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THE PORT-ROYAL SEMANTICS OF TERMS

Although the *Port-Royal Logic* of Antoine Arnauld and Pierre Nicole was the most influential logic textbook up through the nineteenth century, relatively little attention has been paid to it. This article examines the Port-Royal theory of judgement and its foundation in the Cartesian theory of ideas, against the backdrop of Fregean semantics. The first part shows how the theory of judgement incorporates the classical notions of conception, negation, and categorical subject-predicate forms. The second half gives an overview of the Port-Royal semantics of general terms, focusing on how the authors treat general terms as both names and predicates.

1. INTRODUCTION

Logic, or the Art of Thinking (*La logique ou l'art de penser*), known to English speakers as the *Port-Royal Logic*, was written by Antoine Arnauld and Pierre Nicole, two Cartesian philosophers and theologians associated with the Port-Royal Abbey.¹ The primary author was Arnauld (1612–94), who is best known to us as the author of the Fourth Objections to Descartes's *Meditations*. But he also engaged in lengthy correspondence with Leibniz, carried on a polemic against Malebranche's representationalism in the *Treatise on True and False Ideas*, and wrote several theological essays, the most famous of which is *The Perpetuity of the Faith*. Arnauld's family was instrumental in sustaining the Port-Royal Abbey, which became the center of Jansenism, a heretical sect inspired by the writings of St. Augustine. The abbey was the center of intellectual activity for some of the best minds of the seventeenth century, including Pascal and Leibniz.

The first edition of the *Logic* appeared in 1662, and, during the authors' lifetimes, four major revisions were published, the last and most important in 1683. This text is a companion to the *General and Rational Grammar* (*La grammaire générale et raisonnée de Port-Royal*), written primarily by Arnauld and 'edited' by Claude Lancelot and published in 1660, two years before the first edition of the *Logic*. In

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the past 25 years, linguists and philosophers of language have paid some attention to the *Grammar*, thanks largely to Noam Chomsky's claims in *Cartesian Linguistics* and elsewhere that it pre-figured modern transformational generative grammar. By comparison, the *Logic* has received scant attention, in spite of the fact that it was the most influential logic text from the time of its publication up to the end of the nineteenth century. At least 63 editions were published in French and 10 in English. The 1818 English edition served as the text for courses of education at Cambridge and Oxford Universities.

But more important than the wide circulation of the *Logic* is its content. For if any work exemplifies the classical theory of the seventeenth and eighteenth centuries, it is the *Port-Royal Logic*. This theory had a profound influence on such thinkers as Locke, Berkeley, and Hume. It prevailed until Kant's revolutionary break with the classical theory of ideas in the *Critique of Pure Reason*, and the development of modern logic by Frege and by Russell in the late nineteenth and early twentieth centuries. When we read accounts of the breakthroughs of modern logicians, their contributions are always charted against the backdrop of the 'classical theory'. And yet the literature offers few details about this theory, and of the *Port-Royal Logic* in particular.

In this paper I will discuss some features of the *Port-Royal Logic* that make it a paradigm of the classical theory of judgment. This will include showing how the *Logic* is situated in the classical theory of ideas, and especially in Cartesian philosophy. After first giving a general sketch of the theory of judgment, I will focus on the semantics of terms, particularly on the treatment of general terms as both names and predicates. As we proceed I will use Kant and Frege as reference points, to help bring into relief the differences between the classical account and some more recent theories of judgment.

2. JUDGMENT AND THE CLASSICAL THEORY OF IDEAS

The *Port-Royal Logic* presents an account of logic and language situated in the general framework of Cartesian philosophy. Following Descartes, Port-Royal defines logic as the study of the four mental operations required to develop scientific knowledge: conceiving, judging, reasoning, and ordering. It is an axiom of the classical theory that these operations occur in this order, since each operation has for its elements the product of the preceding operation. Thus conceiving consists in

“the simple view we have of things which present themselves to the mind” (p. 37) and produces ideas. Whenever we judge, we relate two antecedently existing ideas so to produce an affirmation or a denial. Reasoning takes place when we make a judgment as a consequence of one or more judgments, and, finally, ordering consists in arranging judgments and inferences “in the manner best suited to know a subject” (p. 38). Immediately we can note two features fundamental to the classical theory of ideas.

First, according to this theory, the basic unit of knowledge and meaning is the idea, by which is meant the objective content of thought. In sharp contrast to contemporary views, the classical theorists thought language (which they took to be essentially speech) had only derivative significance. “Words”, says Arnauld, “are distinct and articulated sounds which men have made into signs to indicate what takes place in the mind” (II, 1, pp. 103–04). Language is significant only to the extent that it expresses publicly the content of essentially private thought. Nevertheless, an adequate study of logic cannot overlook the role of language, since how we speak does affect how we think. Descartes pointed this out in the *Principles on First Philosophy* (I, art. 74) when he identified confusion in language as one of the four main sources of error.² And Port-Royal agrees: “[O]ur need to use external signs to make ourselves understood causes us to attach our ideas to words in such a way that we often pay more attention to words than to things. Now this is one of the most common causes of confusion in our thoughts and discourse” (I, 11, p. 83). We shall return to their view of the complex relations between language, thought, and the world later on.

