Outstanding Dissertations in **Linguistics**

edited by
Jorge Hankamer ■ Harvard University

A Garland Series

Reference to Kinds in English

Gregory N. Carlson

Garland Publishing, Inc. ■ New York & London
1980

Library of Congress Cataloging in Publication Data

Carlson, Gregory N 1948–
Reference to kinds in English.

(Outstanding dissertations in linguistics)
Rev. version of author's thesis, University of Massachusetts, Amherst, 1977.
Bibliography: p.
1. English language—Semantics. 2. English language—Noun phrase. 3. English language—Number.
I. Title. II. Series.
PE1585.C34 1980 425 79-6619
ISBN 0-8240-4551-3

All volumes in this series are printed on acid-free, 250-year-life paper.
Printed in the United States of America

Foreword

In the spring of 1976, Terry Parsons and Barbara Partee taught a course on Montague grammar, which I attended. On the second to the final day of class, Terry went around the room asking the students if there were any questions at all that remained unanswered, and promised to answer them on the last day of class. I asked if he really meant ANY question at all, which he emphatically said that he meant. As I had encountered a few questions in my lifetime that remained at least partially unresolved, I decided to ask one of them. What is life? What is the meaning of life? After all, Barbara and Terry had promised to provide answers to any question at all.

On the final day of class Barbara wore her Montague grammar T-shirt, and she and Terry busied themselves answering our questions. At long last, they came to my question. I anticipated a protracted and involved answer, but their reply was crisp and succinct. First Barbara, chalk in hand, showed me the meaning of life.

$^{\wedge}\underline{\text{life}}'$

Terry then stepped up and showed me what life really is.

$^{\vee\wedge}\underline{\text{life}}'$

As we were asked to show on a homework assignment earlier in the year, this is equivalent to: $\underline{\text{life}}'$.

Leaving me astounded that I had been living in such darkness for all these years, the class then turned to the much stickier problem of pronouns.

ACKNOWLEDGEMENTS

The fact that my name alone appears on the title page as the author of this dissertation should not be taken too seriously, for this could not possibly have come into being were it not for the concerted efforts of a large number of other people. I have many to thank, but I will be brief.

Barbara Partee, had she been present at UMass for the past year would have doubtless served as my dissertation director. Were it not for her work this dissertation simply could not have appeared. In spite of her absence, we managed to correspond with sufficient regularity so as to give rise to a fruitful exchange of ideas, and her many comments and suggestions improved dramatically the contents of this work. My file of correspondence with her reveals that she put in a tremendous amount of time on reading and criticizing the material that I sent her. My debt to her is enormous.

While perhaps not every cloud has a silver lining, this one did, and in Barbara's absence Robin Cooper came here for the year, and graciously assented to serve on my committee. His constant guidance and interest was of incalculable value to me, and I was consistently impressed with Robin's grasp of everything from confusing technical details to the most general aims of the field of linguistics. I am certain that he taught me more than he may think.

Lisa Selkirk served as my committee chairman, and we spent many hours together talking. Her support was of great value to me, and I thank her heartily for her time and efforts. Lisa's criticisms improved the quality of this dissertation dramatically, and her contributions are reflected in the contents.

I also wish to thank Terence Parsons for his guidance and time. He was responsible for keeping some dubious ideas from creeping in, and his positive contributions proved to be the bases for many of the analyses pursued.

This dissertation had as its beginnings in my master's thesis written at the University of Iowa under the direction of Larry Martin, whose original interest and insights started me on the line of thought pursued here. His interest persists to this date, for which I owe him a debt of gratitude.

Emmon Bach and Edwin Williams also contributed to the thinking reflected here in this work. Emmon's interest and his contributions are highly valued, and he was sorely missed in this

past year due to his absence. I regret that he was gone.

My wife Diane is perhaps as responsible for the completion of this thesis as anyone. Her patience, support, and love were an absolute necessity. Without her, not only this dissertation, but no other by me at all would have appeared. It is to Diane that I dedicate this work.

Finally, I wish to thank Martha Young for the long and tedious job of typing this dissertation, and for a job well done.

In my three years in the department of linguistics at the University of Massachusetts, I have been met with nothing but constant support and interest on the part of the faculty and the students. No exceptions. I cannot recall ever having anything even remotely approaching an unsettling experience with anyone associated with the department in my time here. As a result, my three years here have been extremely pleasurable and fruitful, both in terms of intellectual stimulation and interpersonal association. For this I have everyone to thank.

TABLE OF CONTENTS

CHAPTER I INTRODUCTION

0. Scope of Inquiry 1
1. Framework of Inquiry 4

CHAPTER II THE DESIRABILITY OF A UNIFIED ANALYSIS . . 6

0. Introduction 6
1. The Initial Proposal 6
2. Ø as the Plural form of *a* 7
   2.0 Semantics Expected 7
   2.1 Opacity 8
   2.2 Narrow Scope 10
   2.3 Differentiated Scope 12
   2.4 Anaphoric Processes 17
   2.5 The Relationship Between Ø and *a* 21
3. Relationship Between the Generic and the Existential 21
   3.0 Initial Assumptions 21
   3.1 Non-ambiguity 22
   3.2 More Anaphora 24
   3.3 NP's Denoting Kinds of Things . 26
4. The Unity of the Generic Interpretations 30
5. Conclusion 31

Footnotes to Chapter II 32

CHAPTER III THE GENERIC USE OF THE BARE PLURAL

0. Introduction 33
1. Previous Approaches 33
   1.0 Preliminary Comments 33
   1.1 Previous Suggestions 34
2. Inadequacies of Previous Approaches 37
   2.1 All Normal 37
   2.2 Most 39

2.3 Any Quantifier 41
2.3.0 Approximation of Quantifier 41
2.3.1 Fluctuating Truth Conditions 43
2.3.2 The Port-Royal Puzzle 44
2.3.3 Incorrect Truth Conditions 45
2.3.4 Special Predicates 47
2.3.5 Unquantifier-like Behavior 49
2.3.6 Other NP's 51

3. Conclusion 55

Footnote to Chapter III 56

CHAPTER IV SEMANTICS OF THE ENGLISH BARE PLURAL

0. Introduction 57

1. A First Proposal 58
1.0 Relationship Between Kinds and Bare Plurals 58
1.1 Kinds as Individuals 61

2. Individuals and the Existential Bare Plural 66
2.0 Particular Individuals 66
2.1 Representing the Bare Plural Semantically 69

3. Re-examination of Problems from Chapter II . 79
3.0 Narrow Scope 79
3.1 Opacity Phenomena 85
3.2 Differentiated Scope 89
3.3 Anaphora 92
3.4 Summary 95

4. Other Possible Non-quantificational Approaches 96
4.0 Introductory Remarks 96
4.1 Kinds as Sets 96
4.2 Kinds as Non-referring Predicates . . . 99
4.3 Kinds as Mereological Individuals . . 102
4.4 Conclusion. 103

5. General Description 104
5.0 Introduction 104
5.1 Intransitives 104
5.1.0 Predicate Nominals 104
5.1.1 Adjectives 105
5.1.2 Intransitive Verbs 108
5.2 Transitives 112
5.2.0 Verbs 112
5.2.1 Prepositions 117

6. Transformations 118

7. Other Applications 119
7.0 Modals 119
7.1 Adverbs of Quantification 123
7.2 The *see them drunk* construction . 124
7.3 There-Insertion 126

8. Further Constructions 128
8.1 Internal Structure of the Bare Plural 128
8.2 Syntactic Categories and Labeled Bracketings 131
8.3 Auxiliary System 133

Footnotes to Chapter IV 134

Appendix to Chapter IV: The First Fragment 135

CHAPTER V AMENDMENTS TO THE FRAGMENT

0. Introduction 152

1. Coreference 154
1.0 Discourse Reference 154
1.0.0 Reference to Kinds 154
1.0.1 Reference to Subsets of Kinds 154
1.1 Intrasentential Pronouns 158
1.2 Inductive Generalization 163

2. Generics and Existentials, and Absence of Object-Level Predicates 166
2.0 Introduction 166
2.1 Intensionality 166
2.2 The G Operator 168
2.3 Predicates that Basically Hold of Objects 170
2.4 Applications of G and G' 172
2.4.0 Predicate Nominal CN's . . 172
2.4.1 The *a* Generic: A Proposal . 173
2.4.2 Beavers Build Dams and the Passive 178
2.4.3 The Port-Royal Puzzle Reconsidered 181
2.4.4 Progressive Aspect and IV Adverbs 186

2.5 Concluding Remarks Concerning G and G' . . . . . .

3. Stages and Extensionality 190

4. Bare Plurals that Do Not Refer to Kinds 194

5. Conclusions 200

Footnotes to Chapter V 201

CHAPTER VI NOMINAL STRUCTURES

0. Introduction 203

1. Simple CN's 203

2. *Kind* 208

3. *Such* 219
3.0 Introductory Remarks 219
3.1 Syntax 220
3.2 Semantics of *Such* 230
3.3 The *Such-as* Relative 236
3.4 Closing Observations and Post-nominal *Such-as* Relatives 245

Footnotes to Chapter VI 247

Appendix to Chapter VI: The Second Fragment 249

CHAPTER VII FURTHER ISSUES

0. Introduction 265

1. *When* Adverbials and Coreference 265

2. Simple Present Tense 270

3. The Definite Generic *The N* 274

4. Ambiguities 280

5. The President 286

6. Mass Nouns, Abstract Nouns, Gerunds and Infinitives 293
6.0 Mass Terms 293
6.1 Abstract Terms 296
6.2 Gerunds and Infinitives 300

7. Conclusions 301

Footnotes to Chapter VII 304
Bibliography. 305

LIST OF FIGURES

CHAPTER IV

Figure 1 69

CHAPTER V

Figure 1 170

CHAPTER VI

Figure 1 209

Figure 2 240

CHAPTER VII

Figure 1 271

Figure 2 288

Figure 3 289

CHAPTER I

INTRODUCTION

0. Scope of Inquiry

Most English noun phrases are introduced by one of a class of words that have been variously called quantifiers, determiners, articles, numerals, and specifiers. Examples of the range of these classes are given in (1).

(1) a. *The* man ate *a* sandwich.

b. *Four* hunters saw *some* lions in *every* country.

c. *Those* athletes eat *more* food than *any* lion would.

There are, however, certain types of NP's which appear in the surface to lack any overt appearance of such words. Proper names, for example, are complete NP's, though most occur without an article (e.g., *Jeff*). Abstract nouns (*goodness*) and mass nouns (*sand*), too, may function in English as complete NP's. In this work we will be devoting most of our attention to another sort of NP that also may appear without an overt occurrence of any word of the sort found in (1). This is the class of noun phrases that exhibit a plural head noun, examples of which are cited in (2).

(2) a. *Dogs* are *mammals*.

b. *Lions* roar.

c. *Retired groupies* should receive *social security benefits*.

d. Bill threw *rotten oranges* into the garbage.

e. *Ants that go crazy at the sight of sugar* ought to be sent away.

Though syntactically simpler than those NP's that do contain an overt specifier element, the NP's exemplified in (2) have a notorious reputation for defying consistent semantic analysis. This is due to the fact that the meanings of these NP's seem to change with context, apparently meaning one thing in one context, and another thing in

another context. As an example, let us consider an NP of the form *dogs*. In a sentence like (2a), the meaning appears to be very accurately paraphrased by the locution 'all dogs', for the sentence *dogs are mammals* means the same things as *all dogs are mammals*. But if we change the context, as we do in (3), the paraphrase *all dogs* is no longer accurate.

(3) Dogs bark.

As (3) is true, and as it is false that ALL dogs bark (many do not), the NP in this context means something else. A reasonable paraphrase for this occurrence of *dogs* might be 'most dogs', for 'most dogs bark' might be considered a close paraphrase of (3). Changing the context again, though, we find yet another change in the interpretation.

(4) Dogs were sitting on my lawn.

In (4), the most appropriate paraphrase is neither 'all dogs' nor 'most dogs'; here, it seems to mean almost exactly the same thing as 'some dogs'. Yet another change in the context shows that none of the paraphrases suggested above appear to be adequate.

(5) Dogs are common.

(5) does not mean all dogs are common, nor most dogs are common, nor does it mean some dogs are common, but something else.

So we see the general problem with stating the meaning of the NP *dogs* without reference to the context in which it appears. It can mean any number of things, but the context selects only one of these possible interpretations.

One means of accounting for the semantics of NP's such as *dogs*, which we will henceforth refer to as BARE PLURALS, following Chomsky (1975), is to posit an ambiguous null specifier element as being present in the syntactic and semantic representations. One of these null specifiers would mean 'all', another 'most', a third would mean 'some', and so forth. One immediate problem with this suggestion that arises is that this sort of analysis appears to make the prediction that a given bare plural NP will be many-ways ambiguous on any given occurrence (as there might be any one of a number of null specifiers present). But a quick review of sentences (2) through (5) will reveal that no such ambiguity can be perceived.

In this work, we will be taking another angle of attack to this problem, and we will be claiming that the NP *dogs* is in fact unambiguous, and that it can be said to mean one thing and one thing

only. Thus, the claim is, the occurrences of the bare plural *dogs* in sentences (2)-(5) are all occurrences of the same syntactic and semantic structure. There is no ambiguous null specifier element. What gives rise to the different readings is the manner in which the context of the sentence interacts with the bare plural NP's. It is the task of this work to create a system of semantic interpretation for both bare plural NP's in general and the contexts in which they may appear so that we can account for the seemingly erratic behavior of the semantic interpretation accorded the bare plural.

Chapter 2 will be an examination of the status of those occurrences of bare plurals most readily paraphrased by use of the determiner 'some'. It will be argued that these occurrences are not to be distinguished from other occurrences that are most often characterized as having a 'generic' interpretation -- those paraphrased by prefixing *most*, *all*, or those that have no convenient paraphrase (as in (5)). It will be proposed that the key to the semantic solution is to regard bare plurals as names of KINDS of things.

Chapter 3 will examine the generic uses of the bare plural. It will be there argued that any attempt to consistently associate with these uses of the bare plural a generic quantifier will be inadequate in principle.

Chapter 4 will be devoted to the construction of a formal semantics which will account for the problems raised regarding the interpretation of the bare plural in the previous chapters. It is here that we motivate the notion that bare plurals are to be regarded as names of individuals in a certain way, the domain of individuals expanded to include kinds of things. At the end of the chapter is a formal semantics as well as a syntax for a fragment of English.

The fifth chapter examines crucial problems raised by the fragment presented in Chapter 4 regarding coreference, and a modification of the system is proposed. Here we will also examine the semantics of the singular indefinite generic (e.g. *a dog*) as well as a number of other related matters.

In Chapter 6 we turn our attention to other sorts of NP's that make reference to kinds of things. This includes those NP's that have the same form as those that refer to ordinary sorts of individuals, NP's that have in them overt occurrences of the word *kind* (as 'several kinds of animals'), and a study of the English word *such*. In this last section, English *such-as* relative clauses are treated. This chapter concludes with an expanded and corrected version of the fragment first presented in Chapter 4.

The final chapter is a discussion of remaining problems and possible future extensions of the analysis proposed. It ends with a general conclusion for the work as a whole.

1. The Framework of the Inquiry

We will be working within the framework of what has come to be called 'Montague grammar', after the philosopher who devised the basic system, Richard Montague. The basic notions of Montague are largely presented in Montague (1974), especially in the papers entitled "English as a formal language", "Universal grammar" (henceforth UG), and "The proper treatment of quantification in ordinary English" (henceforth PTQ). Unfortunately, for the uninitiated these make quite difficult reading. For more comprehensible introductions to Montague's basic approach, the reader may care to consult Thomason's introduction to Montague (1974), Partee (1975a), and Halvorsen and Ladusaw (to appear).

Montague was the first to apply the techniques of formal logic in a systematic manner to the domain of natural language. One of the basic restrictions that is defined on the sorts of formal systems previously described by logicians is that there be a systematic correspondence between the rules for constructing well-formed expressions and the rules for interpreting these expressions. As it is generally the case for formal languages that the syntax is constructed solely to serve the purposes of the semantics (hence the syntax of the language can be however it needs to be), the correspondence between syntax and semantics in such cases has never been viewed as a matter for empirical investigation. However, when one desires to treat English, for instance, in like manner, one finds that English syntax cannot be readily adjusted to fit the semantics we feel the sentences of English to have. Thus, the question of whether or not English can be treated as a formal language no longer becomes a trivial question. In fact, I feel that it becomes a rather interesting question regarding whether or not there is a statable correspondence between the rules of natural language syntax and the rules of semantic interpretation. Though no one has claimed to have proven that there is such a correspondence, many have argued against this possibility (as in Chomsky (1975)). Whether or not the detractors of this hypothesis are correct remains, in my opinion, yet to be conclusively shown. I regard the hypothesis as currently being one whose conclusion remains an open question, and as being an extremely interesting hypothesis worthy of pursuit. Only empirical investigation, carefully done, will yield an answer one way or the other. Like all investigations that take place within certain frameworks, it is required that the investigator assume the correctness of the framework and use it until insurmountable difficulties are encountered. It is in this spirit that I accept the basic Montague framework as a tool for investigating the nature of the English bare plural. It is hoped, of course, that it will be shown that this framework represents a useful and correct means of solving certain questions with regard to natural language. But this can only be done by exhibiting particular analyses of constructions of natural language.

In this work, we will not be assuming the Montague framework exactly as Montague presented it, but rather a slightly modified version. For the trained syntactician, one look at some of the rules of syntax presented in PTQ will reveal that the syntax misses important generalizations as stated. As one example, Montague's rules concerning the syntax of the auxiliary system are really quite ungainly and miss the generalizations originally noted in Chomsky (1957). For reasons such as these, it is assumed that the syntax of the Montague grammar is a transformational syntax of the general sort suggested in Partee (1976a), (1975a), and (1975b), as well as in Cooper (1975), Cooper and Parsons (1976), and Siegel (1976).

In adopting a transformational syntax for a Montague grammar, the transformational component must be sufficiently constrained so as not to reduce the notion that there is a systematic correspondence between rules of interpretation and rules of syntax (which correspond to the base rules of a transformational grammar) to complete triviality. As constraining the power of transformations is not only of interest to those working with Montague grammar, but to those who are most interested purely in syntax, the need for such constraints is not an artifact of adopting a Montague-type approach.

In this study, very few new transformations will be presented. We will be accepting as possible rules a more or less 'standard' stock of transformations which are familiar to most who have worked within the framework of transformational grammar, though this does not imply the universal acceptance of all the rules used here. Transformations are here allowed to change meaning if the meaning change can be consistently specified as a function of the application of the transformation, and if the meaning change does not violate the basic notion that the meaning of the whole is some function of the meaning of the parts.

It is hoped that this study will be of interest to those who are not familiar with the Montague framework, and are consequently unfamiliar with a good deal of the notations and general ideas used. As a result, an effort is made here to avoid letting the formalism speak for itself, though in certain cases this cannot be avoided. An intuitive characterization of the formalism presented is generally given. Certain sections will be difficult to read for many, but it is trusted these have been kept to a minimum. Nonetheless, it is necessary to assume that the reader is familiar at the very least with first-order logic.

CHAPTER II

THE DESIRABILITY OF A UNIFIED ANALYSIS[1]

0. Introduction

It is the purpose of this chapter to argue that all occurrences of the bare plural in English are one and the same in terms of structure and interpretation. We will be concentrating only on those instances of bare plurals that do not appear in predicate nominal position, thereby leaving open the exact nature of predicate nominals. In addition, we here often refer to the 'null determiner', as if there is such a syntactic element that is not pronounced. Again, we leave open the question of whether or not there is a null determiner in English. However, if there is one, we will here be arguing that there is only one such determiner, and not a multiplicity of them. And if there is no null determiner, then all bare plurals fall under the same determinerless construction, and no given bare plural NP may be ambiguous due to the presence of an ambiguous determiner.

