ON CRITICIZING DEVIANT LOGICS*

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Introduction

A casual acquaintance with logic enables the student of the works of certain philosophers and scientists to recognize arguments and syntactic constructions that, by the standards of modern logic, appear to be nonsense. Analytic philosophers have a long history of accusing those scholars of formulating ungrammatical sentences or plain fallacies. At the beginning of this century, however, mainly under the influence of the neo-kantianism of the Baden School, a different view began to gain ground. In the nineteen-twenties, for instance, Hans Leisegang held that there is no such thing as a generally accepted logic. Instead, what was then called *logic* was but one among many possible ways of establishing lawlike connections between concepts and judgments (Leisegang (1928), p. 9). According to him this explained why one conceptual framework could «without containing a fallacy that burdens the logical conscience and that is easily demonstrable» (*ibid.*, p. 4), logically relate things that within a different framework had no logical connection.

The semantic foundation of the notion of validity reinforced Leisegang's intuitions. It turned out, for example, that the great variety of intensional logics were partly due to differences in ontology and interpretation. This clearly illustrated that one's choice of syntax, ontological presuppositions and way of relating the language chosen to the ontology determine what he considers to be logically valid. So, whether an argument is composed of well-formed sentences and whether or not it is valid can only be determined when the conceptual scheme the argument belongs to is known. This way of relativizing well-formedness and validity has consequences for what counts as justified criticism of deviant logical notions and argument schemes.

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Knowledge of the embedding conceptual paradigm is a prerequisite to the very possibility of criticism.

During the last few years the amount of active interest invested in the study of traditional conceptual schemes has been increasing. See, for instance, Angelelli (1967), Barth (1974), Hintikka (1973) and Ishiguro (1972). It seems that the attitude to logical deviants has changed: deviations are not necessarily illogical but may be attributed to a different logic. Nevertheless, the way in which non-standard logical notions and argument schemes are criticized has largely remained unaltered. This will be demonstrated in this article. I take as my examples three rather recent lines of attack on resp. the notion of a general concrete as the extension of a generic term, and the treatment of the operators «potentially» and «essentially» of traditional logic. I shall first state the arguments. Then I shall give a formal reconstruction of the conceptual frameworks to which the notion and the operators concerned belong. This provides the means of testing the adequacy of these arguments. Finally, we shall generalize the result of our testing and make some remarks on the problem as to the extent to which conceptual schemes are criticizable.

2. *Three Cases*

Modern philosophically oriented logicians have in particular concentrated on criticizing ontological presuppositions and logical operators of essentialistic logic or substance logic. This derives from the fact that in some variants of essentialism contingent sentences may be formulated that are immune to criticism on the basis of empirical knowledge. As it turns out, these variants are still being employed by, for example, phenomenologists and dialecticians. It therefore need not surprise us that one feels obliged to scrutinize these logics. My main objective here, is to show what is wrong with the way in which conceptual models are often criticized. In order not to divert the attention I have borrowed all three examples from this particular field.

A. The concept of a universal concrete is untenable

In «The Untenability of Genera», J. Bacon (1974) examines the

possibility of constructing a formal system in which counterparts of generic descriptions such as «the lion» and «the mouse» perform the function of genuine singular terms. In demonstrating the failure of two promising candidates, Bacon attempts to reinforce the doubts surrounding the tenability of genera as denotations of generic descriptions. In the following, the concern is with his arguments against one candidate, *viz.* Twardowski's theory of general objects.

In Twardowski's view, general concretes represent the individual concretes they are associated with. A general concrete in his opinion has exactly the same properties as all the concretes it represents. First, a definition of «generic term»: iff α is an individual variable, φ is a formula of predicate logic in which at least one free variable occurs and all free variables are occurrences of α, and þ is a generic descriptor(1), then $\text{þ}\alpha\varphi$ is a *generic term*.

Now, let ψ be a formula of predicate logic, then the following equivalence holds: $(\psi^{\text{þ}\alpha\varphi}/\alpha \leftrightarrow (\alpha)(\varphi \rightarrow \psi))$, where $\psi^{\text{þ}\alpha\varphi}/\alpha$ is the formula obtained by replacing in ψ all free occurrences of α by occurrences of $\text{þ}\alpha\varphi$.

On the face of it, Twardowski's formulation seems to agree with what intuitions we have about the logical behaviour of this kind of description within the generic fragment of ordinary language.

In a number of derivations, Bacon shows that Twardowski's concept of a general object, added to the system of first-order predicate logic with identity, leads to undesired consequences. Among these unwanted consequences are ontological monism (everything is identical with everything) and the coincidence of existential and universal quantification. We shall here reproduce the argument leading up to the latter consequence. What will be said in section 4 about this particular argument of Bacon's will turn out to apply equally to his other arguments. The derivation in which universal and existential quantification prove to be equivalent goes as follows:

(1) $(\sim\psi^{\text{þ}\alpha\varphi}/\alpha \leftrightarrow (\alpha)(\varphi \rightarrow \sim\psi))$	(Twardowski's equivalence)
(2) $(\sim\psi^{\text{þ}\alpha\varphi}/\alpha \rightarrow (\alpha)(\varphi \rightarrow \sim\psi))$	((1), by def. of $\leftrightarrow$)
(3) $(\sim(\alpha)(\varphi \rightarrow \sim\psi) \rightarrow \psi^{\text{þ}\alpha\varphi}/\alpha)$	((2), transposition, double neg.)
(4) $((\exists\alpha)(\varphi \& \psi) \rightarrow \psi^{\text{þ}\alpha\varphi}/\alpha)$	((3), familiar equivalence)

(1) «þ» will be used for both the generic operator in the objectlanguage and its name in the metalanguage.

(5) $(\psi^{p\alpha\varphi}/\alpha \rightarrow (\alpha)(\varphi \rightarrow \psi))$ (Twardowski's equivalence)
(6) $((\exists\alpha)(\varphi \& \psi) \rightarrow (\alpha)(\varphi \rightarrow \psi))$ ((4), (5), transitivity of $\rightarrow$)
if for φ we take $(\alpha = \alpha)$ we get
(7) $((\exists\alpha)\psi \rightarrow (\alpha)\psi)$

B. A fallacy as a systematic feature of most of traditional logic

In her book *The Logic of the Articles in Traditional Philosophy* E.M. Barth derives from a great number of historical examples an informal hypothesis about a traditional philosophical conceptual framework. Taking this hypothetical description as a reference, she proceeds (in c. 11) to give several rules of inference that would have to be valid within this framework, and that, according to her, would be acceptable to traditional philosophers. Barth rightly claims that most of these rules of inference give rise to the grossest absurdities (p. 445). I once again describe a concrete example. After reading sections 3 and 4, the reader will have the means to form his own opinion as to which of the rules of inference mentioned by Barth traditional logicians considered to be valid.

On pp. 433-438 she discusses Moore's view that at least two different senses of the ordinary-language operator «possibly» exist, and therefore two different possibility-operators are to be distinguished. Each operator has its own logic. Ignoring the distinction may cause fallacies to arise. Moore's example is the sentence: «It is possible for a human being to be of the female sex». Together with the premiss «I, G.E. Moore, am a human being» this sentence seems to justify the conclusion: «I, G.E. Moore, may be of the female sex», a sentence regarded as false by Moore. Moore's own solution on the fallacy consists in denying the equivalence of the first premiss to the universal sentence: «Every human being may be of the female sex». Instead, the first premiss is equivalent to the particular sentence: «Some human beings are of the female sex».

