger one,²² which means that:

[11] the class of type-identity relations introduced by means of [9] would be a subclass of the one introduced by [10].

10 Due to the modifications adopted in [3], the Law of Identity of absolutely Indiscernibles is equivalent to Strawson's version as formalized in [4].

The reason for introducing the weak version of the Law of Identity of Indiscernibles ([10]) is that it is a
 15 necessary and sufficient condition for what I shall call the **canonical describability** of identity relations. What I have in mind is that -- on the basis of the identity
definitions discussed in the preceding section -- it is
 possible to construct a relational L_A -description $\Delta \bar{E}_A$ in
 20 universal terms (excluding the identity predicate $=_A$) such that:

²² $\text{type}_{[9]}(=_A)$ -- defined as [9] holding for L_A -- implies that $\text{type}_{[10]}(=_A)$.

Necessarily $(a_i)(a_j)[\Delta_{L_A}(a_i, a_j) \iff a_i =_A a_j]$,
iff

the Identity of relatively Indiscernibles holds for L_A .

In other words, it is possible to describe $=_A$ canonically
iff L_A satisfies [10]. If the Law of Identity of rela-
tively Indiscernibles [10] is used to introduce the type-
token dichotomy, then the class of type-identity relations
would be the class of canonically describable identity
relations. Given that identity relations which are
definable (in the sense of the preceding section) are
also describable in the above sense, we would have that
the identity relation between real numbers is a type-
identity relation.²³

Indeed, if we take the notion of a "type" in its technical
sense -- i.e. as referring to classes with certain logical
characteristics²⁴ -- we can furthermore conclude that
the identity between types (namely, the extensional
identity relation between sets) would be classified by
[10] as a type-identity relation.²⁵ An introduction of
the type-token distinction by means of [10] does fulfil
the initially stipulated desideratum ([1.2]) that the

²³ cf. 4.1.1

²⁴ cf. Sommers, [1967]

²⁵ In analogy to the case of real numbers, the canonical
definition $\Phi_{\bar{=}}$ of the identity predicate in the language with $x \in y$
as sole predicate satisfies

$$\Phi_{\bar{=}}(x, y) \iff (z)(z \in x \iff z \in y),$$

which I take as sufficient to conclude that $\Phi_{\bar{=}}$ defines the
genuine identity relation between sets.

identity between types of particulars is to be classified as a type-identity relation.

5 A conceivable drawback of using [10] as the distinguishing criterion between type and token-identity relations is that, due to [11], the identity relation between particulars might be classified by [10] as a type-identity relation. To show that this is not the case, let me finally turn to the initially mentioned argument by Strawson, and show the way in which it can be adapted
10 to demonstrate the token-nature of the identity between particulars, regardless of whether [9] or [10] is used to define the type-token dichotomy.

Strawson wants to refute in his argument the doctrine that

15 "each monad represents the entire universe from its point of view"²⁶

where the notion of a "point of view" is taken literally.

The crucial point which he puts forward against this doctrine is that

20 "It is necessary only to imagine the universe in question being repetitive or symmetrical in certain ways in order to see that there might be numerically different points of view from which the scenes presented would be qualitatively indistinguishable even though they com-
25 prehended the entire universe."²⁷

²⁶ Strawson, [1951], p.121

²⁷ op.cit. p.122

Strawson's argument is based on the possibility of conceiving a universe with a symmetrical spatial structure, and this same possibility forms the basis of my adaptation. I take it that the notion of "symmetry" itself implies that any universe with spatial symmetries must have at least two numerically different "symmetric" locations, say σ_1 and σ_2 , which are indiscernible with respect to spatial qualities and relations. To be more precise, let me use " L_s " to denote the totality of notions pertaining to universal Spatial²⁸ terms. If a universe U has Spatial symmetries, then there must be two numerically distinct locations σ_1 and σ_2 which are relatively L_s -indiscernible in U ,²⁹ i.e.

$$[12] \quad (\Delta_n^2 \in L_s) \quad U \models \Delta_n^2(s_1, s_2) \iff \Delta_n^2(s_2, s_1)$$

My adaptation of Strawson's argument can then be concluded by adopting what -- in analogy to physics -- might be called a "co-variance principle": Even though the spatial characteristics of locations could, in general, impose some restrictions on the sort of particulars they admit, these restrictions must be the same for symmetric

²⁸ "Space" and "Spatial" here are used in the context of the space inhabited by particulars.

²⁹ If Space is absolute, then [12] is sufficient to conclude that its "points" are token-individuals. However, I must stress that the argument I am suggesting here is quite independent of whether Space is absolute or relational.

locations.³⁰ For any two symmetric locations σ_1 and σ_2 holds that a particular could be located at σ_1 if and only if it could be located at σ_2 .³¹

Given this co-variance principle, it is not difficult to show that there can be two numerically distinct, but "qualitatively indiscernible" -- i.e. relatively indiscernible with respect to non-spatial characteristics -- particulars being located in symmetric locations σ_1 and σ_2 respectively. From the nature of symmetric locations and the presupposed "qualitative" indiscernibility, it directly follows that, in a universe with a symmetrical Spatial structure, it is possible to conceive of two numerically distinct particulars which are relatively indiscernible with respect to all possible qualities and relations.

Provided that this adaptation of Strawson's argument is itself correct, and that we can indeed conceive of symmetrical Spatial structures, the definition that

[13] an identity relation is a **type-identity relation** iff_{def} it satisfies the Law of Identity of relatively Indiscern-

³⁰ Note that implicit in this conception of the tie between particulars and locations is the assumption that the occurrence of a particular at a location is a matter of contingency; that is to say that particulars cannot be necessarily tied to locations.

³¹ It might be that certain simultaneity conditions need to be added in this equivalence, but this would not change the overall structure of our argument.

ibles (otherwise it shall be called a **token-identity relation**),

satisfies our initial desiderata. It classifies the identity relation between particulars as a token-identity, and that between types of particulars as a type-identity relation.

4.2 Type-Token Ambiguity of 'Colour'

Let me now demonstrate that the term-introducing concept of 'colour' is type-token ambiguous, and that it has token-instantiations (called colour-tokens) which are not particulars. I shall also describe the involvement of the token-concept of colour³² ('colour^t') in the formation of experiential particular thoughts and show that colour-tokens can be introduced into neutral accounts of sensory/perceptual experience_P.

4.2.1 Colour-Types

It seems to be uncontroversial that the "scope of meaning" of the concept 'colour' allows for the introduction of colour-types, that is of individuals which (as introduced) are subject to a type-identity relation. Examples of such colour-types can readily be found in, say, the qualities of material objects indicated by words such as "red", "blue", or "green". These qualities are universals, and generally taken to be subject to a type-identity relation:

"If one universal differs numerically from another,

³² The token-concept of colour is meant to be the "ontologically determined version" (see 4.0 [4]) which collects only colour-tokens. The reason why I use "token-concept" instead of "sortal-concept" is that the latter is meant to be reserved for concepts which collect particulars.

then it must be possible to state the difference in general, i.e. universal, terms."³³

I am not going to discuss whether this view is correct or not, but in conjunction with the discussion of colour-tokens which is to follow in the next section, I shall try to argue that, if there are indeed such colour-tokens, then we can also speak of colour-types which are not qualities of particulars: in this case it will be possible to indicate sorts of colour-tokens with our traditional colour words. Apart from universals which characterize particulars, the term-introducing concept of 'colour' could also be taken to have the force of introducing universals which are sorts of colour-tokens. Hence, we would have to distinguish two different type-introducing versions of the term-introducing concept 'colour': the one introducing qualities of particulars, such as Material objects (denote by 'colour $\mathfrak{K}$ '), on the one hand, and the one introducing Sorts of colour-tokens (denoted by 'colour $\mathfrak{S}$ ') on the other. To explain this distinction further, let us consider the assertion

[1] "This type of colour is beautiful"

made in the context of some visual experience. This assertion is clearly about a universal, but is it really necessary -- as it would be if we only admit 'colour $\mathfrak{K}$ ' as type-introducing version of 'colour' -- that this universal is a quality of particulars? If we assume that

³³ Strawson, [1951], p.127

[1] is about a quality of particulars, then it could presumably be paraphrased as

[2] "The colour of this (these) particular(s) is beautiful."

5 The issue in question would then be whether [2] is necessarily a correct paraphrase of [1]. I do not think that this is the case: By assuming, for example, that the visual experience in question is a "completely hallucinatory" one, we would have a situation where it could plausibly be said that [1] is meaningful and [2] 10 meaningless (due to "referential failure").³⁴ If this argument is valid then we must admit type-introducing versions of 'colour' other than 'colour~~æ~~'. The question then is, what kind of types (universals) do these other type-introducing version of 'colour' introduce, and how 15 are they related to colour-qualities of particulars? The answer which I shall try to support in the following pages and in Chapter V is, of course, that they are sorts of colour-tokens.

20 ³⁴ The assumption here is, of course, that completely hallucinatory experiences do not allow ostensive references to particulars.

4.2.2 Colour-Tokens

Let me now show that

[1] we can meaningfully speak of colour-tokens -- i.e. of non-particular token-instantiations of 'colour' --

5 and also that the associated individual-introducing concept

[2] 'colour^c' can be incorporated into neutral accounts of perceptual experience.

10 For the sake of economy, I shall try to combine the arguments for both these points, but to do so I must make a few preliminary remarks. The way in which I shall try to justify [1] is to

[1.1] explain within an intuitive phenomenal framework (for S_F -accounts)³⁵ what I mean by "colour-token" -- namely
15 a specific sort of sensations --
and then

[1.2] demonstrate that these individuals are not only non-particular instantiations of 'colour', but also that they are subject to a token-identity relation.³⁶

20 ³⁵ cf. 1.1.3.3

³⁶ The way in which [1.1] will be carried out will -- in accordance with 1.1.3.3, [6.1] -- implicitly ensure the applicability of the proposed notion of "colour-token" to the intuitive phenomenal framework in question.

As for justifying [2], I must emphasize that -- as suggested in [1.1] -- "colour-tokens-as-introduced" are Real individuals.³⁷ This means that the main point in incorporating 'colour^t' into a neutral account A_N will be to

[2.1] add to Σ_N a sort of individuals representing the kind of individuals introduced by 'colour^t' (i.e. "colour-tokens-as-introduced").

According to our initial discussion³⁸ of additions of sorts of individuals to Σ_N , [2.1] can be justified by showing that

[2.2] "colour-token-as-introduced" is meaningfully applicable both in an intuitive phenomenal framework and an intuitive physical framework.

The first of the two tasks set in [2.2] is clearly similar to the one specified in [1.1]. The only apparent difference is that in [2.2] the task is not just to characterize "colour-tokens" in an intuitive phenomenal framework, but to characterize them qua individuals-as-introduced. Indeed, there really isn't any difference between these two tasks, for I take it that colour-tokens are by their very nature individuals-as-introduced. Colour-tokens -- as any sensations -- are purely experi-

³⁷ cf. 1.1.2.1

³⁸ cf. 1.1.3.3

ential individuals,³⁹ and exist only as part of a sensory/perceptual experience. The question consequently must be, what constitutes a characterization of a sort of individuals-as-introduced?

5 In light of our account of individual-introduction so far, one of the main steps of such a characterization must be to give an explicit "identifying-rule" for colour-tokens. To explain how such an explicit "identifying-rule" is to be given, I must anticipate one of the points which will
10 be made in our discussion of "Individuation"⁴⁰, namely that the function of such an identifying-rule in experiential term-introduction is to "constructively" guide what we called identifying-processes.⁴¹ This means -- as we shall see -- that we must characterize the identifying-
15 rule in question in terms of introducing constructively an identity relation into a manifold of units.⁴² The

³⁹ see 2.1.3, [2.1]

⁴⁰ cf. Chapter VI

⁴¹ cf. 2.2.1

20 ⁴² Since I shall discuss these "constructive" identifying-rules in Chapter VI, let me just sketch the issue in question: A "descriptive" identifying-rule, say $x=c_y$ iff $\Phi(x,y)$, is a rule which describes an identity relation $=_c$ of some given set (domain) C. The variables x and y are hence proper individual-variables in
25 that they range over well-identified individuals (i.e. what we called "logical objects"). A "constructive" identifying-rule -- $x=c_y$ iff $\Phi(x,y)$ -- on the other hand is taken to be a rule by means of which $=_c$ is constructed. In this case it would clearly be a vicious circle to say that the variables x and y range over
30 $=_c$ -individuals. They might, of course, range over some set D, but then one would have to make a strict distinction between $=_D$ and the identity relation $=_c$ which is supposed to be constructed. Moreover, if one assumes that all the relevant identity relations

characterization of such a "constructive identifying-rule" -- say $x =_c y$ iff_{df} $\Phi(x, y)$ -- requires that we know the sort of features we can employ in the formulation of $\Phi(x, y)$, or, to put it differently, what sort of features we can associate with the units of the manifold in question.⁴³

As a first step of my "colour-token argument" I shall accordingly

[3.1] give an explicit description, say D^{ct} , of "colour-units"⁴⁴ in an intuitive phenomenal framework $phen-F_I$. This description (i.e. D^{ct}) will be in terms which are equally applicable to an intuitive physical framework $phys-F_I$.

[3.2] In a second step I shall describe explicitly -- on the basis of D^{ct} -- a constructive identifying-rule (for an identity predicate $=_{ct}$) which will be applicable both to the colour-units given in $phen-F_I$ and those given in $phys-F_I$.

are constructed, it is clearly necessary that one allows "initial" introductions of identity relations into mere collections ("manifolds") of units, i.e. collections of entities which can only be "indicated" (as opposed to be referred to) and of which it is, as such, meaningless to ask whether they are identical or not.

⁴³ I am using the phrase "feature associated with units" instead of "quality/property of units" because it might be held that only proper individuals (i.e. logical objects) can have qualities/properties.

⁴⁴ By "colour units" I mean those units which -- according to my conception -- will give rise to what I consider to be colour-tokens.

This dual-applicability is essential if we wish to maintain that the resulting individuals are to be instantiations of one and the same term-introducing concept.

[3.3] The only remaining task will then be the one given in [1.2], that is -- in a third step -- to demonstrate that the individuals which were characterized in the preceding two steps are indeed non-particular token-instantiations of 'colour'.

4.2.2.1 The Identity Relation $=_{ct}$

The first requirement for carrying out the "colour-token argument" is to characterize the said intuitive phenomenal framework *phen-F_I* (for *S_P*-accounts).⁴⁵ As indicated in the preceding section, I regard colour-tokens as a special sort of sensations, which means that they will be paradigmatically "phenomenal".⁴⁶ Given that 'sensation' was taken to be a basic concept adequate for the subject-matter of sensory/perceptual experience, the first point which I think we can reasonably adopt is that

[4] 'colour-sensation' is adequate for sensory/perceptual experience and can hence be added to *S_P*.

⁴⁵ This means, I may recall from 1.1.3.3, that I must give correct ontological characterizations -- based on an intuitive understanding of "phenomenal" -- of those *S_P*-sorts which I shall employ in the colour-token argument.

⁴⁶ see 1.1.2.1, [2.2] and 1.1.3.3, [4]

The following three characterizations of colour-sensations -- based on the intuitive understanding of "phenomenal" -- are what I have in mind by *phen-F_x* in this context. Colour-sensations are

5 [5.1] spatially extended -- and as such are located in some "spatial structure"⁴⁷ --

[5.2] temporally enduring, and

[5.3] they are linked, both across the temporal and spatial structure within which they occur, by ties of chromatic
10 indiscernibility (or "chromatic matching").

If the above characterized items are taken as instantiations of 'colour-sensation', then they must be regarded as proper individuals (i.e. as logical objects). For our purposes, however, I suggest that we construe these
15 characterizations as descriptions of features associated with a particular sort of units, namely "colour-units", individually denoted by $\langle \text{colour}^t \rangle_n$.⁴⁸ The first two of these descriptions simply reflect Goodman's view that

20 ⁴⁷ What I must emphasize here is that this "spatial structure" need not be (part of) Space: all that is required is that colour-sensations occur as located in a space-like relational structure (say, for example, a representation of a part of Space), that is a relational structure which allows of the sort of symmetries we attributed to Space.

25 ⁴⁸ The features referred to under [5] will hence be those by means of which I shall define the constructive identifying-rule for colour-tokens.

"phenomena [...] have spatial and temporal aspects".⁴⁹

The third one reflects our intuitive capacity to match colour-phenomena as "being of the same shade of colour".

Let me denote this by " $\approx$ ", meaning that

$$5 \qquad \langle \text{colour}^t \rangle_n^* \approx \langle \text{colour}^t \rangle_m^*$$

is to be read as indicating that the involved colour-units are matching in colour. I realize that the notion of "matching" colour-units which are temporally separated could give rise to some objections. However, they are not critical, because for our purposes -- i.e. for introducing an identifying-rule for colour-tokens -- we could restrict the relevant manifolds of units to containing only temporally coexisting units.⁵⁰

Indeed, to simplify matters somewhat let me

15 [6.1] restrict the manifolds of colour-units which I shall
consider here to those which could be described as
occurring in the visual field of a perceiver (with normal

⁴⁹ Goodman, [1951], p.152

50 For a discussion of such objection from a phenomenalist
20 point of view see Goodman [1951] section IV.3 on Qualia. Just as
a remark on the side, let me mention that I take this colour-
matching tie to be transitive. Goodman seems to deny this, but
I believe his argumentation for the intransitive nature of the
"matching predicate" -- say, for example, op.cit pp.225 f -- is
25 incorrect, due to a confusion of the phenomenal colours of things
with colour-phenomena. In particular, I cannot see how the
colour-matching tie between coexisting colour-units could fail
to be transitive.

vision) during an uninterrupted period of visual perception.⁵¹

I shall also assume that

[6.2.1] colour-units are chromatically homogeneous,⁵²

5 and that

[6.2.2] colour-units are spatially and temporally maximal with respect to chromatic indiscernibility.

Condition [6.2.2] is meant to imply that colour-units either coincide completely, both spatially and temporally
10 -- something which I shall denote by

$$\langle \text{colour}^t \rangle_{\mathfrak{m}} \sim \langle \text{colour}^t \rangle_{\mathfrak{n}}$$

-- or that they are spatially and/or temporally separate.

The chromatic homogeneity ([6.2.1]) then implies that

$$[6.3] \quad \langle \text{colour}^t \rangle_{\mathfrak{m}} \sim \langle \text{colour}^t \rangle_{\mathfrak{n}} \implies \langle \text{colour}^t \rangle_{\mathfrak{m}} \approx \langle \text{colour}^t \rangle_{\mathfrak{n}}.$$

15 The "inessential" stipulations of [6.2] are simply meant to bring out explicitly what I consider to be the sort of natural constrictions which one ought to take into account in formulating an identifying-rule for Real

20 ⁵¹ The reason for this restriction is purely to simplify the formulation of an appropriate identifying-rule in terms of the features given under [2]. Note that given the aim of this section -- namely to show that there are colour-tokens -- [3] does not restrict the validity of the colour-token argument.

25 ⁵² By this I mean that all spatial and temporal parts of a colour-unit are to be chromatically indiscernible.

entities in general.⁵³ They are "inessential" -- as opposed to the "essential" descriptions given under [5] -- insofar as it might be plausible to "carve up" the visual field into colour-tokens in a different manner.

5 To justify the assumptions made under [6.2], and also to motivate the applicability of our description of colour-units in an intuitive physical framework *phys-F₁*, let us look at Land's "retinex theory" of colour-vision.⁵⁴ On the basis of the light intensity patterns -- which in
10 optics represent our field of vision -- Land manages to predict how colours actually look, and not just whether two physical stimuli will produce matching colours (like the traditional three-receptor theories). The retinex theory achieves a three-dimensional co-ordinatization of
15 the chromatic components of colour-phenomena. This means that this retinex theory would allow us (if it is correct) to define chromatic indiscernibility (i.e. $\approx$) namely as zero distance within Land's colour-space. The way this co-ordinatization is achieved, furthermore shows
20 that

"colours are determined at boundaries and vertexes (where boundaries meet)", and "that the colour of an area depends not only on the surroundings of the area,

25 ⁵³ See also the discussion of Ayers' second objection in section 2.2.1, in particular the rôle of individuated units in limiting the degree of freedom for introducing identity relations.

⁵⁴ Land, [1977]

but also on the running history of the region of the retina on which the area's image falls."⁵⁵

This supports the assumptions made in [6.2] concerning the interdependencies between the spatial/ temporal aspects of colour-units and their chromatic nature.

With the above stipulations concerning the nature of colour-units it is simple to characterize an identifying-rule which transforms these units into colour-tokens,⁵⁶ namely:

$$\begin{array}{l}
 10 \qquad \qquad \qquad \langle \text{colour}^t \rangle_m =_{ct} \langle \text{colour}^t \rangle_n \\
 \qquad [7] \qquad \qquad \qquad \text{iff}_{af} \\
 \qquad \qquad \qquad \langle \text{colour}^t \rangle_m^* \sim \langle \text{colour}^t \rangle_n^* \quad \& \quad \langle \text{colour}^t \rangle_m^* \approx \langle \text{colour}^t \rangle_n^*.
 \end{array}$$

Given that spatio-temporal coincidence is taken to imply chromatic indiscernibility ([6.3]), we could, of course, omit the explicit reference to the chromatic tie in [7]. My reason for including it here is simply that it brings out the fact that chromatic discernibility, by itself, constitutes a sufficient condition for the non-identity of colour-tokens.⁵⁷

20 ⁵⁵ Lettvin, [1986]

⁵⁶ Note here that $\langle \text{colour}^t \rangle_k$ is taken to denote the individual-as-introduced, created by an identifying process on the basis of $\langle \text{colour}^t \rangle_k^*$.

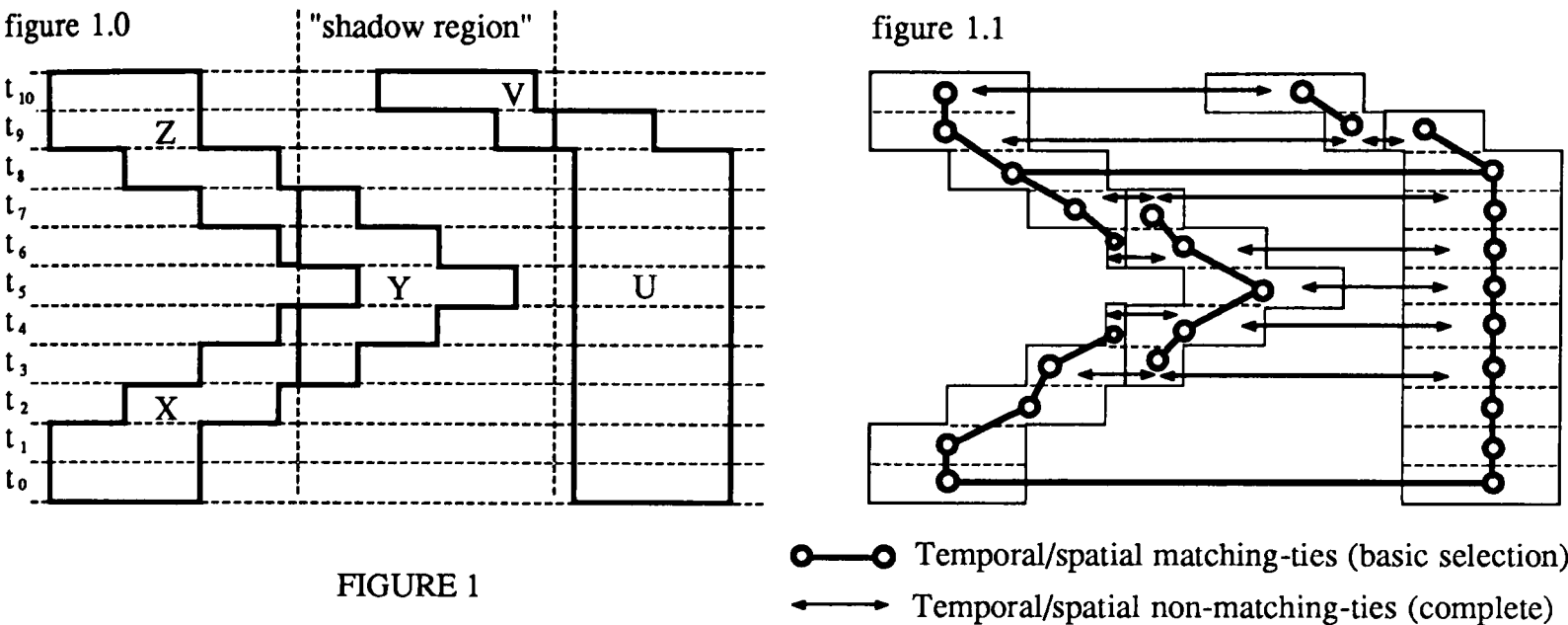
25 ⁵⁷ Let me also point out here that the ties between colour-units of spatio/temporal coincidence and chromatic indiscernibility are taken to give rise to homonymous relations between colour-tokens.

Let me illustrate this identity relation with the following example, involving the graphical representation of Figure 1: At t_0 a colour-token $\langle C^t \rangle_1$ ($\langle C^t \rangle_2$) is experienced₃ by a subject P as coinciding with the visible surface of a billiard ball B_1 (B_2) -- $\langle C^t \rangle_1$ and $\langle C^t \rangle_2$ are chromatically matching, B_1 is located to the left, and B_2 to the right of the line of vision. At t_2 , when B_1 starts to move to the right towards an area of different illumination, say a shadow, P again experiences₃ chromatically matching colour-tokens $\langle C^t \rangle_3$ and $\langle C^t \rangle_4$. At t_5 , when the visible surface of B_1 is completely in the shadow, P experiences₃ the non-matching colour-tokens $\langle C^t \rangle_5$ and $\langle C^t \rangle_6$. At t_6 , B_1 starts to return to its original position (with respect to the visual field), while at t_9 , B_2 starts moving left until at t_{10} its visible surface is completely covered by the shadow. P then experiences₃ the non-matching colour-tokens $\langle C^t \rangle_7$ and $\langle C^t \rangle_8$.

Presupposing a correct application of the colour-token identifying-rule, how many colour-tokens has P experienced₃? Given the simplified "space-time" diagram (i.e. figure 1.0) of the involved colour-units, it is easy to see that P experienced₃ exactly five colour-tokens, namely:⁵⁸ $\langle C^t \rangle_1 =_{C^t} \langle C^t \rangle_3$, $\langle C^t \rangle_2 =_{C^t} \langle C^t \rangle_4 =_{C^t} \langle C^t \rangle_6$, $\langle C^t \rangle_5$, $\langle C^t \rangle_7$, $\langle C^t \rangle_8$.

⁵⁸ $\langle C^t \rangle_1 \sim X$; $\langle C^t \rangle_2 \sim U$; $\langle C^t \rangle_3 \sim X$; $\langle C^t \rangle_4 \sim U$; $\langle C^t \rangle_5 \sim Y$; $\langle C^t \rangle_6 \sim U$; $\langle C^t \rangle_7 \sim Z$; $\langle C^t \rangle_8 \sim V$.

The reason for including figure 1.1, which represents schematically the chromatic ties (matching/non-matching) involved in the formation of the colour-units represented in figure 1.0, was to illustrate that the sort of "minimal"⁵⁹ chromatic ties which is presupposed in the description of colour-units is indeed sufficient for the



formation of such units. Moreover, figure 1.1 exemplifies the way in which, on the basis of these chromatic ties, it is possible to introduce a partial (symmetric and transitive) matching relation ($\approx_{ct}$) amongst the associated colour-tokens:

$\langle C^t \rangle_n \approx_{ct} \langle C^t \rangle_m$ if there is a path of explicit matching ties between $\langle C^t \rangle_n$ and $\langle C^t \rangle_m$;

$\langle C^t \rangle_n \not\approx_{ct} \langle C^t \rangle_m$ if there is a $\langle C^t \rangle_k$ and a $\langle C^t \rangle_i$ which are explicitly non-matching and $\langle C^t \rangle_n \approx_{ct} \langle C^t \rangle_k$ and

⁵⁹ "Minimal" in the sense that while they are meant to be spatially non-local, temporally they are required only to be local.

$\langle C^t \rangle_m \approx_{C^t} \langle C^t \rangle_i$.⁶⁰ The fact that this matching relation is generally only partially defined comes out in our example of the two "shadow-colour tokens" $\langle C^t \rangle_s$ and $\langle C^t \rangle_g$ for which it is neither the case that $\langle C^t \rangle_s \approx_{C^t} \langle C^t \rangle_g$ nor that

5 $\langle C^t \rangle_s \not\approx_{C^t} \langle C^t \rangle_g$.

4.2.2.2 Colour-Tokens as Non-Particular Tokens of 'Colour'

The third and final step in our "colour-token argument" is -- as mentioned in 4.2.2 [3.3] -- to show that the individuals characterized in the preceding section

10 [8.1] are instantiations of the individual-introducing concept 'colour', which

[8.2] are not particulars,

and also that their identity relation

[8.3] $=_{C^t}$ is a token-identity relation.

15 Given the type of intuitive understanding which was presupposed in our characterization of colour-tokens so far, we can justifiably claim that these colour-tokens are instantiations of the concept of 'colour-sensation', but can they reasonably be construed as being instantia-

20 tions of the concept of 'colour'? Let me try to argue for an affirmative answer to this by an analogy. Consider the type-concept 'animal^T' qua ontologically determined version of 'animal'. This concept 'animal^T'

25 ⁶⁰ The transitivity and symmetry of $\approx_{C^t}$ is simply a consequence of the transitivity and symmetry of paths.

can be used to introduce sorts of animals like that of *dog*. Any particular dog is tied to the term *dog* in a way which justifies us to say that particular dogs are instantiations of 'animal'. Now, provided that the

5 conclusions about colour-tokens and colour-types so far are acceptable, we can assume that the ontologically determined version 'colour_T' of 'colour' introduces sorts of colour-tokens, like *blue_S*. Clearly, all blue colour-tokens will be tied to *blue_S* in exactly the same

10 way as particular dogs are tied to *dog*, and thus we are equally justified to call colour-tokens instantiations of 'colour'.⁶¹ This means that we are justified in speaking of a "token-concept of colour" (i.e. 'colour_T') as an ontologically determined version of the concept 'colour'.

15 Another question is, of course, whether the identity relation =_{C_T} of colour-tokens is a token-identity relation in the sense of 4.1.2 [13]. To demonstrate this to be the case, we must show that =_{C_T} does not satisfy what we called the "Law of Identity of relatively

20 Indiscernibles". The first step in this direction must be a clarification of the language involved in stating the indiscernibility in question. We must specify what in section 4.1.2 we referred to as L_A: As (sole) domain of discourse of this language (say L_{C_T}) I shall use a class

25 C_T of "phenomenal" colour-tokens -- i.e. colour-tokens as

⁶¹ The fact that our argument involves blue colour-tokens is, of course, irrelevant.

given in *phen-F_I* -- which arises from the sort of manifold of colour-units described in 4.2.2.1 [6.1]. According to 4.1.2, the predicates of *L_{ct}* must include all those pertaining to the spatial, temporal and chromatic aspects of colour-tokens. That is to say, the language *L_{ct}* can be given as:

$$L_{ct} = \{ \text{'colour'}; \text{'blue'}, \text{'green'}, \dots \}$$

where, apart from 'blue' and 'green', there must also be a concept for every possible shade of colour,⁶² and furthermore concepts pertaining to all possible features of the spatial and temporal structure of *phen-F_I*.

To show that the Law of Identity of relatively Indiscernibles does not hold for $=_{ct}$, we can simply follow the adaptation of Strawson's argument which was used to show the token nature of particulars.⁶³ Instead of going through each step of this re-adapted argument, let me just indicate two points which are crucial to the possibility of such a re-adaptation. The first one is that I take it as intuitively self-evident -- whatever the specific spatial structure of the visual field turns out to be -- that we can conceive of a visual field with

⁶² The inclusion of concepts for any possible shade of colour is required by our formulation of the Law of Identity of relatively Indiscernibles, even though "A normal person does not, and possibly could not [my emphasis] have observational concepts of every possible shade of colour." (Peacocke, [1983], p.11)

⁶³ cf. 4.1.2, [12]

a symmetrical spatial structure. The second point concerns the fact that colour-tokens were characterized in terms of having an extension, and not in terms of having a spatial location, as constituent.⁶⁴ Although colour-tokens must be spatially located, it is conceivable that they could have occurred in a location different from the one in which they actually occur. The tie between a colour-token and its location is contingent and not necessary.

Finally, what is left to be shown from our list [6], is that colour-tokens are not particulars. My argument here is based on the assumption that any "reasonably stable" spatially extended particular can meaningfully be said to have a shape and size. This, however, turns out not to be the case for colour-tokens -- as I shall try to show in Chapter V -- although they are meant to be "reasonably stable" and spatially extended.⁶⁵ Consequently, colour-tokens cannot be particulars.

⁶⁴ This is one of the main differences to Goodman's "realistic phenomenalist system." (cf. Goodman, [1951], pp.107-10)

⁶⁵) More precisely, colour-tokens are meant to be extended in a space-like manner, that is to say not necessarily Spatially extended.

4.3 Colour-Tokens and Structured Predicate Theories

As a postscript to this discussion of colour-tokens let me briefly return to my claim about the inappropriateness of the so-called "structured predicate approach".⁶⁶

5 The main stipulation of this approach was, as mentioned before, that statements of the general form

[1] "P has an F-sense-impression"

ought to be adverbially reconstructed as subject-predicate statements of the form

10 [2] "P senses F-ly",

where "senses F-ly" is taken to be a structured people-characterizing predicate.

Naturally, such a reconstructive attempt cannot be limited to statements of a specific form -- like that of
 15 [1] -- if it is to justify a replacement of the particularistic approach to sensory/perceptual experience associated with the intuitive reading of [1]. An adequate adverbial reconstruction must be given for all particularistic statements which are intuitively meaningful.
 20 In particular, a structured predicate theorist ought to be capable not just of reconstructing statements of the form

"P has an F-sensation",

⁶⁶ cf. 1.3

but he should also be capable of reconstructing statements of the form

[3.1] "P has a complex of sensations"

in the sense of

5 [3.2] "There is a sensory manifold Σ_n which is (part of) an experience of P".⁶⁷

Indeed, he ought to be able to reconstruct statements like

[4.1] "The sensory manifold Σ_n is (part of) an
10 experience of P",

or, for short,

[4.2] "P is experiencing Σ_n ".⁶⁸

How could a structured predicate theorist achieve this? The obvious, and in my view only possible way of
15 reconstructing, say [4], would be to make use of the fact that, for any given sensory manifold Σ_n which is part of an experience of a person P, and any purely universal formula $\Phi(\underline{x})$ pertaining to individuals of Σ_n , the statement

20 [5.1] $(\exists \underline{c}) \Sigma_n \models \Phi(\underline{c})$

⁶⁷ $(\exists \Sigma_n) \exp(P, \Sigma_n)$, cf. 1.3

⁶⁸ In formal notation: $\exp(P, \Sigma_n)$

implies that

[5.2] "P has sensations which are Φ ",

in the sense considered by the main hypothesis of the structured predicate approach. This means, according to this main hypothesis,⁶⁹ there will be a unique⁷⁰ adverbial structured people-characterizing predicate $\Phi^s(y)$ such that $\Phi^s(P)$ can be seen as the adverbial reconstruction of [5.2].

The structured predicate theorist might therefore say that all one needs in order to reconstruct [4] adverbially is a complete description⁷¹ $\Delta_{\Sigma_n}(\underline{x})$ of Σ_n in purely universal terms. The idea here is that a complete description of Σ_n would be such that only Σ_n would satisfy it.⁷² For such a complete description it would hence hold that:

[6.1] "P experiences Σ_n "
iff⁷³

[6.2] "P has a Δ_{Σ_n} -experience"

⁶⁹ see 1.3, [6]

⁷⁰ Since we are dealing with structured predicates, the uniqueness here must, of course, be given in terms of logical equivalence.

⁷¹ A description $\Delta(\underline{x})$ -- where $\underline{x}$ is a short form for $x_1, x_2, \dots$ -- is a set of purely universal formulae with free variables in $x_1, x_2, \dots$. $\Delta(\underline{x})$ is a description of Σ_n iff_{def} $(\exists \underline{c}) \Sigma_n \models \Delta(\underline{c})$.