1. The Initial Proposal

Most people recognize an intuitive cleavage between the 'existential' use of the bare plural, and its 'generic' uses. Roughly, the existential use of the bare plural is generally paraphrasable by prefixing the word *some* to bare plural NP, and the generic uses are generally paraphrasable by use of *all* or *most*. However, these paraphrases are not always available, and we must in those cases resort to native intuition in distinguishing these two general interpretations of the bare plural.

It has been suggested by many, or at least assumed, that the existential use of the bare plural represents the plural form of the indefinite article *a(n)*, and that this is to be considered distinct from the generic uses of the bare plural. One example of this position is found in Chomsky (1965), in which it is assumed that the article *a* is deleted when appearing prior to a plural or mass noun. Under this hypothesis, the existential use of the bare plural NP *books* is derived from an NP that has the form *a books*. One can rather easily see the attractiveness of an idea of this sort. It appears to be the case that the indefinite article *a* and Ø alternate as singular-plural with respect to predicate nominals; both *a* and Ø have generic uses; the semantics of the two seems to indicate a singular-plural relationship as well. For reasons such as these, this hypothesis has appeared in many sources -- Chomsky (1965), Gough (1969), Dowty (1972), Delorme and Dougherty (1972), Kroch (1974), Bartsch (1972), are but a few examples. There has, however, been a certain amount of controversy over whether or not the plural form of *a* (if indeed there is one) should in fact be considered to be Ø. Sweet (1898), Stockwell et al. (1974), and Perlmutter (1970) all suggest that the determiner that functions as the plural form of *a* is the unstressed variant of *some* (here represented as *sm*, following current linguistic tradition). We will eventually see here that considering *sm* to be the plural form of *a* is no doubt more accurate than assuming Ø to be its plural.

The remainder of the chapter will have the following form. We will first be examining the question of whether or not Ø is to be regarded as the plural form of the indefinite article (section 2). It will be concluded that this is not correct. It will then be argued (section 3) that the existential use of the bare plural is not to be distinguished from the generic use in terms of the syntactic structure assigned or the semantic interpretation. We will then in section 4 characterize various different generic uses of the bare plural, and briefly argue that these different uses are not to be distinguished from each other. All through the chapter, we will be encountering a series of semantic puzzles which are to be accounted for by the semantics given in Chapter 4.

2. Ø as the Plural Form of *a*

2.0 Semantics expected. If Ø is truly the plural form of *a*, it follows that the two should share all relevant semantic characteristics up to those that can be attributed directly to the presence or absence of plurality. (For instance, we cannot say *a man gathered* for the same reason we cannot say *the man gathered*; presence of plurality makes these acceptable.) Let us agree to represent the indefinite article as simply being an existential quantifier, with the singular form (*a*) asserting that the number of individuals spoken of in one (though there may be more), and the putative plural form (Ø) asserting that at least two individuals are being spoken of (though possibly more than two). As we are abstracting away from those cases where the linguistic context differentiates between singular and plural (as with the verb *gather*), we will simply suppress the singular/plural distinction in our semantic representations, and represent both *a* and Ø as being existential quantifiers to emphasize the nature of the hypothesis that these two should behave semantically alike. Under this hypothesis, the sentences of (1) become represented as the formula present in (2).

(1) a. A man saw John.

b. Men saw John.

(2) (∃x)(x saw John)

(2) represents the standard text-book means of representing the sentences of (1) in terms of semantic interpretation. We will, for the time being, assume this to be correct.

2.1 Opacity. In the presence of an opacity-inducing predicate (Quine, 1960), the indefinite singular may exhibit a clear ambiguity. Consider sentence (3) as one example.

(3) Miles wants to meet a policeman.

On one reading, there is some particular policeman that Miles has in mind, and Miles wishes to meet HIM. A good paraphrase might be 'There is a policeman that Miles wishes to meet'. Let us, following Quine (1960), call this the TRANSPARENT reading of the sentence. There is clearly another reading, however, where Miles does not have any particular policeman in mind, and Miles' desire is that he meet some policeman or other, it makes little difference which one. This is the OPAQUE reading. The transparent reading entails that there is some existing policeman, whereas the opaque reading entails nothing about the existence of any policeman.

In terms of semantic representation, the transparent reading is quite readily represented as having the existential quantifier outside the scope of the opacity-inducing predicate *wants*, while the opaque reading is conventionally represented as having the existential quantifier within the scope of the predicate in question. Sentence (3), then, is ambiguous between the two interpretations that are associated with (4a) and (4b).

(4) a. (∃x)(Policeman (x) & Miles wants (Miles meet x))

b. Miles want ((∃x)(Policeman (x) & Miles meet x))

(4a) represents the transparent reading, and (4b) the opaque reading of sentence (3). This reflects the ambiguity of (3).

When we turn to examples that contain instances of bare plural NP's, we would anticipate that they, too, would reveal a similar sort of ambiguity. In this light, consider sentence (5).

(5) Miles wants to meet policemen.

Sentence (5) does not exhibit the reading that might be paraphrased as 'there are policemen that Miles wants to meet'. That is, there is no transparent reading for (5), and it can only be interpreted as something like (4b) and not formula (4a). For a particularly striking contrast, compare side-by-side the difference between (5) and (6), where the determiner *sm* has been added. (6) exhibits the same sort of ambiguity as (3).

(6) Miles wants to meet sm policeman.

So it appears that for some reason, the transparent reading that we would expect (5) to have is ruled out. It is quite clear that the presence of the plurality marker itself cannot be held responsible for this state of affairs, for once again examine sentence (6), or the sentences of (7), which in all cases have the head noun of the object NP marked as plural, but all exhibit a clear transparent/opaque ambiguity.

(7) Miles wants to meet {twelve / all / many / several / most / etc.} policemen.

It is apparent that the presence of the plurality marker per se cannot account for the lack of the transparent reading of (5).

We cannot also hold accountable some idiosyncratic property of the verb *want*, for within the scope of virtually any opacity-inducing predicate we find a consistent scope ambiguity with respect to the indefinite singular and all the other quantifiers[2], but never with the bare plural. Compare the (a) versions of the sentences below with the (b) versions. The (a) versions are ambiguous in a way that the (b) versions are not. The opacity-inducing element is italicized.

(8) a. Bill *believes* a fascist to have robbed the bank.

b. Bill *believes* fascists to have robbed the bank.

(9) a. Jimmy *must* find a congressman before noon.

b. Jimmy *must* find congressmen before noon.

(10) a. Max is *looking for* a book on Danish cooking.

b. Max is *looking for* books on Danish cooking.

(11) a. A drunk is *likely* to win the lottery tomorrow.

b. Drunks are *likely* to win the lottery tomorrow.

(12) a. *If* a bank president were appointed to this committee, it would be better organized.

b. *If* bank presidents were appointed to this committee, it would be better organized.

This set of facts is not predicted by any analysis that posits ∅ as being the plural counterpart of *a* if we assume that the plural counterpart of the indefinite singular should behave like the singular up to just those differences that can be directly attributed to the presence or absence of the plurality marker in some independently motivated manner.

2.2 Narrow scope. A related set of facts is noticed when we observe the interaction of the bare plural with negation and other quantified NP's with respect to their relative scope properties.

Let us consider sentences like (13).

(13) A man is in this room and a man is not in this room.

(Let us assume that both occurrences of 'this room' refer to the same room.) Sentence (13) is ambiguous. On the one reading, it is a contradiction, being of the form A & -A. In terms of semantic representation, the contradictory reading of (13) would be represented as (14).

(14) $(\exists x)((\text{Man}(x) \ \& \ x \text{ is in this room}) \ \& \ (\neg(\exists x)(\text{Man}(x) \ \& \ x \text{ is in this room}))$

On the other hand, there is an interpretation of (13) which is not a contradiction. It essentially means that there is a man who is in this room, and there is a man who is not in this room. We can represent this in the form of (15), where the existential quantifier appears outside the scope of the negation, rather than inside it.

(15) $((\exists x)(\text{Man}(x) \ \& \ x \text{ is in this room}) \ \& \ ((\exists x)(\text{Man}(x) \ \& \ \neg(x \text{ is in this room})))$

(15) is not of the form A & -A, nor equivalent to a formula of that form, and is thus noncontradictory as desired.

If ∅ represents the plural of *a*, we would expect that it too would show a similar ambiguity in a context like (13). But it does not.

(16) Men are in this room and men are not in this room.

(16) has only a contradictory reading, something like (14). For some reason, it cannot have associated with it a formula like that of (15), which represents the noncontradictory reading.

Similarly, a sentence like (17) can be interpreted as meaning that John saw no spots on the floor, or that there was a spot that he missed.

(17) John didn't see a spot on the floor.

If it is interpreted as meaning that he saw no spots on the floor, this represents the existential quantifier being within the scope of the negation. If it means that he saw possibly many other spots, but there was one he missed, the existential is outside the scope of the negation (I think this latter reading is harder to get than the first, but it is clearly a possible interpretation). But once again, if a bare plural is inserted in a like context, only the reading represented by an existential appearing within the scope of the negation can be discerned.

(18) John didn't see spots on the floor.

(18) can only be interpreted as meaning that John saw no spots on the floor, and not as meaning that there were some that he missed.

Let us now turn to a look at the interaction of the bare plural and the indefinite singular with respect to their relative scope in the presence of other quantifiers. It is universally recognized that a sentence like (19) is at least two ways ambiguous.

(19) Everyone read *a book on giraffes.*

On the reading where the universal quantifier holds scope over the existential, the interpretation is that each person may have read a different book. That is, one person may have read Markley's *Introduction to Giraffes*, and another Griffin's *Giraffes of Eastern Missouri*. There is another reading, however, which requires that each person read the same book. These readings would be represented as (20a) and (20b) respectively.

(20) a. $(\forall x)(\text{Person}(x) \rightarrow (\exists y)(\text{Book}(y) \ \& \ x \text{ read } y))$

b. $(\exists x)(\text{Book}(x) \ \& \ (\forall y)(\text{Person}(y) \rightarrow y \text{ read } x))$

We would expect to be able to associate both of these representations with a sentence containing an instance of a bare plural in place of the indefinite singular if ∅ were in fact the plural form of *a*. We cannot, however, as (21a)(compare with (21b)) does not exhibit this relative scope ambiguity.

(21) a. Everyone read books on giraffes.

b. Everyone read sm books on giraffes.

If the NP *books on giraffes* has an existential quantifier associated with its interpretation, the quantifier must appear within the scope of the universal quantifier associated with the interpretation of the subject NP in (21). There is no reading of (21a) that corresponds to the formula presented in (20b), but its interpretation corresponds most closely to that of (20a). (21b) is readily associated with either (20a) or (20b).

Let us sum up what has been shown so far in this section. We have observed that if the bare plural were represented as having an existential quantifier associated with it, it would have to be restricted in scope to the narrow-scope reading of the indefinite singular. We might have described the opacity phenomena exhibited in the previous chapter in similar terms. Below are a few more examples of the operation of this apparent restriction of the bare plural to narrow scope, though the indefinite singular exhibits in each case both wide-scope and narrow-scope readings. The italicized constituent is what the scope is to be judged relative to.

(22) a. Jack saw a dog on his lawn *at 3:30, 4:00 and 5:30.*

b. Jack saw dogs on his lawn *at 3:30, 4:00, and 5:30.*

(23) a. A whale attacked our ship *on twelve occasions.*

b. Whales attacked our ship *on twelve occasions.*

(24) a. *Most of the recruits* ate at a hamburger stand.

Most of the recruits ate at hamburger stands.

(25) a. Bull noticed an actor *in every scene of the film.*

b. Bull noticed actors *in every scene of the film.*

In none of these cases is there a reading of the (b) versions that would be appropriately represented with a wide-scope existential quantifier associated with the bare plural NP.[3]

2.3 Differentiated scope. Thus far, it appears that the existential bare plural would have to be more restricted in its interpretation than its supposed counterpart. One could imagine, though,

a defense of the notion that Ø is the plural counterpart of *a* that would simply confine the interpretation of the plural to a subset of the readings available for the singular. Precisely such an analysis is suggested in Kroch (1974).

Though this particular suggestion strikes me as a quite ad hoc restatement of the facts, and as calling for a deeper solution, it nonetheless is a real possibility that should be dealt with. I believe that this position becomes untenable when we look at a wider range of facts, and observe that the scope possibilities of *a* and Ø would have to differ in such a way that one could not be a subset of the possible readings of the other.

Under certain circumstances it appears that the bare plural would exhibit narrower scope than the indefinite singular is capable of showing, provided we continue to represent Ø as being an existential quantifier. Consider (26).

(26) A dog was everywhere.

It is quite clearly the case for me and most others consulted that (26) has only an absurd reading, one which means that there is some omnipresent dog. That is, there is no reading of the sentence which allows the universal quantifier of the predicate to hold scope over the subject NP. (Compare the above with *There was a dog everywhere*, which clearly allows a wide-scope universal.) But a bare plural in the same context does allow there to be an interpretation of the sentence that is not as absurd.

(27) Dogs were everywhere.

(27) has a reading, in fact, its only reading, which would be appropriately represented as a universal quantifier from the predicate holding scope of the existential of the subject. So we see in the sentences (26) and (27), a case where the scope possibilities of *a* and Ø do not coincide at all since they have mutually exclusive readings associated with them.

A similar sort of phenomenon can be observed in the following pair of sentences. In (28), one is asked to imagine a recurring accident; but one has no such difficulties with (29).

(28) An accident happened today three times.

(29) Accidents happened today three times.

Again, in (28) the existential of the subject cannot have narrower scope than the quantifier of the predicate (*three*), but this is precisely the interpretation allowed in (29). So the scope possibilities of the bare plural appear to be not merely a subset of the in-

terpretations allowed the singular. This particular example points up another difficulty with the notion that ∅ is the plural of *a*. We were originally agreed that *plural* meant 'more than one'. But (29) could easily be used to report a situation where at each of the three times during the day only ONE accident occurred. In fact, this is the most natural interpretation in this case. But if we examine what the semantic interpretation of (29) might be, this interpretation should not be a possible one. I use ∃ *pl* to represent an existential quantifier that asserts at least two, or more than one. In rough terms, (29) might be represented by (30).

(30) (∃x) (Time(x) & (∃pl y) (Accident(y) & (y happened at x today))

The interpretation of (30) would be something like *for each of three times, there were at least two accidents that happened at that time.* We cannot get out of this particular difficulty by granting wide scope to the existential, for that would lead us back to the absurd reading where an accident would recur. Again, this is something that is directly contrary to what we would expect to be the case if ∅ were in fact the plural form of a. If we instead regarded *sm* as the plural form, we would find a happier coincidence of readings between it and the indefinite singular.

A particularly interesting construction that is of some relevance here is given much attention in Dowty (1972), where he analyzes *for* time adverbials in some depth. In (31) is an example of this particular construction.

(31) Nat read *for two hours*.

Dowty's analysis treats *for* time adverbials as involving universal quantification over a given range of points of time. In rough terms, the proposed semantics of (31) would be as follows.

(32) (∀t:t ε two hours)(At(Nat read, t))

(32) asserts that (31) is true just in case for each relevant point in time in a two-hour period, *Nat reads* is true at that point in time. This treatment appears to generally give the right readings (though we will later note one problem).

One of the more puzzling aspects of *for* time adverbials is that with a certain class of verbs ('achievement' verbs), the sentences come out strange unless the direct object NP is a bare plural or a mass noun. For instance, the state of affairs described in (33) is quite bizarre, while the situation in (34) is considerably more normal.

(33) Max killed a rabbit for three hours.

(34) Max killed rabbits for three hours.

By using Dowty's analysis, we can represent the readings of (33) and (34) as (33') and (34') respectively.

(33') (∃x)(Rabbit(x) & (∀t:ε3 hours)(AT (Max killed x, t)))

(34') (∀t:ε3 hours)((∃x)(Rabbit(x) & AT (Max killed x, t)))

(33'), where the existential holds widest scope, makes the claim that it was the same rabbit that was killed at each time in those three hours. This is not in accord with our notion of what a rabbit is like, or what killing something is like. (34'), however, makes the claim that at each (relevant) time in the three hours, there was some rabbit or other that was killed. It need not be the same one killed on any two occasions. This is a much more likely state of affairs. And these seem to quite accurately represent what is funny about (33) that is not funny about (34). So once again, we see that the bare plural would have to be able to hold wider scope than the indefinite singular.

There are other time adverbials that behave in a similar fashion, seemingly allowing the bare plural within their scope, but not allowing the indefinite singular. In each case, the narrow-scope possibilities of the bare plural give rise to a rather natural interpretation that is lacking in the singular counterpart.

(35) a. Lenny killed an ant *until the police arrived.*

b. Lenny killed ants *until the police arrived.*

(36) a. Harvey killed a fly *repeatedly* last night.

b. Harvey killed flies *repeatedly* last night.

(37) a. Loren has killed a cow *since the depression.*

b. Loren has killed cows *since the depression.*

Aspectual verbs appear to play a similar role, and they pattern likewise.

(38) a. Max *continued* to kill $\left\{\begin{matrix}\text{a fly}\\ \text{flies}\end{matrix}\right\}$.

b. Fred tends to kill $\left\{\begin{matrix}\text{a fly}\\ \text{flies}\end{matrix}\right\}$.

And even morphologically 'simple' generic tenses pattern likewise.

(39) Carla kills $\left\{\begin{matrix}\text{a fly}\\ \text{flies}\end{matrix}\right\}$ (for a living).

Similar results can be obtained when the relevant NP is in subject position. Consider the following pairs of sentences. In the (a) versions, with the singular, the existential quantifier is interpreted as being outside the scope of the time adverbial, and thus it is the same object that is spoken of at all relevant points of time. In the (b) versions, however, the existential quantifier is interpreted as being within the scope of the adverbial, so the objects referred to may be different from time to time.

(42) a. A dog hung around my house all last week.

b. Dogs hung around my house all last week.

(43) a. A cat has been here since the Vikings landed.

b. Cats have been here since the Vikings landed.

(44) a. A tyrant ruled Wallachia for 250 years.

b. Tyrants ruled Wallachia for 250 years.

As one further interesting example of differentiated scope, I cite the following. Though I do not pretend to understand the semantics of the sentence, the fact that the (a) version makes much better sense than the (b) version is not to be expected if Ø is simply the plural form of *a*.

(45) a. Wolves get bigger as you go north of here.

b. A wolf gets bigger as you go north of here.

While (45a) asserts that northerly wolves are larger than more southerly varieties, it seems the only sense one can make out of (45b) is that if you put a wolf in your back seat and head north, it will increase in size.

One final example of differentiated scope can be drawn from cleft constructions. In (46a), everyone must share eating the same tomato, while in (46b) everyone is allowed to eat his or her own tomato.

(46) a. It was a tomato that everyone ate.

b. Everyone ate a tomato.

With the bare plural, however, matters are different. In (47a), as in (47b), no one need share a tomato.

(47) a. It was tomatoes that everyone ate.

b. Everyone ate tomatoes.

So we see from the evidence from differentiated scope that the bare plural could not be restricted in its scope possibilities to a subset of the possibilities realized by the singular, but rather it is capable of bearing relationships to other parts of a sentence that the indefinite article cannot have.

So far, the distinction to be drawn has been just between the bare plural and the indefinite singular article *a*. But the actual distinction runs much deeper than this. Rather, there is a contrast between the bare plural and ALL quantified NP's. The quantified NP's behave generally like *a* with respect to the data previously considered, and none behaves consistently like the bare plural. As one illustration of these facts, let us momentarily return to consideration of *for* time adverbials. Recall that in sentences like (33) above, a strange interpretation was the only one available with the direct object being quantified by the indefinite singular, but the bare plural allowed a more natural reading.

(33) Max killed $\left\{\begin{matrix}\text{a rabbit}\\ \text{rabbits}\end{matrix}\right\}$ for three hours.