In traditional logic everything that may truly be predicated of a concrete may also be predicated of the species and genera the concrete belongs to (sometimes qualified by the operator «potentially»). For example, because man is rational, the genus animal, to which man belongs, is also rational, be it *potentially*. Now, according to Barth, the type of fallacy described by Moore is a fundamental systematic feature of what may well be most of traditional logic

(p. 435). For Moore's «simple fallacy» to be a systematic feature of most traditional logic, the inference scheme

$$\frac{\ulcorner \text{the X potentially is Y} \urcorner}{\ulcorner \text{every X may be Y} \urcorner} \quad ,$$

where ⌜the X⌝ denotes a general concrete, must be valid. And, indeed, traditional philosophers may sometimes actually be observed to draw inferences of this type. Therefore, Barth says, it is justified to draw the conclusion that there exists an important conceptual paradigm in traditional philosophy that allows of fallacies, *i.e.*, that does not allow of a formal refutation of some fallacies.

C. The use of the operator «essentially» gives rise to absurdities

In his *Word and Object*, Quine, in an example, attempts to demonstrate that something is wrong with essentialism. He uses the example to make clear that essentialist use of language has something perplexing about it. It is to evoke «the appropriate sense of bewilderment» (p. 199). All this must be brought about by the following: According to Quine an essentialist will agree with the following two statements:

(1) mathematicians are essentially rational, but not essentially two-legged;
(2) cyclists are essentially two-legged, but not essentially rational.

But what then does an essentialist think of Mr. A who is both a mathematician and a cyclist? Is he essentially rational ánd not essentially rational?

Quine thinks the confusion is caused by the fact that as long as we speak about objects referentially it is gratuitous to count some of their properties as essential and others as contingent. But this is precisely what essentialists do. For they think, for example, that a man is essentially rational and accidentally two-legged, «not merely qua man, but qua itself» (Quine (1966), p. 173-174).

3. *The description of a conceptual framework*

The notions of species and genus are systematically related to the

traditional logical operators «essentially» and «potentially». Locke, for instance, in his *Essay Concerning Human Understanding*, Bk III, c. VI, section 4, explicitly formulates this relationship: «Let anyone examine his own thoughts and he will find that, as soon as he supposes or speaks of *essential*, the consideration of some species (...) comes into his mind» and «(...) take away the consideration of its being ranked under the name of some abstract idea (*i.e.* species, JvR), and then there is nothing necessary to it» (*ibid.*, section 6). The use of the operator «potentially», on which Barth focuses her attention, is also closely related to the notions of species and genus. Porphyry, for example, discusses this use (p. 11, 5) where he mentions debates about the predication of differentiae. The common view was that differentiae are not only predicated of species but also of all genera these species belong to. A theory of predication along these lines, however, jeopardizes the *principle of non-contradiction*. For if man is rational, and beast irrational, the genus animal, to which both man and beast belong, is both rational and irrational. In the *Isagoge* Porphyry observes that his predecessors solved this problem by taking the genus to possess the differentiae of its species merely *potentially*. And according to Aristotle (*Met.* 1009a, 35 ff.) in the case of such predication the principle of non-contradiction is not applicable.

It falls outside the scope of this article to examine the ontological status of species and genera, or the logic of the operators mentioned above within each of the essentialist conceptual schemes that, with slight variations, may be encountered in the history of Western philosophy. For our purposes such an examination would hardly be interesting. Therefore a conceptual scheme will be described that may not be associated with a single scholar in history, but that may serve as a model of all these variants. This model will have to fulfill the requirement of bearing a sufficient positive analogy to the actual variants to capture their crucial aspects. The historical material I base my description on will not be reproduced in the text. However, when discussing important characteristics of the model, I will in the note refer the reader to some passages where the features modelled actually occur.

We shall consider someone's conceptual framework to have been described when we have established:

(1) the type of ontology the person in question employs;

(2) the language-form in which he talks about his reality;
(3) how this form of language is related to the reality of the type concerned. (2)

Before discussing these three components we shall first give an intuitive outline.

The ontology. The ontology of the conceptual scheme to be examined will be taken to be an ordered set of individuals. In our formal description the ontology will be rendered by a nonempty set D and an ordering relation I_e in D. Intuitively D is the set of all primary and secondary substances of Aristotle's *Categories*. (3) So D may contain entities such as Socrates, man, animal, substance, etc. Within this conceptual framework, species and genera apparently are not taken to be sets, but primitive entities. (4) Every species or genus, however, generates a species- or genus-set: the dog generates the set of all dogs, etc. The domain D may be dichotomized into the ideal domain D_i, which contains all general concretes – species and genera –, and the phenomenal domain D_f, which contains all regular individuals, the individual concretes. D_f and D_i have no element in common: $D_f \cap D_i = \Lambda$; together they are the entire domain D: $D = D_i \cup D_f$. Every individual concrete is a member of a certain species, or

(2) This way of characterizing a conceptual scheme is derived from F. Veltman, *Over Kontekstafhankelijkheid*, Utrecht, 1974 (photocopied), p. 6.

(3) The entities contained in the domain are supposed to subsist. «To subsist» is here used in an ontologically neutral way, *i.e.* no matter if these entities are material or immaterial, separable or inseparable or *in mente*. By restricting quantification to that part of the domain that is supposed to represent the set of individual concretes, the conceptual scheme of those who take a non-realist stand in the debate on the problem of universals may be simulated. But here we shall quantify over the entire domain, which means that a realist version is represented.

(4) This derives mainly from the traditional theory of predication. According to this theory the relation between subject and predicate is the same in case the subject term is an individual term as in case it is a generic term. In this traditional view logical relations are images of ontological relations. Also, the relation of an individual to its species is called the same as the relation of a species to its genus (cp. *Cat.* 2b, 16-20; cp. also Angelelli (1967), c. 4). The fact that individual concretes (and species !) were denoted by an expression («τοδε τι») that refers to concretes rather than to sets excludes the possibility that individual terms can be considered to refer to sets. It therefore is quite natural, within the limits our conceptual scheme imposes on the possible descriptions, to conceive of singular terms and names for secundary substances as referring to concretes.

consists of matter and species-form; therefore there is for every individual concrete at least one corresponding general concrete that makes up its species. Moreover, for the sake of simplicity we shall include Lovejoy's *principle of plenitude*. This principle states that every possibility with regard to a species has been or will be realised at some moment in time.([5]) That is, for any general concrete there is at least one corresponding realisation in the phenomenal domain. Then, from $D \neq \Lambda$ it follows that $D_i \neq \Lambda$ and $D_f \neq \Lambda$. The ordering relation I_e orders the individuals in D into species and genera: for every $d,e \varepsilon D$, $<d,e> \varepsilon I_e$ iff d is an element of the species- or genus-set generated by e; or, as it was sometimes expressed, iff e is an essence of d.([6]) In order for I_e to model the traditional ordering relation certain restrictions will have to be imposed on it. In most of traditional philosophy I_e is reflexive in D_i.([7]) Furthermore, I_e can be shown to be transitive([8]), and antisymmetric.([9]) A genus was thought to be decomposable into two or more species by means of *differentiae specificae* considered to be at least contrary.([10]) So, in order to preserve the validity of the *principle of non-contradiction*, the order-

([5]) This principle was by no means accepted by all traditional philosophers (cp. for example Clichtoveus' view and Javellus' explication as rendered in Ashworth (1974), p. 89). We shall nevertheless adopt it here in order to prevent having to introduce real modalities. This by itself would not involve insuperable difficulties, but it would have the consequence of extending the ontology more than is required for our purpose. Moreover, by accepting the *principle of plenitude* we can reduce all those modal expressions that are relevant to our subject, like ⌜all entities of kind X are necessarily Y⌝ to expressions like ⌜all entities of kind X are always Y as well⌝ (cp. Hintikka (1973), c. V). If we also quantify over all entities from past, present and future, as was traditionally the habit, these modal expressions can be reduced to expressions containing no modal or temporal operators, like ⌜all entities of kind X are Y⌝. Cp. note 25.