⁷² $(\exists \underline{c}) \Sigma_n \models \Delta_{\Sigma_n}(\underline{c}) \ \& \ (\Sigma_m)[(\exists \underline{d}) \Sigma_m \models \Delta_{\Sigma_n}(\underline{d}) \implies \Sigma_m = \Sigma_n]$

⁷³ $exp(P, \Sigma_n)$ iff $(\exists \Sigma_m)(\exists \underline{c})[exp(P, \Sigma_m) \ \& \ \Sigma_m \models \Delta_{\Sigma_n}(\underline{c})]$

According to the adverbial hypothesis, [6.2] ought then be reconstructable as

[7] "P senses/experiences $\Delta_{\Sigma n}$ -ly."

That is, the structured predicate theorist ought to be able to construct a structured people-characterizing predicate $\Delta_{\Sigma n}(y)$ on the basis of the complete description $\Delta_{\Sigma n}$ for which it would hold that

[8] "P has a $\Delta_{\Sigma n}$ -experience" $\iff \Delta_{\Sigma n}(P)$.

This proposal stands, or rather falls, with the describability of sensory/perceptual manifolds in purely universal terms, i.e. with postulate [6]. To see this, we only need to consider that numerically distinct sensory manifolds Σ_1 and Σ_2 can be symmetric,⁷⁴ in the sense that for any purely universal particularistic description $\Delta(\underline{x})$ and any array of individual-constants $\underline{c}$ there will be a symmetry-permutation $\pi(\underline{c})$ such that

[9] $\Sigma_1 \models \Delta(\underline{c})$ iff $\Sigma_2 \models \Delta(\pi(\underline{c}))$.

⁷⁴ The reason for this is that we can conceive of sensory manifolds with spatial configurations which are symmetrical to each other. The structured predicate theorist might object to the statement that phenomena are part of a spatial structure. My reply to such an objection would be that it is not essential to our argumentation whether the relations between phenomena are really Spatial, or just "space-like" in the sense that they conform to the presuppositions we made about the nature of Spatial manifolds in the context of our previous symmetry discussions. It is merely the fact that phenomena have "space-like" characteristics which I take to be intuitively self-evident.

To give a concrete example of sensory manifolds which in my view would be symmetric in this sense, let us look at the situation where an experiencing subject P with normal vision is located in a completely dark room and looking straight at a clock with a small light-source at the end of the minute hand. One of the sensory manifolds, say Σ_1 , which I have in mind in [9], is then induced (as part of an experience of P) by briefly switching on and off the light-source at, say, eight minutes past the hour, and the other (Σ_2) at ten minutes past the hour. In this case, there is a difference between Σ_1 and Σ_2 which is sufficient to conclude that

[10.1] "P experiences Σ_1 "

is not the same statement as

15 [10.2] "P experiences Σ_2 ".

By claiming that Σ_1 and Σ_2 are symmetric, I mean that they cannot be discerned by means of purely universal (particularistic) descriptions, that is, particularistic descriptions which do not involve references to either particular sensory individuals, or to particular locations in the respective spatial structure.⁷⁵ Any purely universal description will hence hold of Σ_1 iff it holds of Σ_2 .

25 ⁷⁵ The assumption here is that the apparent colour etc. of the light-spot is the same in both experiences. The only difference between the two manifolds is meant to be that the light-spot occurs in different (symmetric) locations in the visual field, locations which due to their symmetry cannot be discerned by purely universal means.

No matter how elaborate a description of, say, Σ_1 the structured predicate theorist presumes, it will always be the case that his adverbial reconstruction of [10.1] will also be an adverbial reconstruction of [10.2], and
 5 *vice versa*. The intuitive particularistic statement [10.2] (i.e. $\exp(P, \Sigma_2)$), for example, implies, in conjunction with [9], that⁷⁶

$$[11] \quad \exp(P, \Sigma_2) \ \& \ (E \ \underline{d}) \ \Sigma_2 \Vdash \Delta_{\Sigma_1}(\underline{d}).$$

This, means that

$$10 \quad [12] \quad (E \ \Sigma_n)(E \ \underline{d}) \ [\exp(P, \Sigma_n) \ \& \ \Sigma_n \Vdash \Delta_{\Sigma_1}(\underline{d})],$$

which -- according to [8] -- would be adverbially reconstructed as $\Delta_{\Sigma_1}(P)$, i.e. it would be given the same reconstruction as [10.1]. In the structured predicate approach it is thus impossible to reflect the fact
 15 that [10.1] and [10.2] are different statements. The structured predicate approach does not satisfy [4], which is why it is inappropriate for the description of sensory/perceptual experiences.

20 ⁷⁶ By definition we have $(E \ \underline{c}) \ \Sigma_1 \Vdash \Delta_{\Sigma_1}(\underline{c})$, which together with [9] entails that $\Sigma_2 \Vdash \Delta_{\Sigma_1}(\pi(\underline{c}))$.

V

COLOUR-TOKENS in SENSORY/PERCEPTUAL EXPERIENCES_P

5.1 Structured Primitive Predicates

In our initial discussion¹ of how a neutral account of sensory/perceptual experience A_N is to be achieved it was said that the construction of the desired neutral model Σ_N would be a process of putting the "structural flesh" on an "initial skeleton". This process was seen as the introduction (addition) either of sorts of individuals, or of structural features, as components of Σ_N . One of the main aims of this chapter will be

[1.0] to argue for the introduction of "colour-qualifying-ties" (denoted by $\sim_q$) into Σ_N ,

to allow a formal representation of the semantics of experiential colour predicates. The aim will be to analyse the natural language predicate

[1.1.1] $\text{red}_{eM}(x,y) \equiv \text{'x is looking red to y'}$

-- where x ranges over material-objects-as-introduced, and y over experiencing subjects -- within the adopted restrictions concerning the representational nature of our formalism. More precisely, I shall be looking at what

¹ cf. 1.1.3.3

might be called the "subjectivized version" of $\text{red}_{eM}(x, y)$,
namely

[1.1.2] $\text{red}_{eM}(x) \equiv 'x \text{ is looking red (to me)}'$.

By this I mean the predicate which would be associated
5 with the formation (by some experiencing subject P) of
the (meaningful) experiential particular thought

[1.1.3] $\tau_1 \equiv \text{"This material object is looking red (to me)"}$ ₁

in the context of a sensory/perceptual experience e_n
(of P). On the basis of an argument by Peacocke,² I
10 shall argue that this subjectivized version can be
analysed as:

[1.1.4]
$$\begin{aligned} &\text{red}_{eM}(\langle \text{object}^t \rangle_n) \\ &\text{iff} \\ &(\exists c_m \in C_{e_n}^t) \text{red}_s(c_m) \ \& \ c_m \sim_q \langle \text{object}^t \rangle_n \end{aligned}$$

15 -- where $\langle \text{object}^t \rangle_n$ signifies an arbitrary material
object-as-introduced, $C_{e_n}^t$ signifies the collection of
colour-tokens occurring in the sensory/perceptual
experience_P e_n (of the subject in question) within which
 $\langle \text{object}^t \rangle_n$ occurs, and $\text{red}_s(y)$ signifies a sort-predicate
20 for colour-tokens.

To show the formal implications of this analysis, let me
briefly digress and point out that in a semantic 1st-order
predicate formalism, the semantics of a primitive

² Peacocke, [1983]

predicate $P(x_1, \dots, x_m)$ is given by defining the "truth-conditions" for $P(a_1, \dots, a_m)$ with respect to a typical semantically determined referent-structure $\langle \Sigma_n, \sigma_n \rangle$.³ Such a definition is given by a statement of the form

$$5 \quad [1.2.1] \quad \langle \Sigma_n, \sigma_n \rangle \models P(a_1, \dots, a_m) \text{ iff } Ch^P,$$

where Ch^P is what I shall call the P-characterizing proposition, which itself is given in terms involving $\sigma_n(a_1), \dots, \sigma_n(a_m)$ and $\sigma_n(P)$.⁴ In the case of the standard formalization of classical semantic 1st-order theories we have, for example, that

$$Ch_{\sigma_n}^P \equiv \langle \sigma_n(a_1), \dots, \sigma_n(a_m) \rangle \in \sigma_n(P).^5$$

There are, of course, different ways in which one might be able to classify primitive predicates in terms of their truth-conditions,⁶ but for our purposes I shall simply say that

³ cf. 0.2

⁴ Depending on the nature of the formalism in question, it might be necessary to add to [1.2.1] the precondition that P is meaningfully applicable to $\langle \sigma_n(a_1), \dots, \sigma_n(a_m) \rangle$.

20 ⁵ $Ch_{\sigma_n}^P$ is, on the one hand extensional, and, on the other, has a form which is independent of the particularity of P.

25 ⁶ For example, if we stipulate that the form of Ch^P is to be expressible in 1st-order predicate terms, then it might be possible to introduce a classification according to the 1st-order predicate complexity of this form.

[1.2.2] a primitive predicate P is **structured** if Ch^P involves individuals other than $\sigma_n(a_1), \dots, \sigma_n(a_m)$ and $\sigma_n(P)$.⁷

The question now is whether $red_{eM}(x)$ is to be treated as a primitive predicate in our formalism. Considering that, in the envisaged neutral accounts, formal predicates are essentially meant to represent term-introducing concepts (as possessed by the relevant subjects), the analysis proposed in [1.1.4] becomes an analysis of the full (technical) concept of 'looking red (to me)', which I shall denote by ' red_{eM} '. For a subject to possess this full concept, he must possess all the concepts, explicitly or implicitly, involved in the suggested analysis (in particular, the full concept of 'colour^t'). If he does, there is no need to represent ' red_{eM} ' (as possessed by him) as a primitive formal predicate in neutral accounts of his sensory/perceptual experiences.

However, the claim would surely be wrong that an experiencing subject who does not possess (the full) concept 'colour^t' cannot be credited with an experiential particular thought as exemplified in [1.1.3]. In order to avoid that our theory of experiential term-introduction is invalidated by implying this claim we could introduce an "intuitive" predicate $red_{eM}^*(x)$ (or,

⁷ The attribute "structured" here is simply meant to indicate that the relevant characterizing propositions have more structure than the ones which only involve $\sigma_n(a_1), \dots, \sigma_n(a_m)$ and $\sigma_n(P)$ as individuals.

for that matter the "intuitive concept 'red_{eM}^{*}'" by replacing the reference to colour-tokens in [1.1.4] by one to colour-units (as described in 4.2.2.1.^a):

$$\begin{array}{lcl}
 & \text{red}_{eM}^*(\langle \text{object}^t \rangle_n) & \\
 5 \quad [1.2.3] & \text{iff} & \\
 & (E \ c_m^* \in C_{en}^{t*}) \ c_m^* \sim_q \langle \text{object}^t \rangle_n \ \& \ \text{red}_s(c_m^*). &
 \end{array}$$

The problem with this suggestion in the formal context is that we would not only have to alter the conception of the existential quantifier -- such as to allow a quan-
 10 tification over mere units -- but also our conception of red_s(x). As an alternative, I suggest that we represent sensory/perceptual experiences_P e_n of a subject *P* who does not possess the concept 'colour^t' as if *P* did possess it -- i.e. to treat C_{en}^t, in the case of *P*, as the collection
 15 of colour-tokens which could have been identified by *P* in the context of e_n, had he possessed 'colour^t'. That is to say, I propose that we use red_{eM}(x) -- instead of red_{eM}^{*}(x) -- in a neutral account of *P*'s sensory/percep-
 tual experiences_P, and that we reflect the fact that *P*
 20 does not possess the (full) concept 'colour^t' by representing red_{eM}(x) formally as a structured primitive predicate.

^a The main points here are, on the one hand, that colour-
 25 tokens are what we called logical objects, with an identity which is meant to be conceptually induced by applying the colour-token identifying-rule to colour-units. To experience colour-units, on the other, a subject will, in accordance to our discussion in Chapter III, only have to possess the individuating aspect of 'colour^t', which seems to be a reasonable necessary requirement
 30 for being able to have experiential particular thoughts like the one given in [1.1.3].

Another main aim in this chapter will be

[2.1] to discuss certain "spatial" structures occurring in sensory/perceptual experiences_P

5 (based again on certain views put forward by Peacocke in Sense & Content) and, with the help of this discussion,

[2.2] demonstrate that colour-tokens are not particulars.

5.2 Peacocke's Sense & Content

5.2.1 Sensational vs. Representational Properties

The aim of this section is to make explicit the determined ontological framework within which Peacocke operates and to put forward an interpretation of his theory of perceptual experience in our particularistic conceptual scheme.

[1.1] Peacocke's ontological framework is what we called an intuitive physical framework,

which means that it involves, specifically, the assumption that referents are objectively independent.⁹ This, and the fact that

[1.2] he is committed to a representational approach to perceptual experience,

comes out clearly when he says that:

[2] "The representational content of a perceptual experience has to be given by a proposition, or set of propositions, which specifies the way the experience represents the world to be."¹⁰

Peacocke takes great care to distinguish this representational content of an experience from another type of content associated with perceptual experiences, namely

⁹ see 2.1.2, [8.3]

¹⁰ Peacocke, [1983], p.5

what he calls "informational content",¹¹ which, when attributed to experiences, differs from their representational content in at least four respects:

- [3] "First, the informational content of a visual experience will include the proposition that a bundle of light rays with such-and-such physical properties struck the retina; nothing like this will be in the representational content of the experience. Second, there are cases in which the representational content and the informational content of experience are incompatible [like in the case of geometrical illusions]. Third, though both informational content and representational content are specified by 'that'-clauses, the contents are of different kinds. A specification of informational content of an experience is completely referentially transparent in genuine singular term position: this property it inherits from the corresponding transparency of 'causally explains'. In the representational content of an experience, on the other hand, objects are presented under perceptual modes of presentation. (This contrast applies not only to singular term position, but also to predicate position [...]) Finally, it is in the nature of representational content that it cannot be built up from concepts unless the subject of the experience himself has those concepts."¹²

Given these elaborations, it can reasonably be said that Peacocke's theory of perceptual experience is of the type we described under 2.1.3 [3]. This means not only that Peacocke's conception of perceptual experience can be interpreted in our particularistic terminology, but also that referents and referents-as-introduced (in Peacocke's theory) are different types of individuals.

¹¹ "x's being *F* at *t* has the informational content that there was something standing in *R* to *x* at some earlier time *t'* and which was then *G*, iff in normal circumstances an object's being *F* at some particular time is causally, and perhaps differentially, explained by there existing at some earlier time an object standing in *R* to it and which was then *G*." (Peacocke, [1983], p.6)

¹² op.cit. p.7

In trying to use Peacocke's analysis -- as suggested in the preceding section -- we must now consider Peacocke's claim that

[4] "corresponding to the historical distinction between sensation and perception, we can draw a distinction between sensational and representational properties of experience. Representational properties will be properties an experience has in virtue of features of its representational content; while sensational properties will be properties an experience has in virtue of some aspect -- other than its representational content -- of what it is like to have that experience."¹³

What are we to understand by a "property" (in the sense of Peacocke) of a sensory/perceptual experience_P e_n ? In the case of "sensational properties", the natural choice seems to be to interpret them as properties of the sensory/perceptual manifold_P Σ_{e_n} associated with e_n . To interpret Peacocke's notion of a "representational property" in our terminology is somewhat more difficult, if only because he himself changes his mind as to the nature of "representational content": While in Sense & Content¹⁴ he seems to put forward that representational content must be conceptual, he later retracts this view and claims that there is a type of experiential content ("analogue content") which is representational but not conceptual.¹⁵ The issue here is, of course, linked to what I called the propositional content conjecture¹⁶

¹³ Peacocke, [1983], p.5

¹⁴ cf. op.cit. Chapter I

¹⁵ cf. Peacocke, [1986], in particular pp.16-7

¹⁶ see 2.1.2, [11.2]

(with which both of Peacocke's views are perfectly compatible). The way in which this conjecture was incorporated into our formal representation of sensory/perceptual experiences,¹⁷ suggests that at least "conceptual representational properties" can be interpreted in our terminology as -- conceptually induced -- properties of Σ_{en} .

Whether this interpretation does justice to Peacocke's current views is, I think, questionable, because he seems to reject the view that what we called experiential particular thoughts contribute to a type of experiential content.¹⁸ However, as this rejection is only in conflict with the propositional content conjecture -- which, as mentioned before, is not essential to the feasibility of the envisaged neutral accounts -- and since the following discussion will focus on Peacocke's views on sensational properties, I shall at this point not discuss his rejection.¹⁹

As a final point in this section, let us briefly look at a

¹⁷ see 2.1.2, [13]

¹⁸ cf. Peacocke, [1986]

¹⁹ In the following section I shall, however, briefly return to Peacocke's current views and try to indicate how his analogue content could be incorporated in the envisaged neutral accounts, and suggest a way in which our present formalism could be modified should his rejection of our version the propositional content conjecture be correct.

question which might arise in the context of the proposed interpretations, namely

[5.1] is propositional content (in our sense) generally "representational"?

5 The fact that our conception of sensory/perceptual experience_P is meant to include in its scope "purely hallucinatory experiences", in conjunction with what will be said concerning experience based particular thoughts about "elephant-hallucinations", leads me to think that
10 we must admit the possibility of non-representational propositional content of sensory/perceptual experiences_P (assuming here that we interpret "representational" in terms of "being about referents").²⁰ A possible way of specifying "representational" in the context of our
15 conception of propositional content is to say that

[5.2] only experiential particular thoughts based on "referent-introducing concepts" -- by which I mean term-introducing concepts which are meant to introduce referents (e.g. 'apple⁺') -- contribute to the "representational" propositional content of an experience.²¹

25 ²⁰ Indeed, considering our discussion of colour-tokens, we need not even use "elephant-hallucinations" to motivate the point in question, for any experiential particular thought about colour-tokens will contribute non-representational propositional content -- in the above sense -- to the relevant experience.

²¹ The term "representational" here is obviously borrowed from Peacocke, and might be misleading if adopted in our neutral account, which is why I shall instead use "referential propositional content" whenever appropriate.

5.2.2 Sensational vs. Representational Space

In this second part of my discussion of Peacocke's views, I shall look specifically at the way in which he introduces sensational properties of perceptual experiences.

In order to achieve the second of the initially mentioned main aims of this chapter (i.e. 5.1 [2]), I shall focus on those sensational properties which he characterizes with reference to (visual) sensational space. As a basis for this critical exposition, let me first of all quote two passages which I think bring out Peacocke's conception of a "sensational property" and of "sensational space":

- [1] "If a particular experience e has the familiar sensational property which in normal circumstances is produced by a white object (such as a tilted plate) which would be precisely obscured by an opaque elliptical region (r , say) of the imagined interposed plane, let us express this fact in the notation ' $\text{elliptical}'(r,e)$ and ' $\text{white}'(r,e)$ '. These primed predicates ' $\text{elliptical}'$ ' and ' white' ' should not be confused with their unprimed homonyms. In using the notation we are not thereby saying that experiences have colour properties or spatial properties. With the apparatus we can express what would more traditionally have been expressed by saying 'There is a yellow elliptical region of the visual field next to a white square region'. Thus, using logical notation:

$$(E r)(E s)[\text{elliptical}'(r,e) \ \& \ \text{yellow}'(r,e) \ \& \ \text{square}'(r,e) \ \& \ \text{white}'(r,e) \ \& \ \text{next}'(r,s)].^{22}$$

- [2] "we should not be afraid of acknowledging that there are sensational spaces [...]. The sensational spaces are not, of course, populated by the sensations [i.e. experiences based on a single sense-modality] themselves. Rather, for each intrinsically spatial sense-modality, there is a space such that all experiences in that modality have

²² Peacocke, [1983], p.20

intrinsic sensational properties characterized by reference to that sensational space. The sensational spaces of different modalities do not bear spatial relations to each other: it makes no sense to ask of a location in visual sensational space what spatial relation it bears to a location in tactual sensational space."²³

Let me begin to discuss Peacocke's conception by looking at the disclaimer that experiences do not have Spatial properties, where by "Spatial" I mean "pertaining to experiencable real Space". Can we accommodate this view in our conception of sensory/perceptual experience_P? To demonstrate that this is possible, let me introduce the term "representational s-properties" for those properties which experiences have in virtue of those components of their propositional representational content which pertain to Space, or to Spatial properties.

According to the proposed general conception of representational properties of a sensory/perceptual experience_P e_n ,²⁴ these representational s-properties are taken to be properties of the associated sensory/perceptual manifold_P Σ_{e_n} . Depending on the ontological framework one espouses, it could well be that certain representational s-properties of e_n are given by components of Σ_{e_n} which do have Spatial properties -- say if they are construed as components of brain-states -- but

²³ Peacocke, [1983], p.51

²⁴ cf. 5.2.1, [4]

it is in no way necessary that these Spatial properties have any representational function. The representational character of representational s -properties need not be "graphical", by which I mean that the way in which a representational s -property represents a Spatial feature need not itself involve Spatial features.²⁵ Representational s -properties of experiences -- in accordance with Peacocke's disclaimer -- need hence not be Spatial. However, given that we are meant to be dealing with representational properties, we can assume that the substructure of a sensory/perceptual manifold_P Σ_{e_n} formed by the representational s -properties of e_n is in some sense "space-like". It is this "space-like" nature I shall have in mind when referring to these representational s -properties as being "spatial" (as opposed to "Spatial"). How can we describe this representational spatial structure of sensory/perceptual manifolds_P?

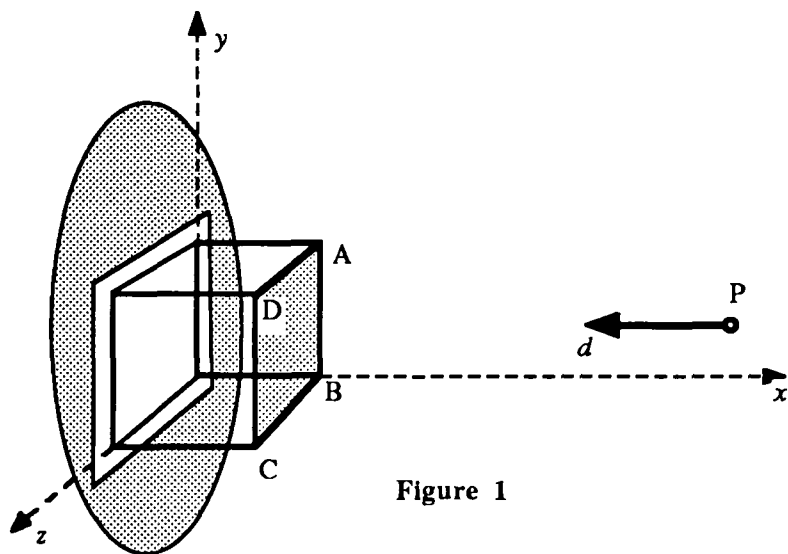
Keeping in mind the possibility of introducing such a description into our neutral accounts of perceptual experience, the best way to describe these representational spatial structures is to use the tools of analytic geometry. Let me try to illustrate this with the following example: Say that the propositional

²⁵ Examples of graphical representations are given in cartographical maps, and -- more to the point in the present context -- in conceptions which take physically circular cerebral configurations as representing perceived circular shapes.

representational content of a sensory/perceptual experience_P e_1 of a subject M contains the proposition

[3] "I see, directly in front of me, a cube placed before a wall."

5 The way I propose to describe the representational spatial sub-structure of Σ_{e_1} is by using the graphical representation of a two-dimensional real-valued vector-field on a three-dimensional real vector-space²⁶ given in Figure 1.



10 Let me begin to discuss this mathematical characterization of the representational spatial structure of Σ_{e_1} by stressing the particular nature of the representation given by Figure 1. First of all, it is quite clear that this drawing is meant to be a two-dimensional graphical

15 ²⁶ The reason for using a (two-dimensional) vector-field is to enable us to form (two kinds of) vector-sets ("point-sets") in the underlying three-dimensional vector-space. I shall take it that the first component of the field-vectors attached to the point-vectors of the "cube" are all the same (and likewise for
20 the point-vectors of the "y-z-wall"), and furthermore that the second component of the field-vectors attached to the point-vectors represented in the grey areas are all the same.

representation of a three-dimensional Spatial figure. A second point is that, for example, the Spatial relation between the Spatial location denoted by A and that denoted by B in this three-dimensional figure is meant to be a graphical representation of a relation between point-vectors of the represented three-dimensional vector-space. Indeed, as the three dashed lines x , y and z in our figure are meant to indicate that the represented vector-space is given in terms of a particular coordinate system, this point can be described in even stronger terms, for in this case it is possible to regard the mentioned Spatial relation as a graphical representation of a relation between ordered triples of real numbers.

This second point is important simply because it ensures that the proposed characterization of the representational spatial sub-structure conforms with the fact that the representational character of representational s -properties need not be graphical: By describing the representational s -property -- attributed to a perceptual experience e_n in virtue of its representing a particular Spatial location -- in terms of there being a particular point-vector $\langle a, b, c \rangle$ in Σ_{e_n} , we are not

committing ourselves to saying that the representations of Spatial features in e_n are graphical.²⁷

After these remarks concerning the general nature of the proposed characterization, let me briefly turn to some issues concerning our specific example. Let us first ask ourselves which -- if any -- of the structural features of a three-dimensional real vector space can be seen as representing Spatial features. To clarify the issue, let me point out one feature which in my view might well turn out not to be of this sort, namely the cardinality of this vector-space: it might be that Space -- i.e. real Space which can be experienced -- does not have non-denumerably many locations. Thus, if someone who possesses the concept of a three-dimensional real vector-space has perceptual experiences with a propositional representational content based on this concept, then he might well be misrepresenting Reality in these experiences with respect to the cardinality of Spatial locations. Now, instead of going through all the structural features of three-dimensional vector spaces in this way, we might ask ourselves whether there are features of Space which plausibly ought to be represented in all experiential (propositional) representations of Space. To be quite

²⁷ Thus, if we espouse the brain-state view of sensory/perceptual manifolds, we can say that a particular component--qua brain-state -- of such a manifold has the representational function of $\langle a, b, c \rangle$ without committing ourselves to the view that this function involves in any way the Spatial properties of the component (brain-state) in question.

clear, it cannot be the aim of this discussion to analyse which -- if any -- Spatial features must be represented in experience, but it seems plausible to say that if an experience gives rise to a propositional representation of (a part of) Space then it ought to be represented as

[4.1] being dimensional,

[4.2] being metrical,

[4.3] extending beyond the experiential fields,

[4.4] containing a (or several mode-specific)²⁸ location(s)

of the subject.

Clearly, these four features are reflected in our characterization of the representational spatial features of sensory/perceptual manifolds_P. Whether or not it is appropriate, say, to use a three-dimensional vector-space²⁹ in our characterization would have to be analysed in much more detail. For the present purposes, let us simply assume that, of all the structural features of the vector-space represented in Figure 1, minimally those referred to in [4] characterize repre-

²⁸ "Mode-specific" here is meant to refer to the sensory modes of presentation.

²⁹ Poincaré, for example, "sought to show how space and geometry arise from the purely intellectual enterprise of comparing sense perceptions and reflecting upon them. Towards the end of his life, he did assert however that there exists such a thing as a 'geometrical intuition', which is the source, e.g. of Hilbert's axioms of order and to which he, Poincaré, had continually resorted in the course of his topological researches. But such intuition is nothing but the awareness of our faculty of constructing an n -dimensional continuum. The decision to put $n=3$ and the definition of a metric must be based on experience." (Torretti, [1978], p.330)

sentational s -properties of Σ_{e_1} . As for the rest of the features traditionally associated with the said vector-space -- say, for example, its cardinality -- we must first of all consider the afore-mentioned subject-specific constraints arising from the dependency of propositional representational content on which concepts are possessed by M : If M possesses the concept of the cardinality of a three-dimensional real vector-space, and if it is -- implicitly or explicitly -- part of the propositional representational content of e_1 that the set of Spatial locations has this cardinality, then we can take the cardinality as a representational s -property of e_1 . If, however, the above is not the case, then we must take the cardinality as merely an auxiliary feature in our characterization, i.e. one which does not pertain to such a property.³⁰

To reduce the number of auxiliary items in our characterization of the representational spatial structure of Σ_{e_1} , I suggest that we assume M to be an old-fashioned mathematician, who conceives of Space in the required way. To be quite clear, even this assumption will leave us with many auxiliary features in our characterization. Thus, not only is it quite unlikely that the propo-

³⁰ Let me just point out here one feature of our characterization which, I think, will quite generally have this auxiliary status, namely the two-dimensional vector-field. This is not surprising, for this field was only introduced for auxiliary purposes.

sitional representational content of e_1 contains the proposition that the length of the side A-B is r (where r is meant to be a particular positive real number), but it is indeed unnecessary that this is so for experiencing the associated Spatial distance, if one adopts Peacocke's view³¹ that experiencing Spatial distances (and directions) involves in many cases what he calls "analogue content" which is not propositional in our sense.³²

Finally, let me re-emphasize that -- if anything -- Figure 1 is meant to represent properties attributed

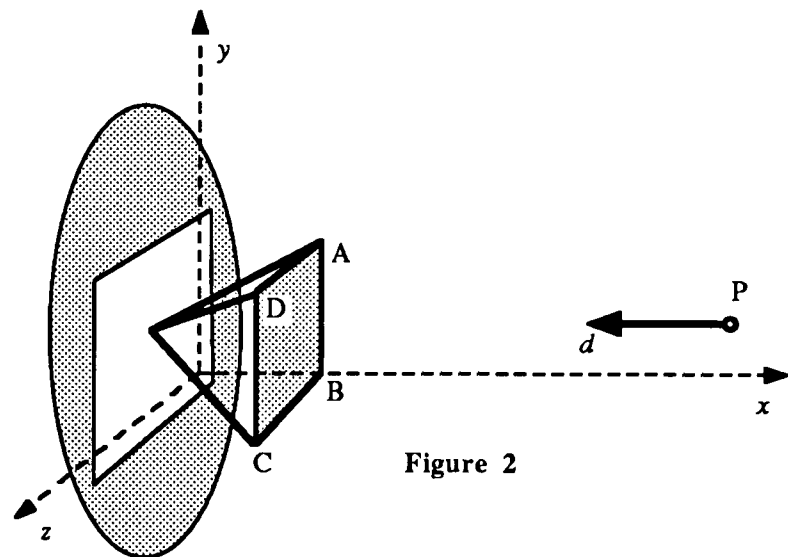


Figure 2

to e_1 by virtue of its propositional representational content. For example, had we assumed the propositional representational content of e_1 to contain the proposition

³¹ Peacocke, [1986]

³² I shall return briefly to this analogue content later in this section.

[5] "I see, directly in front of me, the base of a pyramid, placed before a wall"

-- instead of [3] -- then we would have had to use Figure 2 to represent the relevant representational spatial structure. The important thing here is that the propositions by which we characterize the propositional representational content of an experience need not be true, and thus our drawings are, loosely speaking, not representations of what -- if anything -- *M* really sees, but of what "he thinks he sees".³³

After this mathematical characterization of representational *s*-properties, let us now turn to Peacocke's conception of "sensational spaces" and to his notion of "sensational properties", as characterized by reference to such "spaces". The aim here will be to elucidate Peacocke's conception of **sensational *s*-properties** -- say as given by his *primed* predicate $\text{square}'(r, e)$ -- against the background of our account of representational *s*-properties, and to discuss the adequacy of this conception for our purposes.

Peacock's *primed* predicates are strictly speaking only applicable to genuine perceptual experiences: the region *r*

³³ Thus, it could well be the case that Figure 3 is a correct representation of the representational *s*-properties of *e*, although what really lies in front of *M* is not a pyramid but say a cube.

of the imagined interposed plane, referred to in the definition of $\text{square}'(r,e)$, is a Spatial region; and strictly speaking it would be meaningless to refer to such regions in the proposed way in the context of purely hallucinatory experiences.³⁴ This restricted applicability of Peacocke's *primed* predicates can, however, easily be overcome, at least with respect to sensory/perceptual experiences_P which have representational *s*-properties:³⁵ Considering the four minimal features (cf. [4]) attributed to any representational spatial structure of sensory/perceptual manifolds_P, we can generalize Peacocke's conception of *primed* predicates by replacing his reference to an imaginary Spatial plane with one to an imaginary plane in the representational spatial structure associated with the experience e_n which is the subject of the *primed* predication in question.

To interpret Peacocke's characterization of the sensational *s*-property square' in the context of our sample experience e_1 in this generalized way, we must introduce into our characterization of the representational spatial

³⁴ The sensational properties of purely hallucinatory experiences are not produced by tilted white plates (see [1]) or any other Spatial objects, and hence it makes no sense to refer to (opaque) Spatial regions which obscure these objects.

³⁵ It might be that there are sensory/perceptual experiences with no representational *s*-properties, but this need not concern us here, for I shall shortly propose a further-reaching modification of Peacocke's conception, which will make this point irrelevant.

structure associated with e_1 -- possibly as an auxiliary feature -- the sort of interposed plane represented in figure 3.0. Assuming that the region r in this plane

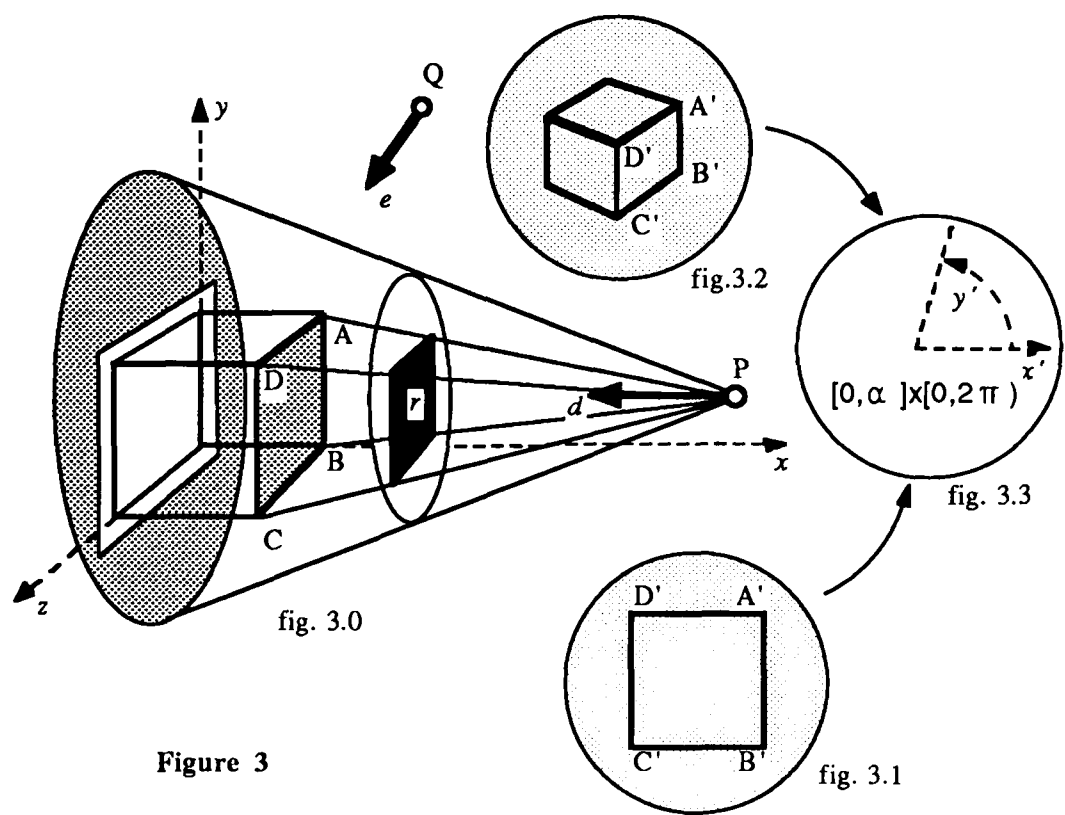


Figure 3

would be thought of by M to precisely obscure the figure
5 $ABCD$, $\text{square}'(r, e_1)$ will be given as

[6] $\text{square}'(r, e_1)$ iff r is a square region in the representa-
tional spatial structure of Σ_{e_1} .