If we substitute the other quantifiers into this context as well, we see that none allow a natural interpretation of the sort allowed with the bare plural. This sets Ø apart in a class by itself.

(48) Max killed $\left\{\begin{matrix}\text{several}\\ \text{all}\\ \text{many}\\ \text{a few}\\ \text{ten}\\ \text{lots of}\\ \text{most}\\ \text{etc.}\end{matrix}\right\}$ rabbits for three hours.

A quick look at all the other cases of differentiated scope will reveal that there, too, the quantified NP's behave like the indefinite singular rather than like the bare plural. In addition, the bare plural would be the only one of the quantified NP's that consistently fails to exhibit opaque/transparent ambiguities, or consistently fails to interact with negation and other quantifiers in terms of relative scope. This suggests that Ø would not belong in the class of quantifiers at all.

There is another set of data which also supports the notion that Ø is not to be considered the plural counterpart of *a*. We now turn our attention to anaphora.

2.4 Anaphoric processes. As has been pointed out previously, a sentence such as (49) is ambiguous between a transparent and an

opaque reading.

(49) Paul is trying to find a policeman.

This sentence becomes unambiguous in the larger context of (50), however, and the opaque reading disappears, leaving us only the transparent reading.

(50) Paul is trying to find a policeman, and Kate is trying to find *him*, too.

The account of this is really quite straightforward. We first make the assumption that natural language pronouns can be represented as bound variables in the semantics (at least the sort of pronoun we see in (50)). Now, if the first conjunct of (50) were to be represented as the opaque reading, the existential quantifier associated with the object NP *a policeman* would not be in a position to bind the variable in the second conjunct, and thus there would be no reading where Paul and Kate are seeking the same policeman. Since we are making the assumption in this case that being bound by the existential quantifier is how the pronoun arises in the first place, that means that (50) cannot have the semantic structure of (51).

(51) (Paul is trying $(\exists x)$(Policeman(x) & Paul find x))
& (Kate is trying (Kate find $\underline{x}$))

The underlined $\underline{x}$ variable cannot be bound by the existential quantifier in this structure.

On the other hand, everything works out quite nicely if we allow the existential quantifier to have wide scope, which we have accepted as the representation of the transparent readings. If we do grant wide scope to the existential, we can have the following representation associated with (50), in which the variable in the second conjunct is bound by the existential quantifier, ultimately giving rise the the pronoun in the second conjunct of (50).

(52) $(\exists x)$(Policeman(x) & (Paul is trying (Paul find $\underline{x}$)
& (Kate is trying (Kate find $\underline{x}$)))

In this case, all occurrences of x are bound by the existential quantifier in the front, and the reading is that Kate and Paul are both seeking a particular policeman, and the same policeman. And this is the only reading we find for (50). In a sense, then, the coreferential pronoun in the second conjunct of (50) forces a transparent reading.

If we recall that it appeared that the bare plural could not participate in a transparent reading in the presence of an opacity-inducing operator, we would anticipate that the presence of the bare plural in a context like that of (50) will give rise to anomaly, as the context would then be forcing a transparent reading that does not exist. But we do find that there is a natural interpretation for such a construction.

(53) Paul is trying to find *policemen*, and Kate is trying to find *them*, too.

But the interpretation in this case does not force a transparent reading, as it did with the indefinite singular. Neither Paul nor Kate in (53) are looking for a particular policeman, nor are they looking for the same policemen. With the bare plural, but not with the indefinite singular, both clauses may retain their opaque readings.

I hasten to point out that the singular-plural distinction between the pronouns *him* and *them* cannot be held solely responsible. It is rather the nature of the antecedent that dictates the difference. Compare the sentences of (54), where in the first case there is a bare plural antecedent, and in the second there is a quantified NP antecedent.

(54) a. Paul is trying to find books, and Kate is looking for them, too.

b. Paul is trying to find sm books, and Kate is looking for them, too.

We also find that with the singular form *it*, if the antecedent is an unquantified mass noun a similar state of affairs can hold. As the reader may have noted by now, bare mass nouns behave very much like bare plurals.

(55) a. Bill is looking for *a chair*, and Toni is looking for *it*, too.

b. Bill is looking for *furniture*, and Toni is looking for *it*, too.

(55b), as opposed to (55a), has an opaque reading for both conjuncts. So we see it is in the nature of the antecedent, and not the nature of the pronoun itself, which dictates the difference between (50) and (53), a difference not predicted by an analysis that treats the bare plural as the plural of *a*.

This set of facts for the bare plural does not depend wholly on the presence of an opaque context to have a pronominal form which does not make reference to the same particular individuals. In (56),

Harriet need not have caught the same rabbits as Ozzie did, while in (57) they must have caught the same rabbit.

(56) Harriet caught rabbits yesterday, and Ozzie caught them today.

(57) Harriet caught a rabbit yesterday, and Ozzie caught it today.

Again, in (57) the form of the pronoun itself cannot be held accountable, for there are cases with *it* where coreference of individuals is not required as in (58).

(58) Julie drank beer fast, but Tricia drank it slow.

Tricia and Julie need not have drunk the same beer.

A similar sort of situation arises when the identical NP's are deleted in a coordinate structure, rather than pronominalized. Let us first consider a case with the indefinite singular.

(59) *A building* will collapse in Berlin tomorrow, and *a building* will burn down in Boston the day after.

Quite clearly, two different buildings are spoken of in this sentence. However, if the subject of the second conjunct is deleted "under identity" with the first, it appears the same building must appear in two cities, which is a bit unusual. (60a) and (60b) are synonymous.

(60) a. A building will collapse in Berlin tomorrow, and ___ will burn down in Boston the day after.

b. A building will collapse in Berlin tomorrow, and *it* will burn down in Boston the day after.

In the case of the bare plural, however, we find that neither deletion nor pronominalization have the effect of changing the sentence into a pragmatically strange one. All the sentences of (61), as far as I know, are synonymous.

(61) a. Buildings will collapse in Berlin tomorrow, and buildings will burn down in Boston the day after.

b. Buildings will collapse in Berlin tomorrow, and ___ will burn down in Boston the day after.

c. Buildings will collapse in Berlin tomorrow, and *they* will burn down in Boston the day after.

These facts are not predicted by any analysis that takes Ø as the plural form of *a*.

2.5 The relationship between Ø and a. The facts presented indicate that Ø simply cannot be regarded as the plural of *a* in any semantically relevant way. A more likely candidate at this time appears to be the unstressed variant of 'some'. We will see in Chapter 7 further reason for regarding a and *sm* to be related quite closely.

Having divorced the null determiner from any roots with the indefinite article, we must search again for its place in the grammar and ask what other parts of the language it is related to, if any. In the next section it will be argued that the existential use of the bare plural is in fact the same both syntactically and semantically as the generic use(s) of the bare plural. Not only will this be motivated by certain facts about the language, but we will see in the next chapter that regarding the existential use of the bare plural as being one and the same with the generic use can lead us to a genuine understanding of the semantic properties that we have noted so far. We will see why it is that the bare plural existential has only opaque readings associated with it, why it has narrower scope than the indefinite singular, why it can participate in differentiated scope phenomena, and why the bare plural interacts with pronominalization in the way it does. But first, let us look at the relation between the generic uses of the bare plural and the existential uses.

3. Relationship between the Generic and the Existential.

3.0 Initial assumptions. For the purposes of this section, let us entertain the hypothesis that there are at least two distinct quantifiers in the English language, both of which have a null pronunciation. The first, $\emptyset_{\exists}$, will give rise to the existential interpretations of the bare plural, and is to be responsible for it being interpreted like *some*, as in the following cases.

(62) a. *Mice* were chasing my cat all over the house.

b. Kerry gave *quarters* to *bums*.

c. I thought I saw *beans* spilled on the floor.

The second hypothetical form of the null determiner could be represented as $\emptyset_{G}$, and would be responsible for the 'universal' interpretations of the bare plural as well as those cases where something is predicated of the whole class of something. The uses covered by this are exemplified in (63).

(63) a. *Wire taps* are illegal.

b. *Dogs* bark.

c. Jerry hates *small ugly creatures*.

d. *Bears that can dance* are quite rare.

We will beg the question for the time being of whether or not there should be distinguished two or more generic uses, and assume that there is but one.

3.1 Non-ambiguity. To claim that Ø has two distinct underlying representations is to make the claim that bare plurals are ambiguous in a systematic and pervasive way. Consider the following sentences.

(64) a. Smokers are rude.

b. Cats meow.

c. Elephants are quite easily trained.

These sentences exhibit the universal, or generic reading of the bare plural. But there is no reading corresponding to existential use of the bare plural. If Ø is really ambiguous, then why isn't it the case that the sentences of (64) have the following interpretations?

(65) a. Some smokers are rude.

b. Some cats meow.

c. Some elephants are quite easily trained.

Pragmatically speaking, these readings are quite clearly plausible, yet there is something that prevents them from being possible readings of (64). We must clearly disallow an existential interpretation from occurring, instead of making the claim that the sentences of (64) are really ambiguous, because then we would be endorsing the truthfulness of the following false sentences.

(66) a. Books have between 100 and 150 pages.

b. Sleds are black.

c. Dogs are collies.

Each of these should be true on one interpretation, then, for some books do have that many pages, some sleds are black, and some dogs are collies. But they are false. Hence there is no existential interpretation available.

On the other side of the coin, there are contexts which select only the existential interpretation, even though a universal interpretation might be a plausible one.

(67) a. John noticed plumbers in Jersey City.

b. Alice personally knows actresses.

c. Sir Mendenhall slew whooping cranes last night.

For example, (67a) cannot mean that ALL plumbers were noticed in Jersey City, even though one might plausibly assume that there was a plumbers' convention there attended by most, or all plumbers. But only the existential interpretation is available, leaving aside the generic interpretation. These facts are not accounted for under an analysis which predicts the ambiguity of the null determiner between an existential and a universal reading.

There are contexts in which the predicted ambiguity does appear. Sentence (68) is one example.

(68) Dinosaurs ate kelp.

One reading posits kelp-eating as being a (past) characteristic of most, or maybe all, dinosaurs. Another reading of the sentence reports a kelp-eating event of long ago (perceived more easily if (68) is continued *...while Grog watched*, or something like that), and predicates *ate kelp* of some dinosaurs, and certainly not all. So here is a context where the analysis of the bare plural as being ambiguous appears to make the correct prediction. However, a sentence like (68) is ambiguous even when the subject of the sentence is not a bare plural, but any of a wide range of other possible cases.

(69) {Fred / Those professors / Few firemen / The old chemist / Many dogs} ate kelp.

(69) is ambiguous as well, between the report of a past event, or whether *ate kelp* represents a past habit or characteristic of the subject NP.

Given that the verb phrase *ate kelp* is already two ways ambiguous, and given the hypothesis that the bare plural is at least two ways ambiguous, we would then expect the sentence of (68) to be four ways ambiguous, and not just two ways ambiguous. However, as pointed out in Dahl (1975), the sentence is not four ways ambiguous. Rather, the existential reading co-occurs with the 'event' reading of the predicate, and the universal interpretation co-occurs with the 'habitual' interpretation. There is no reading of (68) indicating an event in which all or most dinosaurs participated, nor is there a

reading asserting that it was a past characteristic of some dinosaurs to eat kelp. So this is not a case where treating the bare plural as ambiguous makes the correct predictions. Rather the verb-phrase selects one reading or another. This is distinct from the generic vs. the specific uses of the definite article. An NP such as *the horse* may either refer to the species itself, or to a particular horse (e.g. Sea Biscuit). Sentences such as (70) are ambiguous with respect to *the horse*; but a bare plural in this context has only the generic reading, and disallows the specific reading.

(70) $\left\{\begin{matrix}\text{The horse}\\ \text{Horses}\end{matrix}\right\}$ work(s) hard.

The generalization that falls out from this line of inquiry is that the universal and existential uses of the bare plural are in complementary distribution, with the linguistic context selecting only one or the other reading. Let us assume that this is the case, and that if an apparent ambiguity appears in the use of the bare plural, it can be attributed to some independently motivated ambiguity already present in the context in which it appears. The claim is, then, that the bare plural never, in and of itself, gives rise to an ambiguity.

A reasonable argument might be that the bare plural is, in and of itself, ambiguous, but that the context itself SELECTS one reading or the other, giving rise to readings that are largely in complementary distribution derived from an underlying ambiguous null determiner. Although general non-ambiguity is not a sufficient reason to support the claim that there is one and only one null determiner, it is clearly a necessary component of this argument. I now turn to other arguments which show that positing an ambiguous null determiner leads us to wrong predictions about certain other phenomena, but the assumption of a unified analysis leads us to the correct predictions.

3.2 More anaphora. If the bare plural were truly ambiguous between a generic interpretation and an existential interpretation, we would not anticipate that the two could stand in an antecedent-pronoun relation any more than any other pairs of arbitrarily chosen quantified NP's. For example, the pronoun in the following sentence cannot be interpreted as meaning *all* critics, because the antecedent NP is of the form *several* critics.

(71) *Several critics* left the movie, even though they had strong stomachs.

There is no interpretation meaning that several critics left even though all critics have strong stomachs. Likewise, a sentence like

(72) cannot be interpreted as meaning that all critics eat raw liver because SOME critics have strong stomachs.

(72) *All critics* eat raw liver because *they* have strong stomachs.

The same should hold for the bare plural. We would not anticipate ever finding an existential interpretation serving as antecedent for a pronoun with a universal interpretation, nor a bare plural NP with an existential interpretation serving as antecedent for one with an existential interpretation. However, such a possibility is predicted by an analysis which makes the claim that the bare plural is not ambiguous. We can find many cases, though, which support an unambiguous analysis. Consider the following pairs of sentences.

(73) a. Bill trapped *eagles* last night even though he knows full well that *they* are on the verge of extinction.

b. Even though Bill knows that *eagles* are on the verge of extinction, that didn't stop him from trapping *them* last night.

The antecedent of the pronoun in (73a) is an existential instance of the bare plural, even though the pronoun itself has a generic interpretation. In (73b), we see exactly the reverse case. Here, the antecedent NP has a generic interpretation, and it serves as antecedent for a pronoun that has an existential interpretation. A great many other cases can be constructed; the following serve as examples to show that this phenomenon is not a particularly isolated one.

(74) a. May hates *raccoons* because *they* stole her sweet corn.

b. *Raccoons* stole May's sweet corn, so she now hates *them* with a passion.

(75) a. My brother thinks that *snakes* are nasty creatures, but that hasn't stopped me from having *them* as pets.

b. I've had *snakes* for pets my whole life, but my brother still thinks *they* are nasty creatures.

(76) a. Martha told me that *beans* can't grow in this climate, but *they* grew well for me last year.

b. I grew *beans* last year, although I had been warned that *they* can't grow in this climate.

(77) a. I didn't think that *goats* actually liked *tin cans* until I saw *them* eating *them*.

b. Before I actually saw *goats* eating *tin cans*, I didn't think that *they* liked *them*.

In all these cases, a generic is serving as an antecedent for an existential or an existential is serving as an antecedent for a generic. It is not at all clear how this would be possible if the bare plural were to be analyzed as being at least two ways ambiguous, but these cases clearly follow from an analysis where the bare plural is regarded as unambiguous.

At this point, I do not wish to overstate the case that can be made for a unified analysis from evidence concerning pronouns, for only in the framework of a definitive analysis of pronouns could a clear determination be made. We will return to the matter of pronouns and the bare plural later when we consider a wider range of data. Insofar as current notions of pronominalization are conceived, however, it appears that a unified analysis is called for to account for these cases. But I think there is irrefutable evidence that can be presented to indicate the necessity of a unified analysis, and it is to this last bit of evidence that I now turn.

3.3 NP's denoting kinds of things. A good deal of the impetus behind the notion that the bare plural is to be construed as being ambiguous comes from the fact that it represents a gap in the paradigm of forms of NP's. Most other NP's have a definite or a quantifier in the place where nothing at all appears in the bare plural. From there it is a small leap of faith, and not an unreasonable one at first sight, that the bare plural does not represent a gap in the paradigm, but rather it does have associated with it a quantifier of some sort; it is just that the particular quantifier happens to have no phonological realization. And when one notes that there are at least two different interpretations available to the bare plural, it is an easy step to posit there being TWO null quantifiers, just as we might propose that there are two distinct quantifiers in English, both pronounced *any*.

There is a class of constructions in English, however, which does not represent a formal gap in the paradigm of English, yet behaves like the bare plural with respect to the contexts so far examined. These are the class of English NP's which overtly make reference to KINDS of things, like *this kind of animal* or *three kinds of wheat*. We will henceforth use 'kinds' to mean 'kinds of things'.

Let us fix the referent of the NP *this kind of animal* to your favorite kind of animal, and examine the behavior of this NP

with respect to the sorts of data presented previously in this chapter. First consider the following sentence.

(78) Martha wants to kiss *this kind of animal*.

This is the context where a bare plural had only an opaque reading. Now, if we look at (78) from the point of view that asks about Martha's relationship to the particular animals of this kind, we do not find that there is any reading of the sentence which indicates that Martha wants to kiss any particular animals. In fact, it doesn't even entail the existence of any animals of this kind. So, if we were asking a question about particular individuals, we would characterize (78) as having only an opaque reading with respect to the individuals of the kind we have in mind. There would be no transparent reading, as Martha has no particular individuals in mind that she wants to kiss -- only perhaps a kind of animal. That is, if we are looking at things in a certain way, we come to the conclusion that *this kind of animal* behaves like a bare plural with respect to opaque contexts.

We also note that the NP *this kind of animal* behaves like a bare plural with respect to relative scope in the presence of negation and other quantifiers IF we continue to ask questions about what the sentences say about the particular animals of this kind.

(79) Max didn't see this kind of animal in Brooklyn.

This can only mean that Max saw NO animals of this kind, and this is the same result we found with the bare plural.

(80) Every one saw this kind of animal.

Again, everyone need not have seen the same PARTICULAR animals. And this, too, is the same conclusion we saw with the bare plural.

If we move ahead to an examination of how an NP like *this kind of animal* fares with respect to the differentiated scope phenomenon, we see that there, too, its behavior is like that of the bare plural if we ask about what the sentences say about the particular individuals of this kind. Consider a sentence like (81).

(81) This kind of animal was everywhere.

This is the context in which it appeared that only the bare plural, and no other quantified NP, could have scope narrower than the universal quantifier in the predicate. But (81) also admits of differentiated scope if we ask what it says about the distribution of the particular individuals of this kind. And, as with the bare plural, we see that the NP *this kind of animal* exhibits differentiated scope with reference to the particular individuals.

So we see that the NP *this kind of animal* behaves very much like the existential use of the bare plural if we look at things in

a certain way. But the most important fact is that the NP *this kind of animal* also has 'generic' uses alongside its existential uses, AND ITS EXISTENTIAL AND GENERIC USES ARE DISTRIBUTED EXACTLY IN THE SAME WAY AS THE CORRESPONDING USES OF THE BARE PLURAL. In the sentences of (82), it seems that only SOME animals of this kind are being spoken of, just like with the bare plural in the same context.

(82) a. Bill shot {this kind of animal / bears} yesterday.

b. {This kind of animal / Dogs} {is / are} sitting on my lawn.

c. I saw {bears / this kind of animal} in the zoo.

And in those contexts where the bare plural was paraphrased by *all* or *most*, it is the case that *all* or *most* animals of this kind are being spoken of. And in those contexts where no paraphrase was available, the NP *this kind of animal* may also appear felicitously.

(83) a. {This kind of animal / Dogs} bark(s).

b. John hates {this kind of animal / dogs}.

c. {This kind of animal / Dogs} {is / are} common.

Again, if we ask questions about what each sentence says about the particular animals of this kind, we come to the same sort of conclusion as we do with asking about what each sentence says about individual dogs.