([6]) Cp. Aristotle, *Met.*, 1030a, 6-13; 1037a, 26-30; and the usual description «praedicatio notificans essentiam» of the mode of predication that in the *Categories* is described as «ἕτερον καθ' ἑτέρου κατηγορεῖται ὡσ καθ' ὑποκειμένου» (*Cat.*, 1b, 9f.).

([7]) Cp. for instance *Met.* Z, 1031b, 19; 1032a, 5; cp. also note 12.

([8]) Cp. for instance *Cat.* 3a, 17f.

([9]) This conclusion may be drawn from, *i.a.*, *Cat.* 1b, 2ff.; 2b, 17ff.; and from the fact that I_e is relexive in D_i.

([10]) This view has its origin in Plato's method of *diaresis*; it warrants the exclusiveness of the ordering because species or genera located on different branches of the ordering mutually exclude one another.

ing is not right-branching. As no phenomenal individual is the species or genus of another phenomenal individual $I_e \cap (D_f \times D_f) = \Lambda$. Moreover, I_e is such that there exists one entity, the *genus generalissimum* substance itself, such that every element of D bears this relation to this entity: I_e is rooted. ([11]) Finally, we shall take I_e to have the following properties: for every $d \varepsilon D_i$ there is an $e \varepsilon D_f$ such that $<e,d> \varepsilon I_e$ (the *principle of plenitude*); and for every $d \varepsilon D$ there is an $e \varepsilon D_i$ such that $<d,e> \varepsilon I_e$ (every entity has an essence). ([12])

The language-form. The language-form employed by most traditional philosophers was roughly that for which Aristotle had formulated his non-modal logical theory, enriched by singular terms as «Socrates» and «this dog», generic terms as «man» and «metal», and the operators «essentially» and «accidentally», which are to be conceived of as operators modifying the copula. ([13]) Moreover, since the megaric-stoic school traditional philosophers had a propositional logic at their disposal (which many thought unimportant). With the help of this apparatus sentences in philosophical jargon were supposed to be

([11]) From this property, the asymmetry of I_e and the fact that every individual from D_f stands in the relation I_e to an individual from D_i it follows that I_e is rooted in D_i.

([12]) This makes the relation I_e the ontological relation of *essential identity*. For this cp., *i.a.*, Aristotle, *Anal. Post.* 83a, 24-25. This passage also shows that this form of identity can be complete or partial. Complete essential identity is the relation between a general concrete and itself or possibly the relation between an individual concrete and its infima species (1037a, 26-29). The essential identity relation between a concrete and a genus to which it is not strictly identical is a partial essential identity relation.

([13]) Aristotle distinguished as many forms of predication as there are categories (*Anal. Priora* 49a, 6ff.). Moreover, it was not unusual to think that Aristotle had divided all entities into two exclusive and exhaustive groups: the substances or essences on one side, and the accidents, the nine remaining categories, on the other (Boethius, *In Isagogen Porphyrii Commenta*, editio prima, lib. I, c. 5.). Combination produces two fundamentally different modes of predication: one essential, the other accidental. The place of differentiae within the aristotelian ontological scheme – differentiae are qualities (cp. *e.g. Topics* 122b, 17ff.) which are not present in that of which they are predicated (cp. *Cat.* 3a, 21f.), so they are not accidents – gave rise to problems. These problems were among the influences that made for more and more emphasis on one particular criterion for the distinction between essential and accidental properties. The criterion was this: all that which a thing cannot lack without ceasing to exist may be predicated essentially of it, whereas all its remaining attributes are predicated accidentally of it. This development finds its completion in the *Logic* of Port Royal, which on this question reads that not only differentiae but also propria are essential attributes (Arnauld & Nicole, p. 90).

capable of reduction to atomic sentences of the enriched language or to molecular sentences composed of atomic sentences and connectives and/or copula modifiers. For our reconstruction, however, we shall not choose the apparatus of this type of extension of the categorical language-form, but the language-form of the predicate-calculus. This language-form facilitates a confrontation with Bacon's criticism without cutting off the way to the usual extensions. But, at the same time, we have to restrict the expressive power of languages of this form in order to adapt it to the task of modelling the technical languages traditionally used. The most important restriction is the restriction of the general constants or predicates in the vocabulary to unary predicates. Although this is primarily a matter of *interpreting* constants, it is important to notice that the object-language contains no constants denoting *secundae intentiones*.([14]) As it were only attributes or properties that, in the framework of traditional conceptual schemes, were predicated either accidentally or potentially or essentially, these operators will only modify the atomic formulas of the predicate language instead of more complex expressions.

The type of ontology used in our reconstruction contains general concretes; therefore, we need expressions denoting these entities. Also, we are in need of means of denoting the sets of all those primary substances that, in the domain of ordered individuals, are arranged under the general concretes. To give an example: not only do we need an expression denoting the cat, we also need one denoting the set of all cats. By indicating both expressions by primitive constants no connection is made between, *e.g.*, the expression that is a translation of «the cat» and the expression that is a translation of «is a cat». This flaw may be remedied by introducing either expression as primitive. Then the other expression can, by using a logical constant, be constructed from the primitive expression.

As we have seen in the above Bacon takes general constants, *i.e.* predicates, as his point of departure. From these, descriptions are constructed to denote the corresponding general concretes. Here we shall opt for the alternative because it enables us to quantify over species and genera within the framework of a first-order logic.([15]) We

([14]) These terms belong to the metalanguage. Cp. Bocheński (1961), p. 156.

([15]) Contrary to Twardowski's procedure we thereby restrict general concretes to the secundary substances of the *Categories*. Our procedure is inspired by the view (to be

shall denote the logical operator in question by the letter «Σ». So, if α is an individual constant, Σ(α) is a universal constant whose extension is the species-set generated by the extension of α.

The mode of interpretation. The way in which languages of the form described above (L_{ess}) are interpreted with regard to a reality of the type described will by and large be the same as the way in which first-order predicate languages are interpreted with regard to their ontology. Thus singular terms will denote elements of D, and general constants will denote subsets of D_f.([16]) The interpretation of the non-primitive general constant Σ(α) is the set of all those elements of D_f that bear the relation I_e to the interpretation of α.([17]) If U is a general constant then the interpretation of $\overline{U}$ will be the difference of D_f and the interpretation of U. For the interpretation of an atomic sentence Uα we shall make use of a relation E, where E is the union of the essential identity-relation I_e and the relation of strict identity I_s. An atomic sentence Uα will then be true iff all the entities in D_f that stand in the relation E to the interpretation of α are elements of the interpretation of U. In the case that the interpretation of α is an element of D_f this truth-condition coincides with the truth-condition in the semantics of first-order predicate languages. But when the in-

found as early as in Aristotle) that only substances have real existence; it follows the habit of many authors since Porphyry to use the terms «species» and «genus» mainly for the category of substance. This explains why our reconstruction does not contain translations of expressions such as «the colour». Should one want to introduce these, one could adopt Aristotle's opinion that accidents are ὀντα and consequently introduce a domain of discourse of accidents in addition to the first domain of substances. Predicating an accident of a substance in that case means asserting that there is a relation of inherence between two entities from the two different domains.