A second characteristic feature of this account concerns the relations between ideas, propositions, and judgments. On the classical theory, ideas are prior to both propositions and judgments; that is, the significance of an idea is independent of its function in a proposition. In conceiving, we may operate on ideas without either forming propositions or making judgments. We do this, for example, whenever we combine simple ideas to form complex ideas, and, inversely, when we analyze complex ideas into simpler parts or form general ideas by abstraction from particular ideas. Now in Descartes’s thought, the line between a complex idea and a proposition is not as clear as this view suggests. In some passages it looks as though complex ideas shade into propositions: having the idea of a triangle, for example, entails

attributing to it “the properties which license the inference that its three angles equal no more than two right angles . . .” (Descartes, 1985, II, p. 47). By contrast, Descartes draws a clear line between merely conceiving and judging. In the *Meditations* the essential ingredient marking off a judgment from a mere conception is an act of the will, in which the mind affirms or denies that a complex idea corresponds to reality. So in order to judge, we must first have a complex idea before the mind. Now in some cases, namely those of clear and distinct perception, Descartes maintains that the judgment follows the conception irresistably. In the *Fifth Meditation*, for example, he says that understanding the idea of the right triangle entails recognizing that “the square of the hypotenuse is equal to the square of the other two sides . . .” as well as that “the hypotenuse subtends the largest angle . . .” (ibid.). Nevertheless, in principle, conceiving is always prior to judging. Whether Port-Royal can maintain the priority of idea to proposition and of proposition to judgment remains to be seen. Arnauld and Nicole have particular difficulties distinguishing complex ideas that contain embedded judgments from those that do not.

To appreciate the classical aspects of this view, let us move forward a few centuries to see how Kant and Frege call these features into question. Kant, of course, remains in the classical tradition, insofar as he considers ‘representation’ (*vorstellung*) the locus of meaning and knowledge, and ignores the nature of language. But he takes the first step toward a modern view of thought in the *Critique of Pure Reason* when he defines concepts as “predicates of possible judgments” (A69/B94). There Kant says “we can reduce all acts of the understanding to judgments, and the *understanding* may therefore be represented as a *faculty of judgement*” (ibid.). And in his *Logic* he explains that the “*logical* origin of concepts . . . consists in reflection, whereby a presentation common to several objects [*conceptus communis*] arises, as the form required for the power of judgment” (pp. 99–100). From Kant’s point of view, then, judging is prior to conceiving: “[T]he only use which the understanding can make of . . . concepts is to judge by means of them” (A68/B93), and so concepts derive their significance as general representations from their predicative function in judgment. But Kant departs from the Cartesian view in a second way by arguing that judgments (he should say propositions) have a certain inherent formal unity, a definite structure. Not just any assemblage of concepts can constitute the propositional content of a judgment. These ideas

must be related in certain definite ways, which he calls the forms of judgment. On Kant's view, the concepts of these forms, which we would regard as second-order syntactical concepts, are a priori, not derived from experience. It was one of Kant's revolutionary insights to argue in the *Transcendental Deduction* that these concepts are presupposed in any representation of objects, including those of sense perception.

Frege inherited Kant's anti-naturalistic view of judgment through the influence of the German philosopher Lotze,³ but he deepened and systematized these Kantian insights in two general ways. The first is in his notion of the propositional function and the corresponding treatment of negation, introduced in the *Begriffsschrift*. The second is in the famous 'context principle', according to which the parts of a proposition derive their meaning from the proposition as a whole. Frege says this in the *Foundations of Arithmetic*: "Only in a proposition have the words really a meaning It is enough if the proposition taken as a whole has a sense; it is this that confers on its parts also their content" (p. 71). We shall come back to the Fregean theory of meaning when we look at the Port-Royal semantics of terms.

The Port-Royal theory of judgment is a good example of what Geach and others have called the 'two-name' view.⁴ Every simple judgment is composed of the same three elements: a subject, a predicate, and a copula connecting the two. These elements are expressed linguistically in the simplest case by a proper or substantive noun, a common noun or adjective, and a verb, as in the sentences 'Socrates is mortal' and 'All men are mortal'. (Except where confusion may ensue, I will use 'subject' and 'predicate' to refer indifferently to the ideas making up the judgment as well as to their linguistic expressions.) In fact, Port-Royal is still wedded to the theory of categorical syllogisms, according to which judgments are classified in terms of their quantity as universal, particular, or singular, and in terms of their quality as affirmative or negative. The authors take the traditional stand that singular judgments function logically like universals, and so in Part II they claim that all simple judgments have one of the following four forms, labeled A, E, I, and O: 'All S is P', 'No S is P', 'Some S is P', and 'Some S is not P'. Also, following the tradition, Port-Royal treats the quantifiers 'all' and 'some' as part of the subject, so that 'all men' and 'some men' are logically significant units. In explaining the rules of conversion, they then argue that predicates are implicitly quantified: when we say 'All

lions are animals', we do not mean that all lions are *all* the animals, but only *some* of the animals. So 'All S is P' in general means 'All S is (some) P' (II, 17, pp. 169–70).

Most judgments, however, are more complex than these four forms would suggest, for subjects and predicates need not be simple. In the judgment 'God who is invisible created the world which is visible', both the subject and the predicate include subordinate clauses that appear to contain judgments. Hence Port-Royal recognizes that judgments can be embedded within judgments. But because of the overall subject-predicate structure of all judgment, all embedded judgments must be located in the subject or predicate. It is easy to see that this becomes particularly problematic when Arnauld and Nicole discuss rules of inference, since they have to force all judgments, including conditionals and disjunctives, into the standard categorical forms. This uniform treatment of judgment, then, requires that subjects and predicates have unlimited complexity. So the Port-Royal theory provides no basic inventory of simple parts permitting a recursive analysis, as in the modern classification of symbols as variables, function or predicate symbols, and logical symbols. Instead, on the classical view, the judgment has a simple organic unity from the outside and a reiterable complexity from the inside.