With the bare plural, it has been supposed that we can account for the difference in interpretation between the sentences of (82) and those of (83) by proposing that there is an ambiguous null determiner in the place normally occupied by some other quantifier or definite. But what do we do in the case of an NP like *this kind of animal*? The only reasonable location for an ambiguous null determiner would be before the word *animal* -- except the ∅ determiner nowhere else accepts a singular count noun. Besides that, there are no other quantifiers or definites allowed in this position save the determiner *a*.

(84) This kind of {*one / *several / *each / *sm / etc. / an} animal(s)

One might argue that since *a* is allowed, and if ∅ is the plural form of *a* it, too, should be allowed. But, as we have seen, ∅ simply cannot be the plural form of a; in addition, it is extremely difficult to see what semantic sense could possibly be made of such a structure, and how it could affect the interpretation of the whole NP *this kind of animal* as either an 'existential' or as a universal.

But even if this particular argument were to be found persuasive, allowing the introduction of a null determiner after the word *of*, this possibility simply does not exist in another class of NP's.

It has been often noted that mass nouns that appear in count noun form are acceptable if interpreted as making reference to a kind of thing. Thus, though *metal* is a mass noun, the NP *these metals*, or *several metals* are perfectly interpretable as meaning kinds of metal. Such NP's also have 'existential' and 'universal' uses.

(84') John noticed *several metals* in the mine.

(85) *Several metals* are common.

(86) *Several metals* are hard.

In (84'), John only needs to have noticed *some* metal in the mine, certainly not all. In (86), however, *all* metal of those kinds is hard, not just some; and in (85) no such paraphrase is available. In an NP of the form *several metals*, it is difficult to see where we could slide in an ambiguous null determiner to account for these different uses of the NP *several metals*. I do not think it can be done in a reasonable and motivated way, and any attempt to do so would meet with a flurry of questions about the exact nature of this phantom null determiner.

Since we cannot reasonably account for the various interpretations of NP's like *this kind of animal* or *several metals* by positing an ambiguous null determiner, we need to find another means of doing this. But once we do, we would be accounting for exactly the SAME set of facts as we tried to account for in the bare plural by positing an ambiguous null determiner. So to account for the same set of facts by use of a null ambiguous determiner in one case, and some other mechanism in the other cases, would be to miss an important and pervasive generalization in the grammar.[4] I further remark that even the broadest outlines of a semantic analysis of the null determiner do not exist, so in supposing that an ambiguous null determiner would be capable of accounting adequately for the data we are running the risk of making a completely false assumption.

Naturally, the burden is on the one who claims that there is 'some other mechanism' which accounts for the varying interpretations

of the bare plurals and the NP's that refer overtly to kinds. In the next chapter just such a mechanism will be proposed.[5] But before turning to an examination of how we should semantically represent bare plural NP's, I wish to briefly recapitulate some arguments which serve to indicate that the various generic uses of the bare plural are not to be distinguished from each other.

4. The Unity of the Generic Interpretations

One might care to distinguish at least three different null quantifiers to account for the various apparently diverse interpretations among the generic. The first would be equivalent to a universal quantifier, $\emptyset_{all}$, and would be responsible for the interpretation of *dogs* as *all dogs* in a context like (87).

(87) Dogs are mammals.

And we might posit a null determiner that has the force of *most*, $\emptyset_{most}$, to account for the possibility of exceptions to the statement in (88).

(88) Dogs bark.

As we know, not all dogs bark, but (88) is still true.

In addition, we might want a mysterious third form of the null determiner to account for those cases where no quantifier paraphrase is available, $\emptyset_{?}$.

(89) Dogs are widespread.

The first thing we notice about this three-way ambiguous determiner $\emptyset_{all}$, $\emptyset_{most}$, and $\emptyset_{?}$, is that it simply does not appear to be ambiguous in a given context. For example, sentences (87), (88), and (89) are all unambiguous. So there is a general, pervasive ambiguity which fails to show up with any regularity whatsoever.

We also note that each 'interpretation' of the bare plural can serve as an antecedent quite naturally for any of the other interpretations. The following sentences point this up quite nicely.

(90) Dinosaurs ($\emptyset_{?}$) are extinct because *they* (most) ate kelp.

(91) Trucks hauling dynamite ($\emptyset_{all}$) are illegal in Nevada because they (most) are hard to maneuver in heavy traffic.

(92) *Wolves* eat only kosher deer, so *they* are less numerous than *they* would be if *they* weren't so choosy.

(93) *Elephants* are very large and strong, but *they* are not as widespread as one would expect.

So we see that pronominalization fails to effect a separation of the generic uses of the bare plural into two or more classes.

And finally, we would encounter exactly the same sort of difficulty in using an ambiguous null determiner to account for the various generic uses of the bare plural, but using yet another mechanism to account for the interpretation of those NP's that make reference overtly to kinds.

(94) a. This kind of animal barks. (most)

b. This kind of animal is a mammal. (all)

c. This kind of animal is widespread. (?)

We would once again miss an important generalization by using one mechanism to account for the interpretations of the sentence of (94), but another mechanism (an ambiguous null determiner) to account for exactly the same set of facts for the bare plural in the same context.

5. Conclusion

In this chapter we have endeavored to establish that a unified analysis of the English bare plural (less the predicate nominal usage) is to be found desirable on more than just general esthetic grounds. Rather, a unified analysis is called for if we wish to be able to create a complete and adequate analysis of the bare plural, and any attempt to account for its semantics by claiming the English bare plural to have associated with it an ambiguous null determiner will be unable to account for the complete range of data.

We have also established that the relationship between *a* and $\emptyset$ is not to be regarded as a singular/plural relationship, nor are they related in any way. It was suggested that a more likely candidate for the plural form of the indefinite article is the determiner *sm* and we have seen that *sm* is a much better candidate than $\emptyset$.

Finally, in this chapter there have been raised a number of semantic curiosities surrounding the nature of the bare plural. In the next chapters we will be proposing a semantic system which will show how these curiosities arise. We have already seen that a possible clue to the correct semantic interpretation of the bare plural rests in the observation that there appears to be some relationship that holds between bare plurals and NP's that refer to kinds. In the next chapters this relationship will be explicated.

FOOTNOTES TO CHAPTER II

[1]This chapter contains material from Carlson (1973) and from Carlson (1977).

[2]We here do not include the definites among the quantifiers (*the*, the demonstratives, and the possessives), as they exhibit generally unquantifier-like behavior. They don't appear to hold relative scope over negation or other quantifiers, they generally lack transparent/opaque readings in the appropriate contexts, they may co-occur with other quantifiers in an NP while other quantifiers may not, and they serve an anaphoric function that is missing from the quantifiers. More is said about this class of determiners in chapter 7.

[3]The data here is not as clear in other cases because on the narrow-scope reading of the NP in question there is a "reading" that is consistent with a wide-scope interpretation.

[4]I am NOT at this point advocating deriving bare plural NP's from other NP's that have the word *kind* in them. The notion is that the interpretation of the bare plural should in some motivated way be related to the interpretation of NP's referring to kinds.

CHAPTER III

THE GENERIC USE OF THE BARE PLURAL

0. Introduction

We have in the previous chapter devoted a good deal of attention to the existential use of the bare plural construction. We saw in that chapter that there are serious problems that arise with the semantics of the existential use of the bare plural if we attempt to associate with its semantic interpretation an existential quantifier that resides in a null determiner. In this chapter we devote our attention to the generic use of the bare plural and we will examine more closely its semantics. This will be done in a framework which assumes that the analysis of the semantics of this construction involves the positing of a generic quantifier as being associated with the NP itself. This particular proposal I will show to be fundamentally wrong by evidence derived from an examination of the generic use only.

The chapter will proceed as follows. We will first in section 1 be examining previous suggestions that have appeared in the literature for treating the semantics of the English bare plural on its generic interpretation, dividing these into several distinct classes. We will then in section 2 present arguments that bear on all of the suggested analyses at once. Our main conclusion at the end of this chapter will be that the positing of a generic quantifier of any sort is not adequate as an account of the semantics of the bare plural.

1. Previous Approaches

1.0 Preliminary comments. As we are assuming there to be an intuitive split between the generic and the existential uses of the bare plural for the moment, a word is in order concerning the recognition of each. To a large extent, I will be relying upon the sympathy of the reader to make the distinction. However, I am in a position to offer some cruder rules of thumb for distinguishing the two. It bears emphasis that this distinction is made at this time for investigative purposes only, and we leave open for now exactly what theoretical significance to attach to this split.

In extensional non-negative contexts, one can generally make a substitution with the existential use of the bare plural that is not generally available for the generic use. This is the substitution of a 'higher-order' bare plural. For example, if it is true that *dogs* are here, it must also be true that *mammals* are here, since all dogs are mammals. However, on the generic use, this substitution is generally not sanctioned. If it is true that dogs bark, it does not necessarily follow that mammals bark, even though all dogs are mammals. It is also generally the case that the existential use of the bare plural can be paraphrased by use of prefixing *some* to the NP, whereas the generic is usually able to be paraphrased by prefixing *all* or *most* to the bare plural. While these rules of thumb will not work in all cases, and in those cases we must rely on sheer intuition for now, they should be taken as a rough guide to the supposed distinction.

1.1 Previous suggestions. There is a persistent notion exhibited in the literature that the generic use of the bare plural is to be properly represented as having associated with it a universal quantifier, as if the NP *dogs* meant *all dogs*. The development of this notion is based on a number of cases where such an analysis would seem quite appropriate. The sentence of (1) appears to be quite accurately represented by the formula in (2).

(1) Dogs are mammals.

(2) $(\forall x)(\text{Dog}(x) \rightarrow \text{Mammal}(x))$

However, such a representation is clearly inadequate for a number of other cases. To symbolize (3) in terms of (4) is surely mistaken, as (3) is a true sentence, but the formula of (4) is false.

(3) Dogs bark.

(4) $(\forall x)(\text{Dog}(x) \rightarrow \text{Bark}(x))$

(4) is falsified by a single example of a non-barking dog, and as there are many instances of such dogs to be found in the world, (4) is indeed false. But these counterexamples do not appear to materially affect the truth of (3), which remains true even in the face of the existence of many dogs that do not bark.

It is difficult for me to attribute to any one particular source the notion that the English bare plural is to be analyzed as a disguised universal in the generic cases. In any event, it seems quite clear that it is the result of looking at the semantics of natural language through the eyes of the notational system available

in formal logic. The logical tradition extends at least as far back as Aristotle and his studies on the syllogism. In a system such as his, four particular sorts of sentences come under particular scrutiny -- the existential, the universal, and their contradictories. Since these sorts of sentences are quite well understood in terms of the logical system that can be devised by looking at their various interactions and entailments, it is a natural enough move for one to make an attempt to analyze other sorts of sentences in terms of these. The development of a symbolic logic did little to change this basic outlook, as it, too, deals almost exclusively with the existential and the universal. It is, of course, recognized by logicians that certain distinctions that hold in natural language are sometimes obscured by representing certain classes of sentences in terms of first-order quantificational logic. For example, the four sentences below would all be represented semantically by the formula found in (2).

(5) a. Any dog is a mammal.

b. All dogs are mammals.

c. Each dog is a mammal.

d. Every dog is a mammal.

In spite of the fact that the four quantifiers exemplified in (5) are quite distinct from one another in any number of ways, it seems nonetheless quite plausible to represent all four of them in a similar manner. And adding the bare plural to this list appears at first sight to be no more than ignoring similar sorts of differences. Indeed, the standard logic textbooks of the day (for instance, Copi (1967) and Suppes (1957)) advocate treating the bare plural, on its generic use, as simply another variant of the list in (5).

But this tradition has infiltrated the thinking of more than just those interested in the didactic techniques for teaching logic. Quine (1960, p. 134) makes the claim that "Sometimes the plural form of a general term does merely the work of the singular form plus *every*; thus *Lions like red meat, I dislike lions.*" He then proceeds to list at least three other uses of the bare plural. Bennett (1974) suggests that *lions* is elliptical for *all lions*, and in this respect he seems to be following a suggestion made in Montague (1970). Parsons (1970) takes a similar approach for certain instances of the bare plural. Bartsch (1972) also advocates treating the bare plural as a disguised universal, though she appends a remark that the bare plural has different conditions under which it may be used in natural language. Bacon (1974) has a slightly different sort of analysis in mind, when he posits an unpronounced pseudo-temporal quantifier *always* as being present in generic sen-

tences. Thus, *Lions are tawny* is really something like *Lions are always tawny*, which he notes is equivalent to *Every lion is tawny*. We also find that Frege (1970) in 'On Concept and Object' makes a similar sort of suggestion for treating the definite generic (as *the horse*) in certain instances.

It should be emphasized that these suggestions listed above were made largely in an off-hand manner, and were never argued for at any length. In addition, all of the above were assuming that the bare plural should be treated in a multiple number of ways, or at least as being two-ways ambiguous. Thus, those instances of the bare plural that are not accurately represented by the universal quantifier would simply be represented in another way.

When we are seeking one and only one semantic interpretation to associate with the English bare plural regardless of context, it is eminently clear that regarding it as a disguised universal is simply inadequate, and anyone who has momentarily pondered the proposal would reject it out of hand. The most notable problem that arises has been alluded to above. It is that many sentences containing generic instances of the bare plural are simply not falsified by the presence of one or even a number of counterexamples. The knowledge that there are three-legged rabbits does not falsify the statement that rabbits have four legs. It would serve to falsify the claim that *all* rabbits have four legs, however. So, supposing that there is a quantifier of sorts associated with the generic instances of the bare plural, this quantifier would have the ability to tolerate exceptions.

Exactly how to construct a quantifier that will 'tolerate exceptions' is not entirely clear. There have appeared at least three suggestions for doing this, only two of which are explicit enough to bear close examination. One way of tolerating exceptions is set forth by Twardowski as cited in Bacon (1974), and appears as a key ingredient in the treatment accorded bare plurals and other generics in Dahl (1975). Under this treatment, the generic quantifier is essentially paraphrased as meaning *all normal*; thus, *rabbits have four legs* is treated as if it meant *all normal rabbits have four legs*. In this way the notion that there is a universal quantifier associated with the bare plural is preserved, but the exceptions are tolerated because they do not appear in the domain quantified over by the universal. One immediate problem, as Dahl notes, is finding an independent means of defining normality, for there is the ever-present danger that the definition of normality might turn out to be characterized in a circular manner. Though this is quite clearly a problem, it is one I will not explicitly discuss as there are other reasons for thinking this particular analysis to be incorrect. If defining normality were the sole problem associated with this analysis, I think it would not be unreasonable

to accept the analysis, in spite of its vagueness, as a good first approximation.

A second means of tolerating exceptions is alluded to in Parsons (1970) and endorsed implicitly in Nunberg and Pan (1975), where they claim that the bare plural generics "...tolerate the predication of properties that hold only in virtue of statistical generalization over a class." That is, we treat the generic cases of the bare plural as having associated with them a quantifier with properties similar to the quantifier *most*. Its truth conditions are such that if 'enough' x's have some given property, the bare plural may be felicitously used. Under this conception of matters, the properties truly assigned the bare plural are a function of the sheer numerical frequency with which a certain property shows up among a certain class of individuals. Exceptions are tolerated simply because they are so few in number by comparison to those individuals that are not exceptions. So it is true that rabbits have four legs because an overwhelming majority of all rabbits do have four legs, though there are a few that do not.

Both of these suggestions strike me as being really quite reasonable, as they appear to have a good deal of intuitive appeal as accounts of how it is we judge generic sentences containing bare plurals to be true or false. A third line of analysis, taken by Jackendoff (1972) and Lawler (1973) is to posit a specifically generic quantifier which in some unspecified manner behaves like a universal but tolerates exceptions. I simply take this as being the claim that bare plural NP's do in fact have some quantifier associated with them. Whether or not this claim is distinct from those mentioned above cannot be discerned due to the vagueness with which this generic quantifier is characterized.

I will now embark on an examination of the merits of these possible analyses. I will first of all consider the first two, and I will argue that the empirical predictions they make concerning the truth conditions of certain English sentences are in fact false, and that in some cases the entailments are not accurate. It will then be argued that the conceptions of the bare plural as having any quantifier associated with its interpretation cannot be correct, and in this way the third possibility, as well as the first two, will be argued against.

2. Inadequacies of Previous Approaches

2.1 *All Normal*. Treating the generic quantifier as a universal quantifier ranging over normal instances suffers at least two sorts of difficulties. The first is that we need a semantic analysis that will account for all bare plural NP's, including those

containing relative clauses, adjectives, and other modifiers, as well as those containing a simple plural noun. Among these NP's will be expressions such as *normal kittens* and *abnormal drunk physicians*. The difficulty then arises for this particular analysis as to a means of defining what a *normal* normal kitten is, or, even worse, what a *normal* abnormal drunk physician is. It is not clear that either of these NP's can be truly said to have normal representatives. As this borders on the issue of defining normality, I will immediately proceed to other objections.

In some cases, we find that the wrong truth conditions are predicted for certain sentences, as certain other sentences would seem to entail their contradictions. Consider the following.

(6) Chickens lay eggs.

(6) is a true sentence. Its proposed semantic representation might be something of the following form.

(7) $(\forall x)$(Normal Chicken(x) $\rightarrow$ (x) lays eggs)

We also know it to be true that only female chickens lay eggs. It then follows that only female chickens can be included among the normal chickens; if any males were allowed, sentence (6), as represented in (7), would be falsified. So we know that all normal chickens are female. Since all female chickens that lay eggs are hens, the following sentence is predicted to be true.

(8) Chickens are hens.

But (8) is simply not true.

A similar sort of situation exists with respect to the following pair of true sentences.

(9) Lions have manes.

(10) Lions give milk to their young.

Although (9) is true, we know that only male lions have manes, and not cubs or females. Hence, the predicted analysis of this sentence entails that all normal lions are male. Sentence (10) is also true, but in this case the giving of milk to the young is a property of only the females of the species. So it would seem that all normal lions are female. But since it is generally the case that if something is male it is not female, and vice-versa, we can derive the inference that all normal lions are male and not male, and that all normal lions are female and not female. So the analysis under consideration gives rise to contradictions.

We also find under certain circumstances that other entailments are not entirely correct. It would seem that if dogs are

mammals, and if Fido is a dog, then Fido must be a mammal. But let us look a bit closer at the proposed analysis of *dogs are mammals*. It would say that all normal dogs are mammals. But what if there is something quite abnormal about Fido (e.g. she has two heads, or three legs)? It seems that we would still wish to be able to conclude that Fido is a mammal from the knowledge given above, but the proposed analysis does not give us this entailment. Of course, one could possibly write a meaning postulate of some sort to obtain the correct entailment here, but it would apply to those NP's exhibiting this one particular quantifier, and no others. We will in the end be making use of a meaning postulate, but the unusual nature of the bare plural will be shown in such a way that we will not have any such peculiar quantifiers.

As a further illustration of the sorts of difficulties this analysis gives rise to, consider what would be the proposition expressed by sentence (11).

(11) Dogs are smarter than cats.

Informally, it would be characterized by the following formula.

(11') $(\forall x)(\forall y)$(Normal Dog (x) & Normal Cat(y) $\rightarrow$ x is smarter than y)

This says that each and every normal dog is smarter than each and every normal cat. But this is much too strong, for one who is making the claim in (11) is not committed to any such formula as well. Rather, (11) seems unambiguously to indicate that what is being claimed is that the average intelligence of dogs exceeds that of cats, or some such notion. (11) could very well be true at the same time the formula of (11') is false.

We see, then, that the analysis claiming that the bare plural is to be analyzed as involving universal quantification over normal cases runs into serious difficulty in accounting correctly for a number of cases of generic sentences. More problems will be pointed out in the sections that follow.

2.2 *Most*. Treating the bare plural as having associated with it a quantifier having the properties of the quantifier *most* is subject to similar charges of inadequacy, although it does not have the problem of defining normalcy.