([16]) One of the variants of traditional thought to which the category of substance was central allowed of drawing conclusions as to what properties general concretes have, given the ordering of the domain and given the knowledge of the properties of the individual concretes (cp. for instance Locke, *Essay*, Bk IV, c. IV, section 16). It is this variant, which I shall baptize *phenomenal essentialism*, that we shall reconstruct here. We shall formulate the rules of interpretation for sentences in such a way that in order to determine whether a sentence about an element of D_i is true or false it suffices to know the extensions of general constants with regard to D_f.

([17]) This is not in contradiction with those who, influenced by platonism and following Scotus, assumed the existence of individual essences. The extension of, for instance, socraticity then is the set of all individuals having the *general concrete* Socrates as their essence. This set has as its only element the *individual concrete* Socrates.

terpretation of α is an element of D_i the sentence $U\alpha$ is only true if all phenomenal individuals bearing the relation I_e to the interpretation of α are elements of the interpretation of U. To give an example: because «The dog is tan» is true iff all dogs are tan, this sentence is false when white, white-and-tan etc. dogs are found to exist. And although in the latter case «It is not the case that the dog is tan» is true, this does not necessarily imply that «The dog is not-tan» is also true. For the latter sentence will only be true if no dog is tan. In other words, according to the proposed interpretation of this language $\sim U\alpha$ is not equivalent to $\overline{U}\alpha$. This result sheds some light on the traditional distinction between limitative and privative negation.([18]) Modern logicians often deny this distinction([19]), a fact that can be explained once we realize that in their opinion the ontology of traditional logic always coincides with D_f. In this case $\overline{U}\alpha$ would indeed be equivalent to $\sim U\alpha$. At first sight a reconstruction along these lines seems to contradict the historical material. In traditional parlance the dog was called speckled if at least one phenomenal dog existed that was speckled. As tan, black and white dogs exist as well, the dog also was tan, black and white at the same time.([20])

In such cases, however, we must conclude that the relation between the subject and predicate terms in «The dog is tan» is different from the relation between the corresponding terms in «The dog is carnivorous».

In our formal language the former sentence will be taken to be of the form $conU\alpha$, the latter of the form $U\alpha$. We shall have to say more about sentences of the form $conU\alpha$ later.

A sentence $essU\alpha$ (⌜α is essentially U⌝) was thought true when the concrete denoted by α could not be imagined to belong to the species it actually belonged to without its having the attribute referred to by

([18]) Kant (*Kritik der reinen Vernunft*, ed. A, p. 71-72) says that the limitatively negated judgments were traditionally subsumed under the affirmative judgments. In our semantics something comparable holds: If $\overline{U}\alpha$ or $U\alpha$ is true, the extension of α is *determined* with respect to the attribute that $\overline{U}$ or U refers to. This is however not the case when $\sim U\alpha$ is true.

([19]) As early a philosopher as Leibniz wonders if such a distinction has any foundation at all (*General Inquiries*, section 80; in: Leibniz, *Logical Papers*, pp. 47-87).

([20]) Cp. for instance Aristotle, *Cat*. 3a, 3-6; *De Int*. 17b, 29ff.; Met. 1058b, 10-13. Cp. also Angelelli (1967), c. 4, esp. pp. 113-116.

U.([21]) This was pictured as follows: if one asserts that something belongs to a particular species, *i.e.* that something has this particular species-form for its essence([22]), he cannot ask himself whether this entity can do without one of the characteristics of this species-form, as belonging to a species is determined by the possession of the characteristics of the species concerned.([23,24]) All this arouses the suspicion that, in order for us to define an adequate truth-condition for essUα, we must incorporate in our ontology a set of possible worlds together with an accesibility relation defined on it. In order to simplify our description as much as possible we shall once more invoke the *principle of plenitude*: if it is conceivable that an entity belong to a species without possessing a particular property, then there will exist or will have existed at one time an entity that did/will belong to the species concerned without having the property concerned. If, as one traditionally did, we also admit into the domain of discourse all entities from past, present and future, then we can say that a sentence essUα is true iff there exists at least one essence eεD_i of the interpretation of α such that all entities in D_f that are essentially identical to e are elements of the interpretation of U. Consequently, if the interpretation of α is an element of D_i, then Uα is equivalent to essUα. This is in keeping with our intuitions according to which «The dog is carnivorous» and «The dog is essentially carnivorous» have the same meaning.([25])

([21]) Aristotle, *Topics* 145a, 7ff.; Porphyry, *Isagoge*, p. 8, 19f.

([22]) Aristotle, *Met.* 1032b, 1ff.

([23]) We are here concerned with the phenomenal variant of essentialism (cp. note 16). For other variants, especially those that have a neoplatonic background, this does not hold.

([24]) Initially a thing was held to possess essentially, *i.e.* necessarily qua being of a kind, only that which was represented in its *definitio rei*. This was connected with an identification of essence and secundary substance, and also with the fact that every secundary substance except the *summun genus* was thought to be *constituted* of the *genus proximum* and the *differentia specifica* (cp. for instance Boethius, *o.c.*, editio secunda, lib. IV, c. 6). Later on this position was abandoned (cp. note 13).

([25]) This answers Tredennick's question how Aristotle could use the terms «man» and «animal» as subject and predicate terms respectively in both universal assertoric and universal apodeictic sentences (Aristotle, vol. 1, p. 190, Loeb Classical Library) without being trapped in Hintikka's problem that in that case all universal assertoric sentences would be equivalent to apodeictic sentences, which they in reality are not (Hintikka (1973), pp. 112-113). What must be distinguished are sentences of the form

We shall introduce sentences of the form accUα by definition: accU$\alpha \leftrightarrow_{df}$ (Uα & ~essUα). When α denotes a general concrete a sentence of this form is always false. This seems to contradict the fact that accidents were also considered to be attributable to general concretes. Referring back to our previous example, the accident of tanness was attributed to the dog. As we said before, cases like this will be rendered in our reconstruction by means of a sentence of the form conUα. The reason is that traditional philosophers distinguished on logical grounds between the mode of predication in «This dog is accidentally tan» and in «The dog is accidentally tan». Thus the sentence «The dog is accidentally tan and accidentally not-tan» was not considered to violate the principle of non-contradiction, whereas «This dog Rover is accidentally tan and accidentally not-tan» was. ([26])

Now, more needs to be said about the interpretation of sentences of the form conUα. In this case we do not have to make a separate rule of interpretation, either, as the logical behaviour to be simulated can be captured by the following definition: con U$\alpha \leftrightarrow_{df}$ (~ess Uα & ~ess$\overline{\text{U}}\alpha$). ([27]) Once we realize that operators like «essentially», «accidentally» etc. were seldom put into the sentences where they belonged, it will be evident that a sentence ⌜the X is Y⌝, thus used, was ambiguous and could mean ⌜the X is essentially Y⌝ as well as ⌜the X is accidentally Y⌝ or ⌜the X is contingently Y⌝. The only conclusion to be drawn from this sentence with certainty was that ⌜the X is essentially not-Y⌝ was false. And exactly this one wanted to indicate by the conclusion from a valid argument like:

(α) ($\Sigma(\beta)\alpha \rightarrow$V$\alpha$) from sentences of the form (α) (U$\alpha \rightarrow$Vα). It can be proved that the former is equivalent to (α) ($\Sigma(\beta)\alpha \rightarrow$essV$\alpha$); the latter, however, is not equivalent to (α) (U$\alpha \rightarrow$essVα).