To avoid misunderstandings, it is important to point out

[6.1] first, that -- analogously to the fact that the shape of
10 the obscured objects was irrelevant to Peacocke's
conception of square' -- it is irrelevant to [6] whether
 Σ_{e_1} has the representational s -property that $ABCD$ itself
is square, and

[6.2] second, that -- in analogy to the fact that $\text{square}'(r, e_1)$ in Peacocke's sense was not meant to refer to the property of r (here meant to refer to a Spatial region) of being square -- it would be wrong to think that $\text{square}'(r, e_1)$, in our sense, refers itself to a representational s -property.³⁶

It would be wrong to characterize the sensational s -property given by $\text{square}'(r, e_1)$ as a property of the point-set of three-dimensional vectors which make up r . Consequently, if we wish to make sense of square' in terms of being a "spatial" property of "point-sets", we must introduce an ontology ("point-manifold") $\Omega_{e_1}^P$ (graphically represented in figure 3.1) which is quite distinct from the one which makes up the representational spatial structure of Σ_{e_1} . It must be emphasized, however, that $\Omega_{e_1}^P$'s being distinct from this representational spatial structure does not imply that the elements of $\Omega_{e_1}^P$ need not be related to representational spatial locations. On the contrary, the elements of $\Omega_{e_1}^P$

³⁶ The Spatial property of being square, respectively the homonymous representational s -property, is only employed to fix the referent of $\text{square}'(r, e_1)$. However, it must be mentioned here that replacing the reference to the former by a reference to the latter is only legitimate if we assume that the (visual) recognition of shapes of plane regions in the imagined plane is infallible, for otherwise we could have the case that the shape of Peacocke's region could be misrepresented in e_1 which would mean that Peacocke's primed s -predicates and our characterization thereof could diverge. In light of the forthcoming modification of [6], we can unproblematically assume -- for the purposes of this exegesis of Peacocke's conception -- that the mentioned type of shape recognition is actually infallible (indeed, this assumption is not completely implausible if we consider how we judge the shape of objects by visual means).

are taken to be functionally related (in the set-theoretical sense) to points of the interposed plane as represented in figure 3.0. This functional relation -- say between A' and the projection of A on to the said plane (as suggested in figure 3.0) -- is indeed responsible for the "spatial" character of $\Omega_{\mathcal{P}_1}$, and more than that it provides a unique embedding of $\Omega_{\mathcal{P}_1}$ into a specific, two-dimensional metric structure, as suggested in figure 3.3.³⁷ Accordingly, if one wishes to characterize square' as a property of $\Omega_{\mathcal{P}_1}$ -point-sets, one would have to do so in terms of this metric structure, i.e. in terms of x' and y' .

Does this characterization of sensational s -properties reflect Peacocke's conception, or more precisely, our generalization thereof? At least as far as I can make sense of his conception, I believe that we can answer this question affirmatively. In particular, if we take $\Omega_{\mathcal{P}_1}$ to contain the manifold of (visual) sensations associated with e_1 , our characterization will allow us to say that these sensations do not "populate visual sensational space", for $\Omega_{\mathcal{P}_1}$ can be embedded in $[0, \alpha] \times [0, 2\pi)$ without being a subset thereof. Furthermore, the proposed characterization clearly also reflects the conception that sensational s -properties are characterized by reference to the relevant sensational space.

³⁷ This metric structure is simply the Cartesian product of the intervals of real numbers $[0, \alpha]$ and $[0, 2\pi)$, where α is $\frac{1}{2}$ the opening angle of the projective cone represented in figure 3.0.

Indeed it provides a natural reading to the assertion that it makes no sense to ask what spatial relation a location in visual sensational space bears to a location in tactual sensational space: A location in visual sensational space is, in our characterization, a point in $[0, \alpha] \times [0, 2\pi)$ qua image under the above mentioned particular (i.e. vision-specific) embedding-function, and as such it is assumed that all its spatial attributes are given by the structure of $[0, \alpha] \times [0, 2\pi)$ qua collection of visual sensational locations. Now, even if it were possible to characterize "tactual sensational space" by means of the same Cartesian product, none of the resulting tactile locations could be regarded as images under this vision-specific embedding-function, and consequently none of them could be spatially related to visual locations.

The question whether this characterization of sensational *s*-properties does justice to Peacocke's conception is one matter, and, as such, is quite independent of the question concerning the adequacy of this conception itself, to which I shall now return. What I wish to show is that -- in addition to what we have already mentioned with respect to purely hallucinatory experiences -- Peacocke's conception is also incapable of capturing the type of sensational qualities given in the context of "perceptual transparency". Peacocke himself acknow-

ledges a problem in his discussion of the fact that a white piece of paper is seen as being white even when

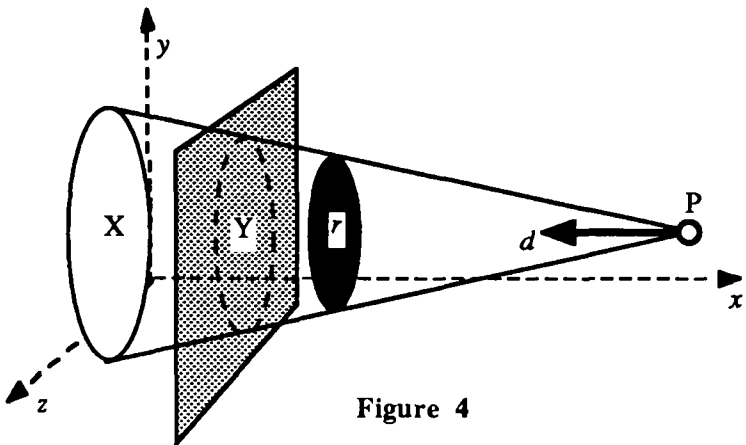


Figure 4

looked at through a sheet of tinted (say red) glass. He says that

5 "In such a case, it would be wrong to insist that the region of the visual field in which the paper is presented is white' and wrong to insist that it is red'."³⁸

The reason for this becomes evident by looking at the representation of the above-mentioned situation in
10 Figure 4.³⁹ If we call the experience represented in this figure " e_2 ", then, according to Peacocke's characterization of *primed* predicates, we would have that
15 $\text{red}'(r, e_2)$ -- due to the fact that r precisely occludes Y , which is red -- and that $\text{white}'(r, e_2)$ -- due to r 's precisely obscuring X , which is white. Even though *primed* predicates ought not be confused with their *unprimed* homonyms, to use homonyms in this case

³⁸ Peacocke, [1983], p.39

20 ³⁹ Note here that the problem in question arises not just for Peacocke's own conception, but also for our generalization thereof.

at all, there must be enough similarity between these pairs of predicates to render the statement

$$\text{red}'(r_n, e_n) \ \& \ \text{white}'(r_m, e_m) \ \& \ r_n = r_m \ \& \ e_n = e_m$$

inconsistent.⁴⁰ Any attempt to describe perceptual transparencies in terms of Peacocke's *primed* predicates will hence lead to inconsistencies.⁴¹

One possible reaction to this might be to question whether these perceptual transparencies are indeed sensational in character. This, however, is conclusively demonstrated in Mettelli's article on "The Perception of Transparency"⁴² where a simple algebraic theory of "colour scission" is developed. Mettelli argues that in the case of perceptual transparency, the "stimulus colour" splits into qualitatively different "scission colours", one of them going to the transparent layer and the other to the figure below. He

⁴⁰ The inconsistency I have in mind here is that of the propositional formula $(r \implies \neg w) \ \& \ r \ \& \ w$.

⁴¹ Peacocke himself reacts to this problem by saying that:
 20 "We have here [i.e. in the situation represented in Figure 4] a new kind of experience, and any extension of these primed properties from the cases where the conditions of viewing are more normal seems partly stipulative." (Peacocke, [1983], p.39)
 This *ad hoc* manner of resolving the mentioned inconsistencies
 25 however is to me unacceptable, in particular if one wishes to retain the view that sensational properties are real.

⁴² Mettelli, [1976]

shows that perceptual transparency is quite independent from physical transparency.⁴³

The problem with Peacocke's conception of sensational properties is that -- due to the involved projection on to a plane -- the resulting visual sensational space is strictly two-dimensional and so literally leaves no room for any sensational "behindness" or "depth". The only way to overcome this problem is by dropping the reference to such a plane in the characterization of sensational properties and instead making use of "sensational individuals". Let me try to explain what I have in mind by returning to our sample experience e_1 , and in particular to our mathematical characterization of the associated representational spatial structure (see figure 1). Given this characterization, let us collect all the point-vectors which are taken to characterize those representational locations which for M represent visually apprehended Spatial locations (i.e. the ones which make up the grey areas) into a manifold, and refer to this manifold -- when taken in abstraction of all the metrical structure represented in figure 1 -- as Ω_{e_1} . This manifold will be meant to contain (possibly as aggregates) the visual sensational individuals taken to be part of e_1 . The important point here is that the

⁴³ That is to say, perceptual transparency phenomena can, on the one hand, occur without concomitant occurrence of physical transparencies, and on the other, they need not occur even if physical transparencies occur.

elements of Ω_{e1} are only characterized in topological terms, even though each of them is taken to carry a

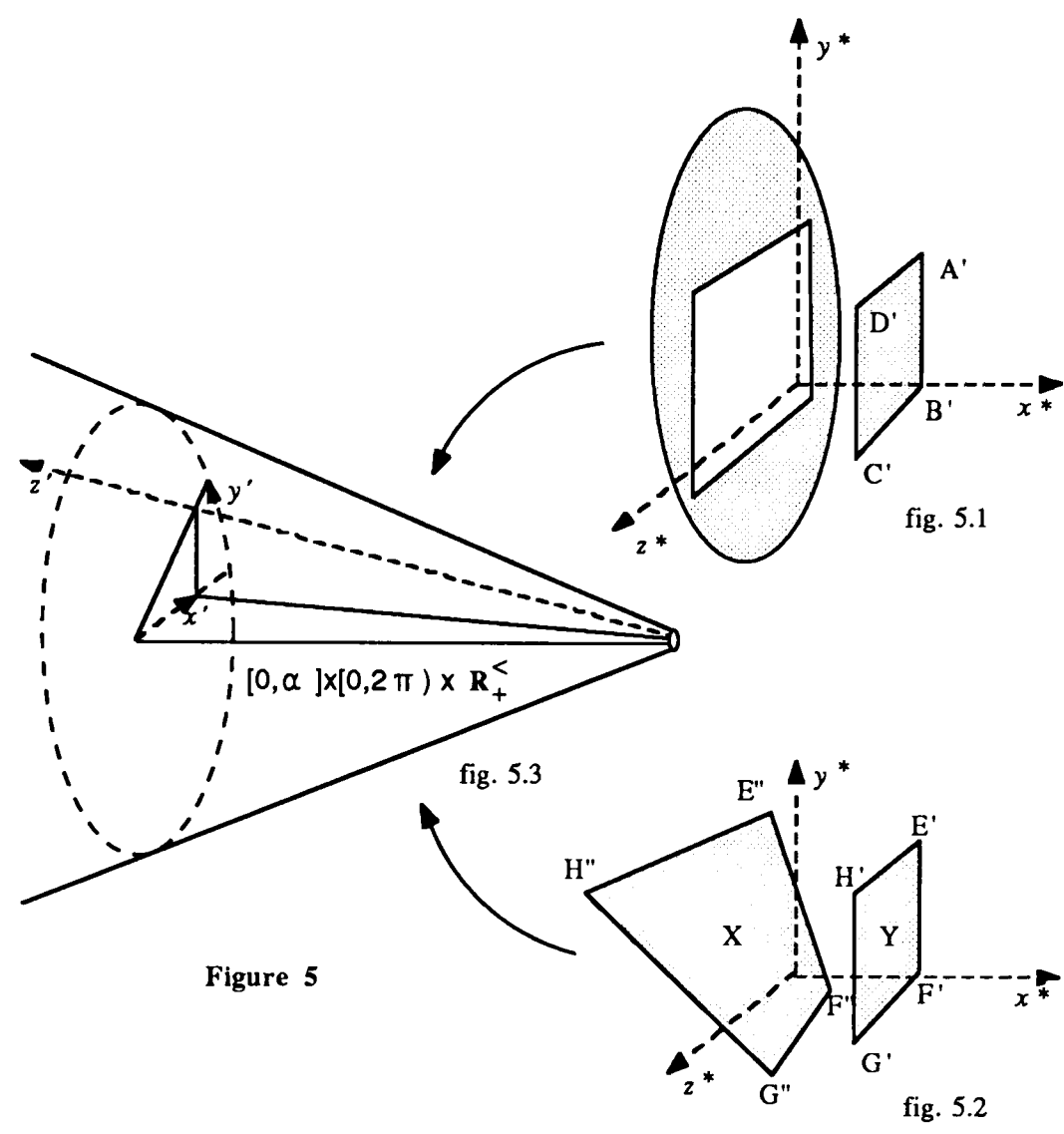


Figure 5

"name-tag" consisting of a triple of real numbers, a feature which I have tried to represent in figure 5.1. The reason for retaining these "name-tags" is that they enable us to embed Ω_{e1} uniquely in the pseudo-metrical mathematical space in the way suggested in figure 5.3. It is not difficult to guess that ultimately, I shall see this figure as a representation of what -- following Peacocke -- one might call "visual sensational space". But right now let us simply assume that we are dealing

5

10

with the mathematical "space" given as the Cartesian product of $[0, \alpha] \times [0, 2\pi)$ with the ordered set of strictly positive real numbers $\mathbb{R}^+$, together with a pseudo-metric given by what I shall call the **projective distance** function d_P :

$$[7] \quad d_P: \{[0, \alpha] \times [0, 2\pi) \times \mathbb{R}^+\}^2 \longrightarrow \mathbb{R}^+;$$

$$d_P(\langle x_1', y_1', z_1' \rangle, \langle x_2', y_2', z_2' \rangle) =$$

$$= [\tan(x_1')^2 + \tan(x_2')^2 - 2\tan(x_1')\tan(x_2')\cos(y_2' - y_1')]^{\frac{1}{2}}.$$

To demystify this mathematical jargon, let me just point out that

[7.1] in the context of the mentioned embedding, this projective distance is nothing but the Euclidean distance between the projections of the points in question on Peacocke's plane, positioned one unit in front of the point of view.⁴⁴

Indeed, the reason why I chose to use the projective distance function given in [7] -- instead of, say, the one corresponding to a spherical projection -- was only to ensure a compatibility with Peacocke's conceptions.⁴⁵ The statement that this projective distance function gives rise to a "pseudo-metric" simply means that

⁴⁴ cf. Bronstein, [1973], p.237

⁴⁵ I think that a spherical projective distance function would be more accurate, but this I believe is an empirical issue and, as such, lies beyond the scope of these investigations.

[7.2] the function d_p fulfils all the axioms of a metric⁴⁶
except for the axiom that $d(x,y)=0$ iff $x=y$.

Two "points" which differ only in their z' -components
 will have no projective distance, although they are not
 numerically identical. In this context, I ought to point
 out that

[7.3] the structure of the threefold Cartesian product which
 we are discussing here prohibits the construction of
 anything more than such pseudo-metrics.

To define a proper distance function constructively
 -- i.e. only in terms of the components of the in-
 volved points -- it would be necessary to compare the
 z' -components of these points quantitatively, something
 which the structure of $R\approx$ does not allow.

In contrast to the previously proposed exegesis of
 Peacocke's conception of sensational s -properties, I
 shall interpret the embedding of Ω_{e1} into $[0,\alpha] \times [0,2\pi) \times R\approx$
 as a transformation of Ω_{e1} into a structurally richer
 manifold Ω_{e1}^+ . That is, I shall take this embedding to
 transform the purely topological $(x^*y^*z^*-)$ manifold Ω_{e1}
 into a pseudo-metrical $(x'y'z'-)$ structure. Within this
 enriched structure, it is then possible to define predi-
 cates referring to what might be called "projective
 forms" of Ω_{e1}^+ -point-sets. Probably the simplest way of

⁴⁶ cf. Mendelson, [1968], Chapter 2

achieving this would be the following version of "being projectively (say) circular":

$$[8] \quad \text{circular}^*(X) \text{ iff}_{\text{def}} (\exists A)(\exists r > 0)(\forall B \in X) d_P(A, B) = r,$$

where X is taken to range over a certain type of $\Omega_{\varepsilon}^{+1}$ -point-sets (namely "linear" ones), and A, B over the points of $\Omega_{\varepsilon}^{+1}$. I take it that the structure attributed to $\Omega_{\varepsilon}^{+1}$ is rich enough for us to generalize [8] by making reference to "tangent-points" such that $\text{circular}^*(X)$ is also applicable to "non-linear" point-sets of sufficient topological regularity. For the purposes of this discussion let me therefore assume that these projective form predicates -- like $\text{circular}^*(X)$ and $\text{square}^*(X)$ -- are of this generalized type.

In addition to accommodating these projective forms, the structure represented in figure 5.3 also allows us to apply a notion of "behindness" to point-sets of $x'y'z'$ -manifolds like $\Omega_{\varepsilon}^{+1}$. One possible way of doing this is to introduce first a behindness relation for the points of our threefold Cartesian product:

$$20 \quad [9.1] \quad \text{behind}^*(\langle x'_1, y'_1, z'_1 \rangle, \langle x'_2, y'_2, z'_2 \rangle) \text{ iff } x'_1 = x'_2 \ \& \ y'_1 = y'_2 \ \& \ z'_1 > z'_2$$

and then define that

$$[9.2] \quad \begin{aligned} & \text{behind}^*(X, Y) \\ & \text{iff} \\ & (\exists A \in X)(\exists B \in Y) \text{behind}^*(A, B) \ \& \ (\exists C \in X)(\exists D \in Y) \neg \text{behind}^*(D, C), \end{aligned}$$

where X and Y are taken to be (sufficiently regular) point-sets of a given $x'y'z'$ -manifold. To exemplify the application of these "star-predicates", let us consider an experience e_3 which -- in analogy to our mathematical construction of Ω_{e_1} -- is meant to give rise to an $x^*y^*z^*$ -manifold Ω_{e_3} , as represented in figure 5.2. The nomenclature used in this figure is meant to reflect that the double-primed points are -- qua $\Omega_{e_3}^+$ -points -- behind* their single-primed homonyms. Assuming that the $\Omega_{e_3}^+$ -point-set Y is projectively square will imply that

$$[9.3] \quad \Omega_{e_3}^+ \Vdash \text{square}^*(X) \ \& \ \text{square}^*(Y) \ \& \ \text{behind}^*(X, Y).$$

It is not difficult to see that these star-predicates can be transformed into predicates which make explicit reference to the presupposed underlying $x'y'z'$ -manifold, say, for example, by stipulating

$$[10] \quad \text{square}^*(X, \Omega_{e_n}^+) \equiv X \text{ is a sufficiently regular } \Omega_{e_n}^+ \text{-point-set} \ \& \ \Omega_{e_n}^+ \Vdash \text{square}^*(X).$$

Keeping in mind that these versions of star-predicates still pertain to mathematical items, we can then use the fact that any sensory/perceptual experience_P e_n which has representational s -content is meant to give rise to a unique $x'y'z'$ -manifold $\Omega_{e_n}^+$, to use the notation $\text{square}^*(X, e_n)$, if e_n is such a "representational s -experience". Given that

[11.1] it is exactly these representational *s*-experiences to which our initial generalization ([6]) of Peacocke's conception of sensational *s*-properties is applicable, and

5 [11.2] given our choice of projective distance function ([7]), it follows that Peacocke's sensational *s*-statements are, without exception, equivalent to statements given in terms of star-predicates. Thus we have, for example, that

10 [11.3] $(\exists r) \text{ square}'(r, e_n) \text{ iff } (\exists X) \text{ square}^*(X, e_n).$

Our mathematical "star"-language, however, has the advantage that it can also be used to describe *x'y'z'*-manifolds, like Ω_{ϵ}^+ , which are based on experiences which cannot be described in terms of Peacocke's
15 *primed* predicates. Thus, we have in

[11.4] $\text{square}^*(X, e_3) \ \& \ \text{square}^*(Y, e_3) \ \& \ \text{behind}^*(X, Y, e_3)$

a (true) "star"-statement for which there is no equivalent proposition in terms of *primed* predicates.

20 It is not difficult to see that if we can "translate" our mathematical "star"-predicates into predicates which genuinely pertain to sensory/perceptual experiences_P, then we have found a generalization of Peacocke's conception of sensational *s*-properties which can be applied to phenomena of perceptual transparency. Such a

"translation" will be achieved if we are able to interpret the relevant components of the involved mathematical items as mathematical characterizations of components of sensory/perceptual experiences_P. It is important in this context that we are not required to interpret each and every feature of the mentioned mathematical items, but only those which are relevant to our characterization of "star"-predicates, namely $x'y'z'$ -manifolds and (sufficiently regular) $x'y'z'$ -point-sets.

Given our previous investigations, it should not be surprising that the desired translation can be achieved

[12.1] by interpreting Ω_n^+ -- for a given sensory/perceptual experience_P e_n -- as being a mathematical representation of the spatial structure of the manifold C_n^+ of colour-tokens which occur in e_n ,

and consequently

[12.2] by interpreting references to "sufficiently regular Ω_n^+ -point-sets" as being references to mathematical representations of colour-tokens in C_n^+ .

Let me try to support this interpretation by arguing for the "ontological significance" of our mathematical description of $x'y'z'$ -manifolds. What I shall try to show is that this this description can genuinely be regarded as

a (mathematical) characterization of Real sub-structures of sensory/perceptual experiences_P.⁴⁷ I shall first of all argue for the conjecture that,

[13] the capacity of having our type of metrical (visual) experiences, cannot be possessed without possessing the capacity to have "experiences of visual self-location"

-- where by "an experience of visual self-location" I roughly mean a visual experience with a "spatial" structure containing a "location" which serves as (representation of) the "locus of the visual self" ("point-of-view").

Geometry, in its widest mathematical sense, is the study of invariances and is concerned with invariance-correlations between properties and transformations. In a more narrow, and etymologically older sense, the subject matter of geometry is taken to be the metrical structure of "manifolds of points" ("spaces"). The invariance-correlations which are of geometrical interest (in this narrow sense) are characterized in terms of **congruence properties** ("size-cum-shape") of point-sets -- of the concerned space(s) -- and **rigid transformations** thereof. The important point here is that neither of these notions can be understood independently of the other, and consequently they can only be possessed jointly.

⁴⁷ Note again that not all the mathematical features used in our analysis need to have "counterparts" in Reality.

Moreover, the fact that the metric of a given space is classifiable by reference to rigid transformation groups -- like the Euclidean metric being identified as the metric given by the group of "translations" and "rotations" -- suggests that the conception of a metric space itself is "necessarily tied" to the above-mentioned invariance conception.

Turning then to sensory/perceptual experiences_P, the above considerations seem to suggest that a subject can have experiences of a genuinely metrical nature only if he is capable of experiencing rigid transformations (in the above sense). The argument (for [13]) which I am trying to give here is based on the fact that our actual (visual) experiences of rigid transformations always contain changes of sensational *s*-properties which are peculiar because they are qualitatively identical with particular changes in sensational *s*-properties of (actual or possible) experiences which are not experiences of rigid transformations. For any (visual) experience e_n of a rigid transformation, an experience of a change of point-of-view can be imagined, or indeed brought about, which -- with respect to the mentioned particular change in sensational *s*-properties -- is qualitatively identical with e_n ; and, indeed *vice versa*. To exemplify this latter point, let me expand our initial example of a vision-based experience (e_1) by stipulating that it is to be an experience of a change of

viewpoint from a location P to the location Q, as represented in Figure 3. This experience is, over its duration, associated with different visual *s*-properties. In figure 3.1 and figure 3.2, I have tried to represent two of the particular visual *s*-properties (both indicated by A'B'C'D') which, when considered as a temporally ordered sequence, are part of what I referred to as the "peculiar" change in visual *s*-properties. It is not difficult to see that we can imagine an experience of a rotating cube which displays a qualitatively identical sequence of visual *s*-properties.

It is hard for me to believe that this type of qualitative identity between (visual) experiences of rigid transformations and experiences of changes in visual self-location is just accidental. Much more likely seems the conjecture that this correlation arises from some "necessary" tie between the two involved capacities. There are several possibilities of what this tie might be. The one which I consider to be the likeliest is that both these capacities have in some sense the same "root" -- reflected in the above-mentioned peculiar sensational correlation -- with the consequence that neither of them can occur without the other. Furthermore, as it seems unlikely that one can possess the capacity of experiencing a change in point-of-view without having the capacity of "visual self-location", I believe that a

thorough analysis along the lines of this sketch would justify the conjecture put forward under [13].

The main implication of this conjecture for our present purposes arises in the context of what I consider to be one of the methods for "dissecting" our sensory/perceptual experiences_p into Real sub-structures. This method is to consider -- as Real sub-structure of sensory/perceptual experiences_p which we actually have -- the structure of the type of sensory/perceptual experiences_p which we would/could have were we deprived of certain experiential capacities which we do possess. The implication of [13] in this context clearly is that there cannot be a Real sub-structure in our visual experience which is metrical but does not contain a location for the point of view.

If, therefore, it were possible to establish (say by means of this method) that "visual-fields" -- being the "natural habitat" of colour-tokens -- are Real sub-structures of visual experiences, then it would follow directly that these Real sub-structures could not have more than what we referred to as a pseudo-metrical structure.⁴⁸ This, I suggest, does provide some

⁴⁸ The very definition of a "visual field" -- say, as the collection of items in a sensory/perceptual experience which are actually visually apprehended -- excludes the possibility of it being an experience of visual-self location as we know it, a fact which in our mathematical characterization of "visual space" (figure 5.3) was reflected in restricting the z' -components to

support for the conjecture put forward in [12], namely to identify the collections of colour-tokens given in sensory/perceptual experiences_p as experiential sub-structures of the type we referred to as $x'y'z'$ -manifolds. My emphasis on "type" here is simply meant to point again at the possibility that the particular pseudo-metric which I have employed might have to be modified.

To finish this discussion of the spatial structure of sensory/perceptual experiences_p, let me briefly mention four points which might provide some further clarification of the issues discussed so far.

[14] First, I wish to point out that I do not consider our mathematical characterization of $x^*y^*z^*$ -manifolds to be ontologically significant. If there is at all a Real spatial sub-structure of $x'y'z'$ -manifolds like Ω_{ϵ}^{+n} , then it would have to be what might be denoted by Ω_{ϵ}^{*n} , that is, $\Omega_{\epsilon n}$ as spatially structured by the topology associated with the pseudo-metric of Ω_{ϵ}^{+n} . Given that I chose to interpret $x'y'z'$ -manifolds as collections C_{ϵ}^{+n} of colour-tokens, my choice of notation here is of course not accidental, for I believe that what I referred to as manifolds of colour-units C_{ϵ}^{+n} must be interpreted as having this Ω_{ϵ}^{*n} -structure.

strictly positive numbers.

[15] The second point concerns Peacocke's *analogue content*.⁴⁹ Peacocke characterizes this type of content by introducing what he calls "manners of perception":

5 [15.1] "Whenever someone perceives something -- an object, a property, a magnitude -- he perceives it in a particular way, or, as I shall say, in a particular *manner*. These manners comprise part of the content of perceptual experience [...]."⁵⁰

A type of manner is said to be analogue if

10 [15.2] "there is some dimension of variation such that for any pair of distinct points d , d' on that dimension, there are two manners of the given type one of which is a manner of perception of something which is or includes d but not d' , and the other of which is a manner of perception of something which is or includes d' but not d ."⁵¹

As an example of two different manners of perception, Peacocke asks the reader to

20 [15.3] "suppose you see two straight lines at oblique angles, one to your right and one to your left. In some such cases, you neither see one line as longer than the other, and nor do you see the lines as of the same length, as matching in length. It follows that the distance between the ends of the one line and the distance between the ends of the other are not presented in the same manner: this follows from our condition on manners that things presented by the same manner must be experienced as matching in the relevant respect."⁵²

30 I must admit that I have difficulties in grasping what exactly Peacocke has in mind by these "manners".

Peacocke adds a footnote to [15.2]:

[15.4] "This 'is or includes' formulation is to leave room for the possibility that manners are manners of perception of something with boundaries sufficiently broad that they

35 ⁴⁹ cf. Peacocke, [1986]

⁵⁰ op.cit. p.5

⁵¹ ibid. p.7

⁵² ibid. p.10

are in one-one correlation [my emphasis] with matching profiles mentioned earlier."⁵³

He also describes "matching profiles of directions" in asking us to

5 [15.5] "Suppose you perceive the end of one arm of a television
aerial to be in a particular direction from you. We can
use the notion of the *matching profile* of your experience
in respect of the perceived direction of the end of the
presented arm. This matching profile is a set of direc-
10 tions [my emphasis]: a given direction is in the set if
and only if it is not discriminably outside the apparent
direction of the end of the perceived arm."⁵⁴

With the help of this, it might be possible to argue for
a formal interpretation of "manners of perception" (say
15 in the case of directions) in terms of sets of directions
introduced into the three-dimensional vector-space which
we initially used to formally characterize (proposi-
tional) representational space. To carry out such a for-
malization, I would, however, first have to understand
20 Peacocke's views more clearly.⁵⁵

[16] A third point which I must mention is a consequence of
[12] concerning the nature of colour-tokens: To say that
the spatial structure of the "natural habitat" of colour-
tokens is represented in figure 5.3 is to restrict the type
25 of spatial predicates which can meaningfully be applied

⁵³ Peacocke, [1986], p.7

⁵⁴ op.cit. p.4

⁵⁵ The formal spatial structure resulting from such a
30 formalization of "perceptual manners" could then either represent
the full representational space (say, if the propositional content
conjecture is false), or represent an intermediate level of
spatial structure between sensational spaces and (propositional)
representational space.

to colour-tokens to our initial "star"-predicates. Colour-tokens can meaningfully be said to be square* but not to be square.⁵⁶ Assuming that by "spatially extended particular" we mean individuals which do have a "real" shape-cum-size, we can conclude 5.1 [2.2], namely that

[16.1] colour-tokens are not particulars.

[17] As a final point in this section, let me make a brief comment on the general status of these investigations of the spatial structures of sensory/perceptual experiences. Although these investigations were *de facto* conducted against the background of Peacocke's representational framework, it seems very plausible -- in particular if conjecture [13] can be justified -- that the structural distinction which we made between "sensational space(s)" and "representational space" can properly be introduced into our neutral accounts of sensory/perceptual experience. The terminology "representational space" would, in this case, naturally be inappropriate, and consequently would have to be replaced by something which does not make reference to a determined ontological framework. Given what was said about the metrical structure, I suggest that the notion of "(geo-) metrical (experiential) space" is to be used instead.

⁵⁶ Mathematically, this non-applicability of "being square" to colour-tokens is given by the fact that "being square" -- as predicate for *xyz*-point sets -- is defined in terms of the canonical *xyz*-metric, and hence involves arithmetical operations on all the components of the relevant points.

5.3 Colour-Qualifying-Ties

After this extensive discussion of sensational *s*-properties, let us turn to the task initially given under 5.1 [1.1.4], which was to show that

$$\begin{array}{l} 5 \quad \text{red}_{\text{em}}(\langle \text{object}^t \rangle_n) \\ [1] \quad \text{iff} \\ \quad (E c_m \in C_{\text{en}}^t) \text{ red}_s(c_m) \ \& \ c_m \sim_q \langle \text{object}^t \rangle_n. \end{array}$$

As mentioned before, I shall try to justify this by using an argument put forward by Peacocke in Chapter II of his Sense & Content. In this argument he discusses the connexion between 'being red' and 'looking red' from the point of view of what he calls "priority of definability"⁵⁷. According to him there are the following three possibilities:

- 15 [2] "(i) The concept of being red is philosophically prior to that of looking red and other experiential concepts. This is true not just in the uncontroversial sense that the phrase 'looks red' contains 'red' as a semantic constituent. On this first type of view, it is true also in
- 20 the more substantial sense that an account of what makes an experience an experience as of something red must ultimately make use of the concept, applicable to physical objects, of being red. This we will label 'the anti-experientialist option'.
- 25 (ii) Neither being red nor any relevant family of concepts whose instantiation entails the occurrence of experiences ('experiential concepts') is prior to the other. Both have to be characterized simultaneously by means of their relations to one another and to other notions.
- 30 This is the no-priority view.

⁵⁷ "We can say that a concept A is definitonally prior to a concept B iff B can be defined illuminatingly in a given respect in terms of A" (Peacocke, [1983], p.30)

(iii) The concept of being red has to be explained in terms of experiential concepts. This can be done in a way not undermined by the fact that 'looks red' semantically contains 'red', and without any circular use of the concept of being red. This might be called [...] 'the experientialist view'.⁵⁸

After discussing at some length, and ultimately rejecting, the first two of these points of view, Peacocke expands on his experientialist position as follows:⁵⁹

- 10 [3.1] "The experientialist can say that when a normal human sees a red object in daylight, there is a certain property possessed by the region of his visual field in which the object is presented to him. This is the property we labelled 'red': [...] the crucial point is
- 15 [3.2] that red' is a *sensational* property of experience. [...] The experientialist may now say this: in mastering the predicate 'red' of objects, one comes to be disposed to apply it to an object when the region of one's visual field in which it is presented is red' and circumstances are apparently normal (or when one has evidence that it would meet this condition were it so presented). The experientialist will say that this explains the inclination we feel initially to explain 'red' in terms of 'looks red'. He will say that what is correct is to explain red in terms of red'; and since normally when something looks red, the region of the visual field in which it is presented is red', he will say that this inclination comes as no surprise.
- 20 [3.3] Since for him the property red' of experiences, and a sensitivity of one's judgments to its presence, are the fundamental notions, rather than that of looking red, this experientialist does not need to deny the obvious fact that 'red' is a semantically significant constituent of 'looks red'. [...]
- 25 [3.4] It is important to note that the experientialist is operating with three, and not two, notions: that of being red', that of looking red, and that of being red. The second of these is not in any simple way definable in terms of the first. However plausible it may seem at first blush, it is not true that anything which looks Φ must be presented in a region of the visual field which is Φ '.⁶⁰
- 30
- 35
- 40

⁵⁸ Peacocke, [1983], pp.29 f

⁵⁹ The numbering is introduced here to facilitate cross-referencing.

⁶⁰ op.cit. pp. 37 f

[3.5] "for something to be red is for it to produce experiences of a certain kind, red' experiences, in standard circumstances. In central cases -- those by reference to which possession of the concept of redness was analysed -- for a thing to look red to someone is for it to produce red' experiences."⁶¹

It will be this experientialist position which I shall use in trying to achieve the set task, but before I can do this I must make some remarks concerning the nature of the predicate $\text{red}_{\text{em}}(x)$ and its connexion to 'looking red' as used by Peacocke. The most obvious difference between the two predicates is that $\text{red}_{\text{em}}(x)$ is defined as pertaining to a class of individuals-as-introduced--namely those introduced by the concept of a material object ('object⁺') -- while 'looking red', I take it, pertains to material objects *per se*. This difference comes out most strikingly in the context of the representational ontological framework adopted by Peacocke: the individuals denoted by $\langle \text{object}^+ \rangle_n$ are -- in what might be called the "standard case" -- representations of the sort of individuals to which 'looking red' is taken to apply. In this context let me adopt the notational convention that " α " denotes a material object, and that " $\langle \alpha \rangle_n$ " denotes α -as-introduced by means of 'object⁺'.⁶²

⁶¹ Peacocke, [1983], p.44

⁶² In Peacocke's ontological framework, $\langle \alpha \rangle_n$ will hence be a perceptual representation, correctly representing α as being a material object.

The main reason why I chose to interpret 'x is looking
 red (to me)' as a predicate pertaining to individuals-as-
 introduced is, in a first instance, to allow for the
 possibility of "categorially incorrect character-
 5 izations"; this happens, for example, when I mistakingly
 take a purely hallucinatory experience e_n to be an
 experience of a material object. In other words, e_n
 contains an individual-as-introduced $\langle \text{object}^t \rangle_n$ which--
 although being introduced by means of ' object^t ' -- has
 10 purely hallucinatory character, and as such is not a
referent-as-introduced (at a later stage I shall refer
 to this as a "categorially incorrect individual-introduc-
 tion"). In this case it would be wrong to say that I
 would inevitably have to believe that the predicate 'x
 15 is looking red (to me)' is inapplicable to $\langle \text{object}^t \rangle_n$: If
 I have a red elephant-hallucination, but think that I see
 a real elephant, then I will surely be in a situation in
 which I can form (in my view meaningfully) an experien-
 tial particular thought that this elephant looks red to
 20 me. This is, of course, not meant to imply that such an
 application of 'x is looking red (to me)' would not *de*
facto be incorrect. All I am trying to say here is that
 in a characterization of the relevant truth-conditions,
 we ought to make sure that such a misapplication
 25 remains possible.