Perhaps the chief weakness of this particular account is that it is too strong a criterion in some cases, and too weak in others. The general prediction is that if an overwhelming majority of x's have some property, then x's generally have that property. Since an overwhelming majority of rabbits have four legs, we can therefore

truly claim that rabbits have four legs. And since it is not the case that an overwhelming majority of dogs climb trees, then dogs do not climb trees. Unfortunately for this proposal, however, there are many cases where something less than half of the individuals under consideration have some certain property, yet we still can truly predicate that property of the appropriate bare plural. For instance, if one were to examine all the lions on earth, one would soon find that the majority do not have a neck mane. Nonetheless, it appears to be quite true that lions have manes. The analysis under consideration would predict this to be false.

In the following set of examples are listed a number of other counterexamples to this hypothesis, where the predicate of the sentence is true only of a minority of the individuals under consideration, but the sentence seems true nevertheless.

(12) a. Mammals give birth to live young.

b. Alligators grow to attain a length of somewhere between fifteen and twenty feet. (Most in fact perish as infants)

c. Cardinals are red. (The females are a dull rust)

d. Rats are bothersome to people. (Most in fact are never seen by anyone, or bother anyone)

e. Bostonians are incredibly bad drivers. (Actually, only one in three is <u>incredibly</u> bad)

f. Shoplifters are prosecuted in criminal court. (Most are never caught, much less prosecuted)

g. Mosquitos carry the paramecium that causes yellow fever. (Fortunately, most do not)

But it would obviously be a mistake to allow that a property may hold of the bare plural just in case it also holds of some individuals, as the cases above might suggest. In fact, there are many cases of predicates for which it is true that the vast majority of a class exhibits that property, but the predicate is still not true of the bare plural. For instance, a walk through any bookstore will convince any observer that the majority of books are printed in paperback rather than in hardcover. Though it is true that most books are paperbacks, it is not true that BOOKS are paperbacks. In (13) are listed some other cases where the predicate is true of most relevant individuals, but it is not true of the bare plural.

(13) a. Seeds don't germinate. (Most never do)

(13) b. Crocodiles die before they attain an age of two weeks.

c. Bees are sexually sterile. (All but queen and drone)

d. Sharks never attack bathers. (Very few ever do)

e. Prime numbers are odd. (All but *two*)

So as a general account of the truth conditions for generic sentences with bare plurals, positing an associated quantifier like *most* is insufficient.

We also find that this account does not in all cases give us the correct entailments. As stated above, if Fido is a dog, it would appear to follow that Fido is therefore a mammal. But we cannot derive this entailment if we treat the bare plural as quantified by something like *most*. Again, it would perhaps be possible to formulate certain semantic conditions to make the entailment go through, but it would again apply to this particular quantifier and no others.

2.3 <u>Any quantifier</u>.

2.3.0 <u>Approximation of a quantifier</u>. In order to examine the possibility of associating any quantifier whatsoever with the English bare plural, it is first necessary to discuss a semantic characterization of what a quantifier does. No formal definition will be given here, for that is a protracted process indeed (cf. Cushing (1976) for a detailed discussion). Instead, an informal characterization will be offered which is sufficiently explicit for us to base some arguments on.

A quantifier is, in rough terms, a word that can answer the question *How much?* or *How many?*. It will not always tell you exactly how much or how many, but it will serve as an answer in any case. For example, the question *How many people eat squid?* can be answered variously as *<u>three million</u> people*, *<u>all</u> people*, *<u>a few</u> people*, *<u>most</u> people*, *<u>some</u> people*, and so on. Note that one cannot answer the question with the simple statement *<u>people</u> eat squid*. This, however, does not show conclusively that there is no quantifier associated with the bare plural *people*. In answering questions such as the above, it is quite necessary to add stress to the quantifier to make the response felicitous. Since the null quantifier we are momentarily supposing to exist has no phonological realization, it is quite incapable of bearing stress, thus possibly accounting for the anomaly of the response with the bare plural. In this regard, we note that the indefinite article *an* as well as its likely plural counterpart *sm* cannot be used in answer to such questions, either. *How many people were at the party?* cannot be

answered by saying *a person was at the party* or *sm people*. I will assume that they in fact do take stress, but change forms when this occurs. Following Perlmutter (1970) we assume the stressed form of the indefinite article to be *one* and following Stockwell et al (1973) we assume the stressed form of *sm* to be *some*. The quantifier-like elements of the language that do appear to be able to bear stress, yet still cannot answer such questions, are the definites (the demonstratives, possessives, and the definite article). These will be excluded from the class of quantifiers.

A more workable criterion is based on the function that is assigned to quantifiers within the framework of a formal logical system. This regards quantifiers, roughly, as being semantic entities that tell you how to assign values to variables in order to calculate the truth value of a given sentence. For those unfamiliar with this notion, I offer the following sort of explanation. Consider a sentence like *He is tall*. The reader cannot tell whether or not this sentence is true or false, for (quite obviously) the truth value of the sentence depends on who *he* refers to. If I were to indicate in some way who it is that *he* refers to, or assign a VALUE to *he*, the reader would be in a position, at least in principle, to assess the truth or falsity of the sentence. The sentence *He is tall* will be true for some values of *he*, and false for others. Let us now consider a sentence of the following sort: *For some person, it is true that he is tall*. The reader will recognize this to be a true sentence, in spite of the fact that in this sentence there is no PARTICULAR person being referred to by *he*. This is because the phrase *for some person* has the function of telling us how values are to be assigned to the pronoun *he*. We will interpret this sentence as essentially meaning that the sentence is true if there is some value or other that can be assigned to the pronoun which makes the sentence *he is tall* true. One person might discover this to be true by assigning Kareem Abdul-Jabbar as the value of *he*, and another person might assign Bill Walton, since either of these makes the sentence *he is tall* true if assigned as the value of the pronoun. In like manner, we will interpret the sentence *For every man, he is tall* as being true just in case *he is tall* is true for every value assigned to *he*. As a final example, *For many men it is true that he is tall* is true just in case there are many values that can be assigned to *he* that make the sentence *he is tall* true.

We will treat more natural sounding sentences in like manner. The sentence *Some man is tall* will be treated as if it had the structure of *For some man, he is tall*. And *every man is tall* will be treated as if it had the structure *For every man it is true that he is tall*. We will be using a slightly different notational system as well. In place of using pronouns, we use VARIABLES in their place (the variables are x,y,z), which behave something

like gender-neutral pronouns. As an example of this informal notation used in this section, the sentence *Many men are tall* will be symbolized in the following manner: Many {x: x is a man}(x is tall). The interpretation accorded the formula will be that it asserts that the sentence is true just in case there are many values of x that are men that make the sentence *x is tall* true.

I believe we are now in a position to determine the feasibility of associating with the bare plural a quantifier that tells us how to assign values to variables in order to clearly determine the truth value of a given generic statement.

2.3.1 Fluctuating truth conditions. One of the first problems any such analysis would face is that the generic sentences containing bare plurals seem to fluctuate in their truth conditions as the predicate of the sentence is varied. Let us use G as a symbol for whatever quantifier one might desire to posit as being the generic quantifier, and symbolize a couple of sentences previously mentioned. The sentences of (14) would be symbolized as the corresponding formula found in (15).

(14) a. Dogs are mammals.

b. Dogs give milk to their young.

(15) a. G {x:x is a dog} (x is a mammal)

b. G {x:x is a dog} (x gives milk to x's young)

(14a), as mentioned above, seems most adequately interpreted as meaning that all dogs are mammals, where we interpret G as simply being the universal quantifier. But (14b) shows that this interpretation of G is not adequate, and that G would have to be much more weakly interpreted -- perhaps as meaning *roughly half of all...* But this would predict the truth of the following sentence, which is true for roughly half of all values assigned the variable x, though (16b) is not a sentence we would endorse as being true.

(16) a. G {x:x is a dog} (x is female)

b. Dogs are female.

So we see that G cannot be interpreted as meaning that a certain proportion of the class of dogs, or a certain number of dogs, have a certain property if we say that that property is true of dogs.

The difference between (14b) and (16b) should also serve to lay to rest any notion that when we speak of species, we can attribute to the bare plural any property possessed by all or most males, or by all or most females of the species. That is, when we say that mammals give live birth, though it is true only of female

mammals, we do not wish to construe this as meaning that all or most FEMALES give live birth (among the mammals). There are many properties possessed by only the males or females of a species that cannot be truly attributed to the bare plural -- most notably the properties of being male and female respectively. This analysis would also predict that it is true that cardinals are a dull rust color, because it is true of all (adult) female cardinals. So we see that in order to know how to construe G, we must have knowledge of the particular predicate that is being applied. No other quantifier in English behaves even remotely in a similar fashion. Let us take *most* as an example. It appears that the truth conditions of all the sentences in (17) can be quite neatly represented by claiming them to be true if we substitute a variable for the subject NP and claim that the sentences are true just in case most values from the domain of dogs make the sentence containing the variable true.

(17) a. Most dogs are mammals.

b. Most dogs give milk to their young.

c. Most dogs are females.

2.3.2 The Port-Royal Puzzle. We find that a simlar sort of situation exists with another class of sentences, the semantics of which were discussed in the Port-Royal Logic, originally published in 1662 (Arnauld (1964)). Let us consider sentence (18).

(18) Dutchmen are good sailors.

Let us, following Arnauld, regard (18) as true. In order for (18) to be true, however, it need not be the case that even a substantial portion of the class of Dutchmen are sailors, much less good ones. If we represent this sentence with the G quantifier, we arrive at something like (19).

(19) G{x:x is a Dutchman}(x is a good sailor)

In this case, the quantifier G would have to allow the sentence to be true just in case there are SOME values of x which make the sentence *x is a good sailor* true. But compare this with the false sentence of (20), to be represented as (21).

(20) Dutchmen are sailors.

(21) G{x:x is a Dutchman}(x is a sailor)

Since there have to be at least as many Dutch sailors as there are good Dutch sailors, it would seem that if (18) is true, we would have to accept (20) as true as well -- if the generic quantifier operates like any of the other quantifiers. However, we do not find a similar sort of situation with any other quantifiers as well. For

instance, if (22a) is true, (22b) as well must be true. The same holds for (22c) and (22d).

(22) a. Some Dutchmen are good sailors.

b. Some Dutchmen are sailors.

c. All Dutchmen are good sailors.

d. All Dutchmen are sailors.

So it appears that any general attempt to give a unique characterization to the generic quantifier as an operator that tells us whether or not a sentence is true or false on the basis of assigning a certain number of values to variables is bound to run into extreme difficulty. It appears that the meaning of this quantifier is dependent on whatever happens to be the predicate of the sentence at the time. It is also noted that the various possible 'interpretations' of G cannot be associated with certain syntactically defined classes of predicates. For example, both (18) and (20) have predicate nominals as their predicates. The crucial distinction that is relevant seems to hinge on the MEANING of the predicate itself, and then we think of G as meaning *all*, *most* or *some* as a result of its interaction with the predicate that happens to appear. Without recourse to the particular linguistic context the bare plural appears in, it does not appear that we can consistently specify how G tells us to assign values to variables to calculate the truth conditions of these sentences, as we seem to be able to do with all the other quantifiers.

2.3.3 Incorrect truth conditions. There are many cases of bare plurals in sentences which will be accorded the wrong sort of reading if we regard them as being represented by use of any quantifier at all. As one example, I offer (23).

(23) Whiskey bottles come in three sizes.

A proposed semantic representation of (23), found in (24), would attribute the predicate *comes in three sizes* to a certain number of whiskey bottles. Since any particular whiskey bottle has only one size, (23) would not stand a chance of being true (at least as things are at the present time) if (24) is in fact its correct representation.

(24) G{x:x is a whiskey bottle}(x comes in three sizes)

(24) could not be true no matter how we construe G as a quantifier (unless we take it to be *no*), as *x comes in three sizes* is false for any given whiskey bottle. But (23) could very easily be true.

Similar arguments can be based on the sentences of (25), as their proposed representations in (26) cannot be true for very many of the values assigned to the variables, though the sentences of (25) themselves may quite well be true.

(25) a. Lions come from Africa and Asia.

b. Horses were first ridden by the Egyptians.

c. Bears live in caves as well as in old logs.

d. Dogs are popular pets.

(26) a. G {x:x is a lion} (x comes from Africa and Asia)

b. G {x:x is a horse} (x was first ridden by the Egyptians)

c. G {x:x is a bear}(x lives in caves as well as old logs)

d. G {x:x is a dog} (x is a popular pet)

In fact, the sentences of (25) may very well be true even if the representations of (26) are all false under any interpretation of the quantifier G, so that there is no individual assigned to the variables that make the sentences true.

In some cases of pronominalization, we find that a similar set of facts arises. Compare sentence (27a), which has a quantified NP as subject, with (27b), which contains a bare plural.

(27) a. *Several Hungarians* are good sailors although *they* live far from the sea.

b. *Hungarians* are good sailors although *they* live far from the sea.

Sentence (27a) seems quite accurately represented by the following formula.

(28) Several {x:x is a Hungarian} (x is a good sailor although x lives far from the sea)

The claim of (27a), as represented in (28), is that there are several good Hungarian sailors who nevertheless live far from the sea. In short, there are certain sailors that are quite unusual in that they live a great distance from their work. If we represent (27b) by use of a generic quantifier, we find that we ought to be making a similar claim concerning the distance from the sea that certain sailors live.

(29) G {x:x Hungarian} (x is a good sailor although x lives far from the sea)

(27b) could very well be true even if there were NO Hungarian sailors that lived far from the sea. But the representation in sentence (29) does not allow any such interpretation if we construe G as asserting that there are at least some values assigned to the variables that make the sentence true (i.e. we don't think of G as the quantifier *no*). In sentence (30) are some more examples of such cases, where the representations of (31) make the wrong predictions concerning the truth value of (30) in that NO value assigned to the variables make the sentences true.

(30) a. *Apes* are killing *themselves* off by refusing to breed.

b. *Lions* have manes and ___ give milk to the young.

c. *Edsels* are so ugly that everyone laughs at *them*.

(31) a. Gx{:x ape} (x is killing off x by refusing to breed)

b. Gx{:x lion} (x has a mane and x gives milk to the young)

c. Gx{:x Edsel} (x is so ugly everyone laughs at x)

The interpretation accorded (31c), for example, makes the claim that there are a certain number of Edsels that EVERYONE laughs at. I am sure there are no such Edsels, where everyone laughs at the sight of that particular car.

2.3.4 Special predicates. In addition to these difficulties encountered by an approach which posits there to be a quantifier associated with bare plural NP's, there is the problem of a special set of predicates which cannot meaningfully be said of any particular individuals, nor can they meaningfully be said of any of the quantified NP's of the language. One predicate that has received a certain amount of attention is the adjective *widespread*. This adjective appears to select the bare plural to the exclusion of all other quantified NP's.

(32) a. Palm trees are widespread.

b. ??{All / Most / Three / Some / Many / Few / ...} palm trees are widespread.

The fact of the matter is that (32a) is not strange, in contradistinction to (32b). (We will return later to the fact that there ARE legitimate readings that can be associated with (32b).) We clearly cannot treat (32a) as having a generic quantifier that binds a variable for which we assign values from the range of individual palm trees, as (32c).

(32) c. Gx: {x palm tree} (x is widespread)

Since there are no individual palm trees that can be said to be widespread, there will never be any value assigned to x which will make the sentence *x is widespread* true. If we treat the quantified NP's of (32b) in a similar manner, it will account for the strangeness of these sentences.

There are a number of other predicates in the language which pattern very much like *widespread* in that they resist having quantified NP's as subjects, but are quite acceptable with the bare plurals. The following list exemplifies this class.

(33) *common, rare, numerous, extinct, indigenous to..., be in short supply, be decreasing in numbers, be fast disappearing*

It bears emphasis that these predicates are to be distinguished from the 'group-level' predicates (*vide* Bennett (1974)) that in some cases select plural NP's as subjects or objects. There is something quite strange about (34a) which is not strange about (34b).

(34) a. ??George *gathered.*

b. {Several men / Many men / Lots of men / All the men / Ten men / Men} gathered.

Even though the subject NP may be quantified, if it is not a plural NP, the sentence remains anomalous.

(35) ??{Every man / Each man / One man / Any man} gathered.

Other predicates of this sort include the following:

(36) disperse, riot, surround, be similar, collide, hit one another, dance together, exchange..., pour into the room

These predicates which select the *group-reading* of the plural subject NP are quite different from those predicates listed previously. Even though the plural quantified NP's have group-readings, this does not suffice to make them able to be felicitous subjects of predicates like *widespread*. Since we are supposing that there is a null quantifier, G, which is like any other quantifier of the language in all relevant respects, it turns out that G in this case as well would have to be distinguished from the remaining quantifiers. Apparently G can participate in an NP structure that no other quantifier of the language can possibly participate in (with the exceptions to be discussed later).

Another case that gives rise to some problems for the suggestion that there is a generic QUANTIFIER is a set of sentences discussed in Lewis (1975), which involve what he calls 'adverbs of quantification'. These adverbs of quantification function very much like they are quantifying over the subject NP of the sentence. Sentence (37a) is paraphrased by (37b).

(37) a. Texans are *often* tall.

b. *Many* Texans are tall.

In similar sentences containing a quantified NP as subject, the sentence has an anomalous ring to it that is lacking in (36a).

(38) ??{Some / Most / All / Many / Few / No / ...} Texans are often tall.

We can quite easily account for the difficulty in finding a natural interpretation for (38), for there is no value we could assign to the variable which would make the sentence true, as it would require a person's height to vary considerably through time. *Some Texans are often tall* would be the following:

(39) Some {x:x Texan} (x is often tall)

But this account does not explain how it is that the bare plural NP can quite naturally occur in such a context, to the exclusion of the quantified NP's. We will be returning to this matter at a later time.

2.3.5 Unquantifier-like behavior. If there is a G quantifier present in the semantic structure of bare plurals, we find that it fails to exhibit the characteristic behavior of other quantifiers with respect to scope phenomena. In sentences like (40), there is a

clear scope ambiguity present with respect to the interpretation of the relative scopes of the negation and the quantifier.

(40) Bill doesn't like all wombats.

This can mean either that there are no wombats Bill likes, or that there are some wombats he doesn't like. This can be represented as follows.

(41) a. -(All {x:x wombat} (Bill likes x))

b. All {x:x wombat} (-(Bill likes x))

We find a similar pattern unfolding throughout the range of quantifiers with the possible exception of *any*, which we know to be quite sensitive to the presence or absence of other sorts of material in the sentence, negation among them. As we have not seen that the bare plural exhibits any particular sensitivity to negation, we would therefore expect it to behave like any other quantifier. In this light, examine the semantics of (42).

(42) Bill doesn't like wombats.

If we think of G as being something like a universal, we find that there is no reading of (39) represented by the formula having G within the scope of the negation (the most salient reading, I find, for the other quantifiers).

(43) a. Gx:x wombat (-Bill likes x)

b. *-(Gx:x wombat (Bill likes x))

The latter interpretation apparently is ruled out for some reason. This does not follow from the notion that there is a generic quantifier associated with the bare plural, and again serves at the very least to point up something special about G which makes it quite different from all the other quantifiers.

It also appears to be the case that bare plural NP's do not exhibit scope ambiguity when they appear in embedded clauses. Sentences like (44) are usually regarded as being at least two ways ambiguous.

(44) Jill believes (that) $\left\{\begin{matrix}\text{every professor is}\\ \text{all professors are}\end{matrix}\right\}$ insane.

On the one hand, Jill has a belief about the class of all professors, and she believes that anyone who is a member of that class is insane. On the other hand, there is a less salient reading which means that Jill has a certain belief about a number of particular individuals, and

it may not have occurred to her that she has a belief about all professors. These readings can be represented in the following way.

(45) a. Jill believes (all {x:x professor} (x is insane))

b. all {x:x professor} (Jill believes (x is insane))

A similar sort of ambiguity can be discerned upon examination of the range of quantifiers in this context. However, the bare plural once again appears to be exceptional.