([26]) Cp. for instance Aristotle, *Met.* 1009a, 34ff; *Met.* 1051a, 6ff.

([27]) The operator con, thus interpreted, combines a number of operators that were formerly distinguished because of ontologizing parlance. It was said, for instance, that a differentia like rationality was *potentially* predicated of the genus animal, but that an accident like blackness, on the contrary, was predicated *accidentally* of the species man. The latter mode of predication has to be distinguished for logical reasons from that in «John is accidentally black». All this is straightened out in the present reconstruction.

Rover is a dog

Rover is tan

The dog is tan

Rover's tanness thus indeed says something about the essence of dogs, *viz.* that tanness is not excluded by it. When the operators «essentially» and «contingently» are deleted, the conclusion may be drawn directly from the first two premisses. This, however, is not possible in case the operators have to be stated explicitly. For from the first two premisses we do not know yet whether all dogs are tan and therefore the dog is essentially tan, or, rather, whether there are, for instance, white dogs and therefore the dog is contingently tan.([28]) So, although our reconstruction breaks down where arguments like the above have no direct counterpart in this reconstruction, we shall not be led to alter it for this reason.([29]) Our main purpose is to explain, not to imitate ambiguous use of language.

Binary operators and the two quantifiers will be defined in the usual manner. An imitation of a non-realist conceptual framework may be obtained by quantifying over D_f only.

Finally we shall definitionally extend our formal language in such a way as to make it suitable for straightforward translations of types of sentences that are so characteristic of this conceptual framework. To give a few examples: ⌜X is Y because of Z⌝, ⌜X is (ess/con) Y qua Z⌝, ⌜X and Y are essentially the same⌝.

Here follows a formal reconstruction of this conceptual scheme. It consists of a description of the syntax of an essentialist language L_{ess}, the type of ontology these languages speak about, and the way in which L_{ess} speaks about these kinds of reality.

([28]) Cp. *e.g.* Hegel's comments upon his argument by analogy in Hegel, *Wissenschaft der Logik*, III, part 1, c. 3, B, c.

([29]) This kind of alteration can be carried out quite simply when we no longer interpret $U\alpha$ in the usual way, but instead introduce it definitionally as equivalent to $(accU\alpha \vee (conU\alpha \vee essU\alpha))$. A sentence $accU\alpha$ then cannot be interpreted any longer as described above, but is true iff the interpretation of α is an element of the interpretation of U and there is no element $d \varepsilon D_i$ to which the interpretation of α is essentially identical, such that all $e \varepsilon D_f$ that are essentially identical to d are an element of the interpretation of U.

Description of the language L_{ess}
I The syntax of L_{ess}

Vocabulary

a. auxiliary symbols : (,);
b. logical constants : $\sim, \&, \vee, \rightarrow, \leftrightarrow, =, \Sigma, \bar{}$, ess, $\exists$;
c. individual constants : a, b, c, a_1, b_1, c_1, etc;
d. individual variables : x, y, z, x', y', z', etc;
e. general non-substance constants: A, B, C, A_1, B_1, C_1, etc.

Formation rules

1. α is an individual symbol of L_{ess} iff α is an individual constant or an individual variable of L_{ess};
2a. every general non-substance constant of L_{ess} is a general symbol of L_{ess};
b. if α is an individual symbol of L_{ess}, then $\Sigma(\alpha)$ is a general symbol of L_{ess};
c. if U is a general symbol of L_{ess}, then $\overline{U}$ is a general symbol of L_{ess};
d. nothing is a *general symbol* of L_{ess} except by 2a-2c;
3. U is a *general constant* of L_{ess} iff U is a general symbol of L_{ess} containing no individual variables;
4a. if α is an individual symbol of L_{ess} and U is a general symbol of L_{ess}, then $U\alpha$ is a formula of L_{ess};
b. if α and β are individual symbols of L_{ess}, then $(\alpha = \beta)$ is a formula of L_{ess};
c. if $U\alpha$ is a formula of L_{ess}, then ess$U\alpha$ is a formula of L_{ess};
d. if φ and ψ are formulas of L_{ess}, then $\sim\varphi$, $(\varphi \& \psi)$, $(\varphi \vee \psi)$, $(\varphi \rightarrow \psi)$, $(\varphi \leftrightarrow \psi)$ are formulas of L_{ess};
e. if φ is a formula of L_{ess} and α is an individual variable of L_{ess}, then $(\alpha)\varphi$ and $(\exists\alpha)\varphi$ are formulas of L_{ess};
f. nothing is a *formula* of L_{ess} except by 4a-4e;
5. φ is a *sentence* of L_{ess} iff φ is a formula of L_{ess} containing no free variables.

II Semantics of L_{ess}

1. A *structure* S is an ordered pair $<D, I_e>$ where $D = D_i \cup D_f$, $D_i \neq \Lambda$, $D_f \neq \Lambda$ and $D_i \cap D_f = \Lambda$, and $I_e \subset DxD$. For our purposes we shall assume that I_e is transitive, reflexive in D_i, antisymmetric and not right-branching. Moreover, $I_e \cap (D_f x D_f) = \Lambda$. Furthermore, we shall assume to be true:

(x) $(x \varepsilon D_i \rightarrow (\exists y)\ (y \varepsilon D_f \,\&\, <y, x> \varepsilon I_e))$ and

(x) $(x \varepsilon D_f \rightarrow (\exists y)\ (y \varepsilon D_i \,\&\, <x, y> \varepsilon I_e))$

As D_i is the set of general concretes and D_f the set of individual concretes, these two conditions stipulate that every general concrete has a least one phenomenal specification, and conversely that every individual concrete is the specification of at least one general concrete. We shall finally assume I_e to be rooted; this property is defined as follows:

a relation R is rooted in a set $A \leftrightarrow (\exists x)\ (x \varepsilon A \,\&\, (y)\ (y \varepsilon A \rightarrow <y, x> \varepsilon R))$; it follows from the other properties of I_e that this root is an element of D_i;

2. A *value-assignment* v is a function whose domain is the set of individual variables of L_{ess} and whose range is a non-empty subset of D;

3. An *interpretation* I for L_{ess} is a function with the following properties:

- if α is an individual variable of L_{ess}, then $I(v, \alpha) = v(\alpha)$;
- if α is an individual constant of L_{ess}, then $I(v, \alpha) \varepsilon D$ and $I(v, \alpha) = I(v', \alpha)$ for every v and v';
- if U is a general non-substance constant of L_{ess}, then $I(v, U) \subset D_f$ and $I(v, U) = I(v', U)$ for every v and v';
- if α is an individual symbol of L_{ess}, then $I(v, \Sigma(\alpha)) \subset D_f$, where for every $e \varepsilon D_f$: $e \varepsilon I(v, \Sigma(\alpha))$ iff $<e, I(v, \alpha)> \varepsilon I_e$;
- if U is a general symbol of L_{ess}, then $I(v, \overline{U}) = D_f \sim I(v, U)$;
- if φ is a formula of L_{ess}, then $I(v, \varphi) \varepsilon \{1, 0\}$ where the following conditions hold:
  a. if U is a general symbol of L_{ess} and α is an individual symbol of L_{ess}, then $I(v, U\alpha) = 1$ iff for every $e \varepsilon D_f$ with $<e, I(v, \alpha)> \varepsilon E$, $e \varepsilon I(v, U)$, E being the union of I_e and I_s, the relation of strict identity;