The part of a judgment that represents the act of willing distinguishing a judgment from a mere conception is the copula. It is expressed linguistically by the verb. Port-Royal says the copula has two functions in a judgment: it relates the subject and the predicate, and it signifies *affirmation* or *denial*: "After having conceived things by our ideas, we compare these ideas together, and finding that some belong together and others do not, we unite or separate them, which is called *affirming* or *denying* and in general *judging*" (II, 3, p. 113). In discussing the copula, Arnauld and Nicole criticize Aristotle and other philosophers who combine the copula with features of the predicate (such as time) or of the subject (such as person), and they argue that the copula is separate from both the subject and the predicate (II, 2). In a well-formed language there would be only one verb, the *substantive verb*, namely, *to be*. In fact, however, natural languages often combine the predicate with the verb, as in 'Peter lives', and in some languages all three elements of the judgment are expressed by one word, as in the Latin verbs *cogito* and *sum*. But these facts about ordinary language should not mislead us to suppose that the copula is not a distinct element of judgment.

As I mentioned earlier, Descartes thought that in judging one held a complex idea or proposition before the mind, and affirmed or denied that this idea corresponds to reality. But the Port-Royal treatment of negative judgments and of the copula sits uneasily with this account, and in particular with the view that all judgment requires a unified complex idea. Let us consider negation first. Negative judgments are those expressed by sentences containing a negative word or syllable attached to the verb, and are understood as *denials*, or judgments having an effect opposite to *affirmations*. Since in affirming we unite two ideas, in denying we separate the subject from the predicate: "If I say *God is not unjust*, the word *is* when joined to the particle *not* signifies the action contrary to affirming, namely denying, in which I view these ideas as repugnant to one another, because the idea *unjust* contains something which is contrary to what is contained in the idea *God*" (II, 3, p. 113). Since the 'not' is attached to the verb, negation extends to the entire judgment. On this view, however, all negation is denial, and the act of denying consists in separating the subject from the predicate. As Frege points out in his essay 'Negation', this theory has several unacceptable consequences (Frege, 1966, esp. pp. 122–29). In the first place, if this account were true, we could never recognize a false thought, or grasp true thoughts that have false thoughts as their components, such as true conditionals with false antecedents or consequents. To recognize that a thought such as '3 is greater than 5' is false requires having a complete thought, and not merely fragments of a thought, that could not have a truth value. In addition, this account makes it impossible to understand the force of double negation. For if denying were an action that effectively dissolved the thought into its parts, then double negation would function as a sword that could magically unite the parts it had sundered. On Frege's view the traditional distinction between affirmative and negative judgments is simply untenable. It is not at all clear, for example, how the following sentences should be classified: 'God is just', 'God is unjust', 'God is not just', and 'God is not unjust'. If the judgments 'God is just' and 'God is not unjust' are logically equivalent, then to classify the first as affirmative and the second as negative is pointless. The root problem in treating negation as denial is the failure to distinguish the thought or proposition that is grasped from the act of judging it.

This same problem also surfaces in the Port-Royal view that the copula has assertive force. For this account also makes it impossible to distinguish making a judgment from merely considering a proposition.

According to the authors, every time one connects a subject and a predicate, one is ipso facto judging. Thus there is no room for thinking propositions and suspending judgment, as Descartes advocated in his method of doubt. In fact the Port-Royal view of the copula would make this process impossible; for this reason Arnauld and Nicole use the terms 'judgment' and 'proposition' interchangeably. Looking ahead briefly, we should note that, although Kant also focuses on the nature of judgment (*urteilung*), he takes the first step toward distinguishing judgment from proposition by treating the categories of modality – possibility, actuality, and necessity – as ways in which the proposition is held by the thinker. On Kant's view, problematic propositions express only logical possibility (A75/B101). Frege carries out the solution in the *Begriffsschrift* by distinguishing the content-stroke from the assertion-stroke, thereby removing assertive force entirely from the propositional content of the judgment.

The second problem arising from this view of the copula concerns embedded generality. As we have seen, Port-Royal must locate subordinate clauses in either the subject or the predicate. But some embedded clauses make assertions and some do not. Despite the two verbs in the complex proposition 'Men who are pious are charitable', for example, it is clear that one is not asserting of all men, or even some men, that they are pious. On the other hand, 'God who is invisible created the world which is visible' permits three assertions: 'God is invisible', 'The world is visible', and 'God created the world'. Port-Royal explains the difference between these two kinds of embedding in terms of 'determinative' and 'explicative' subordinate clauses (or, as they say, relative pronouns). Which class a subordinate clause belongs to depends on whether it restricts the signification of the antecedent of the relative pronoun. Without going into detail here about this view, let me remark that both determinations and explications can be carried out as well without embedded or subordinate clauses, as in the sentences 'Pious men are charitable' and 'The invisible God created the visible world'. So this view of the copula again fails to distinguish complex ideas containing assertions from those that do not, and shows how far Port-Royal was from a satisfactory treatment of assertion and embedded generality. Now let us, finally, turn to the details of the Port-Royal semantics.

3. THE SEMANTICS OF TERMS

The Port-Royal semantics is a complex theory concerning the relations between words, ideas, and things. Descartes believed that all thoughts having some degree of objective reality *represent* things, although his vocabulary was not very stable. (For example, it is not clear whether he thought sensations, which do not resemble the properties of bodies causing them, can be said to represent bodies.) In any case, the representative relation between ideas and things is both *objective* and *natural*. That is, to the extent that ideas present an image of reality, their content is independent of the thought of a particular thinker. Thus Arnauld and Nicole specify that when they speak of ideas, they mean “everything which is in the mind whenever we can truthfully say that we conceive a thing, however we conceive it” (I, 1, p. 41). The idea viewed as the element of logic and knowledge, then, is the *objective content* of thought. And since it is the nature of ideas to represent things, the eidetic structure is isomorphic to the structure of the real, a relation guaranteed by the benevolence of God. But the objective necessity of this eidetic structure also entails that it is *natural* as opposed to *arbitrary* or *conventional*: one can no more change the content of the idea of a right triangle than one can will to feel pleasure on being injured.