(46) Jill believes (that) professors are insane.

This appears to have only the reading where Jill has a belief concerning a class of individuals -- that being a professor entails insanity -- rather than a collection of beliefs about a number of particular individuals. If we attempt to represent these facts using the G quantifier, we find that for some reason the second formula is not a possible interpretation.

(47) a. Jill believes (G{x:x professor} (x is insane))

b. *G{x:x professor} (Jill believes (x is insane))

So in this respect as well, bare plural NP's do not pattern like the other quantified NP's of the language.

2.3.6 Other NP's. The reasons exhibited above for not assuming there to be a generic quantifier, however, do not exhaust the motivation behind our rejection of a quantificational approach to generic NP's. If we return to an examination of NP's that make reference to kinds of things, I think the most compelling reason of all can be found.

With respect to the phenomena noted concerning the generic interpretation of the bare plural, we find that similar facts hold for NP's that make overt reference to kinds of things. We find, for instance, that the same wide variability of truth-conditions appears for NP's like *this kind of x* as for the bare plurals IF we ask the question *how MANY of 'this kind of x' must have the property P in order to say that 'this kind of x has property P?'*. If the sentence is like (48), the answer is *all of that kind.*

(48) This kind of animal is a mammal.

If the sentence is like (49), the answer seems to be *most*, or at least *most normal.*

(49) This kind of animal barks.

And if the sentences are like the following, we find various sorts of answers to arise.

(50) This kind of bird lays large eggs.

(51) This kind of bird is a good pet.

(52) This kind of animal gives live birth.

So we see that we find the same dazzling array of truth-condition variability here as we did with the bare plural.

In addition, it appears that the following sorts of sentences can be true, even though there may be no individuals of that kind which have the property attributed to the kind.

(53) This kind of mammal is from Africa and Asia.

(54) This kind of container comes in three different sizes.

(55) This kind of animal was first ridden by the Egyptians.

With regard to pronominalization processes, we find here, too, that NP's denoting kinds pattern like the bare plural.

(56) *This kind of car* is so ugly that everyone laughs at *it*.

(57) *This kind of animal* is killing *itself* off by refusing to breed.

Finally, we also see that these NP's that make reference to kinds of things may quite felicitously co-occur with those predicates such as *widespread* which appeared to select the bare plural and not the remaining quantified NP's.

(58) This kind of animal is widespread/common/extinct/fast disappearing/etc.

Adverbs of quantification may also quite naturally co-occur with NP's that make reference to kinds of things.

(59) This kind of person is *often* tall.

If we were to represent the English bare plural as having associated with it a generic quantifier to account for its truth-conditions, one might propose that we do the same sort of thing with NP's like *this kind of animal* to account for its parallel behavior. The immediate problem arises that there is no natural place in the NP for a quantifier to be placed. Unlike the bare plural, where it is quite simple, even tempting, to posit the existence of a quantifier

like the others with the exception that THIS one simply has a null pronunciation, it is not such a transparent move in NP's like *this kind of ...* . An attempt might be made to posit G as appearing after *kind of*, or even as a part of the meaning of *kind*. But this too, will meet with disaster.

As mentioned in the previous chapter, it has been often noted that mass nouns, such as *wine* are regularly interpreted as meaning *kind of wine* if they appear in count-noun form. Thus, *every wine* unambiguously means something like *every kind* (or *brand*, perhaps) *of wine* and *three wines* has a meaning of *three kinds of wine*. This *kind of* interpretation is allowed with virtually the whole range of English quanitifers.[1]

(60) { Three wines / Most wines / Several wines / One wine / Few wines / Each wine / etc. }

What has been less often observed is that count nouns, too, productively participate in this construction. For example, the NP *every animal* can be interpreted as meaning *every particular animal*, or as *every kind of animal*. This ambiguity of interpretation, as with the mass nouns appearing in count form, is found to be allowed by virtually the whole range of English quantifiers. All the following are ambiguous NP's, on the one hand referring to particular individuals, and on the other hand making reference to kinds.

(61) { Three animals / Most animals / All animals / Several animals / Few animals / Each animal / This animal / etc. }

When we examine the behavior of NP's like these on the interpretation of referring to KINDS, we find that they, too, exhibit the same sorts of properties as we observed with the bare plural and phrases like *this kind of ...* to have. We find, for instance, the same variability of truth-conditions.

(62) Some animal is a mammal. (all of some kind of animal are mammals)

(63) One animal barks. (most)

(64) This animal gives live birth. (??)

(65) Some animal is a good pet. (most that are pets are good pets)

And we see that these NP's may participate in the other sorts of constructions which at first appeared to distinguish the bare plural from the quantified NP's.

(66) This container *comes in three different sizes.*

(67) *This animal* is so ugly that everyone laughs at *it*.

(68) One animal is *extinct/widespread/rare/fast disappearing.*

(69) Some animal is *often* tall.

This demonstrates that bare plurals are NOT generally to be distinguished from quantified plural NP's IF the quantified NP is interpreted as meaning *kind of* in terms of what the sentences say about the particular individuals of that kind or those kinds referred to.

Any attempt to posit a generic quantifier G as being a syntactic constitutent of an NP like *some animal* in order to account for its behavior paralleling bare plurals is bound to violate any notion of syntactic motivation. This is because in an NP like *some animal*, the quantifier position is already filled by *some*, and cannot also be occupied by G. So this erases part of the original motivation for positing a null generic quantifier in the bare plural, where there IS a very possibly syntactically motivated position to be filled. Of course if someone really wanted to slide G somewhere into NP's like *one animal*, *some container*, *three birds*, and so on, this is of course possible to do. Since G isn't pronounced, it could be posited as being ANYWHERE. Such an attempt would of necessity have to grant G some syntactic properties from which certain empirical predictions could be made and tested. I seriously doubt that this could be done. In any case, one would then be right back in the position of showing the semantic properties to be associated with G, and how they would interact not only with the bare plurals, but these other more complex NP's as well.

Another tack that might be taken is to allow the generic instances of the bare plural to have associated with them a null quantifier, but make no attempt to posit this quantifier as a constituent of the other sorts of NP's that make reference to kinds of things. However, to do this would require that we account for the same set of facts in one case by positing a quantifier, and in the other case by using some other mechanism. This would be a complete loss of generality, for it is quite evident that an account of one should also be

an account of the other. I stress again that what we have seen represents a coherent and systematic set of unified facts, and those general semantic properties that serve to distinguish the bare plural from quantified NP's are also possessed by NP's that make reference to kinds. To make things look like they should be otherwise is simply incorrect. Since it does not appear at all plausible to treat NP's that refer to kinds of things by positing a null quantifier as a constitutent, it seems to be the best approach to cease to look for a null quantifier that is present in the bare plural as well, and instead look for some mechanism in the grammar that would be able to treat both sorts of cases in a uniform fashion. This is an especially desirable goal, as we found that examining the bare plural alone throws doubt on the presence of a null quantifier.

3. Conclusion

In conclusion, it does not seem that the best approach to be taken in attempting to understand the semantics of the bare plural involves the search for a quantifier to 'fill' the position that seems so conspicuously vacant. This is further bolstered by the fact that in attempting to find a 'generic' quantifier we are wholly ignoring the impetus behind our search for a means of treating all instances of the bare plural in a unified fashion -- our arguments that the existential and generic uses of the bare plural represent a unified phenomenon. A generic quantifier would shed no light whatsoever on this particular aspect of the problem.

In rejecting a quantified approach to account for the semantics of the bare plural, we are not automatically committed to the notion that there is no null element in the determiner system of bare plural NP's at all. We are saying that if there is a null element there, it does not semantically function as a quantifier. We will see in the next chapter that we might posit there as being a null determiner that has the effect to be presented, though it does not function as a quantifier in any way. A bit more will be said about this issue at a later point.

FOOTNOTE TO CHAPTER III

[1]It appears that the indefinite article and the article *sm* may be exceptions to this rule. See chapter 6 for illustrations with the indefinite article.

CHAPTER IV

SEMANTICS OF THE ENGLISH BARE PLURAL[1]

0. Introduction

It is the purpose of this chapter to present a unified analysis of the bare plural construction in such a way as to account for many of the puzzles noted in the previous two chapters. Section (1) will be devoted to a hypothesis concerning the relationship between bare plural NP's and NP's that refer to kinds of things, where it will be argued that bare plurals are the names of kinds of things. These kinds of things are in turn to be regarded not as classes of things, but rather as individuals. Section (2) presents a hypothesis in which an ontology is introduced to account for the existential use of the bare plural, though in those cases, too, it functions as the name of a kind of thing. In this section there is further discussion of the intuitive sense in which we may regard kinds to be individuals. The third section is devoted to a point-by-point explication of the unusual characteristics of the existential use of the bare plural noted in chapter two. It will be shown how these properties follow from the system devised, and how the various properties noted FOLLOW from the unified analysis that is proposed.

Section four discusses the merits of the proposed analysis of the bare plural with respect to other logically possible non-quantificational approaches that have been (perhaps obliquely) suggested in the literature. It will be the conclusion of this section that treating kinds as individuals is more likely to be correct than the other alternatives considered.

Section (5) is a general overview of how the fragment to be proposed at the end of the chapter is to operate. Here, various verb-classes will be presented, and treatments will be proposed for each.

The addition of transformations to the grammar will be very briefly noted in section (6), which will be followed by some proposed applications of the general system to other grammatical constructions that have been noted and puzzled over in the literature. The seventh section will be followed by the final section which contains the fragment itself. It is in this section that we take up the internal structure of the bare plural and the treatment of plurality, a short summary of the auxiliary system, and the addition of labelled bracketings to the rules of the syntax. The chapter ends with a presentation of the actual fragment itself.

All through this chapter, we will constantly be in the process of building up a system for obtaining the correct readings for the bare plural by looking at particular elements of the analysis one at a time. The fact that the fragment of English is placed at the end of the chapter rather than at the beginning (where it might serve as a useful summary of matters to be discussed) is a result of a decision on my part to treat the chapter as building up to the fragment, rather than as a discussion of it. Though this may or may not represent the optimal means of organization for the reader, it has the merit of being an organization that is convenient for the writer.

1. A First Proposal

1.0 Relationship between kinds and bare plurals. I believe that we can come to an initial understanding of how we should analyze the bare plural if we ask ourselves about the relationship that holds between bare plurals and those NP's that make overt reference to kinds of things, such as *some kind of bird*.

For those quantified NP's that we construe as making reference to particular individuals, such as *every man*, we thought of the quantifier as binding a variable in a formula, thereby telling us how to calculate the truth-conditions of the closed sentence by assigning different values to variables in the sentence without a quantifier. On an intuitive level (though this is a formal inaccuracy), the values assigned to the variables might be thought of as being expressions that uniquely select one individual from the domain of individuals.[2] In natural language, proper names appear to be the paradigm case of such expressions. A symbolization of *every man sleeps* would be as follows.

(1) (∀x: x man)(x sleeps)

We stipulate, in accordance with the definition of the universal quantifier, that (1) is true just in case every value assigned to the underscored x from the domain of men makes the sentence *x sleeps* true. The values assigned to x might be thought of as being Joe Smith, Tony Kubek, Alice Cooper, etc. So (1) is true just in case it is true that Joe Smith sleeps, Tony Kubek sleeps, Alice Cooper sleeps..., and so on until we have exhausted the domain of men (until we have asserted that each sleeps).

Let us, in this light, examine a sentence like *every kind of bird eats*. An entirely reasonable means of symbolizing this sentence would be to treat it in a fashion like (1).

(2) (∀x:x kind of bird)(x eats)

This formula is true, then, if for any value assigned to x from the domain of kinds of birds, *x eats* is true. In the case of (1), we obtain intuitively satisfactory results for its truth-conditions by using proper names substituted for *x* as an informal means of assigning values to x. But in the case of (2), no names of particular individuals can be used, as *Max* can hardly be considered the name of a kind of thing.

Though it is not strictly necessary for us to be able to find names of kinds of things in order for our formal system to operate, it is nonetheless fruitful to consider whether or not there are any English NP's that we could substitute for x in (2) as an intuitively satisfying means of assigning values to x that are from the domain of kinds of birds. If I asserted that every man eats, I would be making the claim that the sentence *Henry Kissinger eats* has to be true, as Henry Kissinger is in the domain of men. If Henry Kissinger does not in fact eat, my claim that every man eats is false. If I assert that every kind of bird eats, it seems that I would also have to be claiming that orioles eat, that sparrows eat, that pheasants eat, and so forth. If it turns out that orioles do not eat, my claim that every kind of bird eats would seem to be falsified. Likewise for pheasants, robins, and so forth. This appears to be intuitively quite sound, and very parallel in thought to the case illustrated above in (1). Note that what we were (intuitively) using to assign values to x from the domain of kinds of birds were bare plural NP's. These, then, I propose function grammatically as the names of kinds of things. The relationship between an NP like *this man* and *John* is just like the relationship between an NP like *this kind of bird* and *robins*.

The claim that bare plural NP's function grammatically as names may at first sight appear somewhat strange, for most grammarians have made a distinction between proper names on the one hand and common nouns on the other, and the bare plural NP's are much more readily associated with the latter. But I think there is a little more evidence that shows that construing bare plurals as being names is not so far-fetched as it first may appear. Postal (1969) notes a similarity between bare plural NP's and proper names with respect to the English *so-called* construction. This construction appears to select only proper names and bare plurals (along with the definite generic NP, which will be discussed in Chapter 7) to the exclusion of all other NP's. The sentences of (3a) and (3b) seem quite natural. In the case of (3c), however, something is clearly amiss.

(3) a. Slim is so-called because of his slender build.

b. {Cardinals are / The cardinal is} so-called because of {their / its} color.

c. *{All / Most / Few / Some / These / etc.} cardinals are so-called because of their color.

Smith (1964) also notes that another construction seems to favor proper names and bare plurals, though I find definite descriptions quite natural as well.

(4) a. *Mean though Bill is*, he hasn't the heart to do that.

b. Mean though *bobcats* are, they are still good pets.

c. ??Mean though {several bobcats / all bobcats / those bobcats / etc.} are, they wouldn't harm our dog.

In addition, there appear to be a large number of indications that bare plural NP's pattern more like proper names in the grammar than quantified plural NP's, though I know of no other constructions which select proper names and bare plurals to the exclusion of all other possibilities. Bare plurals, like proper names, are quite natural as vocatives, though most quantified NP's sound quite strange. (see also Lakoff (1971).)

(5) a. Fred! Lend me your ears.

b. {Friends! / Soldiers! / Veterans!} Lend me your ears.

c. {??Many friends! / ?All veterans! / *Some man!} Lend me your ears.

Bare plurals further allow backwards pronominalization, support non-restrictive relative clauses, and, as we will see in chapter 5, participate in certain pronominalization phenomena, each of which is a general characteristic of proper names, but not of all quantified NP's. So it appears that treating bare plurals as names may not be so incorrect as it may first seem. A similar notion appears in Kripke (1972) and in Putnam (1975). As we proceed, we will see other advantages for treating bare plurals in this manner.

1.1 Kinds as individuals. We have said that the English bare plural functions grammatically as the name of a kind of thing. It remains for us to investigate exactly what a kind of thing is. We will proceed initially by analogy, and show that there are certain advantages in thinking of kinds as being like individuals. In the section that follows, a characterization of 'an individual' will be discussed at length, and in section four an examination of alternative characterizations of kinds will be conducted.

Perhaps the most recalcitrant aspect of generic sentences containing bare plurals is their general resistance to a quantificational approach due to the (apparent) wide variation in truth-conditions associated with such sentences. This fact has been noted above at some length, and any account given here should be able to accomodate this variability. I am going to suggest that in fact this variability in truth-conditions becomes an issue as the result of our asking the wrong question in such cases.

There are other sorts of sentences for which there is a similar sort of variability that appears to show up if we ask the same sort of questions about them as we do generic sentences containing base plural subjects. Consider, for instance, the truth-conditions of the following sentence.

(6) The battalion was wiped out.

One might be inclined to count this sentence as being true if and only if every MEMBER of the battalion were wiped out. So we might think of (6) as containing a universal quantifer, even though there is no obvious place for one. But if the predicate of the sentence is changed, we find that we are inclined to accept a different quantifier as being more appropriate.

(7) The battalion is quite tired now.

In this case, there is no compulsion to think of this being true if and only if all the members of the battalion are quite tired. It seems that MOST being tired would be all that is required. But another predicate might yield a different result.

(8) The first battalion handles ammunition.

(8) could be true even if a minority of the members of the battalion

handle ammunition. In fact, if this were a real army battalion, only a minority of members WOULD handle ammunition, the majority of them being sergeants, officers, cooks, typists, supply people, mechanics, or downright lazy. Or consider the sentence:

(9) The battalion shifted its position slightly.

This could be true even if no member only SLIGHTLY shifted his position, or it could be true if most members remained stationary, but only a few members actually moved. There are any number of ways that a battalion can change position which don't entail anything in particular about the members of the battalion.

And there are the sorts of predicates which may be true of the battalion, even though completely false for any of its members. A few are presented in (10).

(10) a. The first battalion has served its country for 200 years.

b. The first battalion was given an award for bravery.

c. The first battalion is the worst one in the brigade.

d. The first battalion is too large, and must be cut.

e. The battalion has been dismantled.

In the examples of (10), we are not even tempted to think in terms of how many members the predicate must apply to in order for the sentence to be true.

The most reasonable approach to an account of this that I can imagine is to treat the battalion as being an individual in its own right, with all sorts of properties associated with it that may or may not be related to properties of its members. This does not claim that the properties of individual MEMBERS are completely irrelevant in determining which properties are to be associated with the battalion. Rather, it denies that the battalion has as its properties ONLY those which can be expressed in terms of quantification over its members. In place of searching for some quantifier that ranges over members of the battalion, the question becomes one of discovering how it is that we recognize as true or false certain things said about the battalion. In this process of recognition, we bring with us a whole set of assumptions about the world and how real armies work in the world. In many cases, we can infer what sort of quantification would be appropriate. But this process of inference, I believe, should be viewed as an extra-grammatical process, and hence beyond the scope of semantics (as the area of semantics is conceived here). As any attempt

to treat properties of battalions as being properties derived from quantifying over the members is, it appears, unworkable, this way of looking at the matter I believe is quite fruitful.

A more apt analogy, and one that relates directly to generic sentences containing bare plural NP's, is drawn from the ranks of generic sentences involving particular individuals (sometimes called 'habituals'). Lawler (1973) spends a good deal of time puzzling over sentences like the following.

(11) Fido chases cars.

His proposal is that sentences such as (11) are to be represented semantically as involving quantification over events, the events being in this case Fido chasing cars. So (11) is then true iff Fido has chased cars on x number of occasions (or at x number of times). One of the first problems encountered in positing a quantifier over events is that it is virtually impossible to consistently state its effect, and it seems to require the knowledge of what predicate is in the sentence under scrutiny. (11) does not require that Fido chase all cars he sees, or that he is chasing cars at all times. On the other hand, one car-chasing occasion would not appear adequate to substantiate the truth of (11). Compare (11) with (12).

(12) Fido barks at the mailman.

(12) appears to indicate that Fido barks most of the time when the mailman arrives. Unlike (11), where Fido need not even chase a majority of passing cars, in (12) it appears that he must bark at the mailman on at least a majority of those occasions when the mailman encounters Fido.

The array of quantifiers necessary for an accurate description along these lines is quite astounding, ranging from the universal to the existential. If John beats small children, the frequency with which he does so may be considerably less than the frequency with which he must repair cars if we claim that John repairs cars. And if John runs the mile in 3:45, he need do so with considerably less frequency than if we say that he reads the *Times*. Zemach (1975) makes a similar point. He notes that the truth-conditions for *John is a murderer* and *John is a teacher* require dissimilar sorts of 'quantification over events.' There are other instances of sentences that have the same surface characteristics as habituals which, in any event, do not appear easily reducible to any talk of 'events' in any natural way. The sentences of (13), though in a certain sense "habitual", cannot be represented in any consistent manner as involving quantification over times at which such-and-such a thing happens.