b. if α and β are individual symbols of L_{ess}, then $I(v, (\alpha = \beta)) = 1$ iff $I(v, \alpha) = I(v, \beta)$;
c. if U is a general symbol of L_{ess} and α is an individual symbol of L_{ess}, then $I(v, \text{ess}U\alpha) = 1$ iff there is at least one $d \in D_i$ such that $\langle I(v,\alpha), d\rangle \in I_e$ and for all $e \in D_f$ with $\langle e, d\rangle \in I_e$ it is the case that $e \in I(v, U)$;
d. if φ is a formula of L_{ess}, then $I(v, \sim\varphi) = 1$ iff $I(v, \varphi) = 0$;
e. if φ and ψ are formulas of L_{ess}, then
$I(v, (\varphi \& \psi)) = 1$ iff $I(v, \varphi) = 1$ and $I(v, \psi) = 1$;
$I(v, (\varphi \vee \psi)) = 1$ iff $I(v, \varphi) = 1$ or $I(v, \psi) = 1$;
$I(v, (\varphi \rightarrow \psi)) = 1$ iff $I(v, \psi) = 1$ or $I(v, \varphi) = 0$;
$I(v, (\varphi \leftrightarrow \psi)) = 1$ iff $I(v, \varphi) = I(v, \psi)$;
f. if φ is a formula of L_{ess} and α is an individual variable of L_{ess}, then
$I(v, (\alpha)\varphi) = 1$ iff $I(v', \varphi) = 1$ for all $v' =_{\alpha} v$;
$I(v, (\exists a)\varphi) = 1$ iff $I(v', \varphi) = 1$ for at least one $v' \equiv_{\alpha} v$.

III Definitional extension of L_{ess}

If U is a general symbol of L_{ess} and α, β, γ are individual symbols of L_{ess}, then

1. $\text{acc}U\alpha \leftrightarrow_{df} (U\alpha \& \sim \text{ess}\, U\alpha)$
2. $\text{con}U\alpha \leftrightarrow_{df} (\sim \text{ess}Ua \& \sim \text{ess}\overline{U}\alpha)$
3. $\text{Upr}(\alpha)\beta \leftrightarrow_{df} ((\Sigma(\beta)\alpha \vee (\alpha = \beta)) \& U\alpha)$
4. $\text{Uq}(\alpha)\beta \leftrightarrow_{df} ((\Sigma(\alpha)\beta \vee (\alpha = \beta)) \& U\alpha)$
5. $\text{essUq}(\alpha)\beta \leftrightarrow_{df} ((\Sigma(\alpha)\beta \vee (\alpha = \beta)) \& \text{ess}U\alpha)$
6. $\text{conUq}(\alpha)\beta \leftrightarrow_{df} ((\Sigma(\alpha)\beta \vee (\alpha = \beta)) \& \text{con}U\alpha)$
7. $(\alpha \underset{ess}{=} \beta) \leftrightarrow_{df} (\exists\gamma)(\Sigma(\gamma)\alpha \& \Sigma(\gamma)\beta)$

Pronounce:

'$\text{acc}U\alpha$': 'α is accidentally U';
'$\text{con}U\alpha$': 'α is contingently U';
'$\text{Upr}(\alpha)\beta$': 'β is U because of α';
'$\text{Uq}(\alpha)\beta$': 'β is U qua α';
'$\text{essUq}(\alpha)\beta$': '$\beta$ is essentially U qua α';
'$\text{conUq}(\alpha)\beta$': '$\beta$ is contingently U qua α';
'$(\alpha \underset{ess}{=} \beta)$': '$\alpha$ and β are essentially the same'.

4. A reassessment of the three cases

Now that we know the conceptual scheme the logical notions mentioned in section 2 belong to we can assess the merit of the various criticisms.

A. The alleged untenability of the concept of universal concretes

On logical grounds[30] Bacon argues against general concretes as denotata of generic descriptions. When we consider his arguments in the perspective of the outline of the conceptual scheme of traditional philosophy or of the fragment that we took from it to serve as part of our eclectic scheme, we can easily decide whether his arguments are acceptable.

First of all it is to be noticed that not just any formula of the predicate calculus may be substituted for φ and ψ in Bacon's derivation, but only those of the form $U\alpha$, where U is a monadic predicate.[31] Under this condition only can the language-form Bacon chooses imitate the original language-form. This restriction invalidates the step from (6) to (7) in Bacon's derivation. [32] Nevertheless, the objection still seems to hold that where $\varphi = U\alpha$ and $\psi = V\alpha$ the inference $\{(\psi^{\vdash\alpha\varphi}/\alpha \leftrightarrow (\alpha)\ (\varphi \rightarrow \psi))\}/((\exists\alpha)\ (\varphi \& \psi) \rightarrow (\alpha)\ (\varphi \rightarrow \psi))$ remains valid. But

([30]) I do not exclude the possibility that a conceptual scheme whose ontology does not contain general concretes may have to be preferred on pragmatical grounds or for reasons of elegance and simplicity.

([31]) According to our reconstruction, not only would φ have to be identical to $U\alpha$, on top of it U would have to be a substance-constant.

([32]) The attempt to evade this by regarding the symbol-sequence «$=\alpha$» or «$\alpha=$» as a non-primitive monadic predicate is alien to the minds of those who employed the conceptual scheme to be reconstructed. For relations were not thought to be an unimportant category because they could not be adequately treated in a language in which all sentences are of the subject-predicate form. On the contrary, a richer language was not thought necessary because relations, and therefore all relational expressions disguised as monadic predicates, were not held to refer to properties outside the mind but only to entities within the human mind. Not only were such expressions superfluous for the description of the extramental reality, they all too easily gave rise to fallacies when they were nevertheless used to make assertions about something outside the mind. A well-known example is the fallacy that came of using the expression «to be a species» that referred to something in the mind as if it denoted a property of a general concrete: «Man is a species and Socrates is a man, therefore Socrates is a species». Bacon's argument, put in a different form, could have served us as another example.

as the reader may easily verify, this is not the case. That Bacon is not aware of this is probably due to the fact that he considers the formula he takes as his point of departure to be a version of Twardowski's equivalence. But it ceases to be a version of it once we demand that $\varphi = U\alpha$ and $\psi = V\alpha$ for general symbols U and V. Then, Twardowski's equivalence turns into $(V\text{þ}U\alpha \leftrightarrow (\alpha)\ (U\alpha \rightarrow V\alpha))$. The only formulas that are equivalent to this formula and that can possibly be of any help to Bacon are

(1*) $(\sim V\text{þ}\alpha U\alpha \leftrightarrow \sim (\alpha)\ (U\alpha \rightarrow V\alpha))$
and
(1**) $(\overline{V}\text{þ}\alpha U\alpha \leftrightarrow (\alpha)\ (U\alpha \rightarrow \overline{V}\alpha))$
From (1*) Bacon's derivation then would lead to
(3*) $((\alpha)\ (U\alpha \rightarrow V\alpha) \rightarrow V\text{þ}\alpha U\alpha)$,
which would not help him any further. (1**) seems more promising:
(2**) $(\overline{V}\text{þ}\alpha U\alpha \rightarrow (\alpha)\ (U\alpha \rightarrow \overline{V}\alpha))$
(3**) $(\sim(\alpha)\ (U\alpha \rightarrow \overline{V}\alpha) \rightarrow \sim\overline{V}\text{þ}\alpha U\alpha)$
(4**) $((\exists\alpha)\ (U\alpha \& \sim\overline{V}\alpha) \rightarrow \sim\overline{V}\text{þ}\alpha U\alpha)$
However, the step to
(5**) $((\exists\alpha)\ (U\alpha \& V\alpha) \rightarrow V\text{þ}\alpha U\alpha)$

which Bacon needs in order to reach his conclusion is invalid because, as we saw in the previous section, $\overline{V}\alpha$ and $\sim V\alpha$ are not equivalent within the conceptual scheme of traditional logic. Bacon makes no distinction between privative and limitative negation because he studies the logical behaviour of generic descriptions in the context of an alien conceptual framework. He takes as his frame of reference a conceptual scheme with an ontology identical to the ontology that goes with the semantics of first-order predicate logic. The only thing Bacon thus demonstrated is that generic descriptions probably cannot always with impunity be incorporated into languages belonging to a different conceptual scheme from the one they originally belonged to. (Bacon does not exclude the possibility that it may be tried with success!).