The characterization of 'x is looking red (to me)' as
 $\text{red}_{e_M}(\langle \text{object}^t \rangle_n)$ furthermore suggests why this predi-

cate is "experiential" in the sense that its application implies the existence of a sensory/perceptual experience_P: any truth-conditions associated with a predicate pertaining to individuals-as-introduced must make some reference to characteristics thereof, and hence implicitly to the particular sensory/perceptual experience_P which the relevant subject of predication is part of. Accordingly, we ought to reformulate the task given under [1] as one of showing that for every sensory/perceptual experience_P e_n (of mine) and for every $\langle \text{object}^t \rangle_n$ which is part of e_n (" $\langle \text{object}^t \rangle_n \in e_n$ ") we have

$$[4.1] \quad e_n \Vdash \text{red}_{eM}(\langle \text{object}^t \rangle_n) \\ \text{iff}$$

$$[4.2] \quad e_n \Vdash (E c_m \in C_{e_n}^t) \text{red}_S(c_m) \ \& \ c_m \sim_q \langle \text{object}^t \rangle_n.$$

Even though this description of the truth-conditions of 'x is looking red (to me)' is given in terms of $\langle \text{object}^t \rangle_n$, the correctness of [4] is determined only by whether it is true in what we called the "standard case": the "meaning" of $\text{red}_{eM}(x)$ is fixed in the context of those individuals to which it consequently can properly be applied, namely to material-objects-as-introduced. The analysis of $\text{red}_{eM}(x)$ hence becomes the task of showing that for every sensory/perceptual experience_P e_n (of mine) and for every material object α with $\langle \alpha \rangle_n \in e_n$ the following is the case:

$$[5.1] \quad e_n \Vdash \text{red}_{eM}(\langle \alpha \rangle_n)$$

$$[5.2] \quad e_n \models (E c_m \in C_e^n) \text{ red}_S(c_m) \ \& \ c_m \sim_q \langle \alpha \rangle_n.$$

An application of Peacocke's experientialist conclusion in this context will then be possible if we can find a connexion between " α looks red (to me)" -- in Peacocke's sense -- and $\text{red}_{eM}(\langle \alpha \rangle_n)$. Given the "functional nature" of the relation between $\langle \alpha \rangle_n$ and α ,⁶³ the statement " $e_n \models \text{red}_{eM}(\langle \alpha \rangle_n)$ " is -- in Strawson's sense⁶⁴ -- "about" α . I suggest therefore that we treat ' α is looking red (to me)' as an "objectivized version" of $\text{red}_{eM}(\langle \alpha \rangle_n)$, in the sense that

$$[6.1] \quad \alpha \text{ looks red (to me)}$$

iff

$$[6.2] \quad (E e_n) \langle \alpha \rangle_n \in e_n \ \& \ e_n \models \text{red}_{eM}(\langle \alpha \rangle_n)$$

-- where the existential quantifier is meant to range over those sensory/perceptual experiences_P which are attributable to me.

After these preparatory remarks, let me turn to the envisaged application of Peacocke's experientialist conclusion. The crucial point in this context is that -- according to [3.5] -- we have, in central cases (for any material object α) that:

$$[7.1] \quad \alpha \text{ looks red (to me)}$$

⁶³ For every $\langle \text{object}^t \rangle_n$, for which there is an α such that $\langle \text{object}^t \rangle_n = \langle \alpha \rangle_n$, there is exactly one such α .

⁶⁴ see 2.1.2 [6.1]

iff

[7.2] α produces a red'-experience (in me).

Peacocke's restriction of [7] to "central cases" is introduced to exclude the kind of situation which he describes in [3.4], i.e. that something can look red (to me) without producing a red'-experience (in me). Considering that the situation whereby Peacocke justifies the possibility of [3.4] is nothing but the transparency case,⁶⁵ it is clear from our discussion in the preceding section that Peacocke must restrict [7] in this way. It is, however, equally clear that if we use our "star"-conception of sensational properties, and translate [7] as

[8.1] α looks red (to me)
iff

15 [8.2] α produces a red*-experience (in me),

then there is no need for a restriction to "central cases" in Peacocke's sense. I believe that this translation is a genuine generalization of Peacocke's conclusion, in the sense that if [7] is correct, then so is [8].⁶⁶ The next step in our task must hence be to try to analyse [8.2] in terms of this "star"-language.

Given what Peacocke says in [3.1], it seems justifiable to say that [8.2] implies that

⁶⁵ see Figure 4

25 ⁶⁶ The considerations which Peacocke puts forward to justify [7] can themselves be translated without altering their validity.

[9] $(\exists e_n)[\langle \alpha \rangle_n \in e_n \ \& \ (\exists c_m \in C_{e_n}^+) \text{red}^*(c_m, e_n) \ \& \ e_n \Vdash c_m \sim \langle \alpha \rangle_n]$

where

[9.1] the existential quantifier $(\exists e_n)$ is meant to have the same scope as the one in [6.2],

5 [9.2] $\text{red}^*(c_m, e_n) \text{ iff}_{\text{def}} e_n \Vdash \text{red}_S(c_m)$, and

[9.3] " $c_m \sim \langle \alpha \rangle_n$ " means that c_m is spatially (or, possibly, spatio-temporally) embedded in $\langle \alpha \rangle_n$.

With respect to [9.3] I must add that, although I am using the same symbol (" $\sim$ ") here as I used for spatio-temporal coincidence amongst colour-tokens,⁶⁷ the tie given by $c_m \sim \langle \alpha \rangle_n$ must, strictly speaking, be described as c_m being embedded in $\langle \alpha \rangle_n$: c_m derives its spatial nature from sensational visual space and hence cannot be a proper part of $\langle \alpha \rangle_n$, because $\langle \alpha \rangle_n$ derives its spatial structure from what we called representational space. If

10

15 α produces a red^* -experience (in me) then

[10] $(\exists e_n)[\langle \alpha \rangle_n \in e_n \ \& \ e_n \Vdash (\exists c_m \in C_{e_n}^+) \text{red}_S(c_m) \ \& \ c_m \sim \langle \alpha \rangle_n]$.

Another question is, of course, whether [10] implies that α produces a red^* -experience (in me), in the sense based on [7.2]. Peacocke's usage of " α produces a red' -experience" is meant to refer to the fact that α is producing

20

⁶⁷ cf. 4.2.2.1 [6.3]

the particular red'-property he refers to in [3.5]. One way of doing justice to this view in our generalized conception of sensational properties would be to introduce the notion of a tie between colour-tokens and material objects (or, for that matter, material-objects-as-introduced) which can be used to describe a specific type of ontogenesis of colour-tokens. What I have in mind here is the notion of a "qualifying-tie".

More precisely, if we define (in the context given in [10]) that

$$[11] \quad C_m \sim_q \langle \alpha \rangle_n \quad \text{iff} \quad C_m \sim \langle \alpha \rangle_n \text{ \& } C_m \text{ is produced by } \alpha,^{68}$$

then we can plausibly say

$$[12.1] \quad \alpha \text{ produces a red*}-\text{experience (in me)} \\ \text{iff}$$

$$[12.2] \quad (E e_n) [\langle \alpha \rangle_n \in e_n \text{ \& } e_n \models (E C_m \in C_n^+) \text{ red}_S(C_m) \text{ \& } C_m \sim_q \langle \alpha \rangle_n].$$

To be more specific about the nature of $\sim_q$ as characterized in [11], we must have some theory of how colour-tokens can be produced. Land, for example, claims in his retinex theory of colour-vision, that

"a retina-and-cortex system (retinex) may treat color as a code for a three-part report from the retina, independent of the flux of radiant energy but correlated with the reflectances of objects."⁶⁹

⁶⁸ Note here that I make use again of the functional nature of the relation between $\langle \alpha \rangle_n$ and α .

⁶⁹ Land, [1977], p. 108

If the reflection of an (opaque) material object can be causally explained in terms of its surface structure, then we can interpret the statement that " c_m is produced by α " as referring to -- the surface structure of -- α causing c_m in the particular way described by Land.⁷⁰

There are two immediate conclusions which can be drawn from this:

[13.1] first, we are able to apply meaningfully the notion of a "colour-qualifying-tie" within the particular intuitive physical framework which we used in our introduction of colour-tokens into neutral accounts -- i.e. the one underlying Land's theory -- and

[13.2] second, with respect to this interpretation, our analysis of $\text{red}_{eM}(x)$ is correct if Peacocke's analysis of ' x looks red' is correct.⁷¹

The first of these conclusions brings us back to what in 5.1 was said to be one of the main aims of this

⁷⁰ Having said this, I must add a word of caution, for if Land's theory is correct, then we must be very careful when we say that a particular material object produces a certain colour-token: according to Land's theory, the apparent colour of an opaque object is determined not just by the surface structure of this object, but by the surface structures of all the objects of the apprehended scene.

⁷¹ From [8], [6], [12] follows that

$$\begin{aligned} & (E e_n) [\langle \alpha \rangle_n \in e_n \ \& \ e_n \models \text{red}_{eM}(\langle \alpha \rangle_n)] \\ & \quad \text{iff} \\ & (E e_n) [\langle \alpha \rangle_n \in e_n \ \& \ e_n \models (E c_m \in C_{e_n}^+) \text{red}_S(c_m) \ \& \ c_m \sim_q \langle \alpha \rangle_n], \end{aligned}$$

which, in its "subjectivized version" is nothing but [5].

chapter, namely to introduce qualifying-ties into neutral accounts of sensory/perceptual experience. In the course of this chapter, we focused on a particular sort of qualifying-ties ("colour-qualifying-ties") whose envisaged function in neutral accounts was implicitly given in the hypothesis that

$$\begin{aligned}
 [14] \quad & \text{red}_{eM}(\langle \text{object}^t \rangle_n) \\
 & \text{iff} \\
 & (E c_m \in C_{en}^t) \text{ red}_s(c_m) \ \& \ c_m \sim_q \langle \text{object}^t \rangle_n.
 \end{aligned}$$

Given [13.1], and the methodological considerations put forward in 1.1.3.3, it will be sufficient for the introduction of colour-qualifying-ties -- and, for that matter, for the introduction of $\text{red}_{eM}(x)$ -- into neutral accounts if we justify [14] in the context of an intuitive phenomenal framework. To show that the "meaning" of $\text{red}_{eM}(x)$ can be analysed -- within an intuitive phenomenal framework -- in the way given in [14] requires that both "colour-token" and "material-object-as-introduced" can be meaningfully applied within such a framework. We have already seen that the first of these requirements can be met; the second one might be satisfied by looking at the relevant intuitions underlying Goodman's phenomenalistic theory.

To do this, let us consider the following quotations from his sections IV.1-2 in The Structure of Appearance where he gives an informal account of "things" and "properties":

"A blue thing sometimes looks green, and may become red. In such a simple statement lie rich opportunities for confusion. If a thing looks green, then how can it be actually blue? How is the *apparent* change that we describe by saying a thing *looks* different in color to be distinguished from the actual change that we describe by saying the thing *has become* different in color? And what is *it* that retains identity as a thing throughout innumerable apparent and real changes of quality?

The last question is logically first. If a thing can remain the same while its appearance changes, then clearly the real and the apparent are different. But this means not that the real thing must be something quite separate from its appearances but only that a real thing comprises many appearances. To say that the same thing is twice presented is to say that two presentations [...] are together embraced within a single totality of the sort we call a thing or object."⁷²

"A presentation, of course, cannot be identified with an entire momentary cross section of a physical object.[...] To construct the entire physical object or a cross section of it out of presentations means, in effect, bringing in 'possible' as well as actual presentations;[...]. This immediately involves us in a difficult set of problems that have in recent years been studied very earnestly but with little success."⁷³

Even though these problems are, in my view, insurmountable -- and constitute one of the main shortcomings of phenomenalistic theories -- Goodman's account brings out an intuition according to which visually apprehended material objects have colour-tokens as constituents. This has the effect that such "constituent-colour-tokens" are as much "out there" as the respective visually apprehended material objects. If this account of the intuition underlying Goodman's theory is correct, it is not surprising that he claims that

⁷² Goodman, [1951], p.93

⁷³ op.cit. p.95

"Roughly, then, to say that a thing *looks* green is to make a statement concerning a presented quality, a color quality of some presentation of the thing, while to say that a thing *is* green is a more complex statement concerning the color qualities exhibited by various presentations of a thing. Obviously, the color names are thus used in two different ways in ordinary language: in one case for presented characters, which I shall hereafter call *qualia*; in the other, for properties of things."⁷⁴

In the context of the intuitive phenomenal framework which treats material-objects-as-introduced as having colour-tokens as constituents, I take it that [14] is the obvious analysis of 'x is looking red (to me)', if we interpret $c_m \sim_q \langle \text{object}^t \rangle_n$ as " c_m is a constituent of $\langle \text{object}^t \rangle_n$ ".

The immediate conclusion is that we are justified to introduce colour-qualifying-ties into neutral accounts of sensory/perceptual experience, and consequently that we can use $\text{red}_{eM}(x)$ in this context.⁷⁵ This last point attains a special significance if we consider what at the outset of this chapter was said about the case where $\text{red}_{eM}(x)$ must be taken as a primitive predicate. To show this, let us consider the predicate

'x is looking coloured (to me)' ($\text{colour}_{eM}(\langle \text{object}^t \rangle_n)$).

⁷⁴ Goodman, [1951], p.96

⁷⁵ In this context let me point out that it would equally be possible to introduce a more general experiential colour predicate $\text{red}_e(y)$ -- where y can also range over purely hallucinatory items -- in an analogous manner. In this case, however, it would be necessary to describe the intuitive physical character of the relevant colour-qualifying ties by a disjunctive theory.

Given what we have said about $\text{red}_{eM}(x)$, $\text{colour}_{eM}(x)$ would have to be analysed as

$$\text{colour}_{eM}(\langle \text{object}^t \rangle_n) \text{ iff } (E c_m \in C_{eM}^t) c_m \sim_q \langle \text{object}^t \rangle_n.$$

In the cases in which $\text{red}_{eM}(x)$ must be taken as primitive the same must hold for $\text{colour}_{eM}(x)$. Thus, we can conclude that

[15] there are cases where a term-introducing concept ('colour') with non-particular token-instantiations (namely colour-tokens) gives rise to a -- monadic-- structured primitive predicate where the token-instantiations have the function of "qualitative atoms".⁷⁶

This formulation opens the possibility that [15] might also occur in contexts which involve, say, relational structured primitive predicates, a point which will be of importance in my discussion of experiential intentionality. There might be cases where a term-introducing concept 'R' with non-particular token-instantiations ($r \in R^t$) gives rise to a relational structured primitive predicate $R_{AB}(x,y)$ with token-instantiations functioning as "relational atoms", in the sense that

$$[16] \quad R_{AB}(a,b) \text{ iff } (E r \in R^t) r \sim_r \langle a,b \rangle,$$

⁷⁶ The terminology of an "atom" was suggested to me by Dr R.O.Gandy.

-- where $a \in A$, $b \in B$, " $\sim_r$ " denotes a "relational-tie" and " $r \sim_r \langle a, b \rangle$ " is to be read as " r relationally ties a and b (in that order)".⁷⁷

⁷⁷ The natural generalization of this situation would be in terms of "predicative-ties" and "predicative atoms":
 $P_{A_1, A_2, \dots, A_n}(x_1, x_2, \dots, x_n)$ iff $(\exists p \in P^t) p \sim_p \langle x_1, x_2, \dots, x_n \rangle$.

VI

The *m*-FORMALISM

Let us return to the construction of our neutral model Σ_N of sensory/perceptual experience_P as we left it in 3.3.

5 In the present chapter I shall introduce a modified version of the classical semantic 1st-order predicate formalism used there, a version which I shall refer to as *m-formalism*. This *m*-formalism is introduced to allow a formal representation of structured primitive predicates,
10 and consequently to enable us to represent formally those sensory/perceptual experiences_P where experiential colour predicates (like $\text{red}_{eM}(x)$) must formally be treated as primitive and structured.¹ Also, in 6.3, I shall try to show that the proposed switch to the *m*-formalism
15 is essential if one wishes to give a (formal) account of what in 1.2.2 we referred to as "internal relations", and hence if one wishes to introduce "intentional relations" as internal relations. Before I can give an explicit description of this *m*-formalism, I must (in 6.1 and 6.2)
20 pick up some loose ends from our account of term-introduction.

¹ cf. 5.1

6.1 Individuation

The first of these loose ends is to be found in the context of the hypothesis that experiential individual-introductions involve concept-guided identifying-processes. This hypothesis was meant to contain two distinct claims, namely that

[1.1] experiential individual-introductions involves identifying-processes -- i.e. processes which are governed by identifying-rules,

and that

[1.2] identifying-rules are constituents of concepts.

In the course of discussing experiential individual-introductions, I furthermore tried to support a second hypothesis, namely that if one accepts [1], then one is required to hold that

[2.1] experiential individual-introductions involve -- at least in some cases -- individuating-processes,

and that

[2.2] these individuating-processes are themselves concept guided.

I will now describe certain aspects of these two hypotheses in more detail. This will enable us to accommodate these aspects in the envisaged *m*-formalism, and

will provide us with further support for the hypotheses themselves.

6.1.1 Constructive Identifying-Rules

In section 3.2, I roughly characterized the function of individuating-processes in experiential individual-introductions as making the agent aware of a certain (intrinsic) unity occurring in individuals-as-introduced. Two examples of the kind of unity I am thinking of are the spatio-temporal "cohesion" of perceived material objects -- especially notable when the perceived objects are in motion -- and the chromatic-spatio-temporal² unity inherent in colour-tokens -- manifesting itself in Mettelli's experiments concerning perceptual transparency.³

In the following pages I shall first of all try to illustrate by means of a mathematical example what I have in mind by constructive identifying-processes. These processes are meant to be guided by constructive identifying-rules and taken to construct identity structures. The reason for clarifying these notions is ultimately to support the type of "conceptualist" views

² Note that according to section 5.2.2, the notion "spatial" must here be seen as referring to visual-space, as opposed to its prior use in the context of material objects where it refers to geometrical space.

³ cf. 6.1.2

on experiential individual-introduction which I have put forward in 2.2.1. In my view,

[3.1] experiential individual-introductions involve constructive identifying-processes (in the sense I am about to explain in [5]).

This implies that

[3.2] the identity of (experiential) individuals-as-introduced is constructed -- i.e. individuals-as-introduced are constituents of constructed identity structures.

10 A second aim in the mathematical elaborations which are to follow is to

[3.3] discuss the notion of a "mere (individuated) unit" and its connexion with constructive identifying-processes.

15 The mathematical example I shall use for these purposes is the standard construction of the set of positive rational numbers Q on the basis of the set of natural numbers N , or, to put it in "procedural terms", the creative transformation of N into Q :

20 In this construction we presuppose as initial manifold the set of natural numbers

[4.1] $N = \{1, 2, 3, \dots, n_1, n_2, \dots\} = \mathbb{N}.$

The first step is then to define a relation $\sim_Q$ on the Cartesian product $N \times N$ (" N^2):

$$[4.2] \quad \langle n_1, n_2 \rangle \sim_Q \langle n_3, n_4 \rangle \quad \text{iff}_{\text{def}} \quad n_1 \cdot n_4 =_N n_3 \cdot n_2.$$

This relation between the elements of N^2 is used to aggregate N^2 into a manifold Q^* of $\sim_Q$ -units. Each element $\langle n_1, n_2 \rangle \in N^2$, in conjunction with $\sim_Q$, gives rise to (what I shall call) a unit $[\langle n_1, n_2 \rangle]_{\check{Q}}$ in Q^* through the unifying condition:⁴

$$[4.3] \quad \begin{aligned} &\langle n_3, n_4 \rangle \text{ is a constituent of } [\langle n_1, n_2 \rangle]_{\check{Q}} \\ &\quad \text{iff}_{\text{def}} \\ &\quad \langle n_3, n_4 \rangle \sim_Q \langle n_1, n_2 \rangle. \end{aligned}$$

It is important not to prejudge this sort of unification as being the process of set-formation. In other words, " $\langle n_3, n_4 \rangle$ is a constituent of $[\langle n_1, n_2 \rangle]_{\check{Q}}$ " should not automatically be interpreted as " $\langle n_3, n_4 \rangle \in [\langle n_1, n_2 \rangle]_{\check{Q}}$ ", because doing so would implicitly tie us to an introduction (into Q^*) of the set-identity relation $=_\epsilon$:

$$[4.4] \quad \begin{aligned} &[\langle n_1, n_2 \rangle]_{\check{Q}} =_\epsilon [\langle n_3, n_4 \rangle]_{\check{Q}} \\ &\quad \text{iff}_{\text{def}} \\ &\quad (x \in N^2) \quad x \in [\langle n_1, n_2 \rangle]_{\check{Q}} \iff x \in [\langle n_3, n_4 \rangle]_{\check{Q}}. \end{aligned}$$

The identity relation $=_s$, however, which is applied to the units of Q^* in the standard construction of the positive rationals is given by the definition:

$$[4.5] \quad [\langle n_1, n_2 \rangle]_{\check{Q}} =_s [\langle n_3, n_4 \rangle]_{\check{Q}} \quad \text{iff}_{\text{def}} \quad \langle n_1, n_2 \rangle \sim_Q \langle n_3, n_4 \rangle.$$

⁴ Note that it would be wrong to use " $[\langle n_1, n_2 \rangle]_{\check{Q}} \in Q^*$ " instead of " $[\langle n_1, n_2 \rangle]_{\check{Q}}$ in Q^* ", if we reserve $\in$ to signify set-membership: Q^* is not taken to be endowed with an identity structure, and hence is not a set.

Both [4.4] and [4.5] introduce an identity relation into Q^* , and therewith transform it into a set. Let me denote Q^* -as-endowed-with- $=_{\epsilon}$ as Q^{ϵ} (with elements $[<n_i, n_j>]_{\epsilon}$), and Q^* -as-endowed-with- $=_s$ as Q^s (with $[<n_i, n_j>]_s$ as elements). The final step in the construction of the positive rationals is then to define the appropriate arithmetical operations on Q^s .

Assuming an extensional interpretation of the $\sim_Q$ -aggregation, it turns out that because $\sim_Q$ is an equivalence relation on N^2 , both $=_{\epsilon}$ and $=_s$ are the same:

$$[4.6] \quad [<n_1, n_2>]_s = [<n_3, n_4>]_s \text{ iff } [<n_1, n_2>]_{\epsilon} = [<n_3, n_4>]_{\epsilon}.$$

Nevertheless, there are intrinsic differences between the two identity definitions: first of all, it is essential for [4.5] that $\sim_Q$ is an equivalence relation if it is to define an identity-relation, something which is not the case for [4.4]. Second, the "sameness" given in [4.6] is also dependent on an extensional interpretation of the underlying aggregation, meaning that "being a constituent of" a unit must be interpreted as "being a member" of it. This, however, is not a requirement for [4.5]. Indeed, provided we do not insist on an extensional interpretation of the underlying aggregation, we can use any equivalence-tie⁵ between the units of Q^* -- and not just

⁵ Since the units in Q^* are not logical objects, we ought not speak of relations between them, but merely of diadic-ties.

$\sim_Q$, as used in [4.5] -- to introduce an identity relation into Q^* .⁶ Take, for example,

$$[4.7] \quad [\langle n_1, n_2 \rangle]_{\tilde{Q}} \sim_A [\langle n_3, n_4 \rangle]_{\tilde{Q}} \text{ iff } n_1 = n_3.$$

This clearly is an equivalence-tie on Q^* and thus we can use

$$[4.8] \quad [\langle n_1, n_2 \rangle]_{\tilde{Q}} =_A [\langle n_3, n_4 \rangle]_{\tilde{Q}} \text{ iff } n_1 = n_3$$

to introduce an identity relation on Q^* . But since it is neither the case that $=_A$ -identity implies $=_Q$ -identity, nor *vice versa*, $=_A$ cannot be compatible with $=_Q$.⁷ Consequently, $=_A$ -objects cannot be $\sim_Q$ -equivalence classes, a fact which shows that, in general, it would be wrong to interpret the underlying aggregation as set-formation.

[4.9] What I mean to show with this example is that a set (in our case $N \times N$) can be aggregated -- by which I mean that the elements of certain of its subsets can be unified with one another -- without implicitly fixing a particular identity relation for the units resulting from this aggregation. Moreover, the example shows that it is possible to consistently define identity relations for

⁶ This possibility corresponds to the fact that for every classical model with an equivalence relation R on its domain D , there is an elementary equivalent model in which the equivalence relation corresponds to identity, that is with the R -equivalence classes of D as domain.

⁷ $[\langle 1, 1 \rangle]_{\tilde{Q}} \neq [\langle 1, 2 \rangle]_{\tilde{Q}} \quad \& \quad [\langle 1, 1 \rangle]_{\tilde{Q}} =_A [\langle 1, 2 \rangle]_{\tilde{Q}},$
 $[\langle 1, 1 \rangle]_{\tilde{Q}} =_Q [\langle 2, 2 \rangle]_{\tilde{Q}} \quad \& \quad [\langle 1, 1 \rangle]_{\tilde{Q}} \neq_A [\langle 2, 2 \rangle]_{\tilde{Q}}.$

these units which are mutually incompatible.⁸ Thus, the aggregate in question (in our case Q^*) *per se* cannot be associated with any identity relation. This is why I believe it can meaningfully be called a manifold of (mere) units. Finally, this example shows that the choice of identity relation which one wishes to apply to these units is itself a factor in determining the nature of the resulting logical objects: if one chooses $=_E$ (in the context of Q^*) then the resulting $(=_E-)$ individuals are $\sim \varnothing$ -equivalence classes of $N \times V$, something which is not the case if one chooses $=_A$.

[5] Further support for these conclusions (and an idea of how they are linked with our account of experiential individual-introduction) can be gained by interpreting this mathematical example in terms of "constructing identity structures (by constructive identifying-processes)".⁹ A prerequisite for this is that I explain what such constructions are meant to be. The idea is that such a construction is a particular ("constructive identifying") process,¹⁰ say given as the sequence¹¹

⁸ Two identity relations $=_A$ and $=_B$ are mutually incompatible (as identity relations for a manifold of units $U = \{u_1, u_2, \dots\}$) if there are units u_1 and u_2 (in U) for which $u_1 \neq_A u_2$ and $u_1 \neq_B u_2$, and *vice versa* -- where $u_1 \neq_A (u_2)$ is u_1 qua $=_A-$ ($=_B-$) object.

⁹ cf. [3]

¹⁰ cf. 2.1.1, [3]

¹¹ M_0 denotes the initial manifold, and M_n the "constructed identity structure" qua product manifold.

$$\langle M_0, M_1, \dots, M_n \rangle$$

This process is based on an iterative ("elementary identity-") transformation $M_m \longrightarrow M_{m+1}$, constituted, roughly speaking, in the addition of a particular elementary
 5 identity/non-identity (like $c_1 =_K c_2 / c_1 \neq_K c_2$) to M_m .

Let me try to clarify this idea by describing such identity constructions in terms of a specific, non-classical, formal 1st-order predicate semantics (which I shall call "*i*-semantics").¹² The idea behind this
 10 *i*-semantics is to generalize the standard semantics of the classical formalism so as to allow the possibility of referent structures being incomplete (hence "*i*-semantics"). A referent-structure Σ_n^i is incomplete if

$$[6.1] \quad \Sigma_n^i \not\models_i \Phi \quad \& \quad \Sigma_n^i \not\models_i \neg \Phi$$

15 for some elementary proposition Φ . The constructions, in the above sense, will then be given by taking the different stages $(M_0, M_1, \dots)$ as *i*-referent-structures Σ_0^i , Σ_1^i ..., and by construing the "elementary identity" transformation $M_m \longrightarrow M_{m+1}$ as a transformation of a
 20 structure Σ_m^i with

$$[6.2] \quad \Sigma_m^i \not\models_i c_1 =_K c_2 \quad \& \quad \Sigma_m^i \not\models_i c_1 \neq_K c_2$$

¹² Since our formal representation of sensory/perceptual experiences_p involves itself formal 1st-order predicate referent-structures, this illustration will enable me to connect
 25 identity constructions with sensory/perceptual experiences_p.

into a structure Σ_{m+1}^i such that

[6.3]
$$\Sigma_{m+1}^i \models_i C_1 =_K C_2 \quad \vee \quad \Sigma_{m+1}^i \models_i C_1 \neq_K C_2.$$

5 An objection could be made that formally, such a generalization of the standard classical semantics cannot consistently be defined. The proper reply to this objection would be to give an explicit definition of this i -semantics, but this is, in my view, impossible without involving mere units. What is, however, quite easily possible at this stage is to modify the classical formalism so as to get a semantics which allows [6.1] for elementary propositions which do not involve identity predicates: all we need to do is to associate every, say, monadic predicate $P(x)$ of the involved linguistic apparatus with two disjoint subsets P_n and $\neg P_n$ of the domain of each model Σ_n^i and stipulate that¹³

10

15

[7.1]
$$\Sigma_n^i \models_i P(c_m) \quad \text{iff}_{df} \quad \alpha_m \in P_n,$$

[7.2]
$$\Sigma_n^i \not\models_i \neg P(c_m) \quad \text{iff}_{df} \quad \alpha_m \in \neg P_n.$$

If we modify the classical formalism analogously for all other types of predicates (except identity) then we clearly get a semantics in which there can be a referent-structure Σ_m^i such that for some elementary proposition, say $R(c_1, c_2)$, we would have that

20

¹³ $\sigma(c_m) = \alpha_m$; cf. 0.2

$$[7.3] \quad \Sigma_m^i \not\models_i R(C_1, C_2) \quad \& \quad \Sigma_m^i \not\models_i \neg R(C_1, C_2).^{14}$$

Moreover, for this particular semantics, it is possible to specify explicitly a constructive transformation of Σ_m^i into a referent-structure Σ_{m+1}^i which -- in analogy to the one described in [6] -- has the effect that

$$[7.4] \quad \Sigma_{m+1}^i \models_i R(C_1, C_2) \quad \vee \quad \Sigma_{m+1}^i \models_i \neg R(C_1, C_2).$$

This is achieved by stipulating ("constructing") either

$$[7.5] \quad R_{m+1} := R_m \vee \{ \langle \alpha_1, \alpha_2 \rangle \}, \quad \text{or}$$

$$[7.6] \quad \neg R_{m+1} := \neg R_m \vee \{ \langle \alpha_1, \alpha_2 \rangle \}.$$

Another question is, of course, how this model-theoretic interpretation of constructions of identity structures (and, for that matter, of incomplete referent-structures) is meant to tie in with our investigations of sensory/perceptual experiences_P. In the proposed formal representation of sensory/perceptual experiences_P,¹⁵ it was implicitly assumed that

$$[8.1] \quad \begin{array}{l} \text{"}\Phi \text{ is part of the propositional content of } e_n\text{"} \\ \text{is formally represented by } \Sigma_{e_n}^i \models \Phi. \end{array}$$

¹⁴ The fact that this particular semantics is a generalization of the classical case is readily apparent if we consider that for every complete Σ_n^i there is a classical referent structure which is elementary equivalent to Σ_n^i , and *vice versa*.

¹⁵ cf. 2.1.2, [13]

It would clearly be wrong to say: if it is not part of the propositional content of an experience e_n that some experienced object is a cube then it must be part of the propositional content of e_n that this object is not a cube. From this it becomes clear that

[8.2] Σf_n will have to be an incomplete referent-structure, at least as described in [7].

Moreover, it would be equally wrong to conclude from the fact say that "A is not identical with B and B is not identical with C" is part of the propositional content of e_n , that either "A is identical C" or "A is not identical with C" is part of the propositional content of e_n . This means that

[8.3] the domain(s) of Σf_n must be identity structures which may or may not be complete,

if we wish to keep our formal representations of sensory/perceptual experiences_P.

With this exposition of identity structures (which are constructed and therefore may or may not be complete) and of how they tie in with our formal representation of sensory/perceptual experiences_P, let me now return to the task set under [5]. Let us assume that the identifying-rule for $=_s$ (given in [4.6]) and the one for $=_A$ (given in [4.8]) are both used constructively on Q^* as initial manifold (M_0). My aim now is to support the conception

of a "mere unit" by arguing against a possible alternative line of thought which might be put forward to defend the view that the "units" in Q^* are actually logical objects. This alternative line of thought is: since elementary self-identity must obtain, regardless of (the particularity of) the involved identifying-rule, it must be possible to regard Q^* as an

[9.2] identity structure (say Q^*) which is indifferent to the particularity of identity relations that can be introduced into it.

Q^* is the identity structure which contains only "completely isolated logical objects", meaning that the only identities which are determined in Q^* are that each of its individuals is identical with itself.

Since we do not, as yet, have an explicit semantic theory for identity structures which may or may not be complete, I shall try to argue against this line of thought on the syntactic level. To do this, let me assume first, that Q^{**} denotes the (incomplete) identity structure constructed by means of the identifying-rule $=_x$ which would correspond to Q^* in that it only contains "completely isolated" $=_x$ -individuals, and second, that $\{Q^{**}\}$ denotes the collection of identity statements which hold in Q^{**} , i.e.:

[9.2] $\{Q^{**}\} := \{[\langle n_1, n_2 \rangle] \mathfrak{E} =_x [\langle n_1, n_2 \rangle] \mathfrak{E}, \dots\}.$

The idea now is that if Q^* (as described in [9.1]) really exists, then Q^{*s} and Q^{*A} ought to be "syntactically indistinguishable":¹⁶ the deductive closure of $\{Q^{*s}\}$, $\Phi^{=s}$ and that of $\{Q^{*A}\}$, $\Phi^{=A}$ -- where

$$5 \quad [9.3] \quad \Phi^{=s} \equiv ([\langle n_1, n_2 \rangle]_{\mathcal{D}^{=s}} [\langle n_3, n_4 \rangle]_{\mathcal{D}} \iff n_1 \cdot n_4 =_{\mathcal{N}} n_3 \cdot n_2)$$

$$[9.4] \quad \Phi^{=A} \equiv ([\langle n_1, n_2 \rangle]_{\mathcal{D}^{=A}} [\langle n_3, n_4 \rangle]_{\mathcal{D}} \iff n_1 =_{\mathcal{N}} n_3)$$

-- ought to be identical.¹⁷ The fact, however, that

$$[9.5] \quad \{Q^{*s}\}, \Phi^{=s} \vdash n_1 \cdot n_2 =_{\mathcal{N}} n_2 \cdot n_1,$$

$$[9.6] \quad \{Q^{*A}\}, \Phi^{=A} \not\vdash n_1 \cdot n_2 =_{\mathcal{N}} n_2 \cdot n_1,$$

$$10 \quad [9.7] \quad \{Q^{*s}\}, \Phi^{=s} \not\vdash n_1 =_{\mathcal{N}} n_1,$$

$$[9.8] \quad \{Q^{*A}\}, \Phi^{=A} \vdash n_1 =_{\mathcal{N}} n_1,$$

allows us to conclude that elementary self-identities are as much tied to the particularity of the involved identifying-rules as all other identities/non-identities, and hence that Q^* must be a manifold of mere units.

[10] Our mathematical example has an additional advantage. It can be used to discuss certain modifications that will eventually lead to the envisaged m -formalism.

20 ¹⁶ Q^{*s} (Q^{*A}) is Q^{*x} with $=_s$ ($=_A$) taking up $=_x$.

¹⁷ The reason for including [9.3] and [9.4] respectively in the premises for these deductive closures is to reflect syntactically the particularity of the respective identifying-rules.

First, let us ask ourselves in what sense we are justified in saying that what we have constructed are the positive rational numbers. Considering that natural numbers are often said to be a subset of the rational ones, someone espousing a Platonist view of numbers would presumably deny that Q^+ is the set of positive rational numbers, for the elements of N are clearly not elements of Q^+ . Indeed, such a denial should not be surprising, because a Platonist would -- I suspect -- deny the possibility of "constructing" numbers in the first place. However, even if we admit the constructability of rational numbers -- say in terms of constructing a standard model -- there still remains a problem concerning the above-mentioned intuitive inclusion of natural numbers in the rational ones. The way in which this problem is usually solved is by introducing, in addition to the "strict" interpretation of the set-inclusion relation (" $<_{\epsilon}$ "¹⁸), a weaker version (" $<_e$ ") which is based on the notion that a structure can be isomorphically embedded in another structure.¹⁹ The intuitive inclusion of natural numbers in the rational ones can then be interpreted as referring to the fact that $N <_e Q^+$, due to an isomorphic embedding of N into Q^+ given by $n_i \mapsto \langle n_i, 1 \rangle$. My reason for introducing this weak interpretation of set-inclusion will

¹⁸ $A <_{\epsilon} B$ iff $(x)[x \in A \implies x \in B]$

¹⁹ $<_e$ is weaker than $<_{\epsilon}$ in the sense that
 $A <_{\epsilon} B \implies A <_e B$

become clear when we discuss "semantic functions" in section 6.2.