(13) a. John is a human being.

b. John knows very little.

c. John loves Mary.

d. John is afraid of ghosts.

e. John resembles Myron Adams.

Some mechanism would have to be brought into play to ensure that the sentences of (13) are not associated with a quantifier in its structure that ranges over events, and that habituals would always exhibit such a quantifier.

In all these cases that seem to be connected to events in some intuitively straightforward way, the crucial point is that we must know the nature of the predicate of the sentence in order to determine what sort of quantifier would be deemed appropriate. We cannot simply look at the sentence before us and note (for instance) that it is in the simple present tense, and on that basis assign some quantifier over events which will determine the truth-value of the whole sentence. Since the lexical nature of the predicate is so crucial in determining the quantification it appears to rob the quantifier itself of any GENERAL role that it might play in the semantics of sentences with similar syntactic structure.

I believe that a more elegant solution to this general problem is to be found in the denial of the existence of such a quantifier. Since we must first know what the meaning of the predicate is prior to determining what sort of quantification might be most appropriate, it seems appropriate to construct the semantics in such a way as to reflect this dependency.

In the formal semantics of a sentence like *John is a spy*, we make the claim, essentially, that there is a set of spies and that John is a member of that set. But suppose a person (knowing who John is) wanted to know whether the sentence *John is a spy* were true or false. In the process of actually going out and discovering the truth-value of such an utterance, one goes through an incredibly intricate process of deduction, induction, and cognition (maybe intuition as well). This matter of what constitutes EVIDENCE for the claim is not something we can abstract away from a representation of the meaning of the sentence. We would go through quite different sorts of processes in attempting to determine the truth-value of a similar sort of sentence, such as *John is a robot*. The meaning of the predicate of the sentence dictates what sort of evidence we take into account if we are so inclined as to want to determine the truth-value of the sentence. (As Miller and Johnson-Laird (1976) point out, it's amazing how much we hear that we accept as true without evidence.)

I believe exactly the same sort of thing is to be said of habitual sentences as well. If we predicate *chases cars* of Fido, we are semantically making the claim that there is a set of things that chases cars, and that Fido is in that set. If we wish to discover the truth-value of that claim, we ask ourselves first what would count as EVIDENCE for that claim. Then we go through the quite complex cognitive task of amassing the evidence pro or con. Part of our processes in this case would be INFERRING quantification over certain sorts of events which serve as evidence for the claim. Since we cannot make this inference without first knowing what the sentence is claiming, and since we infer different sorts of things from different sorts of claims, we find a wildly fluctuating array of facts when we attempt to semantically relate the evidence to the claim being made. I agree with Nunberg and Pan (1975) in that it is possible to infer quantification in sentences that "have no explicit indication of quantification in semantic representations." And concerning the relationship between a statement like *Fido chases cars* and the events on which he does so, I think Goldsmith and Woisetschlaeger (1976) put it best: "...they are equally basic; their relationship is as evidence and knowledge."

I am advocating a like approach for bare plural generics as well, where we treat bare plurals as names of individuals (just as *John* names an individual), and this individual has certain properties associated with it that may or may not be related to the properties of things of that kind. We deny that there is either a quantifier associated with the bare plural NP itself, or with the predicates of the various generic sentences. Our semantics will essentially tell us that *Dogs bark* is true iff the individual kind denoted by *dogs* is in the set of things that *bark*. From this statement we may infer quantification over particular dogs, or events on which a dog is barking, but we do not represent in the semantic interpretation of the sentence how we go about determining the evidence for the claim.

What have we gained from looking at things in this way? Might this simply be construed as dumping a problem into the hands of another realm of inquiry, and pretending the generic puzzle is solved? Now we don't have to deal with all that messiness in the semantics, and all us semanticists can breathe easier.

Of course we would be fooling ourselves to think that this 'solves' the generic puzzle in any way. However, I believe the following has been accomplished. Instead of asking the wrong question ('What is the generic quantifier?'), we are now asking the right question ('How can we infer quantification from generic sentences?'). In all fields of endeavor, distinguishing between good questions and bad questions is half the battle.

Ceasing the hunt for a generic quantifier does not, as it may first be supposed, drain the study of the bare plural and of generic

sentences of interest and significance -- or of difficulty. At the very least the existential use of the bare plural must be dealt with. We will now return to an examination of its semantics, and propose a means of unifying the generic use of the bare plural with its existential use. This will be accomplished within the framework of a discussion about the intuitive significance behind thinking of kinds of things as being individuals.

2. Individuals and the Existential Bare Plural

2.0 Particular individuals. It may appear at first sight that calling kinds of things individuals is contrary to our usual notion of what an individual in fact is. Kinds are so abstract where things like *John* are so concrete. But if we look at *John* in a certain way, we see that the notion of him being an individual is not so different from thinking of *men* as being an individual as well.

The notion that individuals are simple, straightforward sorts of things, is a notion that has been known to be simply wrong for a very long time. Heraclitus noted that a person cannot step in the same river twice, for the river (as well as the person) is not, in terms of its physical composition, the same from one instant to the next. Therefore when we make reference to the same object from one time to another, what makes something the same is more than simple identity of material composition. Sameness cannot be reduced, either, to things looking the same, or perceptual indistinguishability. The same person may appear one way at one instant, and another at the next, simply by a change in the light or a quick change of clothes. Nor would we wish to claim that two identical twins are the same person simply because they are indistinguishable. Yet somehow, we may count an infant and a retired fireman as 'the same' individual, even though the infant and the retired fireman have virtually nothing directly observable in common.

In our world of people, cities, refrigerators, and plants, under normal circumstances we are not at all struck by the observation that our notion of an individual is really very elusive and abstract. Occasionally in the real world, though, we do encounter circumstances which challenge our pedestrian assumptions. One quite graphic example is the case of cell division. If a cell divides, do we have two new cells, one old one and one new one, two old cells that are the same? On a slightly more macroscopic level, we find those rare psychotic cases of multiple personalities (as depicted in the film "The Three Faces of Eve") which shatter our notion of a whole, enduring individual in an unusually bizzar way. Many philosophers, at least since the time of the ancient Greeks, have noted that individuals can have these 'identity crises'. A recurrent example is related along the following

lines. We have a wooden ship in a harbor, and every day we come and remove one plank, replacing it with a new plank. The planks thus removed are taken to a new spot, where we construct a ship out of those planks. Eventually, we will have two ships, and explaining in the process which is the original ship is not a simple task. Compare this to what our intuitions would be if we were to destroy each plank upon removal, or if we began with two ships and every day exchanged a plank. One will surely agree that these situations are confusing at best, and that keeping track of the individual ship or ships is not a straightforward matter.

The above should remove any doubts about the abstractness of our notion of an individual, and it should serve to indicate what a complex conceptual entity any individual is, in spite of our everyday assumptions.

We cannot here examine in any great depth exactly what it is that our notion of individualhood involves. However, we will pursue something of a minimal account in order to show the similarity between kinds and more 'normal' sorts of individuals. Let us set the stage anectdotally by constructing a situation that is similar to one that I once encountered.

You are on a picnic and have begun to eat. Out of the bushes pops a ground squirrel, which you throw a scrap of food to. It eats and disappears into the bushes. A few moments later, from another direction, a ground squirrel pops out of the bushes. Since all ground squirrels look pretty much alike (at least to me), there is no way of telling whether or not this second appearance of a ground squirrel is another one, or the same as before. In any event, you feed the second one (the first one?), and it scampers off into the bushes. This process is repeated several times, with only one ground squirrel appearing at a given time, and all appearances seeming quite alike. At this point, you might become curious as to whether or not you have been witnessing appearances of the same ground squirrel, or of several. (At this point, I was visited simultaneously by three ground squirrels which, for some odd reason, I found to be quite relieving.) But continued appearances, all looking alike, and only one appearance of a ground squirrel being seen at a given time, would eventually lead one to think of these appearances as being appearances of the same animal. One might even name the animal *Dale*. And whenever you return to that spot to picnic, you are visited by what appears to be the same ground squirrel. Should this go on for a long enough period of time, certainly all doubt would disappear about the relative continuity of these appearances, and one would think of this one particular animal, which lives in that area and visits you whenever you visit that area, as being an individual, Dale. Now WHAT was

it that was named Dale? Clearly, it is not any particular appearance that bears that name; it is something instead that 'stands behind' these different appearances. Whatever is named Dale makes this succession of appearances into a succession of appearances of the SAME THING.

In this little anecdote, one could easily imagine that a set of unlikely but easily imaginable circumstances converged so that a mistake had been made, and there were indeed a number of different ground squirrels in the area which made regular visits to your picnic spot, but for some unknown reason only one ever appeared at a given time. We have a much more difficult time imagining a similar sort of mistake being made with cities or people with whom you are well acquainted. Nonetheless, one can easily construct fantastic conspiracies being perpetrated where a series of appearances are mistaken as appearances of the same person or thing when in fact they are not. Though in practice it would be quite difficult for my identical twin brother and me to periodically exchange roles in such a way that my wife never notes any change, it is nonetheless a logical possibility. Those much less well acquainted with me are considerably easier to fool.

Let us sum up a partial characterization of the relevant properties of individualhood. For what we have been calling appearances of something above, let us now substitute the more technical term *stage*, following Quine (1960). A stage is conceived of as being, roughly, a spatially and temporally bounded manifestation of something. We think of them as being somewhat akin to Montague's (1970) 'Homaams', and Gabbay and Moravcsik's (1973) 'temporal parts', or Kaplan's (1972) 'assemblages'. An individual, then, is (at least) that whatever-it-is that ties a series of stages together to make them stages of the same thing. So we are looking at the name Dale as naming whatever it is 'behind' all those appearances, or stages, that we witness that make them all appearances OF Dale.

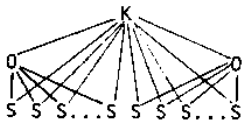
When we look at the notion of an individual in this particular light, it is not a difficult task to apply the same sort of thinking to kinds of things as well. If we put ourselves back into the situation described above, we will recall that the various stages were not described as being totally distinct from one another, having nothing in common. At first we were not certain whether it was the same individual ground squirrel that came popping out of the bushes, but we were sure that the appearances had in common the fact that they were appearances of ground squirrels. So, in this sense, these appearances were indeed appearances of the same thing -- ground squirrels. A kind of thing, then, is that whatever-it-is that ties a series of stages together to make them stages of the same thing. It is in this sense that a kind is to be regarded as also being an individual.

Naturally, we wish to differentiate individuals like Dale from individuals like the kind ground squirrels in some principled manner. Let us henceforth refer to the former sort of individual as *objects* (for want of a better term), and the latter sort of individual simply as *kinds*. There are two major differences that I wish to concentrate on here. The first is that objects, as opposed to kinds, may, in a certain pedestrian sense, occupy only one place at a time. That is, if Mayor Beame is in Albany at a given time, he cannot be in New York City at that very same time. Kinds, though, may function is such a way as to be in many places at a given time. Quite clearly, the presence of ground squirrels in New York City does not preclude the possibility of the presence of ground squirrels in Albany at that very same moment. Though of course this notion of being only in one place at a time ultimately requires a good deal of difficult analysis left unhinted at here, I trust its intuitive significance is fairly straightforward.

The second difference is one that will be motivated a bit later, but which has immediate intuitive appeal. It is that kinds also serve as that whatever-it-is that ties OBJECTS together as well as stages to make them manifestations of the same thing. Objects, on the other hand, only serve to tie stages together, and never other objects. This important difference will receive attention at a later point.

2.1 Representing the bare plural semantically. From what has been said so far, the following sort of organization has been posited within the domain of individuals and stages (which are all regarded as being entities). We take stages to be more primitive in some sense, since they do not serve to tie other things together.[4] If certain (unknown) conditions hold, a series of stages are organized into an individual object. Alternatively, and possibly simultaneously, a set of stages might be organized into an individual kind. A set of objects, too, may be related to a kind in the same way a series of stages is related to an object. If certain criteria hold (which are unknown), a set of objects may be organized into a kind. Kinds, then, have two levels of organization. They may tie together stages, and they may tie together objects. This organization is represented schematically in Figure 1.

Figure 1



K = kind
O = object
S = stage

We will say that a stage is a stage of some object if and only if it *realizes* (or exemplifies) that object, a stage is a stage of a kind iff it realizes (or exemplifies) that kind; an object is an object of a given kind iff it realizes (or exemplifies) that kind. Objects have only one sort of *realization*-stages. Kinds have two sorts -- stages and objects.

We are now in a position to begin to represent formally some of the facts about the bare plurals we have noted. We will be making use of the Montague framework for the time being, though we will be following Bennett (1974) in his treatment whereby individual concepts are done away with, rather than following Montague's PTQ. For simplicity of presentation, the syntax and interpretation of the intensional logic will not be explicitly given until later; questions of the exact syntactic structure of English will be likewise postponed.

It is recognized that a sentence like (14) is at least two ways ambiguous.

(14) Bill ran.

On the one hand, it could specify that there was an occasion on which Bill engaged in a certain activity -- let us call this a 'happening'. On the other hand, the sentence could indicate that Bill had some disposition or characteristic -- that he was one who runs (habitually). We'll call the latter a 'characteristic'. As (14) is ambiguous in this way, as are many other sentences, there must be something in the sentence which gives rise to this ambiguity. How to represent such an ambiguity is not generally agreed upon. One possibility is that the tense morpheme itself carries the ambiguity. I tend to doubt this, as the future 'tense' is likewise ambiguous, though it is represented in English by a modal.

(15) Bill will run.

I also believe that tenseless verbs exhibit a similar sort of ambiguity, (as observed in Lawler (1973)), where the absence of an overt tense marking makes it seem much less plausible that an ambiguous tense could be responsible. In (16), the doctor's orders are ambiguous.

(16) The doctor ordered Bill *to jog*.

The doctor is either ordering Bill to engage temporarily in a happening, or else to be a habitual jogger. If the tense is part of the sentence that bears the happening/characteristic ambiguity, one must derive the infinitive *to jog* from a finite clause. For some arguments against such an approach, see Bach (forthcoming). Likewise, even gerunds can be found to exhibit a similar sort of ambiguity, and gerunds are much less likely derived from finite clauses (cf. Williams (1975)). In (17), the object of consideration may either be a particular happening (attending church on one particular day), or characteristic (being one who habitually attends church).

(17) The couple considered *attending church*.

So having the tense morpheme be responsible for the ambiguity seems much less likely.

The same sort of objections could be voiced in opposition to the notion that there is a 'null modal' that may or may not be present to account for the ambiguity. If it is really a modal (syntactically) it should not co-occur with *will* or be present in infinitives and gerunds, for no other modals may.

For these reasons we will assume that it is the predicate itself which in some way contains the ambiguity. For now, we will think of a verb like *run* as being ambiguous. One homonym, *run'*, gives rise to the 'event' reading of a sentence like (14), and the other, *run''*, gives rise to a generic, or 'characteristic' reading of the sentence. There can be little doubt that these two versions of the verb *run* are related in some systematic way, but we will postpone discussion of this relationship until chapter 5, in favor of examining a first hypothesis concerning how we should represent the differences.

Intuitively, when *run'* (happening) is predicated of an individual, we are saying something about the activity of that individual at some particular time, and probably at some particular place. There is something transient about *run'*, in that it is predicated of an individual in some sense over a short period of time. On the other hand, *run''* says nothing about the activities of the subject at any particular time or place, we have the feeling that there is not something transient about *run''*, and in some sense we feel that it holds of an individual over a long period of time.

A similar set of facts seems to hold among the adjectives of English, as noted by Milsark (1974) (who serves as a primary source of the line of thinking pursued in this section). Milsark noted that there is a predicate restriction placed on the rule of There-Insertion, which allows certain predicates to follow the moved subject, but disallows others. For example, sentence (18a) may be transformed into sentence (18b); (19a) may not be transformed into (19b), in spite of the fact that the syntactic structure of (19a) is identical to that of (18a).

(18) a. Several policemen were *available*.

b. There were several policemen *available*.

(19) a. Several policemen were *intelligent*.

b. *There were several policemen *intelligent*.

The adjectives fall fairly cleanly into two classes -- those that are allowed in the position of the adjectives above (such as *available*), and those that are not (such as *intelligent*). Listed below are some examples of each sort.

(20) a. Allowed: *sick, tired, hungry, drunk, open, naked, alert, awake...*

b. Not allowed: *big, boring, intelligent, insane, orange, fat, smart...*

After warning the reader that he is being quite impressionistic, and that he is by no means giving anything approaching a rigorous definition, Milsark characterizes the differences between the two lists of adjectives in the following manner. He refers to those predicates not allowed by There-Insertion as 'properties', and those allowed (like *available*) as 'states'.

> Properties are those facts about entities which are assumed to be, even if they are not in fact, permanent, unalterable, and in some sense possessed by the entity, while states are conditions which are, in principle, transitory, not possessed by the entity of which they are predicated, and the removal of which causes no change in the essential qualities of the entity.
>
> (p. 212)

This rough characterization could just as easily be applied to the difference between *run'* and *run''* above.

There is one *caveat* that I wish to add regarding the characterizations made by Milsark above and me a bit earlier, and this has to do with the use of the term 'transitory', or 'temporary'. It appears to be reasonably clear that we cannot separate the two lists of adjectives, or the homophonous forms of a verb like *run*, by simply putting a stopwatch on the length of time that a predicate may hold and seeing if the stopwatch reaches a certain critical time. For instance, something does not have to be *big* (a property) longer than it is *open* (a state) (e.g. an expanding door), though we generally expect this to hold. There are a couple of predicates that fall among the predicates allowed (and are thus states) which seem to last quite a long period of time, yet are to be regarded as 'states' -- *alive* and *dead*.

(80) There were five men $\left\{\begin{matrix}\text{alive}\\\text{dead}\end{matrix}\right\}$.

Surely these two predicates, especially the latter, have a certain temporal permanence. So it is clear that the sole criterion for separating the classes of predicates cannot simply be a temporal one. We will not attempt to give any criteria here for distinguishing the two classes of predicates; we will, however, suggest a means of representing whatever their differences are.

There are other sorts of predicates that may appear in the predicate position of structures having undergone There-Insertion as well. We must take care to realize that many of the following structures may be ambiguous in that the predicate might be a reduced relative clause, or some modifier, associated directly with the denoted subject. In any case, below are exemplified cases of prepositional phrases, present progressive participles, and passive participles which allow There-Insertion to apply.

(22) a. Four ducks were *on the corner*.

b. There were four ducks *on the corner*.

(23) a. Several women were *discussing the fight*.

b. There were several women *discussing the fight*.

(24) a. A riot was *put down by the ACLU*.

b. There was a riot *put down by the ACLU*.

Certain other predicates that follow *be* may not allow the application of There-Insertion. No predicate nominals appear to allow the process, and we see that certain prepositional phrases yield questionable results as well.

(26) a. Some man was *a spy*.

b. *There was some man *a spy*.

(27) a. Tires are *in short supply*.

b. *There are tires *in short supply*.

What, then, do verbs, certain adjectives, most PP's, the progressive and the passive participles have in common that the 'characteristic' verbs, the remainder of the adjectives, certain PP, and all predicate nominals do not? Again, Milsark makes the basic observation (though I am slightly expanding on it, and making various minor reinterpretations). He notes that those adjectives which are allowed in There-Insertion select different sorts of subjects from those that are not allowed, in some cases. The non-generic (existential)

use of the indefinite article *a*, the unstressed variant of *some* *a* and, most crucially, the existential reading of the bare plural are all selected by those predicates which may occur as the predicates of there-inserted structures. Those predicates which CANNOT serve as predicates in such structures are strange when predicated of the existential *a*, the unstressed *sm*, and select only the 'universal' interpretation of the bare plural. In (28), with an adjective that may appear in there-inserted structures, we find that a and *sm* are quite acceptable, and that only the existential reading of the bare plural is acceptable. In (29), on the other hand, no existential interpretation is allowed for *a*, *sm* is quite strange, and only the universal reading of the bare plural emerges.