The relationship between language and ideas is not natural, however, for words are “conventional signs of thoughts” (I, 4, p. 54). This means that words are sounds that have no inherent meaning, as opposed to natural signs like cries and laughter. Instead, humans assign words their meaning through various acts of institution. The arbitrariness of this relation between the sound and its corresponding idea is seen in the facts that within a language a sound may change its meaning, and that different languages may attach different meanings to the same sound. So the expressive relation between words and ideas differs in some important ways from the representative relation between ideas and the world. In the first place, the relation between the linguistic sign and its idea is causal-psychological. That is, words or linguistic signs, like natural signs, signify by prompting an idea in the perceiver’s mind. As Paul Spade (1982, p. 190) remarks, although this seems to capture the listener’s side of the communication relation, it offers no explanation of the significance of words to the speaker, who wants to express antecedently existing ideas. In practice, however, Port-Royal tends to

assimilate words to ideas, calling both ‘terms’, and treats significance as transitive. Thus the authors often say that the words used to express ideas also signify the things signified by the ideas.

The conventional nature of language gives rise to a second difference between linguistic and eidetic significance, namely, that the correspondence between words and ideas is very imperfect. We are finite and free beings, and so we often produce utterances that obscure rather than reveal the structure of thought. If language coincided exactly with thought, each word would express one simple idea, and the structure of the sentence would faithfully reproduce the relations of ideas. But thanks to our natural laziness, we use single words like ‘triangle’ to express complex ideas, such as the idea of a figure bound by three straight lines. And we are sometimes confused as to which ideas are connected with which words. Consequently, there is no guarantee that the structure of spoken discourse will accurately reflect the logical structure of ideas. As this overview suggests, the semantical theory in Port-Royal is carried out on two levels, first with respect to ideas, and second with respect to language. Let us begin, then, with ideas.

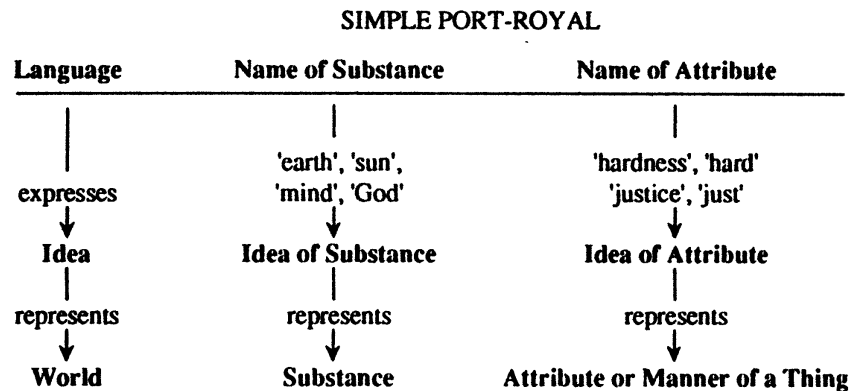
Port-Royal first classifies ideas with respect to their objects. From the standpoint of Cartesian metaphysics, these consist of three sorts of things:

- (1) substances or entities having independent existence;
- (2) attributes or primary essential properties of substances (there are only two real attributes, thought and extension); and
- (3) modes or accidental properties, which are determinations or particular forms of thought or extension.

Descartes sometimes treats modes of thought as *species* of thinking – such as doubting, denying, imagining, willing (*Sixth Meditation*) – and sometimes as particular *instances* of thought – such as a sensation of heat or a thought of a right triangle (*Third Meditation*). We shall see that a similar confusion between the relations of set inclusion and set membership runs throughout the Port-Royal analysis of general terms.

In their classification of the objects of ideas, Arnauld and Nicole condense the substance-attribute-mode framework into the simpler distinction between things or substances, and manners of things. Things are “conceived as subsisting by themselves and as the subject of everything conceived about it”; examples of nouns signifying things are

'earth', 'sun', 'mind', and 'God'. A manner is that which "is conceived in the thing as not able to subsist without it, determines it to exist in a certain way and causes it to be so named". The clearest examples of names of attributes are abstract nouns such as 'hardness' and 'justice' (I, 2, p. 47). By combining these two kinds of ideas we produce ideas of modified things, or substances determined by a manner or mode. Modified things are expressed primarily by adjectives, which have a more complex form of signification than nouns, as we shall see below. But since modified things are also substances, the framework in effect comes down to a distinction between things, that is, complete or independent entities, and manners of things, or incomplete or dependent entities. The table below gives a general sketch of the theory so far:



So far the analysis looks very Fregean, given the emphasis on the distinction between complete and incomplete objects of thought. Whether essential attributes are assimilated to substances or modes (and Port-Royal is not as clear on this as they would like to be⁵), this treatment resembles in some ways a modern analysis of predication: ideas of substances would function as subjects of judgment; ideas of manners would be predicates. Thus Cartesian metaphysics has the resources to analyze an atomic proposition as composed of an expression for an attribute and a name of an object. But because of the subject-predicate analysis of all judgment and their semantics of general terms, the final theory is more complex than this suggests. What results, as we shall see, is a systematic confusion between names and predicates.