Another issue which I want to raise briefly is concerned with the question of how identity structures which are constructed by applying different identifying-rules to one and the same initial manifold M^* are to be represented in the m -formalism. This question ultimately depends on how we define "difference" (or, for that matter, "sameness") for these identifying-rules. For present purposes, it will be sufficient to make the assumption that such a classification would have to be compatible with what I consider to be an intuitive example of difference in this context, namely between the identifying-rules ' $=_s$ ' and ' $=_A$ ', as given in [4.5] and [4.6] respectively. From the fact that

$$[11.1] \quad M^1 \leq M^2 \iff (u_n, u_m \text{ in } M^*) [\langle u_n \rangle^1 =_1 \langle u_m \rangle^1 \iff \langle u_n \rangle^2 =_2 \langle u_m \rangle^2]$$

-- where M^1 (M^2) is a set²⁰ constructed on the basis of M^* by means of the identifying-rule ' $=_1$ ' (' $=_2$ ') -- it follows directly that

$$20 \quad [11.2] \quad Q^s \not\leq Q^A \quad \& \quad Q^A \not\leq Q^s.$$

This, however, suggests strongly that Q^A and Q^s are

²⁰ A "set" is simply a complete identity structure.

disjoint, because it is very likely that Sommers' law of categorial inclusion,²¹ i.e.

$$|P| \not\subseteq |Q| \quad \& \quad |Q| \not\subseteq |P| \implies |P| \& |Q| = \emptyset$$

could be applied in this context.²² Accordingly, our
 5 mathematical example suggests that there are cases
 where different identifying-rules, applied to one and
 the same initial manifold, create disjoint identity
 structures. Given the preceding discussion of set-
 inclusion -- with its implicit possibility to represent set-
 10 inclusion in terms of disjoint sets -- I shall represent
 such identity structures generally as disjoint sets in our
m-formalism.

Finally, let me try to use our mathematical example to
 illustrate the notion of an "essential quality" as I shall
 15 use it in the context of individuals which are the
 product of constructive identifying-processes. If
 identifying-processes are to "operate" on mere units,
 then it cannot be that these units are completely
 featureless. Indeed, every identifying-rule presup-
 20 poses specific types of features in units in order for

²¹ Sommers, [1967], p.163

²² What would have to be shown here is that the "absolute
 value" $|=_{\mathbf{s}}|$ of the relational predicate $=_{\mathbf{s}}$ (i.e. the collection of
 25 all individuals to which $=_{\mathbf{s}}$ can meaningfully be applied) is $Q^{\mathbf{s}}$,
 and also that $|=_{\mathbf{A}}| = Q^{\mathbf{A}}$. The conclusion that $Q^{\mathbf{A}}$ and $Q^{\mathbf{s}}$ are
 disjoint is, in my view, furthermore supported by our results
 concerning the difference between $=_{\mathbf{s}}$ -self-identifications and
 $=_{\mathbf{A}}$ -self-identifications.

it to be applicable to these units. Certain -- if not all -- of these features will become qualities of the logical objects based on the units in question. It is not difficult to see that in this case they will have to do so inevitably, which is why I call the resulting qualities essential.²³

Take our example involving the manifold Q^* : each of the proposed identity definitions presupposes that

[12] $\langle n_1, n_2 \rangle$ is a constituent of $[\langle n_1, n_2 \rangle]^{\check{Q}}$.²⁴

If the aggregation in question did not create units of this kind, none of the proposed definitions could be applied. In the case of definition [4.4], i.e.

$$[\langle n_1, n_2 \rangle]^{\check{Q}} =_{\epsilon} [\langle n_3, n_4 \rangle]^{\check{Q}} \\ \text{iff}_{\Delta \neq}$$

$$(x \in N^2) \quad x \in [\langle n_1, n_2 \rangle]^{\check{Q}} \iff x \in [\langle n_3, n_4 \rangle]^{\check{Q}},$$

[12] gives rise to an essential property of $=_{\epsilon}$ -individuals, namely that, as sets, they all are non-empty. More concrete examples of essential qualities can be obtained -- provided our interpretation of Spelke's

²³ Note here that in the context of individual-introduction, the notion of an "essential quality" refers to qualities of individuals-as-introduced and as such should not be confused with the homonymous notion which is sometimes used in the context of "essences".

²⁴ [4.5] and [4.7] do so explicitly, while [4.4] does so via the interpretation of the involved ϵ -relation.

results is correct -- from what she described²⁵ as the fourfold material object conception of infants. In this case we could say that material-objects-as-introduced have the essential qualities of being cohesive, bounded, substantial and spatio-temporally continuous.

Let me also point out that features which are presupposed to the application of a identifying-rule (say ' $=_n$ ') are not confined to giving rise to essential qualities of $=_n$ -individuals: depending on the nature of $=_n$, they can also give rise to relations between $=_n$ -individuals. Indeed, the type of essential items which will be most important in our inquiry occurs in relational form, namely what we have labelled *internal* relations. The main problem is that in many cases these features can only be referred to in terms of the essential qualities, or relations, they give rise to. This can create difficulties if one fails to appreciate the special ontological nature of these qualities and relations, which I have tried to highlight here.

6.1.2 Individuating-Processes

In the introduction to this section, I restated that one of the aims of our discussion of experiential individual-introduction was to support the view that some experi-

²⁵ cf. 3.2.

ential individual-introductions involve concept-guided individuating-processes, that is processes which were meant to create experiential units in our technical sense. To be clear, this view is not meant to be a logical consequence of the claim made in [1]: Someone could, for example adhere to [1] and consistently claim that

[13.1] the sort of units which are involved in identifying-processes are not created by some process, but simply "given".

Another view which clearly would be consistent with [1] is that

[13.2] the sorts of units in question are created by processes, but these processes are not "concept-guided".

Indeed, both these alternatives to the claim of [2] can, I think, be associated with different existing theories of sensory/perceptual experience which themselves are compatible with [1]. Thus, I take it that [1] is perfectly compatible with a phenomenalist approach to sensory/perceptual experience, and that someone who does try to combine the two might suggest that identifying-processes operate on certain "atoms of the system", as described in Goodman's account.²⁶ In this case he would

²⁶ "If we divide the stream of experience into its smallest concrete parts and then go on to divide these concreta into sense qualia, we arrive at individuals suitable as atoms for a realistic system. A visual concretum might be divided, for example, into three constituent parts: a time, a visual-field location, and a color." (Goodman, [1951], p.147)

have to hold that his units, being atoms, are indivisible and "given". The view suggested in [16.2], on the other hand, could clearly be taken up by someone who (in an intuitive physical framework) admits that, for example, some sort of colour-codes (like in Land's theory) are created, but who, in distinguishing strictly (and in my view incorrectly) between "conception" and "perception", places the relevant processes in the realm of perception.

I mention these alternatives here to prepare the ground for the fact that neither of them will require us to make any fundamental changes in the *m*-formalism I am about to describe. That is to say, the envisaged *m*-formalism will, in essence, be indifferent as to which of these alternatives is correct, and those features which will be seen as reflecting [2] will, for the purpose of our neutral accounts, be regarded as auxiliary in nature.

Nevertheless, let me just make one additional point which I think supports [2], at least as far as this can be achieved by rejecting the suggested interpretations of [13.1] and [13.2]: I believe that Mettelli's account of perceptual transparency²⁷ provides a counter-example to both these interpretations. The fact is that there are

"[...] the colors taken as atoms are single phenomenal shades; the places, times and atoms of other kinds are likewise minimal distinguished (commonly called 'least discernible') qualia." (op.cit. p.155)

²⁷ Mettelli, [1976]; see also 5.2.2

cases where we can split "single phenomenal shades" of colour, and that we can do so purely on the basis of what we wish to see. It would seem to be a very strange notion of "being given" if what is given depends on some purely mental activity.²⁸ As for the proposed interpretation of [13.2], it is not difficult to see that if the distinction between "perception" and "conception" is drawn along the line of the second criterion listed by Spelke²⁹ -- namely that

"Central cognitive systems are open to the influence of what we believe, [whereas] perceptual systems are *impenetrable* by explicit knowledge and thought."

-- then one must consider the processes which create colour-codes (at least in the cases described by Mettelli) as being non-perceptual.

²⁸ Indeed, I believe that Mettelli's account shows that colour-qualia -- say in Goodman's sense -- would have to be replaced by other, more fundamental abstract items as atoms for a phenomenalist system.

²⁹ see 3.2, [4.2]

6.2 The Partial Order of m -Domains

Turning to the second of the loose ends mentioned in the introduction to this chapter, let me recapitulate that in our construction of the m -formalism we have so far reached the stage where our "initial-skeleton" is transformed into a "many-sorted" formalism in order to reflect the tie between individual-introducing (thought) components and individual-introducing concepts. This modification was roughly based on the following line of thought: It was assumed that the term-introducing function of determined individual-introducing concept 'C' could be described in terms of exactly one identifying-rule, say $=_1$. Whenever an individual is introduced by means of 'C', it must be identified by means of $=_1$, and hence would be an $=_1$ -individual. The idea then was that a particular sensory/perceptual experience e_n would only give rise to one $=_1$ -identity structure, which as such would be represented as a particular domain in the many-sorted model used in representing e_n .³⁰ The above-mentioned tie was taken to be represented by the tie between individual constants and identity predicates which is presupposed in such a many-sorted formalism.

³⁰ Note, incidentally, that these domains are sets. As such they are strictly speaking only adequate to represent complete identity structures.

The problem with this formal representation is that it can at best be taken as an initial approximation of what we wish to represent. The fact is that different individual-introducing concepts, say 'A' and 'B', can involve the same identifying-rule, say $=_1$. To represent individual-introducing components like "This A"_n and "This B"_m as components which introduce individuals merely as ' $=_1$ '-objects -- which, in essence, is what the proposed many-sorted formalism does -- clearly fails to reflect an important difference between "This A"_n and "This B"_m. The former introduces an individual as being (an) A, while the latter introduces one as being (a) B. This problem would not arise if it were possible to interpret the domains of our many-sorted referent-structures as representing proper subsets of identity structures -- say, as the sub-set of $=_1$ -individuals introduced as being As or that of $=_1$ -individuals introduced as being Bs.

Given that the domains of many-sorted referent-structures are by definition taken to be disjoint, such an interpretation is only feasible by using the weak notion of set-inclusion ($<_e$) in this context, that is the notion which allows us to interpret certain functional relations -- in the mathematical sense -- across domains as set-inclusions. To justify the introduction of such functional relations into the envisaged m -formalism let

me discuss "semantic subordinations" between term-introducing concepts.

6.2.1 Semantic Subordination

When I talk of semantic subordination, I have in mind a
 5 relation between term-introducing concepts which, loosely speaking, obtains due to certain connexions between these concepts in their function of "providing the meaning"³¹ for the associated linguistic expressions. An example of this relation which is classical -- in more
 10 than one sense, as we shall see -- is that 'bird' is semantically subordinate to 'animal'. Given my view of concepts,³² I take it that whatever "semantic subordination" turns out to be, it will have to be reflected in connexions between those functional aspects of semanti-
 15 cally subordinate concepts which are fundamental to their identity/particularity.

To illustrate the nature of such a connexion on a functional level -- namely the logico-inferential one -- I suggest that

- 20 [1] the connexion between 'bird' and 'animal' referred to by
 "'bird' is semantically subordinate to 'animal'" implies

³¹ Hence the attribute "semantic".

³² cf. 3.1

that something which falls under 'bird' must also fall under 'animal'.

On a more abstract level, the notion of semantic subordination can be used to describe the analyticity of propositions. Walker, for example, claims that

"the truth of an analytic judgment like 'All bachelors are unmarried' depends on two factors: the meanings of the words 'bachelor' and 'unmarried' on the one hand, and on the other the laws of logic."³³

As far as the first of these factors is concerned, it is not so much the "meanings" of the two involved notions which constitutes the source of truth for the proposition in question, but their relation, and this is nothing but that of semantic subordination.³⁴ In other words, the semantic subordination of 'bachelor' under 'unmarried-person' is, together with the "laws of logic",³⁵ responsible for the truth of the statement

[2] $(x)[\text{bachelor}(x) \implies \text{unmarried-person}(x)]$.

The fact that this truth is dependent only on the mentioned two factors is responsible for placing the proposition into the realm of the analytic. Using [2] as a paradigm example of an analytic statement, I propose

³³ Walker, [1978], p.24

³⁴ "[...] the predicate of an affirmative analytical judgment is already contained in the concept of the subject, of which it cannot be denied without contradiction." (Kant, [1783], §2.b, p.15)

³⁵ Considering our analysis of the notion of "a logic" (c.f. 1.5) we must make a reservation concerning Walker's notion of the laws of logic: more appropriately one ought to speak of the logical laws of the language in question.

the following notation for a concept 'A' being semantically subordinate to a concept 'B':

$$[3.1] \quad 'A' \longrightarrow 'B', \quad \text{and}$$

$$[3.2] \quad 'A' \longleftrightarrow 'B'$$

5 for the mutual semantic subordination of 'A' and 'B'.
Given a language with the same logical form as the one
employed in the above example, it follows that

$$[4] \quad \text{If } 'A' \longleftrightarrow 'B' \text{ then } (x)[A(x) \Longleftrightarrow B(x)],$$

10 which, in conjunction with an extensional interpretation
of predicates,³⁶ gives us³⁷

$$[5] \quad 'A' \longleftrightarrow 'B' \quad \text{iff} \quad A \equiv_{\epsilon} B.$$

15 The point I wish to highlight here is not that predicates
ought to be interpreted extensionally -- for in many
cases, I think, this is simply wrong -- but rather that
there appears to be a link between the identity $\equiv$ of
term-introducing concepts and their mutual semantic sub-
ordination: the identity between term-introducing
concepts can be characterized as

20 ³⁶ An "extensional" interpretation of, say, monadic predi-
cates is given by the assumption that $P \equiv Q$ iff $(x) P(x) \longleftrightarrow Q(x)$.

25 ³⁷ The implication $'A' \equiv_{\epsilon} 'B' \implies 'A' \longleftrightarrow 'B'$ is a direct
consequence of a) the assumption implicit in an extensional inter-
pretation of predicates that $\equiv_{\epsilon}$ is an identity-relation for the
involved predicatively used concepts, and b) the logical law of
indiscernibility of identicals.

[6] $'A' \equiv 'B' \text{ iff } 'A' \longleftrightarrow 'B'.$

Similar reasoning on this logico-inferential level suggests that semantic subordination constitutes a partial order for term-introducing concepts.

5 6.2.2 Semantic Functions

After this brief description of semantic subordination in logico-inferential terms, let me now demonstrate how the semantic subordination of 'A' under 'B' can be described in terms of a connexion between the term-introducing
 10 aspects³⁸ of 'A' and 'B'. In returning to our initial example of a semantic subordination, I think that -- on the basis of [1] and the discussion of 2.2.1 [4] -- we can say that:

[7] 'bird' $\longrightarrow$ 'animal' implies that if a referent α which
 15 is introduced by means of, say, the token-concept 'bird^{*}' -- by a perceiver P who is in possession of both 'bird' and 'animal' and the knowledge concerning their semantic subordination -- then α -as-introduced must ultimately be seen by P as being an animal, provided that
 20 P 's thought-processes are logical.³⁹

³⁸ see 3.1, [4]

³⁹ By saying that α -as-introduced must ultimately be seen as being an animal, I am referring to something like the fact that the question whether α -as-introduced is an animal would
 25 have to be affirmed by P .

Considering that α -as-introduced "is experienced (seen) as being a B" was typically meant to reflect that α has been introduced by means of 'B', I think we can give the following characterization of semantic subordination in the context of the individual-introducing function of concepts: 'A'—>'B' refers to a connexion between 'A' and 'B'

[8.1] in virtue of which it is the case that every referent which can be (correctly) introduced by means of 'A' can also be (correctly) introduced by means of 'B', and

[8.2] which is -- or at least can be -- sufficient to induce such a "semantically correlated" 'B'-introduction for any 'A'-individual.

To discuss this characterization of semantic subordination, let me assume, for the moment, that

[9.0] 'A'—>'B', and that $=_1 (=_2)$ is the identifying-rule employed in the ontologically determined version of 'A' ('B') which I shall consider.

In formulating [8.1] I have tried, in particular, to reflect the following two cases:

[9.1] If a referent α can be correctly introduced by means of 'A' -- which, in the context of individual-introduction, simply means that α is (an) A -- then it will be possible, in virtue of 'A'—>'B', to correctly introduce α by means of 'B'.

[9.2] Assuming that a bush β can be introduced by means of 'camel⁴⁰', then [8.1] is meant to imply that β can, in virtue of 'camel' $\rightarrow$ 'animal', also be introduced by means of 'animal⁴¹'.

5 In [8.2], on the other hand, I have tried to capture the situation that someone

[9.3.1] who has introduced a referent α by means of 'A',

[9.3.2] who possesses 'B', and

10 [9.3.3] whose thought-producing processes reflect the connexion indicated by 'A' $\rightarrow$ 'B' (who "has knowledge of"/"is aware of" 'A' $\rightarrow$ 'B' and who "thinks correctly")

[9.3.4] can introduce α by means of 'B' in a thought-producing process which, loosely speaking, can be said to be "caused"/"brought about" solely by the connexion
15 'A' $\rightarrow$ 'B'.

Finally, I take it that

[10] what has been said in [8] can be generalized by formulating [8.1] in terms of "referents or units".

20 I mention this because in the formulation of [8] in terms of "units" it will emerge -- in conjunction with what has been said in 6.1.2 -- how a difference between

⁴⁰ Such an introduction would of course be incorrect.

25 ⁴¹ If it is possible to perceptually apprehend β "as being a camel" then it will, in virtue of 'camel' $\rightarrow$ 'animal', also be possible to apprehend it "as being an animal".

$=_1$ and $=_2$ can be compatible with the presupposition that
'A' $\longrightarrow$ 'B', but this just as a remark on the side.

In order to discuss the implications of [8] in the context
of what has been said so far about sensory/perceptual
experiences_P, let me amend [9.0] by stipulating that for
any sensory/perceptual manifold_P Σ_{en}

[11.0] A_{en} (B_{en}) denotes the collection of individuals-as-
introduced occurring in Σ_{en} due to an introduction by
means of 'A' ('B'); while $|=_1|_{en}$ ($|=_2|_{en}$) is to denote the
identity structure constructed in Σ_{en} by means of $=_1$
($=_2$), which, for the sake of simplicity, I shall assume to
be complete.

One of the main ideas in formulating [8] was to motivate
the view that 'A' $\longrightarrow$ 'B' can give rise to a specific
relation $s_{\mathcal{A}B}^{en}$ between the elements of A_{en} and those of
 B_{en} . This relation is meant to reflect what might be
called the "semantic ontogenesis" of those elements of
 B_{en} which have been introduced by what in [8.2] we
called semantically correlated 'B'-introductions in
virtue of 'A' $\longrightarrow$ 'B'. In other words, $s_{\mathcal{A}B}^{en}(a, b)$ is meant
to reflect the fact that b was introduced "by applying
'A' $\longrightarrow$ 'B' to a ". Accordingly, I propose to call b the
semantic correlate to a . The choice of definite article
in this nomenclature reflects another fact which I have
tried to capture in the formulation of [8], namely that

for every $a \in A_{en}$ there can be at most one such semantic correlate.⁴² The relation s_{AB}^{en} will hence be functional in its first argument, and constitute what I shall call a (partial) **semantic function**⁴³

$$5 \quad [11.1] \quad s_{AB}^{en}: A_{en} \longrightarrow B_{en}.$$

Two features of these semantic functions were meant to be implied by the above characterization, namely that

[12.1] if ' $A \longrightarrow B$ ', ' $B \longrightarrow C$ ' and ' $A \longrightarrow C$ ' then

$$s_{AC}^{en}(x) = s_{BC}^{en}(s_{AB}^{en}(x)),$$

10 and, in keeping with the nomenclature of [9.0] and the assumption that each sensory/perceptual manifold_P contains only one identity structure per involved constructive identifying-rule, that

[12.2] if $=_1$ and $=_2$ are the same then $s_{AB}^{en}(x) = x$.⁴⁴

15 ⁴² If I perceive a bush/camel "as being a camel", and I know that ' $\text{camel} \longrightarrow \text{animal}$ ', then I may perceive this bush/camel -- in virtue of this knowledge -- "as being an animal", but I cannot, in virtue of this knowledge, perceive it "as being two (three, four, ...) animals".

20 ⁴³ For the sake of simplicity let us assume that we are only dealing with sensory/perceptual experiences_P of very prolific thinkers, in the sense which allows us to consider s_{AB} as a total function on A_{en} .

25 ⁴⁴ If $=_1$ is the same as $=_2$ then $|=_1|_{en} = |=_2|_{en}$, and consequently $A_{en}, B_{en} <_{\epsilon} |=_1|_{en}$. The claim then is that

$$(x \in A_{en}) \quad s_{AB}^{en}(x) = {}_1x,$$

a claim which incidentally implies that $A_{en} <_{\epsilon} B_{en}$.

These two characteristics have the immediate consequence that

[12.3] if ' A ' $\longrightarrow$ ' A ' then $s_{\mathcal{A}}^{\mathcal{P}_{\mathcal{A}}}(x) = x$, and

[12.4] if ' A ' $\longrightarrow$ ' B ' and ' B ' $\longrightarrow$ ' A ' then $s_{\mathcal{A}}^{\mathcal{P}_B} \equiv (s_{\mathcal{B}}^{\mathcal{P}_A})^{-1}$.

5 This, and in particular the fact that the semantic function described in [12.2] is nothing but the paradigm isomorphic embedding of $\mathcal{A}_{en}$ into $\mathcal{B}_{en}$, suggests a modification of our formalism which overcomes the problems discussed in the introduction to this present
10 section. This modification is based on the assumption that

[13.1] for each identifying-rule $=_n$ there is a concept ' $=_n$ ' whose term-introducing function is exhaustively described by saying that individuals introduced by means
15 of it are "experienced/seen as being subject to $=_n$ "⁴⁵

What I propose to do is

[13.2] to represent as a domain in our many-sorted formalism each collection of those individuals which occur in a sensory/perceptual manifold_P due to having been introduced by one and the same individual-introducing
20 concept, and

⁴⁵ Any individuals introducing concept which contains, say $=_1$, as constituent will be semantically subordinate to ' $=_1$ ', a fact which -- given our restriction to total semantic functions
25 -- allows us to identify the collection of individuals introduced by means of ' $=_1$ ' with $|=_1|_{en}$.

[13.3] to represent the set-inclusions between these collections weakly⁴⁶ by means of semantic functions.

That is to say, individual-introducing concepts ('A', 'B', 'C', ...) shall formally be represented as identity predicates ('=A', '=B', '=C', ...). The underlying many-sorted formalism shall be modified -- in order to reflect the semantic subordination of these concepts -- by

[14.1] introducing into the linguistic apparatus an auxiliary relational symbol " $\longrightarrow$ " used to describe a partial order in the set of identity predicates (which is isomorphic to the partial order induced by semantic subordination in {'A', 'B', 'C', ...}),

and by

[14.2] introducing, into each referent-structure Σ_n , functions between domains meant to represent what we called semantic functions.⁴⁷

Given that there are cases where ' $A \neq B$ ', ' $A \longrightarrow B$ ' and $s_{AB}^{\Sigma}(x) = x$,⁴⁸ [14.2] can only be achieved if we allow the possibility that

⁴⁶ see 6.1.1, [10]

⁴⁷ Thus, if the formal referent-structure Σ_n is to represent a sensory/perceptual manifold Σ_{en} , itself associated with a semantic function $s_{AB}^{\Sigma}: A_{en} \longrightarrow B_{en}$, then there will be a function $s_{AB}: |A|_n \longrightarrow |B|_n$, which is meant to be a formal representation of s_{AB}^{Σ} .

⁴⁸ Say, for example, in our previous notation the case of 'A' and ('B' $\equiv$) '=1'.

[14.3] in some cases, $s\mathcal{A}_B:|=_{\mathcal{A}}|_n \longrightarrow |=_{\mathcal{B}}|_n$ in a referent-structure Σ_n must be interpreted as $|=_{\mathcal{A}}|_n$ being a subset of $|=_{\mathcal{B}}|_n$.

There will hence be cases where the formal semantic functions must be interpreted as isomorphic embeddings.

5 If we wish to define the suggested modified semantics in purely formal terms, these cases must be specified with reference only to formal items. Considering that we are dealing with functions between domains of many-sorted referent-structures, this specification can only be
10 achieved by stipulating that

[15.1] $|=_{\mathcal{A}}|_n <_{es} |=_{\mathcal{B}}|_n$ iff_{def} $(\exists s\mathcal{A}_B) s\mathcal{A}_B$ is one-one.⁴⁹

By interpreting " $<_{es}$ " as set-inclusion,⁵⁰ we implicitly introduce an identity relation ($=_s$) between the domains of any referent-structure Σ_n :

15 [15.2] $[|=_{\mathcal{A}}|_n]^{s=s} [|=_{\mathcal{B}}|_n]^{s=s}$ iff $|=_{\mathcal{A}}|_n <_{es} |=_{\mathcal{B}}|_n$ & $|=_{\mathcal{B}}|_n <_{es} |=_{\mathcal{A}}|_n$.

⁴⁹ Domains in this context are nothing more but sets, and with respect to the language of set-theory, a function between sets can be considered an isomorphic embedding iff it is one-one. Note, however, that [15.1] is not the same as

20 $|=_{\mathcal{A}}|_n <_e |=_{\mathcal{B}}|_n$ iff_{def} $(\exists f:|=_{\mathcal{A}}|_n \longrightarrow |=_{\mathcal{B}}|_n) f$ is one-one,

for the existential quantification in [15.1] ranges over a set of particular functions given in Σ_n .

25 ⁵⁰ The interpretability of " $<_{es}$ " as set-inclusion in a purely formal characterization of the envisaged semantics will of course depend on the adoption of certain constraints concerning the nature of the $s\mathcal{A}_B$ s which reflect the nature of semantic functions as given under [12].

The resulting identity structure⁵¹ -- say

$$[15.3] \quad \{[|=_{\mathbf{A}}|_n, |=_{\mathbf{B}}|_n]^s, [|=_{\mathbf{C}}|_n]^s, \dots\}^s$$

-- will be associable with a natural partial order ($<_s$) which is given by whether there is a formal semantic function between two domains or not. By making it a requirement for the adequacy⁵² of a referent-structure to a linguistic apparatus -- say

$$[15.4] \quad L^m = \langle \{ '=_{\mathbf{A}}', '=_{\mathbf{B}}', \dots \} \mid '=_{\mathbf{A}}' \longrightarrow '=_{\mathbf{B}}', \dots \rangle$$

displaying the above-mentioned "syntactic representation" of the partial order of semantic subordination -- that

$$[15.5] \quad \Sigma_n \text{ contains a semantic function } s_{\mathbf{X}\mathbf{Y}} \text{ iff } '=_{\mathbf{X}}' \longrightarrow '=_{\mathbf{Y}}',$$

we achieve that the canonical formal interpretation⁵³ $\sigma_n('=_{\mathbf{X}}') = [|=_{\mathbf{X}}|_n]^s$ becomes an order-isomorphism.

Now, I am not claiming that this formalization represents fully the nature of semantic subordination, but only that certain aspects of it are sufficient for the purpose outlined in the introduction to this section. However, as a final remark in this discussion let me mention a point which, although not directly tied to our investigations, nevertheless merits to be included: If what has been

⁵¹ This result, incidentally, ties in directly with what we discussed in 6.1.1 [11].

⁵² cf. 0.2

⁵³ cf. 0.2

said in this section is correct then it follows directly that a representation of semantic subordination in purely syntactic terms can only be sufficient if semantic subordinations are (necessarily) **classical** in the following sense

[15.6] $'A' \longrightarrow 'B'$ is classical iff_{def} $(\Sigma_n) \ s\mathcal{A}_B$ is one-one.

Considerations involving the type of relations which we will be discussing in the next section, however, lead me to think that this cannot be the case. This is why I believe that a conception of the "meaning" of term-introducing notions -- or, to put it differently, of the identity/particularity of term-introducing concepts-- in purely syntactic terms cannot be sufficient, but this just as a remark on the side.

6.3 *spp*-Semantics

In Chapter V I have tried to support the claim that the desired neutral account of sensory/perceptual experience will have to accommodate a certain type of what I called "structured primitive predicates".⁵⁴ Given the description of these predicates, it should not be surprising that in order to achieve this we must yet again introduce another non-classical type of formal 1st-order predicate semantics, one which I shall refer to as the type of *spp*-semantics ("structured primitive predicate"-semantics).⁵⁵ Such *spp*-semantics will be meant to accommodate structured primitive predicates of any rank, but for simplicity's sake I shall focus this discussion on two-place ("relational") predicates. The particular reason for choosing rank two in this context is that it will allow me ultimately to introduce a formal representation of what in 1.2.2 we referred to as "internal relations".

⁵⁴ cf. 5.1

⁵⁵ By "introducing a type of (formal) semantics" I mean that we amend/modify the general description of what a formal semantics consists in -- in the sense of amending/modifying the basic conceptual scheme S_{FS} given in 1.1.1 [8] -- and not that we specify these modifications, say, in the context of a set-theoretical interpretation of models. This will be the aim of the final section in this chapter, where I shall construct a "standard" *m*-semantics as a special kind of *spp*-semantics.

6.3.1 Particular Relational Complexes

In order to give the desired general description of *spp*-semantics, I must first of all introduce a type of individual used in the general conception of classical 1st-order predicate semantics which are often not explicitly mentioned. For any formal predicate, say ' $R(x,y)$ ' -- or, in the case of a many-sorted formalism, ' $R_{AB}(x,y)$ ' -- each referent-structure Σ_n will be taken to contain a set of particular instantiations of ' $R(x,y)$ ', a set which I shall refer to as the **extension** of ' $R(x,y)$ ' in Σ_n . In the case of the standard classical semantics, for example, we have that particular instantiations of an n -place predicate in a given classical referent-structure Σ_n^c (with domain A_n) are specified as ordered n -tuples of elements of A_n . One point which comes out clearly from this example is that particular instantiations of formal predicates are individuals occurring in formal referent-structures which are of a different nature than the individuals which make up the domain(s) of these structures.⁵⁶

At the very end of Chapter V it was suggested that there might be cases where a term-introducing concept

⁵⁶ Note here that even in the case of particular instantiations of monadic predicates one ought to make a difference in the description of the standard classical semantics between particular instantiations and individuals of the respective domain: an "ordered 1-tuple" $\langle \alpha_n \rangle$ will, strictly speaking, have to be an individual of a different type from that of α_n .

'R' with non-particular token-instantiations ($r \in R^t$) gives rise to a relational structured primitive predicate $R_{AB}(x,y)$. These token-instantiations have the function of "relational atoms", in the sense that

$$5 \quad [1.1] \quad R_{AB}(a,b) \text{ iff } (\exists r \in R^t) r \sim_r \langle a,b \rangle$$

-- where $a \in A$, $b \in B$, " $\sim_r$ " is meant to denote a "relational tie" and " $r \sim_r \langle a,b \rangle$ " is to be read as "r relationally ties a and b (in that order)". Just to give a rough idea of a possible concrete interpretation of these items, let
 10 me point out that in 6.3.2 [6], I shall use an example where the relata (i.e. a and b) are points in an Euclidean Space, and the relational atoms (i.e. r) are the straight line segments with the relevant relata as endpoints.

Any formal representation of this sort of structured
 15 primitive predicate would hence have to involve referent-structures, say Σ_n , each containing a class A_n , a class B_n , and a class R_n^t if we wish to use the standard formalization of the statement that the right-hand side of [1.1] holds in Σ_n , namely

$$20 \quad [1.2] \quad (\exists r_k \in R_n^t) \Sigma_n \models r_k \sim_r \langle \alpha_1, \beta_2 \rangle.$$

Even though [1.1] does not involve a reference to a particular relational atom (i.e. to a particular element of R_n^t) we are, by adopting [1.2] as interpretation, forced to reflect the particularity/identity of rela-

tional atoms in a conception of particular instantiations of ' $R_{AB}(a_i, b_j)$ '.⁵⁷ Accordingly, I shall use

$$[2] \quad \alpha_i \text{---} (r_n) \text{---} \beta_j$$

as notation for the particular instantiation of ' R_{AB} ' given by the ' R '-token-instantiation r_n of as relationally tying α_i with β_j . For the sake of reference, let me call a particular instantiation of this type a **particular relational complex**,⁵⁸ -- or, if I wish to draw attention to the specific version, say ' R_{AB} ', of the term-introducing concept which it is a particular instantiation of, I shall refer to it as a **particular ' R_{AB} '-complex**.

Implicit in this notation is the assumption that the identity of particular relational complexes is determined by the identity of their components, i.e. that

$$[3.1] \quad \begin{aligned} \alpha_i \text{---} (r_n) \text{---} \beta_j &= \alpha_k \text{---} (r_m) \text{---} \beta_n \\ &\text{iff} \\ \alpha_i &=_A \alpha_k \ \& \ r_n =_R r_m \ \& \ \beta_j =_B \beta_n. \end{aligned}$$

Moreover, it is assumed that the graphical distinction achieved by the involved (broken) line-segment reflects

20 ⁵⁷ To use [1.2] means that we must specify for any $\alpha_1 \in A_n$, $\beta_2 \in B_n$ and any $r_3 \in R_n$ whether " $\Sigma_n \models r_3 \sim, \langle \alpha_1, \beta_2 \rangle$ " is the case or not, and this clearly does depend on the particularity of the involved relational atom r_3 .

25 ⁵⁸ In general, I shall therefore identify the particular instantiations of a structured primitive n -adic predicate as **particular n -adic complexes**. Note that such particular n -adic complexes in general involve $n+1$ individuals.

the "syntactic order"⁵⁹ inherent in relational concepts:
 a relatum occurring on the left side of such a line shall
 be called a **first relatum**, whereas one occurring on the
 right shall be referred to as a **second relatum**. Given
 5 that the totality of particular instantiations of a
 formal predicate symbol, say ' $R_{AB}(a_i, b_j)$ ', in some
 referent-structure Σ_n^s was called the **extension** of
 ' $R_{AB}(a_i, b_j)$ ' in Σ_n^s , let me refer to the totality of
 extensions of ' $R_{AB}(a_i, b_j)$ ' as given by the involved
 10 semantics as the **relation** R_{AB} . In conclusion, we can
 characterize the typical *spp*-referent-structure Σ_n^s as

$$[3.2] \quad \Sigma_n^s = [A_n, B_n; R_n^s \mid R_{AB}]$$

where R_n^s is the set of ' R '-atoms occurring in Σ_n^s and
 R_{AB} the extension of ' $R_{AB}(a_i, a_j)$ ' in Σ_n^s , which in turn
 15 means that $\Sigma_n^s \models r_k \rightarrow \langle \alpha_1, \beta_2 \rangle$ is taken to be interpretable
 as

$$[3.3] \quad \alpha_1 \rightarrow (r_k) \rightarrow \beta_2 \in R_{AB}.$$

To give an example of a specific application of this
 terminology, let me now suggest how a classical referent-
 20 structure, say

$$[4.1] \quad \Sigma^{c'} = [A \mid R]$$

-- where $A = \{\alpha_1, \alpha_2, \dots\} =^A$ is the domain of a relational
 predicate ' $R^{c'}(a_i, a_j)$ ' and $R \subseteq A \times A$ its classical exten-

⁵⁹ That is the type of order which makes it possible to
 25 differentiate syntactically between $R(a, b)$ and $R(b, a)$.

sion -- can, in a natural way, be transformed into an *spp*-referent-structure $\Sigma^{sc'}$. By saying that this transformation is "natural" I mean that it does not essentially alter the function of the constituents of $\Sigma^{c'}$:

5 [4.2] A will serve as the domain in $\Sigma^{sc'}$ for a relational predicate ' $R^s(a_i, a_j)$ ',

and,

[4.3] R can be used to serve as a representation of the extension of ' $R^s(a_i, a_j)$ ' in $\Sigma^{sc'}$.

10 In order for [4.3] to be the case, it is necessary that

[4.4] the identity of a particular ' R^s '-complex, say $\alpha_i \text{---} (r_n) \text{---} \alpha_j$, must be characterizable purely in terms of the particularity of α_i and that of α_j .