B. Not all fallacies are fallacies in traditional logic

We shall first discuss the general form of Barth's criticism of

traditional logic with respect to the logical behaviour of the operator of potentiality. We shall then proceed to have a closer look at her example of the type of fallacy that she claims to be acceptable in most of traditional logic. From her informal description of the conceptual framework in question Barth concludes that the inference {⌜The X is potentially Y⌝}/⌜An X can be Y⌝ must be considered to be valid in this framework. Note that there is no traditional philosopher who explicitly holds this argument scheme in this general form to be valid. In our reconstruction Barth's argument-form corresponds to an inference of the form {conUα}/(β)(Σ(α)β→conUβ). It is of no consequence to the rest of the argument that we render Barth's operator of potentiality by the same operator we use in the conclusion.

Now, {conUα}/(β)(Σ(α)β→conUβ) is invalid in the conceptual scheme as described by us. This is in full accordance with our intuitions, as we shall hold «the animal is contingently feathered» to be true because the animal neither is essentially feathered nor essentially unfeathered. And though Moore is an animal we should not like to call him contingently feathered.[33] However, it is an entirely different matter when in the ontological pyramid the general concrete denoted by α is the successor of phenomenal individuals.[34] Let us assume that the species man is such an infima species. In that case feminity is a contingent attribute of man, as there are female and non-female human beings. Therefore, we may assert that Moore is contingently female as this only means that there are entities with the same essence as Moore's and which, in addition, are female.[35] So there is no fallacy involved whatsoever. One would only be inclined to speak about fallacies in this context when one assigns to conclusions from similar arguments (and especially to the operators «possibly»[36]

([33]) It is of course different when we modify the sentence «Moore is contingently feathered» by the phrase «qua animal». Our reconstruction provides for this.

([34]) This of course presupposes that the ordering of D is not dense.

([35]) Moore partly gives this analysis himself where he says that a sentence ⌜the X can be Y⌝ is not equivalent to ⌜all X can be Y⌝ but rather to ⌜some X are Y⌝. And indeed: if conUα is true and α denotes a general concrete, then conUα is equivalent to ((∃β) Σ(α)β&Uβ) & ~(β) (Σ(α)β→Uβ)), but not to (β) (Σ(α)β→conUβ).

([36]) This possibility-operator is not the logical possibility-operator we are acquainted with, but the one that is related to an essence, just like the operator «essentially» is not the logical necessity-operator, but the one that is related to essences.

or «contigently») a meaning which it may have within our conceptual scheme, but definitely not within the conceptual scheme of traditional logic. Therefore, Barth's opinion that traditional logic is guilty of this fallacy has been shown to be wrong.

C. What use of language is baffling?

Even if we disregard the fact that «cyclist» and «mathematician» would never be looked upon as substance-constants as they do not denote natural kinds, Quine's attack on essentialism does not hold any water. According to our reconstruction of this way of thinking the set $\{(\alpha) \quad (\Sigma(\beta)\alpha \rightarrow (\mathrm{essU}\alpha \& \mathrm{conV}\alpha)), \quad (\alpha)(\Sigma(\gamma)\alpha \rightarrow (\mathrm{essV}\alpha \& \mathrm{conU}\alpha)), (\Sigma(\beta)\delta \,\&\, \Sigma(\gamma)\delta)\}$ is inconsistent. That is, someone who uses this scheme speaks about an «essentialist» kind of reality in such a way that for him these three sentences can never all be true. In the previous section we have seen why: only substances possess genuine essences, and which attributes a concrete essentially possesses depends on the secondary substances the concrete stands in the relation of essential identity to. In Quine's example these secundary substances would be the cyclist and the mathematician. When a concrete stands in the relation of essential identity to two general concretes, one of these general concretes always stands in the same relation to the other, or they are strictly identical to one another. This is because the ordering generated by the relation of eesential identity is not right-branching. In terms of Quine's example this means either that the mathematician must be a cyclist, or the cyclist a mathematician, or that the mathematician is identical to the cyclist. In this last case it is trivial that one of Quine's first two assertions (cf. section 2) must be false. In the first case the cyclist is only essentially two-legged if all mathematicians are so, too. In this case one of the first two assertions is also false. In the second case the mathematician is only essentially rational if all cyclists are so. Thus here, too, one of the assertions must be false. Finally, when discussing Barth's observations on the operator of potentiality, we pointed out that the argument: $\{\mathrm{conU}\alpha\}/(\beta)\ (\Sigma(\alpha)\beta \rightarrow \mathrm{conU}\beta)$ is invalid. So, from a premiss such as «The cyclist is contingently rational» it may not be validly concluded that «A cyclist is contingently rational» or «Cyclists are contingently

rational». Quine seems to be misled by the same confusion we noted in Barth.[37]

Now it might possibly be felt that the question of how Quine's example nevertheless succeeds in bringing about the desired effect requires an answer. The initial plausibility of the state of affairs as described by Quine derives from the fact that the essentialist sub-language of modern colloquial language with the corresponding conceptual framework is but a worn remnant of the essentialist language and conceptual apparatus as developed centuries ago. Therefore, the intuitions of a modern language-user about this essentialist fragment are vague and unreliable. In this respect we must take Quine's criticism of essentialist usage seriously: one must be strongly dissuaded from continuing to use a fragment of language belonging to a conceptual instrument we hardly know how to handle any more.[38]

There is no foundation whatsoever for Quine's own view that essentialism is evil mainly because it makes it sensible to assert that something possesses some attributes essentially and others contingently, even when entities are spoken about in a purely referential way. Contrary to what Quine says, no essentialist will ever assert that someone is essentially rational, not qua man or whatever, but without qualification. When Locke says that all talk of essential attributes of a thing presupposes a species it belongs to (see our quotation in the above), he expresses the generally excepted opinion.[39] Accordingly,

([37]) Our refutation of Quine's criticism, as far as it is directed against traditional essentialism, is fundamentally different from Plantinga (1974), p. 23ff. According to Plantinga an essentialist can only go along with a *de dicto* interpretation of Quine's formulation of his first two premisses; then no contrary conclusions can be derived from the premisses any more. But it has to be pointed out that the characteristic essentialist operators «essentially» and «accidentally» were never used as sentential operators but only as modifiers of the copula or the predicate term. Our reconstruction partly simulates this by using ess and acc only as modifying atomic formulas.

([38]) But Quine clearly has a much wider object in mind where he explicitly refers to the philosophical tradition that developed this conceptual scheme ((1960), p. 199). It is an entirely different matter that it may also be *superfluous* to use this instrument any longer because we now have different, more adequate conceptual means at our disposal.