The first complication occurs in Chapter 6 of Part I, where the authors distinguish singular from general or universal ideas. This is what Arnauld and Nicole say:

Although everything that exists is singular, nevertheless, by means of the abstractions we have just explained, we all have several sorts of ideas. Some of these represent only a single thing, such as the idea each person has of himself. Others are capable of representing several things equally. For example, when we conceive a triangle without considering anything except that it is a figure having three lines and three angles, our idea enables us to conceive all other triangles

Nouns which are used to indicate [*marquer*] the first are called proper: *Socrates, Rome, Bucephalus*. Those which we use to indicate the latter are called common and appellative, such as *man, city, and horse*. Both universal ideas and common nouns may be called general terms. (I, 6, pp. 57–58)

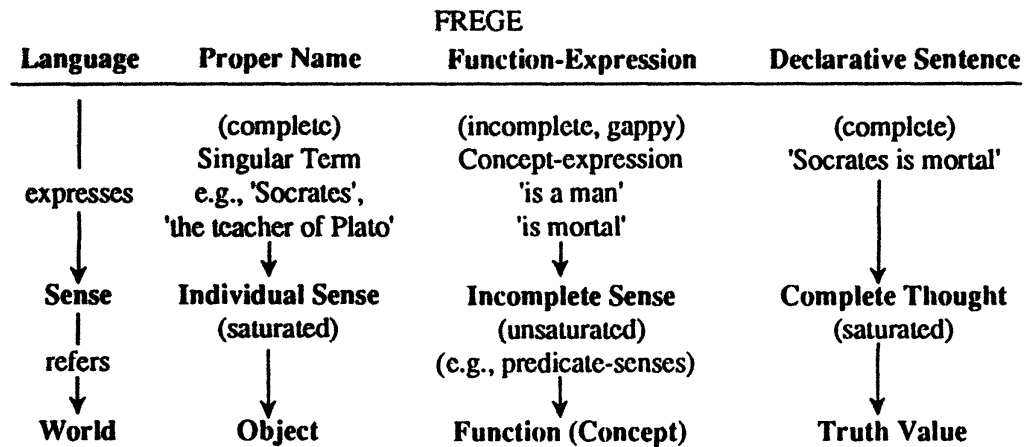
Here, then, we have a second classification of ideas, with respect to whether they can represent a single individual or more than one individual. Any term that is capable of applying to more than one thing, even though it in fact applies only to one, would be common or general. So, ‘U.S. city of over 9 million inhabitants’ would be a general term although it currently applies only to New York City. It may also be helpful to note that the Port-Royal notion of a thing is broader than the strict Cartesian notion of a substance, which refers only to a body or a mind. Port-Royal calls both the city of Rome and a triangle ‘things’, although neither would count as Cartesian substances. This is just our first hint of the way the theory is more driven by linguistic considerations than the authors would want to admit.

The question we must now consider is this: What is the relation between these two ways of classifying ideas, the first in terms of complete or incomplete objects, the second into singular or general ideas? Is the second intended to be exhaustive, as is the first? Are they equivalent distinctions? It looks tempting at first to identify the two, but there are several reasons why this is not so easy for Port-Royal. The best way to appreciate the complexity in the theory is to use Frege’s simpler theory as a point of reference.

For Frege, meaning also takes place in a three-fold structure, comprised of linguistic signs or expressions, the entities they designate, and the sense of the expression, which is a mode of presenting the entity. Frege is very careful to distinguish the sense of an expression from an idea, understood as the mental state of a particular thinker. In his essay ‘The Thought’, Frege contrasts the subjective nature of ideas with the objective nature of the thoughts expressed in our judgments, and he argues that senses belong to a “third realm”, being neither “things of the outer world nor ideas” (Frege, 1966, p. 302). Despite the difference

in the way he uses the terms 'idea' and 'thought', which are just the opposite of the Cartesian uses, Fregean senses look to function very much as ideas in Port-Royal: they are the objective contents of our mental states and utterances; neither their existence nor their truth value (in the case of propositions) depends on being thought or recognized by any thinkers; and they are inter-subjectively accessible. These very general similarities give us a basis for comparing Frege's third realm of senses with the Port-Royal realm of ideas.⁶

Frege says that connected to every linguistic sign there is a reference and a sense. The sense of the sign is the mode of presentation of that which the sign designates. Frege divides linguistic signs into three general groups: proper names (singular terms); function-expressions, which include concept-expressions; and sentences. Both proper names and sentences are complete names; function-expressions are incomplete names. In the essay 'On Sense and Reference', Frege begins with proper names. In general, proper names such as 'Socrates' and 'the teacher of Plato' express individual or complete senses, which refer to individual complete entities. "The reference of a proper name is the object itself which we designate by its means . . ." (ibid., p. 60). Frege then argues that declarative sentences also express senses – the thought contained in the sentence – and designate or refer to complete objects, namely, the truth value of the sentence. Although Frege says nothing about the sense and the reference of incomplete expressions in this essay, his principle that the sense and the reference of a complex complete name are determined, respectively, by the senses and the references of its parts entails that an incomplete name must also have a sense and a reference. As Frege made clear in his essay 'Comments on Sense and Meaning', the reference of a function-expression is a function, an incomplete entity.⁷ Function-expressions, when properly formulated, contain one or more gaps, corresponding to the 'unsaturated' or incomplete nature of the sense they express and the entities they designate. For example, an expression that names a concept under which all humans fall would be 'is a man'. Frege's theory may be sketched as follows:⁸



It is interesting to note that the reference of incomplete names for Frege was initially a source of some confusion: Carnap and Quine, among others, originally took Frege to say that the reference of a concept-word is the extension of the concept, or the objects that fall under the concept. But this was clearly not Frege's view; the original Carnap-Quine reading is in fact closer to the classical theory.