This in turn suggests that the elements of R must, in the
15 context of $\Sigma^{sc'}$, be seen as playing a double rôle; on the one hand, that of representing particular ' R^s '-complexes, and, on the other, that of being ' R^s '-atoms. The second of these rôles can be reflected in⁶⁰

[4.5] $\Sigma^{sc'} = [A; R^{\tau} \mid R_A]$

20 by stipulating that $R^{\tau} := R$, and the first one can be implemented by taking into account that in virtue of [4.4] all elements of R_A must be of the form

⁶⁰ Instead of R_{AA} I shall simply use R_A .

$$[4.6] \quad \alpha_i \text{---} (\langle \alpha_i, \alpha_j \rangle) \text{---} \alpha_j.$$

To do justice to the desideratum that R is to have the mentioned representational character, we consequently only need to stipulate that

$$5 \quad [4.7] \quad \alpha_i \text{---} (\langle \alpha_i, \alpha_j \rangle) \text{---} \alpha_j \in R_A \quad \text{iff}_{df} \quad \langle \alpha_i, \alpha_j \rangle \in R. \text{ } ^{61}$$

From these considerations it follows immediately that

$$[4.8] \quad \Sigma^{cl} \models_{rc} R^{cl}(a_i, a_j) \quad \text{iff} \quad \Sigma^{sc} \models_{rs} R^s(a_i, a_j).$$

6.3.2 Canonical & Internal Relations

10 From our description of the *spp*-referent-structure Σ^{sc} in [4] it follows directly that the elements of the extension of ' $R^s(a_i, a_j)$ ' in Σ^{sc} -- i.e. the elements of R_A -- satisfy

$$[5] \quad \alpha_i \text{---} (r_k) \text{---} \beta_j \ \& \ \alpha_n \text{---} (r_k) \text{---} \beta_m \implies \alpha_i =_A \alpha_n \ \& \ \beta_j =_B \beta_m.$$

15 The particular instantiations of ' $R^s(a_i, a_j)$ ' in Σ^{sc} satisfy this condition in virtue of the particular character of R_A -- as given in [4.6] -- and it is not difficult to see that [5] will not generally be the case for *spp*-relations: To exemplify this, let us consider the subject
20 matter of Euclidean Geometry and let us assume that we are dealing with a formal semantics in which each referent-structure is (a formal representation of) a

⁶¹ To see that [4.6] and [4.7] are stipulations which can indeed be fulfilled, we only need to specify R_{AA} as a subset of
25 $(A \times A) \times A \times A$:
 $\langle \langle \alpha_i, \alpha_j \rangle, \alpha_n, \alpha_m \rangle \in R_A \quad \text{iff}_{df} \quad \alpha_i =_A \alpha_n \ \& \ \alpha_j =_A \alpha_m \ \& \ \langle \alpha_i, \alpha_j \rangle \in R.$

Euclidean Space with individuals referred to as points, lines etc. In such Euclidean Spaces it is possible to define the particular instantiations of the relation between points expressed as " p_i is one unit apart from p_j " as being particular relational complexes -- or, to put it differently, it is possible to construe the relevant relational predicate ' $1_P(p_i, p_j)$ ' as being a structured primitive predicate. This is achieved

[6.1] by choosing unitary, closed and connected straight line segments as relational atoms, and

[6.2] by using the fact that such line segments are uniquely tied to their end-points to define their function in relationally tying points.

Using the standard mathematical representation for line segments, namely $[p_i, p_j]$ (which itself is based on the unique tie between line segments and their end-points) and adding the index "1" to indicate the unit-length, the relational-tie in question shall be given by

$$[6.3] \quad p_i \text{---} ([p_n, p_m]_1) \text{---} p_j \quad \text{iff}_{\Delta \neq} \quad p_i =_P p_n \ \& \ p_j =_P p_m.$$

Accordingly, all extensions of ' $1_P(p_i, p_j)$ ' satisfy [5], a situation which I shall reflect in referring to the relation 1_P as being **canonical**.

The same relational atoms can be used to tie geometrical objects which, for illustrative reasons, I shall simply

call "bodies".⁶² This can be achieved because, with respect to the given geometrical structure, it is possible to assign to every "body" m_i a unique "center of gravity" $c_g(m_i)$. In other words, we can use these line segments to tie "bodies" in the following way:

$$[6.4] \quad m_i \text{---} ([p_n, p_m]_1) \text{---} m_j \quad \text{iff}_{df} \quad c_g(m_i) =_P p_n \ \& \ c_g(m_j) =_P p_m.$$

In this case, however, it is clearly possible that two "bodies" share the same "center of gravity", which means that this relation -- associated with the (ontologically determined) structured primitive relational predicate ' $l_M(m_i, m_j)$ ' (" m_i is one unit apart from m_j ") -- is not canonical.

After this exposition of the categorization of *spp*-relations as being canonical, let me now turn to the second category which I wish to characterize here, namely that of **internal** relations. The aim will be to formalize the notion of an "internal relation" introduced in section 1.2.2 by interpreting it as referring to a particular category of *spp*-relations. The best way of approaching this is, I believe, by returning again to the *spp*-referent-structure $\Sigma^{sc'}$ constructed in [4]. There we find -- in virtue of the fact that particular ' R^s '-complexes were taken to be of the form

⁶² "Bodies" here are roughly meant to be sufficiently regular, voluminous geometrical objects.

$$[7] \quad \alpha_i \text{---} (\langle \alpha_i, \alpha_j \rangle) \text{---} \alpha_j$$

-- that the identity/particularity of any relational 'R^s'-atom which occurs as tying two relata α_i and α_j is determined by the identity/particularity of α_i and α_j .
 5 Now, in an internal relation this situation is, loosely speaking, reversed in the sense that the identity of the relational atom in a relational complex determines the identity of one (or both) relata of this complex.

10 To describe this internal dependence more precisely, let me introduce the notion of a **dependent relatum**: In a relational complex $\alpha_i \text{---} (r_k) \text{---} \beta_j$, the (first) relatum α_i is said to be dependent if its identity is determined by r_k -- and analogously for β_j being a dependent (second) relatum. I shall denote the former by

$$15 \quad [8.1] \quad \alpha_i < \text{---} (r_k) \text{---} \beta_j,$$

and the latter by

$$[8.2] \quad \alpha_i \text{---} (r_k) \text{---} > \beta_j.$$

Analogously, I shall reflect the interdependencies in 'R^s'-complexes mentioned in [7] by altering their
 20 notation to

$$[8.3] \quad \alpha_i \text{---} > (\langle \alpha_i, \alpha_j \rangle) < \text{---} \alpha_j.$$

Three kinds of relational complexes with dependent

relata, or **internal relational complexes**, as I shall call them, can hence be distinguished, namely those

- with only a dependent first relatum,
- with only a dependent second one, and
- **dual-dependent** complexes, denoted accordingly by

$$[8.4] \quad \alpha_i < \text{---} (r_k) \text{---} > \beta_j.$$

This classification allows us to define the notion of an **internal relation with a first (second) dependent argument** as being a relation with exclusively internal relational complexes with dependent first (second) relata.⁶³ Moreover, let me refer to totalities of dependent relata associated with a dependent argument of an internal relation which form a domain of a referent-structure as **dependent domains**.

To characterize a *spp*-relation R_{AB} as being internal is to make a statement about certain ontological interdependencies between the constituents occurring in each 'R'-complex, and for this reason I shall call it an **ontological** characterization. The reason for using "ontological" here here is that, say in the case of $\alpha_i \text{---} > (< \alpha_i, \alpha_j >) < \text{---} \alpha_j$, the dependent component (i.e. $< \alpha_i, \alpha_j >$) could not exist as a well-defined individual ("logical object") if the determining components (i.e. α_i and α_j) were not well-defined. The converse, for example, is

⁶³ Dual-dependent internal relations are meant to be defined analogously.

clearly not the case: an identification of either α_i or α_j is meant to be possible without reference to the ordered pair $\langle \alpha_i, \alpha_j \rangle$.⁶⁴ A particular implication of these ontological interdependencies is meant to be that if the relation R_{AB} is internal, say, with a dependent first argument, then we will have that

[9] for any two of its relational complexes, say $\alpha_i \leftarrow (r_k) \rightarrow \beta_j$ and $\alpha_n \leftarrow (r_q) \rightarrow \beta_m$, $\alpha_i =_A \alpha_n$ is determined by whether $r_k =_R r_q$.

10 6.3.3 Ontological Functions

The discussion of internal relations so far was meant to bring out the involvement of certain ontological interdependencies in the conception of this category of *spp*-relations. These interdependencies can be explicitly incorporated into formal 1st-order predicate semantics by using what I shall call **ontological functions** as constituents of *spp*-referent-structures. To explain how I envisage these ontological functions to represent formally the said interdependencies, let us look again at the *spp*-referent-structure $\Sigma^{sc'}$ given in 6.3.1: The very characterization of ' R^s '-complexes as

$$\alpha_i \longrightarrow (\langle \alpha_i, \alpha_j \rangle) \leftarrow \alpha_j$$

⁶⁴ Note in this context that the categorization of being canonical is not ontological in this sense.

suggests that the type of ontological interdependency associated with these complexes can be represented by the function which is standardly associated with the formation of the Cartesian product of two sets. This function, usually called **pair-function** $\pi(x_1, x_2)$ maps the individuals x_1, x_2 occurring in its arguments to the pair $\langle x_1, x_2 \rangle$. The pair-function is an ontological function in my sense because it is possible to define the identity of the elements of its image set (i.e. the Cartesian product) in terms of the identity of the elements of its domain(s):

$$[10] \quad \pi(x_i, y_j) = \pi(x_n, y_m) \text{ iff } x_i = x_n \text{ \& } y_j = y_m.$$

In the case of an internal relation -- say with a dependent first argument -- I suggest that the involved ontological dependencies give rise to an ontological function⁶⁵ $\Omega: R^t \longrightarrow A$ mapping each relational atom $r_k \in R^t$ on to the individual determined by r_k : To see this, we only need to consider the relation Ω , defined as the set of all ordered pairs $\langle r_k, \alpha_n \rangle$ as given by the relational complexes $\alpha_n \longleftarrow (r_k) \longrightarrow \beta_m$ of R_{AB} . The functionality of Ω is a direct consequence of the fact that R_{AB} is meant to be an internal relation with a first dependent argument: given two of its relational complexes, say, $\alpha_n \longleftarrow (r_k) \longrightarrow \beta_m$ and $\alpha_i \longleftarrow (r_q) \longrightarrow \beta_j$ we have, according to [9], that

⁶⁵ The image set A being the dependent ontology and R the determining class.

$$[11] \quad \alpha_n =_A \alpha_i \quad \text{iff} \quad r_k =_R r_q.$$

This not only ensures the functional character of Ω , but also that it is a one-one function. Again, we can describe the ontological dependencies between $=_R$ and $=_A$ by means of this ontological function:

$$[12] \quad \Omega(r_j) =_A \Omega(r_k) \quad \text{iff} \quad r_j =_R r_k.$$

Let me emphasize that in the given context this equivalence is meant to reflect the fact that the determined entities can only exist as logical objects in conjunction with the determining ones. The same can be said for [10], as it is meant to reflect that a pair $\langle \alpha_1, \alpha_2 \rangle$, qua well-defined entity, cannot exist if either α_1 or α_2 fail to be well-defined.

6.4 Standard m -Semantics

To conclude this chapter, let me bring together the requirements concerning the desired m -formalism which have so far been established -- say, for example, that its semantics must be an i -semantics as well as an spp -semantics -- by giving what I shall call the standard definition of m -semantics in set-theoretical terms. The aim of this section will be to characterize, in set-theoretical terms, an m -referent-structure Σ^m which can be seen as a typical member of an m -semantics that in turn is meant to be adequate to a typical example of a linguistic/syntactic apparatus L^m of our m -formalism.⁶⁶

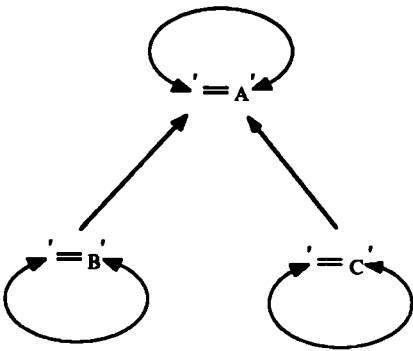
The first task will be to give an explicit description of L^m . This leads us back to our discussion of semantic subordination in 6.2.2, where it was said that any such linguistic apparatus is to be given with a partial order amongst its identity predicates. In this context let me point out that the partial ordering of the relation ' $=_x$ ' $\longrightarrow$ ' $=_y$ ' allows us to stipulate, without loss of generality, that

- [1] ' $=_x$ ' $\longleftrightarrow$ ' $=_y$ ' iff ' $=_x$ ' is the same character as ' $=_y$ '.

⁶⁶ To simplify the notation I decided to omit the particularizing indices ("n", "k") in both the notation for the referent-structure (Σ_n^k) and the linguistic apparatus (L_k^n).

Given this, I suggest that we consider for our present purposes a linguistic apparatus L^m with three identity predicates ' $=_A$ ', ' $=_B$ ', ' $=_C$ ' together with the partial order

[2]



5 and the (non-identity) predicates ' $P(a_i)$ ' and ' $R(a_i, b_j)$ '. According to our discussion in 6.2.2 -- in particular 6.2.2 [15] -- this means that Σ^m will have to contain three domains A, B, C and a collection S^f of semantic functions

10 [3.1] $S^f = \{s_{xy} : X \longrightarrow Y\}.$

These semantic functions are -- due to their specific nature⁶⁷ -- taken to transform the three domains not just into a set

[3.2] $\{A, B, C\}^{=s}$

15 but, indeed, into a partially ordered set

[3.3] $\langle \{A, B, C\}^{=s}, <_s \rangle$

⁶⁷ The formal definition of S^f would have to reflect what we said in 6.2.2 [12], in the sense that it must contain Id_x for any domain X of Σ^m , and that for any $s_{xy}, s_{yz} \in S^f$ there must be a function $s_{xz} \in S^f$ with $s_{xz}(x) = s_{yz}(s_{xy}(x))$.

which, if Σ^s is to be adequate to L^m , must be isomorphic with syntactic partial order ([2]) of L^m in virtue of the canonical formal interpretation⁶⁸

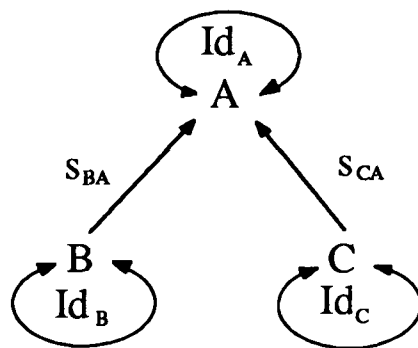
$$[3.4] \quad \sigma^m(=x) = \mathbf{X}.$$

5 That is to say, in order for⁶⁹

$$[3.5] \quad \Sigma^m = [\mathbf{A}, \mathbf{B}, \mathbf{C}; \dots \mid \mathbf{S}^\varepsilon, \dots \mid \dots]$$

to be adequate to L^m , $\mathbf{S}^\varepsilon$ must contain exactly five semantic functions -- namely $\text{Id}_\mathbf{A}$, $\text{Id}_\mathbf{B}$, $\text{Id}_\mathbf{C}$, $\mathbf{S}_{\mathbf{BA}}$, $\mathbf{S}_{\mathbf{CA}}$ -- which are meant to induce the partial order

[3.6]



15 The next stage in our construction of a typical (standard) m -referent-structure Σ^m will be to take into account that, according to our discussion of constructive identifying-rules in 6.1.2, it is meant to be possible for Σ^m to be incomplete. As a first step in this direction,

20 ⁶⁸ To keep this characterization of a typical m -referent-structure as simple as possible, I chose to ignore the distinction between reference-introducing character and reference-introducing symbol (cf. 2.1.1 [10*]) in this context.

25 ⁶⁹ For notational economy I shall not make explicit reference to the set $\{\mathbf{A}, \mathbf{B}, \mathbf{C}\}^s$ in [3.5].

let us look at incompleteness with respect to elementary identity statements. To achieve the desired result in this context, I suggest that we introduce the particular identities/non-identities which are meant to hold in the domains of Σ^m explicitly, and in turn treat these domains as (possibly incomplete) identity structures $|=_{\mathbf{A}}|$, $|=_{\mathbf{B}}|$ and $|=_{\mathbf{C}}|$. What I have in mind, say in the case of $|=_{\mathbf{A}}|$, is to introduce two disjoint subsets of $\mathbf{A} \times \mathbf{A}$, namely $\text{Id}_{\mathbf{A}}$ and $\neg \text{Id}_{\mathbf{A}}$, which allows us to stipulate that

$$[4.1] \quad \Sigma^m \models_m a_i =_{\mathbf{A}} a_j \quad \text{iff}_{\text{def}} \quad \langle \alpha_i, \alpha_j \rangle \in \text{Id}_{\mathbf{A}} \quad ,$$

$$[4.2] \quad \Sigma^m \models_m a_i \neq_{\mathbf{A}} a_j \quad \text{iff}_{\text{def}} \quad \langle \alpha_i, \alpha_j \rangle \in \neg \text{Id}_{\mathbf{A}} .$$

In light of the fact that $=_{\mathbf{A}}$ is meant to be an identity predicate, this sort of stipulation is, of course, only admissible if we put certain constraints on the nature of both $\text{Id}_{\mathbf{A}}$ and $\neg \text{Id}_{\mathbf{A}}$: for example,

[4.3] there must be a subset of $\mathbf{A} \times \mathbf{A} \setminus \neg \text{Id}_{\mathbf{A}}$ containing $\text{Id}_{\mathbf{A}}$ which classically defines an equivalence relation on $\mathbf{A}$.

This second constructive step leaves us then with a typical m -referent-structure

$$[4.4] \quad \Sigma^m = [|=_{\mathbf{A}}|, |=_{\mathbf{B}}|, |=_{\mathbf{C}}|; \dots | S^{\mathbf{f}}, \dots | \text{Id}; \dots]$$

where Id is meant to denote the collection $\text{Id}_{\mathbf{A}}$, $\neg \text{Id}_{\mathbf{A}}$, $\text{Id}_{\mathbf{B}}$ etc... Three points must be emphasized in this context. First, the identity relation of the set $\mathbf{A}$ (and likewise for that of $\mathbf{B}$ and $\mathbf{C}$) -- a set which, although

not explicitly denoted in [4.4], is still meant to be a constituent of Σ^m -- becomes purely auxiliary in nature. Accordingly, it would be possible to use A as a formal representation of a manifold of mere units. For the sake of simplicity, I shall stipulate that -- in addition to [4.3] --

[4.5] Id_A must contain the diagonal of $A \times A$.

This will enable us to construe A as a proper substructure of $|=_A|$, a fact which in turn allows us to retain the conception that individual constants/variables are formally interpreted as logical objects: The canonical interpretation

[4.6] $\sigma^m(a_i) = \alpha_i$

can then be interpreted as the association of a_i with an item which is an individual of $|=_A|$ in virtue of the fact that, according to [4.5], $\langle \alpha_i, \alpha_i \rangle \in \text{Id}_A$.

The second point is simply that any semantical function in S^f , say s_{CA} , must now be considered as

[4.7] $s_{CA}: |=_C| \longrightarrow |=_A|$.

And thirdly, let me point out that⁷⁰

[4.8.1] if $\neg \text{Id}_A = A \times A \setminus \text{Id}_A$ then

⁷⁰ Note here that [4.8.1] together with [4.3] imply that Id_A is an equivalence relation on A .

$$[4.8.2] \quad \Sigma^m \not\models_m a_i =_A a_j \quad \text{iff} \quad \Sigma^m \models_m a_i \neq_A a_j,$$

which is why I shall refer to $|\equiv_A|$ in this case as complete identity structure (or, for short, "set").

In order to keep this sketch as concise as possible, let
 5 me combine the discussion of incompleteness of non-identity predicates -- i.e. ' $P(a_i)$ ' and ' $R(a_i, b_j)$ ' -- with that of their being structured primitive predicates. From our discussion of *spp*-referent-structures in 6.3.1 [3.2] it follows that our paradigm *m*-referent-structure
 10 must be given as

$$[5.1] \quad \Sigma^m = [|\equiv_A|, |\equiv_B|, |\equiv_C|; P^t, R^t \mid S^t, \dots \mid \text{Id}; P_A, R_{AB}]$$

where $P^t = \{p_1, p_2, \dots\}$ ($R^t = \{r_1, r_2, \dots\}$) is a set which formally represents qualitative-' P '-atoms (relational-' R '-atoms), and P_A (R_{AB}) the extension of ' $P(a_i)$ '
 15 (' $R(a_i, b_j)$ ') in Σ^m .

More precisely, P_A (R_{AB}) is meant to be a subset of $P^t \times A$ ($R^t \times A \times B$) -- a specification which is legitimate due to 6.3.1 [3.1] -- such that

$$[5.2] \quad \Sigma^m \models_m P(a_i) \quad \text{iff}_{df} \quad (E p_n \in P^t) \langle p_n, \alpha_i \rangle \in P_A,$$

$$20 \quad [5.3] \quad \Sigma^m \models_m R(a_i, b_j) \quad \text{iff}_{df} \quad (E r_n \in R^t) \langle r_n, \alpha_i, \beta_j \rangle \in R_{AB}.$$

In this context, I must emphasize the auxiliary nature of say $R^t \times A \times B$ qua super-set of R_{AB} : while we can reasonably consider the elements of R_{AB} as formal representa-

tions of particular relational complexes, such an interpretation would simply be wrong in the case of the elements of $R^{\tau} \times A \times B \setminus R_{AB}$. This means, in particular, that if we wish to introduce the possibility of an incompleteness in this context, we cannot think of the set⁷¹

$$\neg R_{AB} \quad (<\in R^{\tau} \times A \times B \setminus R_{AB})$$

as representing a collection of particular relational complexes. It would be wrong to define

$$\Sigma^m \models_m \neg R(a_i, b_j) \quad \text{iff}_{df} \quad (\exists r_n \in R^{\tau}) \langle r_n, \alpha_i, \beta_j \rangle \in \neg R_{AB}.$$

This should not be surprising, for $\neg R(a_i, b_j)$ is not meant to be a primitive predicate. The appropriate stipulation emerges if we make the assumption that

$$[5.4.1] \quad \text{if } \neg R_{AB} = R^{\tau} \times A \times B \setminus R_{AB}$$

$$[5.4.2] \quad \text{then } 'R(a_i, b_j)' \text{ is complete in } \Sigma^m,$$

because then we must stipulate that

$$[5.5] \quad \Sigma^m \models_m \neg R(a_i, b_j) \quad \text{iff}_{df} \quad (r_n \in R^{\tau}) \langle r_n, \alpha_i, \beta_j \rangle \in \neg R_{AB},$$

for only this will ensure that [5.4.1] implies

$$\Sigma^m \not\models_m R(a_i, b_j) \quad \text{iff} \quad \Sigma^m \models_m \neg R(a_i, b_j).$$

In the final stage of this construction of Σ^m let me now try to reflect what we called ontological interdependencies in the context of constituents of particular instan-

⁷¹ cf. 6.1.1, [7]

tiations of *spp*-relations. Given our discussion of these interdependencies in 6.3.2/3 it is clear that the most natural way of doing this is by introducing into Σ^m a set Ω^f of functions as formal representations of what we referred to as ontological functions. Our typical (standard) *m*-referent-structure will be given as

$$[6.1] \quad \Sigma^m = [| =_A |, | =_B |, | =_C | ; P^t, R^t \mid S^f, \Omega^f \mid Id; P_A, R_{AB}].$$

Again -- as in the case of formal semantic functions-- it will be necessary to put certain restrictions on the nature of functions which are meant to occur in Ω^f , if these functions really are to serve as formal representations of ontological functions. For example, if a function, say $\Omega_D \in \Omega^f$, is to represent an ontological function, itself reflecting the determination of an identity relation represented in the Σ^m -ontology D, then Ω_D must first of all be of the form⁷²

$$[6.2] \quad \Omega_D : A_1 + A_2 + \dots + A_n \longrightarrow D,$$

-- that is, it must be a (possibly partial) function from the disjoint "determining" Σ^m -ontologies $A_1, A_2, \dots, A_n$ onto the "determined" ontology D. Secondly, it must also be compatible with a defining description of the deter-

⁷² The notation for the domain of Ω_D is simply meant to reflect the types of individuals which are jointly taken to be involved in the determination of $=_D$. If required, this domain could be defined by means analogous to the Wiener-Kuratowsky definition of ordered pairs, i.e. $\langle a, b \rangle \equiv \{\{a\}, \{a, b\}\}$. Note in this context also that $\langle a \rangle = \{\{a\}\}$ which is clearly an individual of a different type than *a* itself.

mined identity relation. By this I mean that there must be a formula Φ given in terms of the identity relations of the determining ontologies (i.e. $=_1, =_2, \dots =_n$) such that

$$\begin{aligned} \Omega_D(x^1, x^2, \dots, x^n) =_D \Omega_D(y^1, y^2, \dots, y^n) \\ \text{iff} \\ \Phi(x^1, x^2, \dots, x^n, y^1, y^2, \dots, y^n), \end{aligned}$$

-- where x^i and y^i are meant to range over A_i .

In analogy to our preceding discussion, let me furthermore introduce a special symbol π^n for the Cartesian n -tuple function, given by

$$[6.4.1] \quad \pi^n: A_1 + A_2 + \dots + A_n \longrightarrow A_1 \times A_2 \times \dots \times A_n,$$

and

$$\begin{aligned} \pi^n(x^1, x^2, \dots, x^n) =_\pi \pi^n(y^1, y^2, \dots, y^n) \\ \text{iff} \\ x^1 =_1 y^1 \ \& \ x^2 =_2 y^2 \ \& \ \dots \ \& \ x^n =_n y^n. \end{aligned}$$

This allows us to refer to a relation -- with R_{AB} as Σ^m -extension -- as being m -classical in Σ^m if

[6.5.1] there is a Cartesian ontological function $\pi_R^2: A+B \longrightarrow R^c$ in Σ^m such that⁷³ $\langle r_k, \alpha_i, \beta_j \rangle \in R_{AB}$ iff $r_k =_R \pi_R^2(\alpha_i, \beta_j)$,

and if

[6.5.2] R_{AB} is complete.⁷⁴

⁷³ Since R^c is usually a proper subset of $A \times B$, let me stress again that π_R^2 , qua ontological function, can be partial.

⁷⁴ " R_{AB} is complete" here is meant to refer to the fact that $\Sigma^m \not\models_m R(a_i, b_j)$ iff $\Sigma^m \models_m \neg R(a_i, b_j)$.

The rationale for choosing the attribute "*m*-classical" in this context becomes clear if we consider, for example, that for any relation which is *m*-classical in Σ^m , and which obtains between the elements of one single complete domain -- say $|=_{\mathbf{A}}|$ -- of Σ^m , it is possible to reverse the transformation discussed in 6.3.1 [4]. We can construct a classical referent-structure Σ^{clm} with the set $|=_{\mathbf{A}}|$ as domain such that⁷⁵

$$[6.6] \quad \Sigma^m \models_m R(a_1, a_2) \quad \text{iff} \quad \Sigma^{clm} \models_{cl} R(a_1, a_2).$$

This, incidentally, leads directly to the conclusion that

[6.7] our *m*-formalism is a proper generalization of the classical formalism,

in the following sense: given any (classical) linguistic apparatus *L*, there is a proper subset Σ^{mcl} of the standard *m*-semantics Σ^m adequate to *L* (qua *m*-apparatus) such that the set of *L*-formulae which hold universally in Σ^{mcl} is identical with the set of those *L*-formulae which are classically universally true. Indeed, our *m*-formalism is also a proper generalization of the so-

20 ⁷⁵ $\Sigma^{clm} = [|=_{\mathbf{A}}|, \mathbf{R}]$ where $R \in [|=_{\mathbf{A}}|, x | =_{\mathbf{A}}|]$ is defined as:
 $\langle \alpha_1, \alpha_2 \rangle \in R$ iff $\alpha_1 \neq \alpha_2$ the inverse π^2 -image of $\langle \alpha_1, \alpha_2 \rangle$ is in the domain of $\pi \mathbf{R} : \mathbf{A} + \mathbf{A} \rightarrow \mathbf{R}^c$, which, roughly speaking, amounts to stipulating that $\mathbf{R} := \mathbf{R}^c$.

called intuitionistic formalism,⁷⁶ but this just as a remark on the side.

Given this representation of ontological functions in the suggested standard m -formalism, the classification of a
 5 relation, say with R_{AB} as Σ^m -extension, as being m -internal (with, say, a dependent first argument) in Σ^m can only mean that

[7.1.1] there is an ontological function $\Omega_A: R^{\tau} \longrightarrow A$ in Σ^m with

$$\Omega_A(r_i) =_A \Omega_A(r_j) \text{ iff } r_i =_R r_j; \text{ and}$$

10 [7.1.2] $\langle r_k, \alpha_i, \beta_j \rangle \in R_{AB} \implies \Omega_A(r_k) =_A \alpha_i.$

Let us assume that an m -language is given by a linguistic apparatus L^m with ' $R(a_i, b_j)$ ' $\in L^m$ and the m -semantics Σ^m , which is meant to be the collection of all possible m -referent-structures which are adequate to L^m . To say
 15 then that

[7.2.1] ' $R(a_i, b_j)$ ' is a relational predicate referring to an internal relation (with a first dependent argument)

must be interpreted as meaning that

[7.2.2] the extensions of ' $R(a_i, b_j)$ ' must be m -internal -- with a
 20 first dependent argument -- in all referent-structures of Σ^m ,

⁷⁶ This can be shown by using the Kripke-semantics as standard intuitionistic semantics, and by interpreting the partial order given in Kripke-structures in terms of our
 25 semantic partial order.

if the ontological character of the classification of relations being internal is to be properly represented. In other words, to reflect the nature of internal relations properly, [7.1] must hold in each referent-structure of Σ^m as a matter of what might be called "ontological necessity" -- in analogy to the fact that, if ' $I(a_i, a_j)$ ' is an identity predicate then all possible (complete) extensions of ' $I(a_i, a_j)$ ' must be equivalence relations as a matter of "logical necessity".⁷⁷

An important consequence of this is that

[8] if ' $R(a_i, b_j)$ ' refers to a canonical⁷⁸ internal relation with a first (second) dependent argument then ' $R(a_i, b_j)$ ' will be necessarily functional in its first (second) argument, in the sense that

$$\begin{aligned} & \models_m (a_i)(b_j)(b_k)[R(a_i, b_j) \ \& \ R(a_i, b_k) \implies b_j =_B b_k] \\ & (\models_m (a_i)(b_j)(a_k)[R(a_i, b_j) \ \& \ R(a_k, b_j) \implies a_i =_A a_k]). \end{aligned}$$

This sets ' $R(a_i, b_j)$ ' clearly apart from any "classical" relational (non-identity) predicate. I mention this because it will be of importance in the Chapter VII. There, I shall use the m -formalism to give an explicit neutral account of sensory/perceptual experiences which focuses on the nature of experiential intentionality.

⁷⁷ Naturally, [7.1] can hold in a referent-structure merely as a matter of fact; however, if [7.2.1] is stipulated then it must hold necessarily.

⁷⁸ Note here that dual-dependent internal relations are always canonical.

VII

A PARTICULAR NEUTRAL ACCOUNT of
EXPERIENTIAL INTENTIONALITY

The aim of the first part of this final chapter is to demonstrate that experiential intentionality involves an internal relation (in the sense of 1.2.2 and 6.3.2) between what we called¹ individual-introducing thought-components and individuals-as-introduced. I shall first of all introduce an argument by Aquila in which he tries to establish the relational nature of perceptual intentionality. I shall then try to adapt Aquila's argument to our neutral account in order to show that -- in this context -- experiential intentionality can be regarded as being relational. The main point of this will be to show the compatibility of this relational nature with (experiential) intentional inexistence. Finally, I shall try to argue for the internal nature of these experiential intentional relations.

The aim of the second part of this chapter is to give an explicit neutral account (A_{NT}) of experiential intentionality in order to explain the peculiarities of intentionality (as occurring in experiential contexts) listed in 1.2.1.

¹ see 2.1.1 [8.1]

7.1 Experiential Intentionality

7.1.1 Aquila's Theory of Perceptual Intentionality

Aquila, in his treatise on Intentionality,² introduces

"[mental] states which involve a person's having an awareness or a conception of some object or kind of object, or some state of affairs involving some object or kind of object"³

as the topic of his investigations. He also specifies that he intends to use the term "intentionality" to designate the phenomenon of awareness or conception of objects which may or may not "really exist". His ontology contains "mental states" as well as "objects of awareness", the latter being subject to a classification concerning their "real existence". The acceptance of such a classification leads directly to his definition of an intentional relation as

[1] a relation in which one of the relata may or may not really exist.⁴

Aquila's concern with the problem of intentionality is primarily metaphysical (as opposed to phenomenological or linguistic): he is mainly concerned with "the nature of awareness and the nature of the 'relation'

² Aquila, [1977]

³ op.cit. p.ix

⁴ Note that this is simply a definition of what is meant by "intentional relation" and, as such, is not meant to imply whether there genuinely are such relations.

(if there is one) that unites awareness and the world (or worlds) of objects that confront it."⁵

In the third chapter of his book, Aquila turns to discussing the possibility of giving an account of perception in terms of intentional relations, and proposes a theory of perception to which I shall now turn.

After discussing the shortcomings of theories of perception which construe the objects of sensory awareness as being physical, Aquila proposes a theory which is based on the assumption that

[2] universals are the proper objects of sensory awareness.

In a first attempt to demonstrate the plausibility of this theory, he shows that, given certain assumptions concerning the nature of universals, the proposed theory will satisfy the general condition that

[3] "if sensory awareness involves an intentional relation, then someone's apprehending a particular object of sensory awareness will not imply either that such an object does or does not really exist."⁶

This assumption -- or, more precisely, stipulation-- concerning the nature of universals is that

[4.1] "the 'real existence' of some universal F is just F's being exemplified or instantiated by something."⁷

Given this definition of the real existence of a universal, it follows directly that

⁵ Aquila, [1977], p.ix

⁶ op.cit. p.51

⁷ ibid. p.51

[4.2] "since someone's apprehending a given universal (seeing Red, for example) does not imply that the universal in question is in fact instantiated by anything (either by anything which he perceives, or by anything at all), it follows that if sensory awareness involves a relation between a perceiver, or a state of a perceiver, and universals, sensory awareness will involve an intentional relation."⁸

Aquila continues by discussing certain objections which might be brought forward against his view. Amongst them, there is one which cannot be brushed aside: it is indeed quite difficult for me to see "what it could mean to speak of *seeing* universals",⁹ in particular if one considers that Aquila's intent is to give a metaphysical theory of (perceptual) intentionality. To say that if *P* sees an elephant then *P* is visually apprehending "the universal Elephant" ("elephantness"), is something which I find difficult to understand.

7.1.2 *m*-Reality and Intentional Inexistence

The problem with Aquila's theory of perceptual intentionality lies not so much in the way in which he argues for the relational nature of perceptual intentionality, but rather in the involved assumption that universals are the proper objects of sensory awareness. If we replace this assumption by the one that

⁸ Aquila, [1977], p.51

⁹ op.cit. p.52

[5] the proper objects of sensory awareness -- in Aquila's sense -- are token individuals-as-introduced,

then it is possible to use his way of argumentation to support the relational nature of experiential intentionality in a manner which seems much more natural than the one which he himself uses. My aim in this section will now be to motivate the introduction (into neutral accounts) of intentional relations between individual-introducing thought-components_N and token individuals-as-introduced_N.¹⁰ Given the brief exposition of Aquila's argument in the preceding section, the main issue in this enterprise will be to replace [4.1] by a suitable distinction between what I shall call *m-real* and *non-m-real* token individuals-as-introduced.¹¹ The emphasis on the suitability of such a distinction is meant to highlight that the envisaged categorization must be compatible with Aquila's notion of "real existence" as used in [1] -- at least as far as experiential intentionality is concerned. It does seem reasonable to say that Aquila's notion of "real existence" is, in particular, meant to exclude items which are "purely hallucinatory",

¹⁰ Given that the issue here will be a specification of neutral accounts, I shall use the neutral correlates (like thought-component_N, individual-as-introduced_N etc.) of the basic concepts which we used so far in our description of sensory/perceptual experiences_P.

¹¹ The reason for introducing the technical term "*m-real*" is to create a terminological distinction to "Real" -- in the sense of being *concrete* -- as used previously in this thesis. All of the items represented in Σ_N^* are meant to be Real, but not all of the items of Σ_N^* will be *m-real*.

that is "of purely hallucinatory origin".¹² Assuming that this is the case allows us to formulate the following "minimal suitability criterion" for the envisaged definition of being *m*-real in our neutral account:

- 5 [6] Any item of Σ_N^* -- i.e. of "genuine representational character"¹³ -- which is *m*-real must not represent a hallucinatory item in any of the possible (correct) determined accounts of sensory/perceptual experience_P.