([39]) This even was the view of those who introduced individual essences. For them the infima species was but an essence belonging to only one concrete other than the species itself.

in our reconstruction (α) $(\mathrm{essU}\alpha \rightarrow (\exists\beta)\ (\Sigma(\beta)\alpha \& \mathrm{essUq}(\beta)\alpha))$ turns out to be a logical truth. Quine makes the following mistake: whenever he mentions philosophers that assert individuals to possess attributes essentially, he has in mind the individuals as they occur in his own conceptual scheme: entities in an unordered domain. The entities within the conceptual framework of an essentialist, however, have their fixed place in a hierarchically ordered domain.

5. Some conclusions

The authors whose criticism we have analysed did not all want to prove the same. Whereas Barth's and Quine's arguments were directed against an entire conceptual scheme, Bacon's only dealt with one specific logical notion. At the same time, however, Bacon wanted to make it plausible that there *could* be no logical system in which this notion fulfilled its function. That is what makes his approach comparable to Barth's and Quine's. For they could not take the conceptual model they criticized as a datum. They based their criticism on the behaviour of characteristic logical operators in the context of a more or less explicitly described conceptual framework, which they formulated as a hypothesis about the historical conceptual model.

The analysis of the arguments of the three authors made clear that they all suffered from the same defect: within their arguments they assigned such a central position to their own conceptual frameworks that

- they thought they had demonstrated the inadequacy of the deviant by showing that parts of the deviant conceptual instruments are useless within their own conceptual model, and/or
- they overlooked the fact that different contexts of the deviant and their own conceptual scheme may involve differences in the function of logical categories that both schemes have in common and of operators that, if only in the same form, are to be found in both.

He who criticizes as they do resembles someone who blames the rollerskate wheel for not fitting a car. Not only does this comparison indicate where Bacon, Barth, Quine *et al.* went wrong, it also suggests the global lines along which conceptual frameworks *are* to be judged. First of all we must know how the conceptual structure in question works, and, furthermore, what the demands are it has to meet. The

first requirement is trivial: we cannot judge something without knowing what it exactly is we are talking about. The second requirement is equally obvious once we realize that a conceptual scheme is something in which description takes place, and that determines what is to be taken as a fact.[40] Therefore, it is only *within* a frame of thought that statements can be formulated that are true or false. Truth is truth relative to a conceptual scheme. Because of this characteristic a conceptual model itself is not capable of being or not being in accordance with the facts. Therefore truth cannot be the decision-criterion for conceptual schemes.

Now it is a well-known fact that there are statements that we hold to be true but that in certain different conceptual schemes even lack a counterpart. Examples thereof are relational statements such as «$F = m \cdot a$», which cannot be translated into a language of the form that goes with the aristotelian qualitative frame of thought. This being so, it seems that we would use as our decision-criterion the criterion of usefulness. Then, in case we state as our purpose the optimization of the adaptation to our environment by obtaining knowledge about it, we could specify this criterion as follows: those conceptual frameworks are to be preferred in which the greatest number of successful, or the most important theories can be formulated in the simplest and most elegant way.

It is of course nothing new that the criteria by which conceptual schemes with their respective logics are to be judged are pragmatic. C.I. Lewis suggests as much («... the ultimate criteria of the laws of logic are pragmatic». *Mind and the World Order,* 1929, repr. 1956, N.Y., p. 247). E. Nagel expresses himself more *in extenso:* «... the 'justification' for a proposed set of regulative principles will not be arbitrary and can be given only in terms of the adequacy of the proposed changes as means or instruments for attaining the envisaged ends» (1944), p. 228). The choice among alternatives then is equally

([40]) To give an example: many traditional philosophers denied reality to relational facts that could not be reduced to substance-quality relations. For this cp. Weinberg's study «The Concept of Relation: Some Observations on Its History» in: Weinberg (1965), pp. 61-119. The validity of this is not disproved by the fact that not all traditional philosophers did this. For apart from the official, philosophical scheme philosophers of course also had at their disposal the schemes that can be associated with their regular colloquial language, which generally speaking must have had more expressive power.

unarbitrary: it is based on «the relative greater adequacy of one of them as an instrument for achieving a certain systematization of knowledge» *(ibid.)*. A change of or an alteration in a conceptual framework is *not* always conditional upon a change of the end envisaged. The ends being equal it may take place under the pressure of the empirical data. These may be of such a kind that the conceptual model employed prevents the realization of the object envisaged. This can very elegantly be illustrated by an example that falls outside the essentialist story. Because the example is so wellknown it can be sketched summarily. The conceptual scheme corresponding to codified aristotelian logic was an intellectual design in which only qualitative phenomena could be conceived of. The reason is that only those relations that could be expressed by the ambiguous copula belonged to this scheme. These were the relations of strict and essential identity and the inherence-relation. This limited instrument was, nevertheless, adequate, given the limited object of acquiring knowledge of the so-called «internal», qualitative aspects of things. For a quantitative approach, however, it was useless. This approach required conceptual schemes that allowed of mathematical descriptions. As long as the objects they were used for were different, these fundamentally differing types of conceptual frameworks were not competitive. The situation changed, however, when, from the 13th century on, the relevance of science was more sought in its use for daily life, technology and war. This made knowledge of quantitative relations indispensable. Although this was not the only cause that led to the depreciation of the qualitative conceptual framework,[41] it is obvious enough that by this change of object the aristotelian conceptual model with the logic it generated was unable to meet scientific requirements. From those days date the proclamations made by scientists that the aristotelian way of thinking and the logic it generates are of no use to the growth of knowledge. It was only in philosophical circles that both would henceforth be employed in the quest for the essences of things. But a number of scientists *also* deemed the qualitative framework inadequate for the study of sub-

([41]) Other contributing factors were developments within mathematics and the pythagoraean interpretation of the *Timaios*, which was common in 15th-century Italy and especially in Florence.

stances and their essences, especially in the case of the so-called *intensive qualities*. For as early a group of people as the thirtheenth-century *calculatores* it was beyond dispute that the quantitative approach was indispensable for an adequate rendering of the *intension* and *remission* of such a quality of a substance in space and time. The functional descriptions they employed do not fit in with the traditional conceptual structure in which all real descriptions must eventually be reducible to sentences having a subject-predicate structure. Thus, without a change of object the original qualitative conceptual framework lost its value and was superseded by a more powerful one.

Not all situations allow of as clear a judgment of how a choice between alternatives works out. For instance, in mathematical research there are no convincing arguments to prefer an intuitionist way of thinking to a classical one. In these and similar cases a pragmatic criterion does not lead to an univocal choice. But thereby the criterion is not necessarily rendered useless: as long as one instrument does not turn out or promise to be capable of more than the other, there are no rational motives for preferring one to the other. Then the choice can only be determined by tradition and/or personal taste.

Conceptual schemes with their respective logics are to be judged by pragmatic standards. Perhaps Bacon, Barth and Quine let themselves be guided by these when they critized the traditional substance-logic of essentialism. The former by proving that in this logic the distinction between existential and universal quantification, generally recognized to be useful, is lost; the latter two by showing that within a conceptual framework a sentence and its negation can both be true, which makes it of no use for acquiring knowledge. But unfortunately none of them had thereby demonstrated the inadequacy of the deviant way of thinking. Their criticism was in fact only directed against the concoction they made from ingredients of their own conceptual framework and of the one they really set out to criticize: a concoction of the kind that, already according to Leisegang ((1928), p. 444 ff.), mostly produces nothing but ludicrousness.

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