Now so far there seems to be a great overlap between this view and Port-Royal's theory of ideas. Arnauld and Nicole also analyze meaning in a three-fold structure, with ideas taking the place of Fregean senses. Linguistic signs express (or 'indicate') ideas, which represent or refer to existing entities, either things or their attributes. Names of entities are either proper or common, depending on whether they express singular or general ideas. The name 'Socrates' expresses or indicates the idea of the man Socrates, who is a single complete entity. Now if the distinction between ideas of things and ideas of attributes coincided with the distinction between singular and general ideas, the parallel with Frege would be complete: common nouns would express general ideas that would refer to attributes, or incomplete entities. For example, the noun 'man' would indicate the idea of what is common to humans, namely, the attribute of being human. But Port-Royal actually says that general ideas represent or refer to more than one individual. On this view the reference of a general term is not an attribute, but the collection of individuals possessing the attribute. This is one way Port-Royal assimilates the relation of a name to its bearer with the relation of a predicate or concept-expression to the objects falling under it.

Had Arnauld and Nicole stopped here, the picture would be fairly simple. But the authors go on to develop the theory in two ways. In analyzing the significance of general terms, they make an important contribution to the history of semantics by distinguishing the comprehension (or intension) from the extension. But at the same time they are led astray by grammatical considerations into complicating the theory of reference and blurring their own distinction between expressions for complete and incomplete entities.

Let us start with their contribution. Port-Royal's medieval predecessors, such as William of Sherwood and Peter of Spain, explained the various uses of general terms by a complex theory of supposition. This theory was connected with the doctrine of the distribution of terms in categorical propositions, and may have been intended to give an account of inference relations. Although there was no one generally accepted theory, most versions recognized at least seven different varieties of reference (see Spade, 1982). Port-Royal condenses this framework to one in which the significance of general ideas has two aspects: the *comprehension* and the *extension*. The comprehension of a general idea consists in the set of attributes essential to the idea. The comprehension of the idea 'triangle', for example, includes the attributes "extension, shape, three lines, three angles, and the equality of these three angles to two right angles, etc." (I, 6, p. 59). The extension of the idea consists in the "inferiors" or "subjects to which this idea applies", as "the idea of the triangle in general extends to all the different species of triangles" (ibid.). Here Arnauld and Nicole commit the confusion we saw earlier in Descartes, between a species and an individual (or between the relations of set inclusion and set membership). Despite this particular example, they usually take the extension of a general idea to be the individuals possessing the attributes in the comprehension of the idea. Here are three central features of this theory of signification.⁹

First, the comprehension rather than the extension is essential to the function of a general idea: "[N]one of its attributes can be removed without destroying the idea . . . whereas one can restrict its extension by applying it only to some of the subjects to which it conforms without thereby destroying it" (ibid.). This entails the second aspect, that in this double signification the comprehension governs the extension. It is the set of attributes that determines the set of individuals in the extension of a general idea. Except for the case of the most general attribute,

being or substance (I, 7, p. 60), it is not clear that each set of individuals corresponds to a set of attributes or is *thinkable*. Finally, comprehensions and extensions are inversely related: in adding attributes to the comprehension of an idea, we restrict the extension, assuming that attributes are independent and instantiated. This relation is expressed in the classical principle: If the comprehension of A includes that of B, the extension of B includes that of A. This principle is not stated explicitly in the *Logic*, but it is presumed throughout. So in recognizing these two modes of signification of general terms – the comprehension and the extension – Port-Royal imports the distinction between incomplete and complete entities into the signification of general terms.

Although they originally introduce the distinction between the comprehension and the extension of ideas for general ideas, the authors maintain that singular ideas also have extensions. This arises in their discussion of subordinate clauses, when they distinguish clauses that restrict the extension of a general term from those that do not.¹⁰ In the complex idea of ‘man who is an animal endowed with reason’, the relative clause only explicates the idea of ‘man’ because it makes explicit what is already contained in the general idea, and so does not restrict its extension in any way. On the other hand, the relative clause in ‘men who are knowledgeable’ is a determination rather than an explication, because not all men are knowledgeable. So the qualified idea has a smaller extension than the class of all men. Arnauld and Nicole then classify as explications all additions to names that distinctly indicate an individual – such as ‘Paris which is the largest city in Europe’, and ‘Julius Caesar who was the greatest captain of the world’ – precisely because “individual terms distinctly expressed are always taken throughout their entire extension, being as determinate as possible” (I, 8, p. 65). My guess is that they would similarly attribute comprehensions to singular terms – at least to definite descriptions – but they are not as clear on that point. In any case, this is a second way Port-Royal assimilates the notion of the extension of a predicate with the notion of the bearer of a name. In spite of these differences with the Fregean view, Port-Royal’s account of general ideas is the first systematic use of the intension-extension distinction. It makes possible both intensional and extensional readings of propositions, which the authors exploit in attempting to overcome difficulties in the theory of judgment.