10 Of all the types of token individuals-as-introduced_N given in our neutral account so far,

- [7] particulars-as-introduced_N are the most natural candidates for being *m*-real.

15 One way of ensuring that this will be the case is to make use of the fact that we can consistently (with what has been said so far¹⁴) stipulate that the nature of the tie between particulars_N and particulars-as-introduced_N must be such as to render particulars-as-introduced_N "non-hallucinatory". To see this, let us return to our interpretations in different determined frameworks of the tie between referents_N and referents-as-introduced_N. If π is a particular -- say a "thing" in Goodman's terminology

¹² Aquila uses the notion of "real existence" to characterize items which can be perceived, something which surely would be wrong to say of purely hallucinatory items.

25 ¹³ cf. 1.1.3.2

¹⁴ cf. 2.1.3

-- then π -as-introduced will, in Goodman's system, be an actual presentation of π , and, as such, a part of π . Assuming that Goodman takes "things" to be real existing items, it would be absurd to say that π -as-introduced
 5 -- qua part of π -- is hallucinatory. In a representational framework, where referents-as-introduced were, in general, meant to be experiential representations (of the referents in question), the proposed additional stipulation simply amounts to the requirement that the
 10 tie between π and π -as-introduced must be such that π -as-introduced constitutes a perceptual representation (of π). This will again exclude π -as-introduced from being hallucinatory in character.

In classifying particulars-as-introduced_N as being
 15 m -real, we must keep in mind the "ontological flexibility" mentioned in 2.1.3: "referent" and "referent-as-introduced" need not refer to different types of individuals, which clearly implies that in defining the notion of being m -real, we must at least leave open the possibility
 20 of referents_N themselves being m -real. Indeed, it seems reasonable to assume that any referent_N which is a particular_N is itself an m -real individual.¹⁵

¹⁵ It is reasonable to assume that (perceivable) particulars must be "really existing" items in every (correct)
 25 determined account of sensory/perceptual experience.

After this initial classification of particulars-as-introduced_N as being *m*-real, we must now consider the fact that certain token individuals-as-introduced_N were not meant to be particulars-as-introduced_N. Indeed, in the discussion of colour-tokens, I have tried to show that they -- qua token individuals-as-introduced_N -- are "purely experiential" in character, at least in the sense that they cannot be referents-as-introduced_N.¹⁶ Let me just re-emphasize that even if a colour-token_N *c_m* is taken to be a constituent of a particular_N *π*, *c_m* will not be a part of *π* -- in the sense of being a part, say, of *π*'s surface -- but spatially embedded in such a part.¹⁷

However, it would be wrong to conclude that all colour-tokens_N are non-*m*-real, just because they are not meant to be referents-as-introduced_N. For example, it would be absurd to say that constituents of Goodmanian "things" are hallucinatory, for the same reasons which lead me to reject the hypothesis that their parts are

¹⁶ Note here that all individuals-as-introduced are "experiential" in character in the sense that they must be part of a sensory/perceptual experience. However, given the characterization of referents (see 2.1.2 [8]) and the mentioned "ontological flexibility", referents-as-introduced must at least be tied to items of a non-experiential type of existence, which is why I do not consider them as purely experiential in character.

¹⁷ It is the surface part which has a geometrical shape-cum-size -- remaining invariant, say, when I walk around *π* -- while *c_m* will only have a projective form/projective size, typically not invariant in the above-mentioned situation. The failure to make this distinction is, in my view, one reason why some sense-datum theories fail to be convincing.

hallucinatory. In a representational framework -- say one which interprets colour-tokens in terms of Land's colour-codes -- it is surely possible that colour-tokens can be created by "genuine perceptual means", say, by being the effect of a typical perceptual causal process. In this case it would again be wrong to classify the colour-tokens in question as being of hallucinatory origin.

In our attempt to introduce a distinction between being m -real and being non- m -real for all token individuals-as-introduced_N, our task is now to give a characterization (in neutral terms) of being m -real for colour-tokens_N. The considerations put forward in the preceding paragraph suggest strongly that this can be achieved in terms of what we referred to as "colour-qualifying-ties", along the lines of

- [8] $c_k \in C_{en}^t$ is m -real iff_{def} there is a particular π such that $c_k \sim_q \langle \pi \rangle_j$.

With respect to this particular way of characterizing the m -reality of colour-tokens_N, I must point out that-- even though [8] does satisfy our "minimal suitability criterion" -- there are clear reasons for saying that it is too narrow a conception of being m -real in this context. Take, for example, the case of colour-tokens_N which occur in the context of experiencing a rainbow. Clearly it would be wrong (say, in the above-mentioned

representational framework) to characterize these colour-tokens_N as being of hallucinatory origin. However, it seems doubtful whether these colour-tokens_N would be *m*-real in the sense given by [8], for to say that there is a particular which causes them -- which would be the interpretation of the definiens in [8] -- does seem to be at least problematic.¹⁸ A "fine-tuning" of the definition of being *m*-real in the context of colour-tokens_N can, in my view, only be achieved by introducing explicitly-- into what I shall call the "meta-language"¹⁹ -- a category of colour-qualifying-ties_N which reflects the perceptual/non-hallucinatory origin of the relevant qualifying colour-tokens. But for our present purposes, I suggest that we retain the "crude" definition given in [8].²⁰

¹⁸ Another example of the same situation was suggested by Paul Snowden, namely the (blue) colour-tokens_N which occur in the context of experiencing a perfectly clear sky. Let me also mention at this point that the colour-tokens_N involved in experiencing a rainbow exhibit clearly the fact that their spatial characteristics are derived from visual sensational space -- i.e. that they have a projective form as opposed to a geometrical shape: it is quite impossible to walk around a rainbow and to observe the changes of apparent shape which would have to occur if rainbows had a geometrical shape.(cf. 5.5.2)

¹⁹ cf. 7.2

²⁰ In the context of introducing "meta-language categories" of colour-qualifying-ties_N, let me also point out that, strictly speaking, such categories must also be introduced because the structure of sensory/perceptual manifolds_N is meant to reflect the propositional content of the relevant experiences: without such additional categories it would not be possible to reflect in our formalism, say, the situation that it is part of the propositional content of e_n that a (perceived) apple looks red, although this is *de facto* not the case -- say because the involved colour-token is not caused by the apple in the relevant way.

Following Aquila's original argument for the relational nature of perceptual intentionality, what remains to be shown is that

- [9] "someone's apprehending" a token individual-as-intro-
 5 duced_N $\langle X^t \rangle_n$ will not imply either that $\langle X^t \rangle_n$ is *m*-real or non-*m*-real

-- where X^t stands for token-version of some individual-introducing concept, and "someones's apprehending $\langle X^t \rangle_n$ " is meant to refer to the fact that $\langle X^t \rangle_n$ is part of a
 10 sensory/perceptual experience_N, i.e. $\langle X^t \rangle_n \in e\mathfrak{H}$. To achieve this, let us look at two typical cases, namely, on the one hand, the case where the involved individual-introducing concept ' X^t ' is that of a colour-token ('colour^t'), and, on the other, the case where it is a
 15 sortal concept, say 'elephant^s'.

The fact that $\langle \text{colour}^t \rangle_n \in e\mathfrak{H}$ can at most imply that the attribute of being *m*-real is significantly applicable to this individual-as-introduced_N, namely in the case where
 $\langle \text{colour}^t \rangle_n$ is indeed a colour-token_N (i.e. if
 20 $\langle \text{colour}^t \rangle_n \in C\mathfrak{H}$). However, what is not implied is whether in this case, $\langle \text{colour}^t \rangle_n$ is *m*-real or not. Colour-tokens can be part of sensory/perceptual ex-

periences without being qualifyingly tied to particulars-as-introduced_N.²¹

To support the correctness of [9] in the case of an individual-as-introduced_N by means of the sortal concept of an elephant -- that is to show that $\langle \text{elephant}^s \rangle_n \in e\mathcal{F}$ does neither imply that $\langle \text{elephant}^s \rangle_n$ is *m*-real nor that it is non-*m*-real -- it is necessary to discuss the possibility of what I shall call "categorially incorrect" individual-introductions. Let us in a first instance assume that α_E is a particular elephant. Clearly, α_E can be correctly introduced by means of ' elephant^s '. We can assume that some subject has a perceptual experience e_n which is "of α_E as being an elephant", in the sense of

[10] $\exists \langle \text{elephant}^s \rangle_n \in \Sigma \mathcal{F}_n$ such that $\langle \text{elephant}^s \rangle_n = \langle \alpha_E \rangle_n$.

The individual-introducing process involved in creating this situation would hence not only be successful -- in introducing α_E -- but also correct. In section 2.2.1 I have already mentioned that a funnily shaped bush β can be successfully but incorrectly introduced by means of ' camel^s '. However, this sort of introduction would still be "categorially correct" in the sense that it does not

²¹ This can be supported in exactly the same way in which the claim that not all colour-tokens_N are non-*m*-real was supported.

involve the incorrect attribution of what we called essential qualities.²²

To clarify this, let us assume that the sortal concept of a material object ('object[±]') is, in essence, nothing but an identifying-rule and, moreover, that it is (minimally) associated with boundedness, substantivity and spatio-temporal cohesion as essential qualities.²³ Provided then that 'object[±]' is the identifying-rule of 'camel[±]', an introduction of β by means of 'camel[±]' will implicitly amount to the attribution of these three essential qualities to β -as-introduced. As bushes are bounded, substantial and cohesive,²⁴ these attributions would be correct, which is why this introduction of β is "categorially correct."

This situation changes if we consider a particular "elephant-hologram" α_H : Given that holograms are not substantial, a perceptual introduction of α_H by means of 'elephant[±]' would be categorially incorrect, for it would introduce α_H as being substantial. At this point the question might be whether this type of situation--namely, to put it analogously to [10], that

²² Let me re-emphasize that "essential qualities" -- as I use the term -- are given by identifying-rules, and are not to be confused with "essences". (cf. 6.1, [12])

²³ cf. 3.2

²⁴ They "fall into the category of material objects."

[11] $E \langle \text{elephant}^s \rangle_n \in \Sigma_n^f$ such that $\langle \text{elephant}^s \rangle_n = \langle \alpha_H \rangle_n$

-- can indeed arise. Can an individual-introduction by means of 'elephant^s' be successful in introducing α_H ? The reason why I think that the answer here must be affirmative is that elephants and elephant-holograms are visually sufficiently similar²⁵ so as to allow the possibility of categorially incorrect visual perceptual experiences of the sort described in [11]. Having said this, I must emphasize that $\langle \text{elephant}^s \rangle_n$ in [11] is *m*-real²⁶ (a fact which legitimizes my use of "perceptual" in this context). This however means that the possibility of there being experiences of the sort described in [11] will not suffice to demonstrate that [9] is true for token individuals-as-introduced_N by means of 'elephant^s'.

It is my hope that the discussion of [11] shows that there can be complexes of non-*m*-real colour-tokens which also display enough visual similarities with elephants to allow their introduction by means of 'elephant^s'. I suggest -- on essentially the same grounds which were used to justify the possibility of sensory/perceptual experiences of the type described in [11] -- that it is possible that

²⁵ Indeed, it is only this similarity which allows us to speak of elephant-holograms.

²⁶ The elephant-hologram α_H is a particular, which means that $\langle \text{elephant}^s \rangle_n (= \langle \alpha_H \rangle_n)$ is a particular-as-introduced_N.

[12] $\exists \langle \text{elephant}^s \rangle_n \in \Sigma_n^f$ such that $\langle \text{elephant}^s \rangle_n$ is an
elephant-hallucination

-- where by "elephant-hallucination" I mean a complex of
non- m -real colour-tokens_N. The possibility of there
5 being such "hallucinatory" visual experiences leads us
directly to the desired conclusion that $\langle \text{elephant}^s \rangle_n \in \Sigma_n^f$
does neither imply that $\langle \text{elephant}^s \rangle_n$ is m -real nor that
it is non- m -real.²⁷ With this I conclude my adaptation
of Aquila's original argument in the hope of having given
10 some support to the claim that experiential inten-
tionality is an intentional relation involving token
individuals-as-introduced_N which may or may not be
 m -real.

Before turning to discuss the internal nature of this
15 relation, let me make one final remark concerning the
suggested nature of "elephant-hallucinations". To
treat sensory/perceptual experiences which are common-
ly characterized as "having a hallucination of an
elephant" as cases of what might be called "onto-
20 logically incorrect"²⁸ 'elephant^s'-introductions of
elephant-hallucinations has the advantage of providing
an explanation of the well-known apparent "(geo)metri-

²⁷ Elephant-hallucinations, in the proposed sense, must be non- m -real.

25 ²⁸ "Ontologically incorrect" here is meant as extreme case of "categorially incorrect".

cal indeterminacy" of these hallucinatory intended objects. Visual elephant-hallucinations -- qua complexes of non-*m*-real colour-tokens_N -- derive their spatial characteristics exclusively from the spatial structure of visual-sensational space. This means that geometrical shape/size concepts are not meaningfully applicable to them.²⁹ The apparent indeterminacy then arises simply if we still try to apply these geometrical concepts in this context.³⁰ Another point which I hope these elaborations have brought out is that it is as wrong/nonsensical to speak of a "hallucinated elephant" as it would be to talk of a "hologrammed" one. The sortal-concept of an elephant refers to items of a category (namely, material particulars) with essential qualities which are incompatible with holograms and hallucinations.

²⁹ Note that this is not the same as saying that they are geometrically amorphous.

³⁰ Assuming that the application of "being coloured" to abstract objects like numbers, is equally meaningless -- which seems reasonable considering the obvious difference between the statement "This piece of glass is colourless" and "9 is colourless" -- the apparent (geo)metrical indeterminacy of hallucinated items would have the same origin as what would be the "chromatic indeterminacy" of numbers, namely an illegitimate application of a predicate (having geometrical shape, being coloured) to items which are not within its range of significance.

7.1.3 The Internal Nature of Intentional Relations

Of the three peculiarities of intentionality³¹ which Dennett puts forward as objections to a relational character of intentionality, I have so far tried to show
 5 that the second one -- concerning intentional inexistence -- is perfectly compatible with intentional relations, at least as far as experiential intentionality is concerned. The aim of this section will now be to suggest how it can be that such experiential intentional relations display
 10 the first of Dennett's peculiarities, which, we may recall, he described as

[13] "one and the same belief cannot at one moment be about
 15 a frog (that it is green, say) and in another moment be about a house (that it is green). The latter is a different belief. What a belief is supposed to be about is crucial to which belief it is."

The problem with Dennett's example of this peculiarity is that it can be misleading. Let me therefore first of all explain what I take this peculiarity to be. Since
 20 there is nothing very peculiar about the fact that a house is not the same sort of thing as a frog, I take it that the essential point in Dennett's example is that we are dealing with two different particular things (a particular frog and a particular house) and that it is
 25 the non-identity of these particulars which crucially influences the identity relation between the associated

³¹ cf. 1.2.1

beliefs. I take it equally to be the case that one and the same belief cannot at one moment be about a particular frog f_1 (say again, that it is green) and in another moment be about another particular frog f_2 (that it is green). Moreover, given the "peculiarity of intentional inexistence", it is quite clear that the fact that the mentioned beliefs are about particulars cannot be essential to the peculiarity. In my view it will also be the case that one and the same belief cannot at one moment be about a frog-hallucination h_1 and in another be about another frog-hallucination h_2 .

Summing up, my interpretation of Dennett's first peculiarity is that intentionality is "directional," in the sense that given the intentional states s_1 and s_2 which are about a_1 and a_2 respectively, then it will be the case that

$$[14] \quad \text{if } s_1 = s_2 \text{ then } a_1 = a_2.$$

I use the notion of an "intentional state" in this description of the "directional nature of intentionality" simply to establish a connexion to our previous investigations. There, the directional nature of intentionality is meant to be interpreted as: given the experiential particular thoughts τ_1 and τ_2 which are about a_1 and a_2 respectively, it will be the case that

$$[15] \quad \text{if } \tau_1 \equiv \tau_2 \text{ then } a_1 = a_2.$$

How then can this directional nature of experiential intentionality be explained in terms of experiential intentional relations? The answer is that experiential intentional relations -- which, we may recall, were meant to hold between individual-introducing thought-components_N and token individuals-as-introduced_N -- are canonical and internal with a first dependent argument. A typical particular instantiation of an intentional relation is meant to be a relational complex ("intentional complex") of the form

$$[16] \quad \text{"This } X^t \text{"}_n \leftarrow (i_k) \text{---} \langle X^t \rangle_m,$$

where i_k denotes the involved relational atom, which, accordingly, I shall refer to as "intentional atom".

Going back to our discussion of the structure of particular thoughts in section 2.1.1, we can now say that it is these intentional complexes which are meant to be the components of particular thoughts which fulfil the rôle of "particular references".³² The particular thoughts mentioned in [15] are hence typically meant to be of the form

$$[17.1] \quad \tau_1 \equiv \text{"This frog is green"}_1 \mid \text{"This frog"}_1 \leftarrow (i_1) \text{---} \langle \text{frog}^t \rangle_1, \dots]$$

$$[17.2] \quad \tau_2 \equiv \text{"This frog is green"}_2 \mid \text{"This frog"}_2 \leftarrow (i_2) \text{---} \langle \text{frog}^t \rangle_2, \dots]$$

³² cf. 2.1.1 [10*]

-- where, according to our discussion in the preceding section, τ_1 would be about $\langle \text{frog}^t \rangle_1$ and τ_2 about $\langle \text{frog}^t \rangle_2$.

Given then that canonical internal relations with a first dependent argument were shown to be necessarily functional in the dependent argument,³³ and that (according to 2.1.1 [9])

[18] if $\tau_1 \equiv \tau_2$ then "This frog"₁ = "This frog"₂,

it follows not only that [15] will be the case, but indeed that it will have to be so necessarily. This I think shows that the directional character of intentionality is compatible with its relational nature, at least in the experiential case.

³³ see 6.4, [8]

7.2 The Neutral Account A_{NI}

We have finally reached a stage in our investigation where I can explicitly formulate a neutral account of sensory/perceptual experience. What I intend to do in the following pages is to give a specific neutral account " A_{NI} " which can be used to explain the one remaining peculiarity of intentionality³⁴ (hence the subscript "I") which I have not yet addressed, namely the one concerning the substitutivity in intentional relations. From our initial discussion³⁵ we know that, being neutral, A_{NI} is meant to be an S_N -account of a formal structure Σ_N , given in terms of a consistent formal theory T_N .

The "neutral basic conceptual scheme" S_N is obviously meant to be the (technical) conceptual scheme which I have developed in the course of these investigations. It is meant to contain:

- ```
[1] 'sensory/perceptual manifoldN';
 'colour-tokenN';
 'colour-qualifying-tieN';
 'individual-as-introducedN';
 'referentN';
 'particular-thoughtN';
 'intentional-relationN';
 etc.
```

My use of the subscript index "N" here emphasizes that, strictly speaking, these concepts refer to items in the relevant formal structure  $\Sigma_N$ , even though they have

34 Cf. 1.2.1

35 cf. 1.1.3.2

been shown to have "non-formal correlates" in the basic conceptual scheme  $S_P$ .<sup>36</sup>

To formulate  $A_{NI}$ , I must first decide what level of generality is to be associated with the term "sensory/perceptual experience<sub>P</sub>" in this context. Is it to refer to a particular actual experience, to a class of actual and/or possible particular experiences, or, indeed to all particular experiences (actual and possible)? My first choice here is to interpret the term as referring to a class of particular experiences of some subject  $P$  (during some specified period of time). Accordingly,  $\Sigma_N$  is meant to be a class  $\Sigma^{(P)}$  of formal representations of particular sensory/perceptual experiences<sub>P</sub> of  $P$ , i.e.:

$$[2] \quad \Sigma^{(P)} = \{e\delta, e\dot{f}, e\ddot{f}, \dots\}.$$

Being such a representation, each  $e\ddot{f} \in \Sigma^{(P)}$  is meant to contain a sub-structure  $T_n$  of particular-thoughts<sub>N</sub>, a sensory/perceptual-manifold<sub>N</sub>  $\Sigma_e^f$  and, possibly, a sub-structure  $R_n$  of referents<sub>N</sub>. Thus, a typical element of  $\Sigma^{(P)}$  is meant to be of the form<sup>37</sup>

$$[3] \quad e^f = [ T; \Sigma_e^f; R ].$$

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<sup>36</sup> cf. 1.1.3.1

<sup>37</sup> For the sake of notational economy, I shall henceforth omit the particularizing index "n" in the notation for a typical element of  $\Sigma^{(P)}$  and its constituents.

My second choice in this context, namely that  $\Sigma^{(P)}$  is to be a formal representation of the class of all actual and possible sensory/perceptual experiences<sub>P</sub> of  $P$ , is based on my intention to use  $\Sigma^{(P)}$  as a 1<sup>st</sup>-order predicate semantics for formal theories of experiential intentionality.<sup>38</sup>

Given that the connexion between particular-thoughts<sub>N</sub> and individuals-as-introduced<sub>N</sub> is meant to involve a type of internal relations (viz. intentional-relations<sub>N</sub>), we can reasonably assume that

[4]  $\Sigma^{(P)}$  is a standard  $m$ -semantics.

The fact that the conception of a meaningful formula was modified to ensure that particular thoughts can be formally represented as meaningful formulae,<sup>39</sup> and that the modifications involved in conceiving  $m$ -semantics were intended to allow a formal representation of sensory/perceptual manifolds<sub>P</sub> as  $m$ -referent-structures, brings us to the reason why I chose to restrict the scope  $\Sigma^{(P)}$  in terms of a specific experiencing subject  $P$ . Adopting this restriction allows us to interpret  $T$  and  $\Sigma_f$  (as given in [3]) in terms of a  $P$ -specific formal  $m$ -language (the "subject-language"  $L_P$ ) based on the

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<sup>38</sup> Formal (1<sup>st</sup>-order predicate) semantics are meant to contain representations of possible as well as actual "states of affairs".

<sup>39</sup> see 2.1.1, [10\*]

experiential conceptual scheme possessed by  $P$  (during the specified period of time). To put it differently, this restriction allows us to interpret  $\Sigma^f$  as an  $L_P$ -referent-structure, and also to see  $T$  as a collection of meaningful  $L_P$ -formulae which "derive their meaning" from  $\Sigma^f$ .

Say, for example, that  $P$  possesses the experiential term-introducing concepts

[5] 'material object', 'bush', 'camel' and 'colour',

10 and that we are interested in those sensory/perceptual experiences <sub>$P$</sub>  of  $P$  which can be described in terms of the individual-introducing concepts

[6.1] 'material object<sup>t</sup>', 'bush<sup>t</sup>', 'camel<sup>t</sup>',

15 and the experiential material-object-characterizing predicate of looking coloured, i.e.:<sup>40</sup>

[6.2]  $\text{colour}_{eM}(x).$

In this case, the linguistic apparatus of the formal  $m$ -language which I have in mind would be given as

[7]  $L_P = \{ '=_M', '=_B', '=_C'; C_{eM}(x) \}$

20 -- where  $'=_M'$  represents 'material object<sup>t</sup>',  $'=_B'$  represents 'bush<sup>t</sup>', etc. -- with the appropriate partial

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<sup>40</sup> cf. 5.3, [15]



order amongst the identity predicates,<sup>41</sup> while  $\Sigma_e^f$ , as  $L_P$ -referent-structure, would typically be given as<sup>42</sup>

[8]  $\Sigma_e = [ \mid =_M \mid_e, \mid =_B \mid_e, \mid =_C \mid_e; C_e^t \mid S_e^f, \Omega_e^f \mid Id_e; C_{eM} ]$ .

In light of the extensive discussion which led to the conception of  $m$ -referent-structures, I take it to be clear what the different components in [8] are meant to be.<sup>43</sup>

One of the main ideas behind the modifications leading to the conception of  $m$ -semantics was to ensure that, in the context of  $L_P$ , the associated semantic turnstile  $\Vdash_e$  could be interpreted in terms of asserting propositional content. More precisely, there were two aims which motivated the conception of  $m$ -referent-structures in this context.

The first one was to enable us to interpret  $\Sigma_e^f \Vdash_e \tau^f$  "informally" as

[9] "It is part of the propositional content of  $e_n$  that ' $S_\tau$ '"

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<sup>41</sup> see 6.4, [1],[2]

<sup>42</sup> see 6.4, [6.1]

<sup>43</sup> Just as a remark on the side, I ought to mention my doubts as to the usefulness of this purely set-theoretical representation of sensory/perceptual manifolds in the context of representing the different spatial structures we have previously discussed. This, however, need not concern us in the present context, because the suggested set-theoretical models are fully sufficient to discuss the substitutivity in experiential intentional relations.



-- where  $\tau^f$  is meant to be a meaningful  $L_P$ -formula representing a particular thought  $\tau$  (formed by  $P$  and expressed by the sentence " $S_\tau$ ") which in turn determines the propositional content of the experience  $e_n$  which is represented in  $e^f$ . An immediate consequence of this with respect to the connexions between  $T$  and  $\Sigma_e^f$  is that

$$[10] \quad (\tau^f \in T) \quad \Sigma_e^f \Vdash_e \tau^f,$$

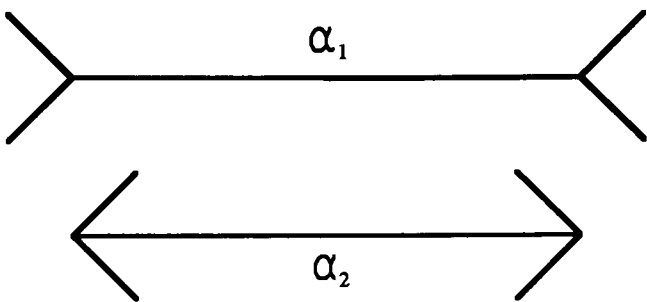
due to the fact that the particular thoughts<sub>P</sub> represented in  $T$  were meant to determine the propositional content of  $e$ .

The second aim was to provide a formal representation of the propositional content (of an experience  $e$ ) which is compatible with the conception of propositional content put forward in 2.1.2 [11]. I shall say more about this formal representation later in this section. At this moment let me just point out that the  $L_P$ -theory of  $\Sigma_e^f$  -- by which I mean the collection of all possible meaningful  $L_P$ -formulae (based on the formal interpretation  $\sigma^P: L_P \longrightarrow \Sigma_e^f$  as given by the formulae of  $T$ ) which hold in  $\Sigma_e^f$  -- is meant to represent the class of possible particular thoughts<sub>P</sub> which could be entertained consistently with, and on the basis of the propositional content of the represented experience.

To exemplify the function of particular thoughts in this context, and to show how perceptual illusions fit into

our neutral accounts, let us briefly consider the experience  $e_{ML}$  given by the following description:  $P$  is looking straight at the following "Müller-Lyer"-type<sup>44</sup> diagram

5 [11.1]



and, in this context he experiences<sub>3</sub> (in the sense of 2.1.2 [10.3]) the horizontal lines  $\alpha_1$  and  $\alpha_2$  by forming a particular thought  $\tau$  expressed by

10 [11.2]  $S_\tau \equiv$  "This horizontal line [ $\alpha_1$ ] is longer than that horizontal line [ $\alpha_2$ ]".

The function of  $\tau$  here is to determine part of the propositional content of  $e_{ML}$ , in the sense that  $P$  having  $\tau$  is meant to be sufficient to conclude that  $P$  experiences that  $S_\tau$ . It is important that the fact that  $P$  has  $\tau$  does not, by itself, imply that  $\alpha_1$  is longer than  $\alpha_2$ .

Just as a side-remark let me say two things concerning the fact that  $e_{ML}$  would usually be classified as a (Müller-Lyer) illusion. It must be emphasized that, even

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20 <sup>44</sup> Named after the German psychologist Franz Carl Müller-Lyer (1857-1916)

though  $e_{ML}$  clearly is a perceptual illusion, it is not essential to illusory experiences in general that they involve a particular thought (or, if we wish, propositional content) which ultimately would have to be interpreted as  $P$  entertaining a false belief. The description given above remains a description of an illusory experience even if we replace  $\tau$  by a particular thought  $\tau'$  expressible by "This horizontal line looks longer than that horizontal line." What is essential, however, is that  $e_{ML}$  involves referents-as-introduced and (possibly) that it allows the formation of a correct particular thought ( $\tau'$ ) which, under the described circumstances would usually be seen as sufficient for concluding that  $S_{\tau}$ .<sup>45</sup>

After this short digression, let us return to the description of  $e^f$  as an  $m$ -referent-structure of what -- in contrast to the term "subject-language" -- I shall now refer to as the **meta-language**, namely<sup>46</sup>

$$L^{(P)} = L(L^{(P)}, \Sigma^{(P)}) .^{47}$$

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<sup>45</sup> In the example, the two lines  $\alpha_1$  and  $\alpha_2$  are meant to be in the "canonical position" with respect to visual size-cum-shape judgments in the sense that their looking the same/different in length is meant to be sufficient for the conclusion that they are the same/different in (perceivable) length.

<sup>46</sup> see 0.4, [10]

<sup>47</sup> The subject language  $L_P$  is a formal language which, in essence, is given by particular-thoughts<sub>N</sub> ( $\in T_N$ ) and sensory/perceptual manifolds<sub>N</sub> ( $\Sigma^f_N$ ), that is, it is given by constituents of the models ( $e^f$ ) of the semantics  $\Sigma^{(P)}$  of the meta-language  $L^{(P)}$ .

Being meaningful  $L_P$ -formulae, the elements of  $T$  are themselves meant to be structured. Given also that certain particular thoughts<sub>P</sub> were meant to involve intentional relations -- like, for example

$$5 \quad [12] \quad \tau \equiv \text{"This } M \text{ is ..."} \mid \text{"M}^\tau\text{"}_n \leftarrow (i_\kappa) \text{---} \langle M^\tau \rangle_m, \dots]$$

where "M" is meant to be a shortform for "material object" -- it follows that, in order to permit an adequate representation of  $\tau$ ,  $e^f$  will have to contain not just the sets  $\mid =_M \mid_e$  and  $T_M$  (representing individuals-as-introduced by means of ' $M^\tau$ ', and ' $M^\tau$ '-introducing thought-components respectively), but also two sets, say  $I^\tau$  and  $I_{TM}$  (representing the relevant intentional atoms and intentional complexes, respectively) and an ontological function  $\Omega_\tau: I^\tau \longrightarrow T_M$ , in order to reflect the internal character of intentional relations.

By omitting explicit references to those components which will not play a major rôle in the discussion which is to follow, this leaves me with

$$[13] \quad e^f = [ T_M, \mid =_M \mid_e, R, \dots; I^\tau, \dots \mid \Omega_\tau, \dots \mid Id_{Me}, \neg Id_{Me}, \dots; I_{TM}, \dots ]$$

20 as typical referent-structure of the semantics ( $\Sigma^{(P)}$ ) of the meta-language  $L^{(P)}$ .<sup>48</sup>

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<sup>48</sup> Note that  $\Sigma_e^f$  occurs in [13] only as an implicit substructure, whose components are indicated by the index "e".

In order to explain the substitutivity of intentional relations, let me now describe a specific  $\Sigma^{(P)}$ -referent-structure

$$[14] \quad e\mathcal{E} = [T_{\mathcal{M}}, | =_{\mathcal{M}} |_{e_0}, R_0, \dots; I_{\mathcal{E}}, \dots | \Omega_{\mathcal{E}}, \dots | Id_{\mathcal{E}}, \neg Id_{\mathcal{E}}, \dots; I_{\mathcal{M}}, \dots]$$

5 representing a possible sensory/perceptual experience<sub>P</sub>  $e_0$  of  $P$  which itself is meant to exhibit certain ways in which experiential identifying-processes can fail. Let us first of all assume that for  $e\mathcal{E}$

$$[15.1] \quad T_{\mathcal{M}} = \{ "M^{\tau_1}", "M^{\tau_2}, \dots, "M^{\tau_6} \} \quad \text{and}$$

$$10 \quad [15.2] \quad I_{\mathcal{E}} = \{ i_1, i_2, \dots, i_6 \}.$$

I ought to mention here that

$$[15.3] \quad "M^{\tau_n} \text{ and } i_k \text{ are, strictly speaking, individual-constants of } S_N,$$

15 but for the sake of notational economy, I have decided to follow standard practice and drop the distinction between individual-constant and individual in this context.

20 The next assumption concerns the nature of  $| =_{\mathcal{M}} |_{e_0}$ . According to our account of  $m$ -semantics,<sup>49</sup>  $| =_{\mathcal{M}} |_{e_0}$  is formally given by an auxiliary set  $\mathcal{M}_{e_0}$  which is used to define the identity structure of  $| =_{\mathcal{M}} |_{e_0}$ , in that both

---

<sup>49</sup> cf. 6.4

$\text{Id}_{\mathcal{M}_e}$  and  $\neg \text{Id}_{\mathcal{M}_e}$  are meant to be given as subsets of  $\mathcal{M}_{e_0} \times \mathcal{M}_{e_0}$ . For *ef* let us assume that<sup>50</sup>

$$[16.1] \quad \mathcal{M}_{e_0} := \{ \langle M^t \rangle_1, \langle M^t \rangle_2, \dots, \langle M^t \rangle_5 \}$$

and, furthermore, that the identity structure of  $|\text{Id}_{\mathcal{M}}|_e$  is complete<sup>51</sup>, and, as such, given by

$$[16.2] \quad |\text{Id}_{\mathcal{M}}|_{e_0} := \{ [\langle M^t \rangle_1, \langle M^t \rangle_2], [\langle M^t \rangle_3], [\langle M^t \rangle_4], [\langle M^t \rangle_5] \}.$$

The elements of  $\mathcal{M}_{e_0}$  can be seen as representing individuals-as-introduced qua "isolated" logical objects in the sense of 6.1.1 [9].<sup>52</sup>

The point which I am trying to exemplify in *ef*, namely the fallibility of experiential identifications, really only emerges if we consider both the connexions between the elements of  $\mathcal{T}_{\mathcal{M}}$  and those of  $|\text{Id}_{\mathcal{M}}|_{e_0}$ , and, the connexions between the elements of  $\mathcal{M}_{e_0}$  and those of  $\mathcal{R}_0$  -- which itself is meant to be given as

$$[17] \quad \mathcal{R}_0 := \{ \alpha_1, \alpha_2, \dots \}.$$

The connexions of the first type are determined by the structure of  $\text{Id}_{\mathcal{M}}$ : since the elements of  $\text{Id}_{\mathcal{M}}$  are meant to represent intentional complexes, it is implicitly

<sup>50</sup> Note that [15.3] also holds for the elements of  $\mathcal{M}_{e_0}$ .

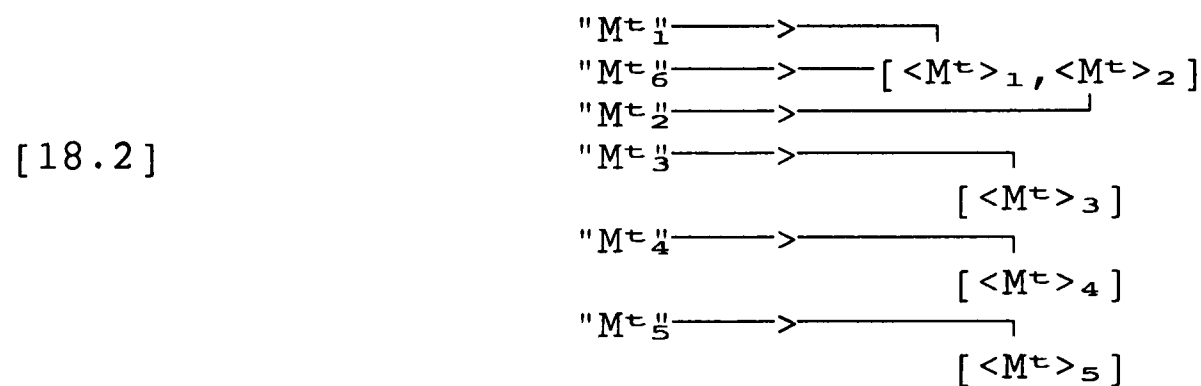
<sup>51</sup>  $\neg \text{Id}_{\mathcal{M}_e} = \mathcal{M}_{e_0} \times \mathcal{M}_{e_0} \setminus \text{Id}_{\mathcal{M}_e}$ .

<sup>52</sup> Strictly speaking, we would have to introduce a sub-structure  $|\text{Id}_{\mathcal{M}}|_{e_0}$  of  $|\text{Id}_{\mathcal{M}}|_e$  -- given by  $\text{Id}_{\mathcal{M}_e}$  being the diagonal of  $\mathcal{M}_{e_0} \times \mathcal{M}_{e_0}$  and  $\neg \text{Id}_{\mathcal{M}_e} = \emptyset$  -- to achieve this representation, but for our present purposes, it is quite sufficient to use  $\mathcal{M}_{e_0}$ .

assumed here that  $I_{\mathbf{M}}$  is  $m$ -internal<sup>53</sup> and canonical in  $\mathcal{E}$  and, as such, gives rise to a function<sup>54</sup>

[18.1] 
$$\sigma_o^P: T_{\mathbf{M}} \longrightarrow | =_{\mathbf{M}} |_{\mathcal{E}_o}.$$

The reason for using " $\sigma_o^P$ " as notation for this function is to emphasize that it is this function which serves as the formal interpretation for the elements of  $T_{\mathbf{M}}$  qua  $L_P$ -individual constants. Let me directly specify  $\sigma_o^P$  by means of the following diagram:<sup>55</sup>



The connexions between the elements of  $\mathbf{M}_{\mathcal{E}_o}$  (or  $| =_{\mathbf{M}}^* |_{\mathcal{E}_o}$ , if we wish) and those of  $\mathbf{R}_o$  are meant to be formal representations of what we referred to as the ties between referents-as-introduced<sub>P</sub> and referents<sub>P</sub>. My reasons for choosing  $\mathbf{M}_{\mathcal{E}_o}$  (instead of  $| =_{\mathbf{M}} |_{\mathcal{E}_o}$ ) for this representation is that in the context of those referents-as-introduced<sub>N</sub> which are the products of elementary self

<sup>53</sup> see 6.4. [7.1]

<sup>54</sup> Note that the functional character of  $\sigma_o^P$  would, in general, have to be characterized as  
 $"M^t_n" =_T "M^t_m" \implies \langle \sigma_o^P("M^t_n"), \sigma_o^P("M^t_m") \rangle \in \text{Id}_{\mathbf{M}_{\mathcal{E}}}$ .

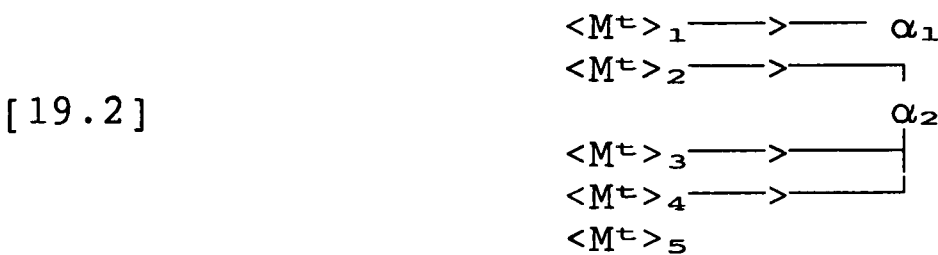
<sup>55</sup> " $M^t_n$ "  $\longrightarrow$   $x$  ( $x \in | =_{\mathbf{M}} |_{\mathcal{E}_o}$ ) is meant to represent the fact that  $\sigma_o^P("M^t_n") = x$ .



identifications, the ties we are looking at here can be represented by a (possibly partial) function

[19.1]  $r_o:M_e \longrightarrow R.$

For present purposes, I shall assume  $r_o$  to be given as



The conjunction of this stipulation and that of [16.2] -- representable as

[19.3]  $|=_{\mathbf{M}}|_{e_o} = \{[\langle \alpha_1 \rangle_1, \langle \alpha_2 \rangle_2], [\langle \alpha_2 \rangle_3], [\langle \alpha_2 \rangle_4], [\langle M^t \rangle_5]\}$

-- exemplifies the fallibility of identification. To make this more explicit, let us first look at the fact that

[20.1]  $\langle \langle \alpha_1 \rangle_1, \langle \alpha_2 \rangle_2 \rangle \in \text{Id}_{\mathbf{M}_e} \quad \& \quad \alpha_1 \neq_R \alpha_2.$

This sort of misidentification could occur, say, when  $P$  perceptually apprehends two identical twins (one after another) and thinks of this experience as being of one single person. The second type of mistake, given in our example by

[20.2]  $\langle \langle \alpha_2 \rangle_2, \langle \alpha_2 \rangle_3 \rangle \in \neg \text{Id}_{\mathbf{M}_e} \quad \& \quad \alpha_2 =_R \alpha_2,$

could occur if  $P$  apprehends one and the same person twice and not only fails to realize that this is the



case,<sup>56</sup> but indeed is under the delusion of having perceived two different people.<sup>57</sup>

The next stage in this discussion of the substitutivity in intentional relations, is to suggest a way in which the interpretation of  $\models_e$  given in [9] can be formally implemented. I intend to specify explicitly a formula of the meta-language  $L^{(P)}$  which is meant to capture formally the statement that

"It is part of the propositional content of  $e_n$  that ' $S_\tau$ '."

To make matters somewhat less cumbersome, let me use a specific particular thought, namely

[21.1]  $\tau_1 \equiv$  "This material object looks coloured"<sub>1</sub>

and assume that this particular thought be represented in  $e_0^f$  as<sup>58</sup>

15 [21.2]  $\tau^f \equiv [C_{eM}]_1 ("M^t_3") \mid "M^t_3" \leftarrow (i_3) \rightarrow \langle M^t \rangle_3, \langle [C_{eM}]_1, C_{eM}^2 \rangle$ .

This implies that

[21.3]  $\sigma_0^P("M^t_3") = \langle M^t \rangle_3, \sigma_0^P([C_{eM}]_1) = C_{eM}^2$ .

---

<sup>56</sup> This situation would itself be formally representable as  $\langle \langle \alpha_2 \rangle_2, \langle \alpha_2 \rangle_3 \rangle \notin \text{Id}_M$ .

20 <sup>57</sup> The third type of mistake, namely the application of 'material object<sup>t</sup>' without there being a referent, has already been discussed in the context of elephant-hallucinations.

25 <sup>58</sup> The implicit assumption here is, of course, that we add  $C_{e_0}^t$  and  $C_{eM}^2$  -- as given in [8] -- to our description of  $e_0^f$  (as representing the relevant experience  $e_0$  of  $P$ ).

The aim in this case is hence to find a formalization of the statement

[21.4] "It is part of the propositional content of  $e_0$  that 'This material object looks coloured'."

5           According to our previous discussion we can assume that

$$[22.1] \quad \Sigma_{e^0}^f \models_e \tau f \text{ iff } (E \ C_K \in C_{e^0}^+) \ \langle C_K, \ \sigma_o^p("M^t_3") \rangle \in \sigma_o^p([C_{eM}]_1).$$

Now, [22.1] in conjunction with [21.3] implies that

$$10 \quad [22.2] \quad e_{\sigma}^f \Big|_{\mathcal{M}}^L \left( \bigcup_{k \in \mathbb{C}} C_k \in C_{\sigma}^{\tau} \right) \subset C_k, \quad m_2 \in C_{\sigma}^{\tau}$$

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-- assuming that $\sigma_0^P:L^{(P)}\longrightarrow_{ef}$ (the "meta-interpretation")
for $m_1, m_2, m_3\dots$ is given by59
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$$|_{=M}|_{e_0} = \{ [\langle M^t \rangle_1, \langle M^t \rangle_2], [\langle M^t \rangle_3], [\langle M^t \rangle_4], [\langle M^t \rangle_5] \}. \quad (15)$$

This suggest [22.2] as the desired formal  $L^{(P)}$ -representation of [21.4].<sup>60</sup> Moreover, if we introduce the meta-language predicate  $C_{\mathcal{L}^M}^m(m_i)$  (where the  $L^{(P)}$ -variable  $m_i$  is meant to range over  $|=_{\mathcal{M}}|_{\mathcal{L}^0}$ ) as

20 [22.3]  $e_{\mathcal{O}}^f \big|_{\mathcal{C}_M} C_{\mathcal{O}}^M(m_{\perp}) \text{ iff}_{df} (\exists C_K \in \mathcal{C}_{\mathcal{O}}^{\perp}) \langle C_K, m_{\perp} \rangle \in C_{\mathcal{O}}^{\circ}$

then we have that

<sup>59</sup>  $m_i \dashv x$  ( $x \in \bigcup_{e \in \mathcal{E}_0} e$ ) represents  $\sigma''(m_i) = x$ .

<sup>60</sup> The statement given in [22.2] is implied by  $\Sigma_{\mathcal{E}}^f \Vdash_{\mathcal{E}} \tau_f$ , and does itself not refer to the identity/particularity of  $\tau_f$ .

[22.4]  $e\mathcal{S} \Vdash_m C_e^m(m_2)$  iff  $e\mathcal{S} \Vdash_m (E C_k \in C_{e_0}^+) \langle C_k, m_2 \rangle \in C_{e_0}^m$ .

This, in conjunction with the intended interpretation of [22.2], suggests that

[22.5]  $e\mathcal{S} \Vdash_m C_e^m(m_2)$

5 could "informally" be interpreted as

[22.6]  $P$  experiences (in  $e_0$ ) that  $m_2$  looks coloured.

Two points ought to be mentioned regarding this sort description of experiential propositional content. First, that it is applicable in the context of purely hallucinatory experiences, and second, that it is "referentially transparent", meaning that

[22.7] if  $P$  experiences (in  $e_0$ ) that  $m_i$  looks coloured &  $m_i =_M m_j$  (in  $e_0$ ) then  $P$  experiences (in  $e_0$ ) that  $m_j$  looks coloured.

15 The crucial point here is that experiential intentional relations involve individuals-as-introduced, which means, in particular, that they involve referents-as-introduced and not referents. Let me now try to explain how a failure of taking this point into account can lead to "referentially opaque" descriptions of experiential propositional content. My aim is to suggest an explanation of how it can be that

20 [23]  $P$  experiences that  $A_1$  is coloured and  $A_1 =_R A_2$ , but  $P$  does not experience that  $A_2$  is coloured

-- where  $A_1$  and  $A_2$  are expressions which are both meant to refer to a particular material object.

The sort of explanation I have in mind emerges with what I consider to be a legitimate assumption, namely  
 5 that<sup>61</sup>

[24.1]  $e \models_e C_{\mathcal{M}}(m_2)$  and  $\sigma_{\mathcal{M}}(A_1) = \alpha_2$

can "informally" be interpreted as

[24.2]  $P$  experiences (in  $e_0$ ) that  $A_1$  is coloured.

Given that we can consistently assume that<sup>62</sup>

10 [24.3]  $e \models_e \neg C_{\mathcal{M}}(m_3)$  and  $\sigma_{\mathcal{M}}(A_2) = \alpha_2$

we have in  $e_0$  an experience such that

[24.4]  $P$  experiences (in  $e_0$ ) that  $A_1$  is coloured &  $P$  experiences (in  $e_0$ ) that  $A_2$  is not coloured &  $A_1 =_R A_2$ ,

which, in turn, implies [23]. The reason why the logical  
 15 Law of Substitution of Identicals fails in the context of the "opaque" descriptions of  $e_0$  given here is clearly that these descriptions fail to reflect the possibility of misidentification -- in this case of the type given in

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20 <sup>61</sup> This is based on [22.5/6] in conjunction with the fact that  $\sigma_{\mathcal{M}}(m_2) = [\langle M^c \rangle_3]$  and  $r(\langle M^c \rangle_3) = \alpha_2$  -- i.e. the fact that  $e \models_e C_{\mathcal{M}}([\langle \alpha_2 \rangle_3])$ .

<sup>62</sup> To see this,  $e_0$  might be given as  $P$  apprehending  $\alpha_2$  perceptually at time  $t_1$  as not being coloured. This is consistent with  $P$ 's having apprehended  $\alpha_2$  at  $t_0 < t_1$  as being coloured  
 25 because  $P$  fails to realize that what he apprehended at  $t_0$  is the same object as the one which he is apprehending at  $t_1$ .

[20.2] -- of perceptually apprehended individuals. This is why the classical laws of logic are too strong<sup>63</sup> in the context of these opaque description of experiential propositional content.

5 For the same reason, the laws of classical logic also are "too weak"<sup>64</sup> in the context of these opaque descriptions. To show this, let me assume that the propositional content of  $e_0$  is determined by the particular thoughts

10 [25.1]  $\tau_2 \equiv \text{"This } M \text{ is } P" \mid "M^t_1 < \text{---} (i_1) \text{---} <M^t>_1, \dots]$

[25.2]  $\tau_3 \equiv \text{"This } M \text{ is } Q" \mid "M^t_2 < \text{---} (i_2) \text{---} <M^t>_2, \dots]$

This assumption is clearly consistent with our preceding description of  $e_0$  and it is easy to see that [25] implies logically that<sup>65</sup>

15 [26]  $P$  experiences that  $m_1$  is  $P \ \& \ Q$ .

However, in "opaque terms", the contribution of  $\tau_2$  and  $\tau_3$  can -- if at all -- only be described as

[27.1]  $P$  experiences that  $B_1$  is  $P$  (with  $B_1$  referring to  $\alpha_1$ )

[27.2]  $P$  experiences that  $B_2$  is  $Q$  (with  $B_2$  referring to  $\alpha_2$ )

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20 <sup>63</sup> By "too strong" I mean here that they lead to false conclusions from true premises.

<sup>64</sup> By "too weak" I mean here that they do not allow the derivation of conclusions which ought to be derivable.

25 <sup>65</sup> [25.1]  $\implies P$  experiences that  $m_1$  is  $P$   
[25.2]  $\implies P$  experiences that  $m_1$  is  $Q$

which, given  $B_1 \neq_R B_2$ , is clearly insufficient to yield classically a logical consequence corresponding to [26].

5 With this I conclude this discussion in the hope that I have managed not only to explain the nature of substitution in experiential intentional relations and the resulting descriptions of experiential propositional content, but also, more generally, to convey what is involved in giving a particular neutral account of sensory/perceptual experience.

### 7.3 Conclusion

In conclusion let me summarize what I believe has been achieved in these investigations. The least controversial achievement is in my view our characterization of a 1<sup>st</sup>-order predicate formalism which

[1.1] is capable of supporting a certain type of structured primitive predicates and which

[1.2] allows the representation of certain ontological interdependencies, in particular those involved in what we called internal relations.

The answer to the question whether we have achieved the principal aim of this thesis, which was to give an ontologically neutral account of sensory/perceptual experience, depends, in the first instance, on whether

[2.1] the argument for a particularistic basic conceptual scheme is tenable,<sup>66</sup> and on whether

[2.2] the constructive method suggested in the introductory chapter is acceptable.<sup>67</sup>

Provided that these requirements are, jointly, the case, I believe that it can justifiably be claimed that this principal aim has been achieved in our construction of

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<sup>66</sup> cf. 1.1.3, 1.3, 4.3

<sup>67</sup> cf. 1.1.3.3



$\Sigma_N$  as semantics ( $\Sigma^{(P)}$ ) for a formal theory of sensory/perceptual experience. In this context let me re-emphasize that a genuine representational character -- in the sense which gave rise to the notion of a representational sub-structure  $\Sigma_N^*$  -- was by no means meant to have been established for all features of  $\Sigma_N$ . Indeed, if we look at those features which I think have been shown to have such representational character, -- namely

[3.1] referents<sub>N</sub>, referents-as-introduced<sub>N</sub>,

10 [3.2] colour-tokens<sub>N</sub> qua individuals-as-introduced<sub>N</sub>,

[3.3] (structured primitive experiential) colour-predicates<sub>N</sub>,  
involving colour-qualifying-ties<sub>N</sub>,

[3.4] sensational spaces<sub>N</sub>, geometrical experiential space<sub>N</sub>

-- it becomes clear that our investigations have, strictly speaking, only established a certain representational core of  $\Sigma_N$ , a core which is essentially restricted to what we referred to as sensory/perceptual manifolds<sub>N</sub>. This is not to say that all the other features of  $\Sigma_N$  are purely auxiliary in nature, but only that the representational character -- say of

[4.1] particular-thoughts<sub>N</sub>,

[4.2] term-introducing thought-components<sub>N</sub>,

[4.3] (internal)intentional-relations<sub>N</sub>,intentional-complexes<sub>N</sub>  
and intentional-atoms<sub>N</sub>,

25 -- was so far not meant to have been demonstrated, but only given a degree of plausibility. Indeed, the question of whether intentional-atoms<sub>N</sub> do represent anything Real/concrete brings us back to the initially



suggested ontological motivations for these investigations: I believe that by taking the idea seriously that the creation of sensory/perceptual experiences -- of the type we have considered here -- involves (in a first instance the creation of) intentional atoms, it will not only be possible to give an account of the subject-object dichotomy which is inherent in any such experience, but it will also be possible to show that any being with such an experiential apparatus will -- in principle -- end up with having the kind of apparently incompatible theories of its experiences which, in our case, we referred to as phenomenalist and physicalist theories.

However, even if this metaphysical programme cannot be carried out, our neutral account of sensory/perceptual experience can still be regarded as a useful achievement, if only in that it provides a conceptual scheme which allows certain fundamental inter-theoretic comparisons -- like the ones arising from our sketch of Marr's, Gibson's and Goodman's theories in section 2.1.3. The importance of there being such an "inter-theoretic" conceptual scheme for any subject matter is, in my view, self-evident, for without them, there simply cannot be a constructive -- or, indeed, meaningful -- discourse between adherents of different theories of the subject matter in question.

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LIST of SYMBOLS\*

Glossary

|                                        |                                                            |
|----------------------------------------|------------------------------------------------------------|
| $a_1, b_1, x_1, y_2$                   | : individual constants and variables;                      |
| $P(.), R(.,.)$                         | : predicates;                                              |
| $.=_{1.}, .=_{2.}$                     | : identity predicates;                                     |
| $\&$                                   | : conjunction (and set-intersection);                      |
| $\vee$                                 | : disjunction (and set-union);                             |
| $\implies$                             | : material implication;                                    |
| $\iff$                                 | : material bi-implication;                                 |
| $\neg$                                 | : negation (and set-complement);                           |
| $(x)$                                  | : universal quantifier;                                    |
| $(\exists x)$                          | : existential quantifier;                                  |
| $(\exists!x)$                          | : "There is exactly one $x$ such that...";                 |
| $\models_r$                            | : semantic turnstile of type $r$ ;                         |
| $\vdash_r$                             | : syntactic turnstile of type $r$ ;                        |
| $L_n$                                  | : linguistic apparatus;                                    |
| $\Sigma_n$                             | : referent-structure;                                      |
| $\sigma_n$                             | : interpretation;                                          |
| $\in$                                  | : set-membership relation;                                 |
| $\subseteq$                            | : subset relation;                                         |
| $\phi$                                 | : empty set;                                               |
| $A \setminus B$                        | : relative set-complement, $A \setminus B = A \& \neg B$ ; |
| $A \times B$                           | : Cartesian Product;                                       |
| $\langle \Sigma_n, \sigma_n \rangle$   | : determined referent-structure (model);                   |
| $\langle \Sigma'_n, \sigma'_n \rangle$ | : model $\in \Sigma_r$ ;                                   |
| $\Sigma_r$                             | : semantics;                                               |
| $L(L_r, \Sigma_r)$ or $L_r$            | : language formed by $L_r$ and $\Sigma_r$ .                |

Chapter I

|               |                                                                                              |
|---------------|----------------------------------------------------------------------------------------------|
| $A, A_n, A_x$ | : accounts (of some subject-matter), 1.1.1 [1];                                              |
| $S, S_n, S_x$ | : basic conceptual schemes, 1.1.1 [1];                                                       |
| $T, T_n, T_x$ | : theories of concepts ontologically relevant to<br>some basic conceptual scheme, 1.1.1 [4]; |

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\* The list is given in order of the initial occurrence of the respective symbols.

## List of Symbols

|               |                                                                                                           |
|---------------|-----------------------------------------------------------------------------------------------------------|
| $S_{GN}$      | : basic conceptual scheme for accounts of the Group structure of Natural numbers, 1.1.1 [6];              |
| $F, F_n, F_x$ | : ontological framework, 1.1.1 [7];                                                                       |
| $S_{FS}$      | : basic conceptual scheme for accounts of Formal 1 <sup>st</sup> -order predicate Semantics, 1.1.1 [8];   |
| $T_S$         | : set-theory, 1.1.1 [10];                                                                                 |
| $S_T$         | : collection of traditional basic notions which are adequate for Reality, 1.1.1.2;                        |
| $S_1 (S_2)$   | : basic conceptual scheme for physicalist (phenomenalist) accounts of Reality, 1.1.1.2;                   |
| $T_1 (T_2)$   | : physicalistic (phenomenalistic) theory of traditional ontological notions adequate for $S_T$ , 1.1.1.2; |
| $F_1 (F_2)$   | : traditional physicalistic (phenomenalistic) framework, 1.1.1.2;                                         |
| $S_P$         | : particularistic basic conceptual scheme for accounts of sensory/perceptual experience, 1.1.3.1;         |
| $A_N$         | : neutral account of sensory/perceptual experience, 1.1.3.2;                                              |
| $S_N$         | : basic conceptual scheme for neutral accounts of sensory/perceptual experience, 1.1.3.2;                 |
| $\Sigma_N$    | : formal structure representing sensory/perceptual experience, 1.1.3.2;                                   |
| $T_N$         | : consistent formal theory (employed in $A_N$ ), 1.1.3.2;                                                 |
| $\Sigma_N^*$  | : representational sub-structure of $\Sigma_N$ , 1.1.3.2;                                                 |
| $F_N$         | : the neutral ontological framework in $A_N$ , 1.1.3.2;                                                   |
| $phen-F^n$    | : phenomenal framework given in $A_n$ , 1.1.3.3;                                                          |
| $phys-F^n$    | : physical framework given in $A_n$ , 1.1.3.3;                                                            |
| $phen-F_I$    | : intuitive phenomenal framework, 1.1.3.3;                                                                |
| $phys-F_I$    | : intuitive physical framework, 1.1.3.3;                                                                  |

## Chapter II

|                |                                                                                                 |
|----------------|-------------------------------------------------------------------------------------------------|
| $A_F$          | : account of 1 <sup>st</sup> -order predicate formalism, 2.1.1;                                 |
| $S_F$          | : basic conceptual scheme for $A_F$ , 2.1.1;                                                    |
| $e_n$          | : particular (type <sub>3</sub> ) sensory/perceptual experience, 2.1.2 [10];                    |
| $\Sigma_{e_n}$ | : sensory/perceptual manifold <sub>P</sub> of sensory/perceptual experience $e_n$ , 2.1.2 [12]; |



List of Symbols

- $\Sigma_{en}^f$  : 1<sup>st</sup>-order predicate referent-structure, representing  $\Sigma_{en}$ , 2.1.2 [13.1];
- $T_{en}^f$  : set of meaningful formulae, representing the experiential particular thoughts associated with  $e_n$ , 2.1.2 [13.2];
- $e_n^f$  : 1<sup>st</sup>-order predicate representation of  $e_n$ , 2.1.2 [13.2];

Chapter III

- $\alpha_1, \alpha_2$  ( $\beta_1$ ) : individuals from the domain  $A$  ( $B$ ), 3.3 [3];
- $a_1, a_2$  ( $b_1$ ) :  $=_A$ - ( $=_B$ -)individual constants, with standard interpretations  $\sigma(=_A)=A$ ,  $\sigma(=_B)=B$ ,  $\sigma(a_1)=\alpha_1$ ,  $\sigma(b_1)=\beta_1$ , etc., 3.3 [3];

Chapter IV

- $L^n$  : set of all well-formed  $L$ -formulae with  $n$  free variables, 4.1.1 [2];
- $\Phi_{\bar{L}}$  : formula  $\in L^2$  fulfilling the identity axioms [J1] and [J2], 4.1.1 [3];
- $L_A$  : classical 1<sup>st</sup>-order predicate language based on a given domain  $A$ , 4.1.2 [2];
- $\Delta_n^m$  : sub-set of  $L^m$ , 4.1.2 [3];
- $\Sigma \Vdash \Delta_n^1(a_0)$  : iff  $a_0 \in (\Phi_n \in \Delta_n^1) \Sigma \Vdash_{\sigma} \Phi_n(a_0)$ , 4.1.2 [3.3];
- $L_S$  : totality of notions pertaining to Spatial terms, 4.1.2 [12];
- $s_1, s_2$  : individual-constants canonically interpreted as Spatial locations  $\sigma_1$  and  $\sigma_2$ , respectively, 4.1.2 [12];
- $=_{ct}$  : Identity predicate for colour-tokens, 4.1.2 [3.2];
- $\langle \text{colour}^t \rangle_n$  : colour-unit (underlying the colour-token  $\langle \text{colour}^t \rangle_n$ , 4.2.2.1 [5];
- $\approx$  : colour-matching-tie between colour-units, 4.2.2.1 [5];
- $\sim$  : spatio/temporal coincidence of colour-units, 4.2.2.1 [6];
- $\Delta_{\Sigma n}(\underline{x})$  : putative "complete description" of the sensory/perceptual manifold<sub>P</sub>  $\Sigma_n$ , 4.3;



## Chapter V

|                      |                                                                                                      |
|----------------------|------------------------------------------------------------------------------------------------------|
| $\sim_q$             | : colour-qualifying tie, 5.1 [1.0];                                                                  |
| $\text{red}_{eM}(x)$ | : experiential colour-predicate ranging over material-objects-as-introduced, 5.1 [1.1.2];            |
| $C_{en}^t$           | : collection of colour-tokens occurring in $e_n$ , 5.1 [1.1.4];                                      |
| $C_{en}^{t*}$        | : collection of colour-units occurring in $e_n$ , 5.1 [1.2.3];                                       |
| $\text{red}_s(y)$    | : sort-predicate for colour-tokens, 5.1 [1.1.4];                                                     |
| $\Omega_{en}^P$      | : auxiliary two-dimensional point-set used in representing Peacocke's sensational spaces, 5.2.2;     |
| $\Omega_{en}$        | : topological point-set (" $x^*y^*z^*$ -manifold") used to represent sensational spaces, 5.2.2. [7]; |
| $\Omega_{e+1}^+$     | : pseudo-metrical point-set (" $x'y'z'$ -manifold") based on $\Omega_{en}$ , 5.2.2 [7];              |
| $\sim_r (\sim_P)$    | : relational (predicative) tie, 5.3 [16];                                                            |

## Chapter VI

|                                    |                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------|
| $Q$                                | : set of positive rational numbers, 6.1.1 [4];                                   |
| $N$                                | : set of natural numbers, 6.1.1 [4.1];                                           |
| $\sim_Q$                           | : (unifying) equivalence relation on $N \times N$ , 6.1.1 [4.2];                 |
| $Q^*$                              | : aggregate based on $\sim_Q$ and $N \times N$ , 6.1.1 [4.3];                    |
| $[<n_1, n_2>]_{\tilde{Q}}$         | : unit in $Q^*$ , 6.1.1 [4.3];                                                   |
| $=_{\in}$                          | : set-identity relation for $Q^*$ , 6.1.1 [4.4];                                 |
| $=_s$                              | : standard identity relation for $Q^*$ , 6.1.1 [4.5];                            |
| $Q^{\in} (Q^s)$                    | : $Q^*$ -as-endowed-with- $=_{\in}$ ( $=_s$ ), 6.1.1 [4.5];                      |
| $=_A$                              | : non-standard identity relation for $Q^*$ , 6.1.1 [4.7];                        |
| $Q^A$                              | : $Q^*$ -as-endowed-with- $=_A$ , 6.1.1 [4.7];                                   |
| $\langle M_0, \dots, M_n \rangle$  | : particular constructive identifying-process, 6.1.1 [5];                        |
| $M_m \longrightarrow M_{m+1}$      | : elementary identifying transformation, 6.1.1 [5];                              |
| $\Sigma_n^i$                       | : $i$ -referent-structure, 6.1.1 [6.1];                                          |
| $\Sigma_n^i \Vdash_i P(C_m)$       | : iff <sub><math>\alpha \neq</math></sub> $\alpha_m \in P_n$ , 6.1.1 [7.1];      |
| $\Sigma_n^i \nVdash_i \neg P(C_m)$ | : iff <sub><math>\alpha \neq</math></sub> $\alpha_m \in \neg P_n$ , 6.1.1 [7.2]; |

- $\langle_e$  : isomorphic embedding interpreted as "weak" set-inclusion relation, 6.1.1 [10];  
 $'A' \longrightarrow 'B'$  :  $'A'$  is semantically subordinate to  $'B'$ , 6.2.1 [3.1];  
 $A_{en} (B_{en})$  : the collection of individuals-as-introduced occurring in  $\Sigma_{en}$  due to an introduction by means of  $'A'$  ( $'B'$ ), 6.2.2 [11.0];  
 $|=_1|_{en}$  : the identity structure constructed in  $\Sigma_{en}$  by means of  $=_1$ , 6.2.2 [11.0];  
 $S_{AB}^{en}(a, b)$  : " $b$  is the semantic correlate to  $a$ ", 6.2.2 [11];  
 $S_{AB}^{en}$  : semantic function:  $A_{en} \longrightarrow B_{en}$ , 6.2.2 [11.1];  
 $|=_A|_n \langle_e s | =_B|_n$  : iff  $a \neq (E S_{AB}) S_{AB}$  is one-one, "weak" set-inclusion for many-sorted referent-structures, based on semantic functions, 6.2.2 [15.1];  
 $L^m$  :  $= \langle \{ '=_A', '=_B', \dots \} \mid '=_A' \longrightarrow '=_B', \dots \rangle$ , modified linguistic formalism with partial ordering, 6.2.2 [15.4];  
 $\Sigma_n^s$  : *spp*-referent-structure, 6.3.1 [1.2];  
 $\alpha_i \text{---} (r_n) \text{---} \beta_j$  : particular relational complex, 6.3.1 [2];  
 $R_{AB}$  : extension of  $'R_{AB}(a_i, a_j)'$  in  $\Sigma_n^s$ , 6.3.1 [3.2];  
 $R_{AB}$  : relation  $R_{AB}$  in *spp*-semantics  $\Sigma^s$  as set of the extensions of  $'R_{AB}(a_i, a_j)'$  in all the referent-structures of  $\Sigma^s$ , 6.3.1 [3.2];  
 $\Sigma^{scl}$  : *spp*-referent-structure constructed on the basis of, and elementary equivalent to a classical referent-structure  $\Sigma^{cl}$ , 6.3.1 [4.5];  
 $1_P(p_i, p_j)$  : " $p_i$  is one unit apart from  $p_j$ ", 6.3.2 [6];  
 $\alpha_i \text{---} (r_k) \text{---} \beta_j$  : internal relational complex with dependent first relatum, 6.3.2 [8.1];  
 $\alpha_i \text{---} (r_k) \text{---} \beta_j$  : internal relational complex with dependent second relatum, 6.3.2 [8.2];  
 $\alpha_i \text{---} (r_k) \text{---} \beta_j$  : dual-dependent internal relational complex, 6.3.2 [8.4];  
 $\Omega_A: R^t \longrightarrow A$  : ontological function, 6.3.2 [12];  
 $\Sigma^m$  : *m*-referent-structure, 6.4 [1];  
 $S^f$  : totality of semantic functions given in  $\Sigma^m$ , 6.4 [3.1];

- $\text{Id}_X$  :  $X \longrightarrow X$ ,  $\text{Id}_X(y) = xy$ , 6.4 [3.6];  
 $\Sigma^m \models_m a_i =_A a_j$  :  $\text{iff}_{df} \langle \alpha_i, \alpha_j \rangle \in \text{Id}_A (\in A \times A)$ , 6.4 [4.1];  
 $\Sigma^m \models_m a_i \neq_A a_j$  :  $\text{iff}_{df} \langle \alpha_i, \alpha_j \rangle \in \neg \text{Id}_A (\in A \times A)$ , 6.4 [4.2];  
 $\Sigma^m \models_m P(a_i)$  :  $\text{iff}_{df} (E p_n \in P^c) \langle p_n, \alpha_i \rangle \in P_A (\in P^c \times A)$ , 6.4 [5.2];  
 $\Sigma^m \models_m R(a_i, b_j)$  :  $\text{iff}_{df} (E r_n \in R^c) \langle r_n, \alpha_i, \beta_j \rangle \in R_{AB} (R_{AB} \in R^c \times A \times B)$ ,  
 6.4 [5.3];  
 $\Sigma^m \models_m \neg R(a_i, b_j)$  :  $\text{iff}_{df} (E r_n \in R^c) \langle r_n, \alpha_i, \beta_j \rangle \in \neg R_{AB}$   
 $(\neg R_{AB} \in R^c \times A \times B \setminus R_{AB})$ , 6.4 [5.4];  
 $\Omega^E$  : totality of ontological functions given in  $\Sigma^m$ ,  
 6.4 [6.1];  
 $\pi^n$  : Cartesian  $n$ -tuple function, 6.4 [6.4];  
 $\Sigma^{clm}$  : classical referent-structure constructed on the  
 basis of, and elementarily equivalent to an  $m$ -  
 referent-structure  $\Sigma^m$ , 6.3.1 [4.5];  
 $\Sigma^m$  :  $m$ -semantics, 6.4 [6.7];

## Chapter VII

- "This  $X^c$ " <sub>$n$</sub>   $\longleftarrow (i_k) \longrightarrow \langle X^c \rangle_m$  : intentional complex, 7.1.3 [16];  
 $i_k$  : intentional atom, 7.1.3 [16];  
 $A_{N\tau}$  : neutral account of experiential intentionality,  
 7.2 [1];  
 $\Sigma^{(P)}$  :  $= \{e^f, e^f, e^f, \dots\}$ ,  $m$ -semantics representing the  
 actual and possible sensory/perceptual experien-  
 ces <sub>$P$</sub>  of a subject  $P$ , 7.2 [2];  
 $e^f$  :  $= [T; \Sigma^f; R]$ , typical element of  $\Sigma^{(P)}$ , 7.2 [2];  
 $T$  : totality of particular-thoughts <sub>$N$</sub>  in  $e^f$ , 7.2 [3];  
 $\Sigma^f$  : sensory/perceptual manifold <sub>$N$</sub>  in  $e^f$ , 7.2 [3];  
 $R$  : referents <sub>$N$</sub>  involved in  $e^f$ , 7.2 [3];  
 $L_P$  :  $P$ -specific formal  $m$ -language ("subject-language"),  
 based on experiential particular-thoughts <sub>$N$</sub>  as  
 meaningful formulae and sensory/perceptual  
 manifolds <sub>$N$</sub>  as referent-structures, 7.2 [5];  
 $\models_e$  : semantic turnstile associated with  $L_P$  and used to  
 attribute propositional content to  $e^f$ , 7.2 [9];  
 $\Sigma^f \models_e \tau^f$  : "It is part of the propositional content of  $e$   
 that ' $S_\tau$ '", 7.2 [9];

## List of Symbols

|                       |                                                                                                                                                         |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\tau^f$              | : meaningful formula $\in T$ (particular-thought $_N$ )<br>representing particular thought $_P \tau$ , 7.2 [9];                                         |
| " $S_\tau$ "          | : sentential expression of $\tau$ , 7.2 [9];                                                                                                            |
| $\sigma^P$            | : $T_M \longrightarrow  _{=M} _e$ , $L_P$ -interpretation, 7.2 [10],[18.1];                                                                             |
| $e_{ML}$              | : Müller-Lyer illusion, 7.2 [11];                                                                                                                       |
| $L^{(P)}$             | : meta-language, based on $\Sigma^{(P)}$ as semantics,<br>7.2 [12];                                                                                     |
| $T_M$                 | : 'M $^\tau$ '-introducing thought-components $_N \in e^f$ ,<br>7.2 [13];                                                                               |
| $ _{=M} _e$           | : individuals-as-introduced $_N \in e^f$ by means of 'M $^\tau$ ',                                                                                      |
| $I^\tau$ ( $I_{TM}$ ) | : intentional atoms $_N$ (intentional complexes $_N$ ) $\in e^f$ ,<br>7.2 [13];                                                                         |
| $\Omega_T$            | : $I^\tau \longrightarrow T_M$ , ontological function in $e^f$ , used to<br>reflect the fact that intentional-relations $_N$ are<br>internal, 7.2 [13]; |
| $e_g^f$               | : specific $\Sigma^{(P)}$ -referent-structure containing $\Sigma_g^f$ and<br>representing the experience $_P e_o$ of $P$ , 7.2 [14];                    |
| $\sigma_g^P$          | : $T_M \longrightarrow  _{=M} _{e_o}$ , formal $L_P$ -interpretation, 7.2 [18.1];                                                                       |
| $\sigma_g^M$          | : $L^{(P)} \longrightarrow e_g^f$ , formal $L^{(P)}$ -interpretation ("meta-<br>interpretation"), 7.2 [22.2];                                           |