Completing the theory of signification of terms is the noun system, taken largely from Part II of the *Grammar*. Here Arnauld and Nicole attempt to bring grammatical distinctions in line with the structure of ideas. As explained in Part II of the *Logic*, nouns are names of entities,

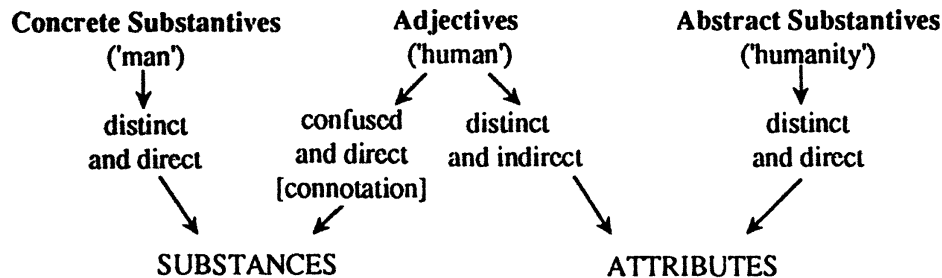
that is, substances and attributes (the term *nom* stands for both *noun* and *name* in French). Substantive nouns such as ‘earth’ and ‘sun’ signify substances, and adjectival nouns such as ‘good’, ‘just’, and ‘round’ signify attributes, “indicating at the same time the subject to which they apply . . .” (II, 1, p. 104). Just as substances are ontologically prior to their manners or modes, nouns preceded adjectives in the genesis of language: “[W]hen what is in itself a substance or a thing comes to be conceived by relation to some subject, the words signifying it in this way become adjectives, such as *human* and *carnal* . . .” (ibid.). From the adjective we then create a secondary substantive, an abstract noun: “[B]y stripping the adjective formed from these [primary] substantive nouns of this relation [to the thing], we make new substantives out of them. So after having formed from the substantive word *man* the adjective *human*, we form from the adjective *human* the substantive *humanity*” (ibid.). Thus we have at our disposal three kinds of nouns: concrete substantives, adjectives, and abstract substantives.

The interesting point for our purpose is the difference between concrete substantives and adjectives. The *Logic* says this about the way adjectives signify:

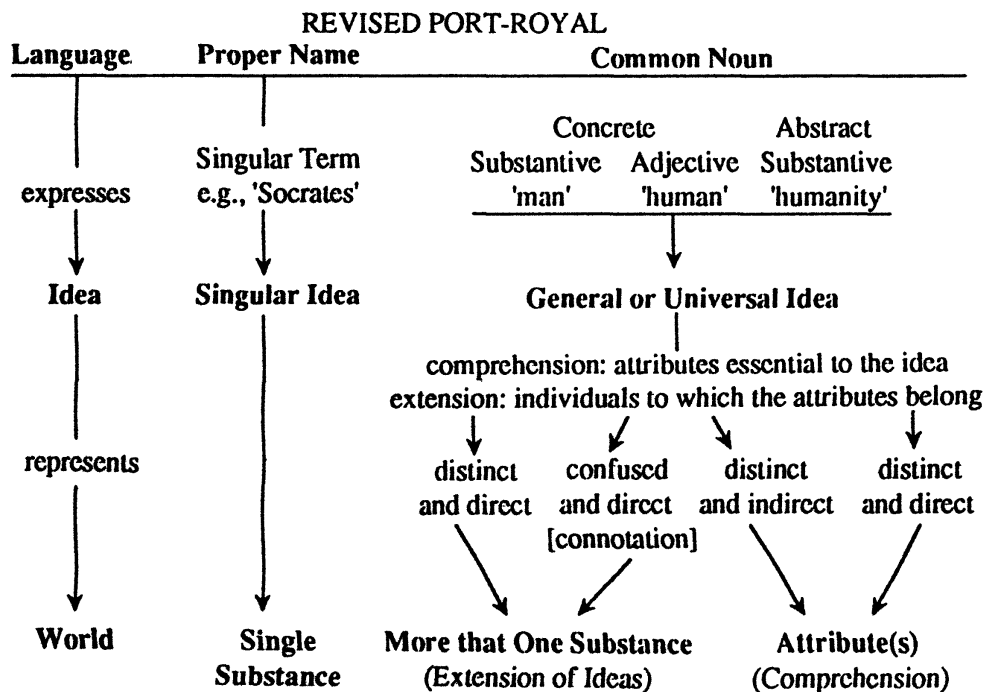
[A]djectives have essentially two significations; one distinct, which is that of the mode or manner, the other confused, which is that of the subject. But although the signification of the mode is more distinct, it is nonetheless indirect; and by contrast, that of the subject, although confused, is direct. The word *white*, *candidum*, signifies the subject directly but confusedly, and *whiteness* indirectly but distinctly. (II, 1, p. 105)¹¹

The account seems to be this. Every noun picks out or *distinctly signifies* some one thing, either an individual, a collection of individuals, or an attribute. Concrete or first-order substantives such as ‘man’ distinctly signify complete objects, that is, individual substances; the noun ‘man’ distinctly signifies the set of humans. The adjective ‘human’ distinctly signifies the incomplete object, the (complex) attribute of being human. And abstract substantives such as ‘humanity’ also pick out this attribute distinctly. But the adjective ‘human’, unlike the concrete substantive ‘man’, is linguistically incomplete. ‘Human’ really means ‘a human [being]’, as ‘red’ really means ‘a red —’. Linguistically, then, adjectives are gappy, and require completion by a substantive to refer. Port-Royal identifies this incomplete signification as the *connotation* or confused (but direct) signification of an adjective. So adjectives signify substances *directly and confusedly*, and attributes *indirectly and distinctly*. Because substantive nouns of both kinds are linguistically complete, they lack connotation altogether. Hence they have only distinct and direct sign-

ification to the individual substances or attributes they name. The following chart represents these signification relations:



It looks as though Port-Royal is led to this notion of the double signification of adjectives only because they have transferred metaphysical categories to language. Originally, concrete nouns were words naming substances or complete entities, and adjectives were names of attributes or incomplete entities. But Arnauld and Nicole blur this distinction by taking signification to depend on whether the *word* is capable of referring alone in discourse. One possible explanation for this view is that, although adjectives such as ‘red’ have their own criteria of application, they do not provide criteria of individuation. This accords with the idea that the connotation is confused, that is, it does not pick out distinct individuals.¹² When we incorporate this last analysis into the overall semantics, then, we obtain this final result:



In spite of the complexity here, we can make a few observations. First, both concrete nouns and adjectives directly signify the objects in the extension of the term. This makes it look as if Arnauld and Nicole are equating 'direct signification' with 'being predicable of', except that this does not apply in the case of the abstract noun. On the other hand, the distinct but indirect signification of the adjective looks to be equivalent to Frege's view of the reference of concept-expressions. The key difference is that Frege treats the distinction between complete and incomplete reference as invariant across grammatical form. On his view there is no logical difference between common nouns and adjectives: both the noun 'man' and the adjective 'human' are incomplete expressions. Their predicative nature is more easily seen when they are correctly formulated as 'is a man' and 'is human'.

4. CONCLUSION

It is tempting to say from the contemporary point of view that the *Port-Royal Logic* is full of confusions as well as insights. I have focused on several of these confusions and their relations, in particular the confusions between complex idea and proposition, between proposition and judgment, and especially between name and predicate. In particular I have tried to emphasize the instability of the Port-Royal semantics – the ways in which their theory of terms vacillates between earlier views and something closer to a modern analysis. It may, however, be more profitable to regard this work as incorporating several logics, and to view the confusions as the inevitable results of the dynamical tensions among these different views.

NOTES

¹ Page references to *La logique ou l'art de penser* are from the Clair and Girbal edition. Most references will specify the part, chapter, and page numbers. All translations are my own.

² References to Descartes's works are from the Cottingham, Stoothoff, and Murdoch translation, and will cite volume and page numbers.

³ A fine account of the theory of judgment in Frege's predecessors is available in Hans Sluga (1980, Chaps. I–II, pp. 8–65).

⁴ See, for example, Geach (1962, pp. 34–36).

⁵ Cf. Chapter II of Part I.

⁶ There are, of course, some important differences between Cartesian ideas and Fregean

senses. For one thing, Fregean senses are partial representations, whereas it is not clear that this is true of Cartesian ideas. I am indebted to Stuart Cornwell for this observation.

⁷ See Frege (1979, pp. 118–19) as well as Montgomery Furth's introduction to Frege (1967, pp. xxxviii–xxxix).

⁸ I am indebted to unpublished notes by John M. Vickers for this presentation.

⁹ Cf. Vickers (1988, Chap. 1; 1979).

¹⁰ See my 'Judgment and Predication in the *Port-Royal Logic*' (1993) for a fuller treatment of relative clauses and the distinction between subject and predicate.

¹¹ A more extended discussion is found in the *Grammar* (II, 2, pp. 70–72). My explanation here follows footnotes 7–10 by Rieux and Rollin (pp. 70–71) and unpublished notes by Vickers.

¹² For a discussion of this point, see Dummett (1981, pp. 73–80, 233–34).

REFERENCES

- Arnauld, Antoine, and Claude Lancelot: 1975, *General and Rational Grammar: The Port-Royal Grammar*, ed. and trans. Jacques Rieux and Bernard E. Rollin, Mouton, The Hague.
- Arnauld, Antoine, et Pierre Nicole: 1981, *La logique ou l'art de penser*, édition critique par Pierre Clair et François Girbal, J. Vrin, Paris.
- Buroker, Jill Vance: 1993, 'Judgment and Predication in the *Port-Royal Logic*', in Elmar Kremer (ed.), *Essays on Arnauld*, University of Toronto Press, Toronto, forthcoming.
- Descartes, René: 1985, *The Philosophical Writings of Descartes*, trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch, 2 vols., Cambridge University Press, Cambridge.
- Dummett, Michael: 1981, *Frege: Philosophy of Language*, 2nd ed., Harvard University Press, Cambridge, Massachusetts.
- Frege, Gottlob: 1959, *The Foundations of Arithmetic*, trans. J. L. Austin, Basil Blackwell, Oxford.
- Frege, Gottlob: 1966, *Translations from the Philosophical Writings of Gottlob Frege*, ed. and trans. P. Geach and M. Black, Basil Blackwell, Oxford.
- Frege, Gottlob: 1967, *The Basic Laws of Arithmetic*, trans. and ed. Montgomery Furth, University of California Press, Berkeley and Los Angeles.
- Frege, Gottlob: 1979, *Posthumous Writings*, eds. Hans Hermes, Friedrich Kambartel, and Friedrich Kaulbach, trans. Peter Long and Roger White, University of Chicago Press, Chicago.
- Geach, Peter Thomas: 1962, *Reference and Generality*, Cornell University Press, Ithaca.
- Kant, Immanuel: 1970, *Critique of Pure Reason*, trans. Norman Kemp Smith, St. Martin's Press, London.
- Kant, Immanuel: 1974, *Logic*, trans. Robert S. Hartman and Wolfgang Schwarz, Bobbs-Merrill, Indianapolis.
- Sluga, Hans: 1980, *Gottlob Frege*, Routledge & Kegan Paul, London.
- Spade, Paul: 1982, 'The Semantics of Terms', in Norman Kretzmann, Anthony Kenny, and Jan Pinborg (eds.), *The Cambridge History of Later Medieval Philosophy*, Cambridge University Press, Cambridge, pp. 188–96.

Vickers, John M.: 1979, 'Definability and Logical Structure in Frege', *Journal of the History of Philosophy* 17, 291–308.

Vickers, John M.: 1988, *Chance and Structure*, Clarendon Press, Oxford.

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