(28) a. Sm doctors are available.

b. A doctor is available.

c. Doctors are available.

(29) a. *Sm doctors are intelligent.

b. (*)A doctor is intelligent.

c. Doctors are intelligent.

We also find that PP's that are allowed select the existential readings as well, and that progressives and passive participles do, too (although the passive is ambiguous).

(30) a. {Sm cats were / Cats were / A cat is} on the corner.

b. {Sm cats were / Cats were / A cat was} running.

c. {Sm cats were / Cats were / A cat was} attacked by Jules.

Predicate nominals, which are not allowed, do not allow the existential interpretations of *a* or the bare plural, and are unacceptable with *sm*.

(31) a. *Sm cats are mammals.

b. (*)A cat is a mammal.

c. Cats are mammals. (universal reading only)

The example of the PP listed above, which does not allow There-Insertion to apply felicitously, selects solely the 'universal' interpretation of the bare plural.

(32) *Tires* are in short supply.

Returning to the verbs, which we noted to be ambiguous between happenings and characteristics, as noted before the 'happening' reading of the verb selects the existential reading of the bare plural. This reading is also felicitous with *a* and *sm*. On the 'characteristic' reading, we find that the universal interpretation of the bare plural is called for, *sm* is disallowed, and the existential reading of the indefinite article is not allowed, either.

(33) a. Dogs ran. (ambiguous)

b. Sm dogs ran. (unambiguously a happening)

c. A dog ran. (ambiguous)

It should be noted that with any of the other sorts of NP's we do not find similar patterns of selection. For example, *three men are intelligent* is as acceptable as *three men are available*; and *every man ran* is ambiguous.

I believe the best way to look at this array of facts is to consider them part of one and the same phenomenon. We will take those predicates which select the existential reading of the bare plural -- verbs, progressives, passives, certain adjectives, and most PP's -- and think of them ALL as speaking of HAPPENINGS. Those predicates that select the universal interpretation of the bare plural -- verbs, passives, certain adjectives, all predicate nominals, and a few PP's -- we will think of as speaking of characteristics. Thus, being intelligent is a characteristic, but being drunk is a happening; being a linguist is a characteristic, but being on the corner is a happening. A VP like *is running* is a happening, but VP's like *be eaten alive* and *runs* are ambiguous between characteristics and happenings.

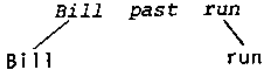
We are now in a position to begin to formalize these observations, and in so doing we will be able to see how it is that the existential reading of the bare plural rises, even though the bare plural itself is ambiguous. We will then return to the problems raised in Chapter 2, and show how it is that the preliminary analysis offered here accounts for the semantic characteristics noted therein in a principled way.

Let us return to the ambiguity of sentence (34), reproduced here.

(34) Bill ran.

First, let us concentrate on representing the habitual reading of the sentence, where running is a general characteristic of Bill. We will represent this in a rather straightforward manner. The predicate of the sentence, which is represented as *run''*, is to be regarded as a set of *individuals* (recall we are regarding both kinds and objects as individuals). In representing *Bill*, we will follow Montague, and treat the NP *Bill* as denoting the set of properties that Bill has. We then offer the following representation of the habitual sense of *Bill ran*. The following may not be regarded strictly speaking as a translation into an intensional logic, but it will serve as a useful approximation thereof. I assume an interpretation of the sort found in Bennett (1974) or Montague PTQ.

(35) Syntax:



Translations: 'Bill' $\lambda P^{\vee}P(b)$

'run' $\underline{run}''$

'Bill run' $\lambda P^{\vee}P(b)\ (\hat{}\underline{run}'') = \underline{run}''(b)$

Here *b* is to be regarded as the individual Bill, and the formula makes the claim that b is in the set of individuals that is named by run''.

How we will represent the other reading of *Bill ran* -- the happening -- is to regard *run'* (the happening) NOT as applying to Bill, the individual, but rather to one of his STAGES. The ultimate claim we would wish to make is that *run'* denotes a set of stages (not a set of individuals), and that (with respect to a given time) the sentence is true iff one of Bill's stages is in that set. In formally representing what has been said here, we cannot simply substitute *run'* for *run''* above (i.e. -- $\underline{run}'(b)$), for that would make the sentence always false (if not sortally incorrect), as *run'* is a set of stages, but Bill is an individual. In order to say what we want here, a relation R is introduced ('realizes'). This two-place, asymmetric, irreflexive, transitive relation holds between stages and individuals. A formula like R(a,b) means that a is a stage of b. This will only make sense if a is a stage and b is an individual (it may be read 'a realizes b'). On the happening reading of (34), the predicate of the sentence will predicate $\underline{run}'$ of some stage, and make the further claim that that stage is a stage of the individual that is the subject of the sentence. The predicate that denotes the set of all individuals who have a stage that runs is the following.

(36) $\lambda x\ \exists y[R(y,x)\ \&\ \underline{run}'(y)]$

Here, x is a variable over individuals, and y is a variable over stages. Translating 'Bill' as before, and applying them in the same manner, we arrive at the following representation for the happening sense of (34).

(37) $\lambda P^{\vee}P(b)(\hat{x}\exists y[R(y,x)\ \&\ \underline{run}'(y)]) = \exists y[R(y,b)\ \&\ \underline{run}'(y)]$

So the difference between the readings of (34) is not that one is true for a limited period of time, whereas the other is true for a more substantial period of time, but rather that $\underline{run}''$ and $\underline{run}'$ are predicated of different sorts of things. One characterizes individuals, and the other characterizes STAGES of individuals.

A similar sort of analysis will be presented for the two classes of adjectives. Those referred to by Milsark as 'states', the ones that select the existential reading of the bare plural, will be predicates that denote sets of stages; the others, like *intelligent*, will be represented as sets of individuals. So, the difference between *John is available* and *John is intelligent* would be represented in the following fashion. (I use obvious abbreviations)

(38) a. *John is intelligent*: $\lambda P^{\vee}P(j)(\hat{}I) = I(j)$

b. *John is available*: $\lambda P^{\vee}P(j)(\hat{x}\ \exists y\ [R(y,x)\ \&\ A'(y)]) =$

$\exists y[R(y,j)\ \&\ A'(y)]$

Most prepositional phrases likewise will be represented as applying to stages, and not directly to individuals.

(39) *John is in Boston*: $\lambda P^{\vee}P(j)(\hat{x}\ \exists y[R(y,x)\ \&\ \underline{in}'(\underline{Boston}')$

$(y)]) = \exists y[R(y,j)\ \&\ \underline{in}'(\underline{Boston}')(y)]$

All predicate nominals, on the other hand, will be thought of as applying to individuals and never to stages of individuals. Hence, *John is a linguist* will be something of the following sort.

(40) $\lambda P^{\vee}P(j)(\hat{}L') = L'(j)$

Characteristics of things, then, are all predicates that apply directly to individuals, whereas happenings are those predicates that apply only to stages of things via the 'realization' relation.

When we turn this analysis to the bare plural, things remain as uncomplicated as above. We will treat the bare plural NP *dogs* as an unanalyzed name, like *John*, and for the time being ignore its internal structure. Its translation, then, will be the set of properties the individual denoted by *dogs* has -- $\widehat{P^{\vee}P}(d)$. Here, *d* is to be thought of as being the individual dogs, just as *b* is Bill, or *j* is John. The following formulae for the following example

sentences are derived just as on the previous page, except substituting *d* for *b* or *j*.

(41) a. *Dogs run* (generic reading -- a characteristic)

$\hat{P}^{\vee}P(d)(\hat{}\underline{run}'') = \underline{run}''(d)$

b. *Dogs ran* (existential reading -- a happening)

$\exists y[R(y,d) \& \underline{run}'(y)]$

c. *Dogs are intelligent*

$I(d)$

d. *Dogs are available*

$\exists y[R(y,d) \& A'(y)]$

e. *Dogs are in Boston*

$\exists y[R(y,d) \& \underline{in}'(\underline{Boston}')(y)]$

f. *Dogs are linguists*

$L'(d)$

In the sentences above, we find that the 'generic' or 'universal' reading of the bare plural is associated with those statements that involve predicates that name sets of individuals, and the existential reading is associated with those predicates that apply to stages of things. This, then, is how the existential use of the bare plural arises: whenever there is an existential claim being made about one or more of its stages. We note that there is an existential quantifier associated with the existential reading of the bare plural. However, that existential quantifier is an independent part of the predicate, and appears no matter what the subject of the sentence is, be it a proper name, a quantified NP, a pronoun, or a bare plural.

In order to arrive at the existential reading for the bare plural, there is no more need to treat the bare plural as being ambiguous than for us to treat an NP like *Bill* as being ambiguous. Exactly the same ambiguity we find in *Bill ran* is present in *Dogs ran*. Whenever something is predicated as being a characteristic of an INDIVIDUAL we are speaking of that whatever-it-is that ties a series of stages together, making them stages of the same thing. This whatever-it-is does not necessarily have to appear at a time and a place -- its STAGES do that. Given the notion that stages are temporally and spatially bounded sorts of things, we can see how the existential interpretation of the bare plural arises. The happening reading of *Dogs ran* makes the claim that there is some stage or

other of *d* which ran. At any given time, there are many, many different d-stages, since there are dogs in various different places in this world. If any one of those individuals that are dogs has a stage that ran, then *Dogs ran* is true (at a given time). There is no necessity whatsoever for ALL or even MOST dogs to run; some running dogs will suffice.

In the case of objects, we do not perceive a similar sort of 'existential' use, as with the bare plural. I think the intuitive reason for this is quite clear. Unlike kinds, objects cannot have stages that appear at various distinct places at a given instant. In the every-day sense of the phrase, an object can only be in one place at a time. Hence, at any given time there is only one stage available for any given object for a predicate to be true or false of. (We may have to modify this view later.) So when we say that *Bill ran* on the happening reading, we don't have a wide range of possible different stages that could be examined, as we do with kinds of things, but our choice of stages is limited to a single stage. So the existential claim of the assertion that there is (at a given time) a Bill-stage that runs does not allow for SOME Bill-stages (over here) to run, and others (over there) to be at rest. In this respect, the quantifier might as well be a universal -- saying that all Bill-stages (at a given time) are running -- since there is but one to choose from. In the case of kinds, like dogs, a universal quantifier would be radically different from an existential.

Given this view of things, we see how it is that the sentence *Dogs ran* can only be two-ways ambiguous instead of possibly four ways ambiguous (meaning some dogs characteristically run, or that all dogs participated in an event of running). The happening reading of the predicate essentially IS the existential reading of the bare plural, and the characteristic reading IS the generic reading of the bare plural. The existential reading arises when there is an existential claim about stages made.

With this overall view of things in mind, along with the rather meager amount of formalism presented, we are now in a position to return to the problems that were presented in the second chapter and re-examine them in this light. I will continue to present things in a quite informal manner, and I will likewise continue to oversimplify questions of English syntactic structure in order to make clear the intuitive understanding of the processes that are involved. We continue to assume an interpretation of the semantics along the lines found in PTQ .

3. Re-examination of Problems from Chapter 2.

3.0 Narrow scope. It was noted that unlike quantified NP's, the existential use of the bare plural fails consistently to exhibit

a scope ambiguity with respect to other quantifiers and negation. The general conclusion reached was that the existential use of the bare plural only exhibited narrow scope, and never wide scope. For instance, (42) has a non-contradictory reading, whereas (42b) does not, being only a contradiction.

(42) a. Some dog is here, and some dog is not here.

b. Dogs are here, and dogs are not here.

The contradictory readings of (42a) and (42b) are represented as being formulae of the form A & -A, where the element with the widest scope in the second conjunct is the negation. If the subject NP is a quantified NP, it may hold scope over the negation. So the second conjunct of (42a) need not have a negative with widest scope but may have an existential quantifier (roughly, the translation of *some*) holding widest scope. So then the form of (42a) on this reading would not be of the form A & -A, and would not thus be a contradiction.[5]

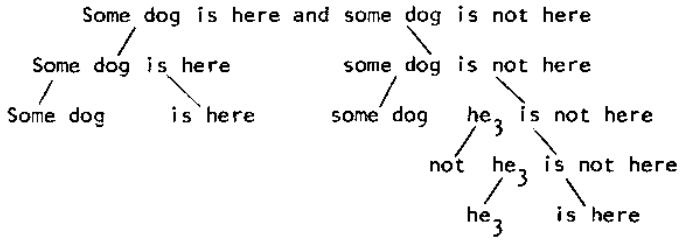
In the case of (42b) with the bare plural subject, we only find a contradictory reading. We attribute this to the treatment of the bare plural as a proper name, so that a bare plural NP like *dogs* does not hold scope over anything in the sentence. As the existential quantifier that appears in the translation of (42b) is in essence a part of the predicate itself (this is the existential quantifier that quantifies over stages of the subject), the existential quantifier cannot hold scope over the negative. Hence, the element that holds wide scope in the second conjunct of (42b) is the negative under all circumstances. So ultimately, (42b) can only be equivalent to a formula of the form A & -A, a contradiction. We find exactly the same result we would find if we were to put a person's name in for the bare plural in (42b), as done in (43).

(43) Fred is here and Fred is not here.

(43), too, has only a contradictory reading.

In formal terms, the derivations below illustrate the following. First, the non-contradictory reading of (42a), then its contradictory reading. There there is a derivation of (42b) illustrating how it only has a contradictory reading. I introduce the use of SORTED VARIABLES here. The superscripts *s* and *i* stand for stages and individuals respectively (bearing in mind that individuals include both kinds and objects). So a variable of the form x^s is a variable that only takes as values stages, and something like y^i may only take as values individuals. We follow the convention of omitting the superscript after its first occurrence in a formula where no confusion will result.

(44) a. (Non-Contradictory)



Translations of elements:

Some dog: $\lambda P(\exists x^i)(\underline{Dog}'(x) \,\&\, {}^{\vee}P(x))$

be here: $\lambda x^i(\exists y^s)[R(y,x) \,\&\, \underline{here}'(y)]$

Translation of sentence:

$\lambda P \exists x^i[\underline{Dog}'(x) \,\&\, {}^{\vee}P(x)](\hat{}\lambda y^i \exists z^s[R(z,y) \,\&\, \underline{here}'(z)])$

$\&\ \lambda P \exists x^i[\underline{Dog}'(x) \,\&\, {}^{\vee}P(x)](\hat{}\lambda y^i \sim \exists z^s$

$[R(z,y) \,\&\, \underline{here}'(z)])$

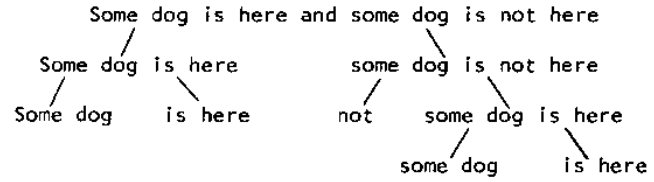
This reduces to:

$\exists x^i[\underline{Dog}'(x) \,\&\, \exists z^s[R(z,x) \,\&\, \underline{here}'(z)]] \,\&$

$\exists y^i[\underline{Dog}'(y) \,\&\, \sim\exists z^s[R(z,y) \,\&\, \underline{here}'(z)]]$

This is not a contradiction.

b. (Contradictory)



Translation of the whole sentence:

$$\lambda P \exists x^{i}[\underline{\underline{Dog}}'(x) \;\&\; {}^{\vee}P(x)](\hat{}\lambda x^{i}\, \exists y^{s}[R(y,x) \;\&\; \underline{\underline{here}}'(y)])$$

$$\&\; \sim[\lambda P \exists z^{i}[\underline{\underline{Dog}}'(z) \;\&\; {}^{\vee}P(z)](\hat{}\lambda x^{i}\, \exists y^{s}$$

$$[R(y,x) \;\&\; \underline{\underline{here}}'(y)]]$$

This reduces to

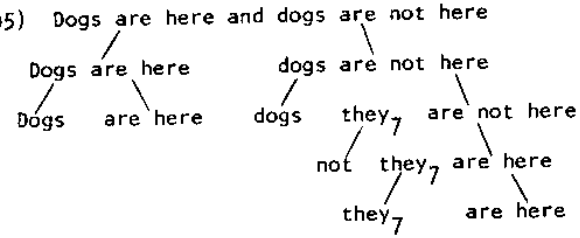
$$\exists x^{i}[\underline{\underline{Dog}}'(x) \;\&\; \exists y^{s}[R(y,x) \;\&\; \underline{\underline{here}}'(y)] \;\&\; \sim\exists z^{i}[\underline{\underline{Dog}}'(z) \;\&$$

$$\exists y^{s}[R(y,z) \;\&\; \underline{\underline{here}}'(y)]].$$

This is a contradiction.

In the case of the bare plural, we exhibit only the derivation where the subject NP in the second conjunct is introduced outside the scope of the negative, as this is the means by which a non-contradictory reading was derived in the example above.

(45) Dogs are here and dogs are not here



Translation of the NP *dogs*: $\lambda P {}^{\vee}P(d)$

Translation of the whole sentence:

$$\lambda P {}^{\vee}P(d)(\hat{}\lambda x^{i}\, \exists z^{s}[R(z,x) \;\&\; \underline{\underline{here}}'(z)]) \;\&\; \lambda P {}^{\vee}P(d)$$

$$(\hat{}\lambda x^{i} \;\; \sim[\exists x^{s}[R(y,x) \;\&\; \underline{\underline{here}}'(y)]])$$

This is equivalent to (by lambda-conversion):

$$\exists z^{s}[R(z,d) \;\&\; \underline{\underline{here}}'(z) \;\&\; \sim\exists y^{s}[R(y,d) \;\&\; \underline{\underline{here}}'(z)]$$

This is contradictory.

So we see that in treating bare plurals as denoting sets of properties of proper names will only give us a contradictory reading for (42b).

In the presence of other quantified NP's, it was also observed in Chapter 2 that in all cases discussed the bare plural, if it had

an existential quantifier associated with it, never held scope over the other quantified NP's. The existential use of the bare plural only exhibited narrow scope possibilities relative to other quantifiers, as it seems to with negation. The intuitive account of this phenomenon that we will offer here is that the existential quantifier apparently associated with the bare plural actually arises as being a part of the translation of the predicate itself. Since all the other arguments of the predicate are combined with the predicate in the syntax, these arguments will in all cases hold scope over the quantifiers that may be 'within' the predicate. As it is this existential quantifier that gives us the existential reading of the bare plural, any other quantified NP in the sentence will appear to in all cases hold scope over the bare plural.

Let us give a concrete example of this. Consider the following sentences, to be interpreted non-generically.

(46) a. Dogs bit every mailman.

b. Every mailman bit dogs.

In neither of these cases, I believe, is there a reading where it was the same group of dogs biting, or being bitten by, every mailman. The universal quantifier (*every*) holds wide scope in both cases.

To give a formal account of this requires us to anticipate a later section and introduce a proposed translation for the transitive verb *bite*. The direct object of this verb apparently makes an existential claim concerning stages of the direct object NP, as in direct object position only the existential reading of the bare plural is found, and existential *a* and *sm* are both felicitous.

(47) George bit $\left\{\begin{matrix}\text{a dog}\\ \text{sm dogs}\\ \text{dogs}\end{matrix}\right\}$.

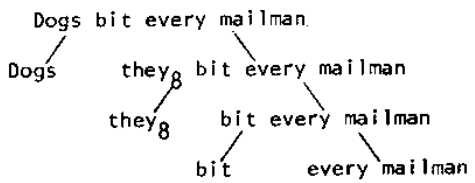
And, of course, on the event reading the subject NP has an existential claim made about a stage of it, as well. We will therefore treat the verb *bite* as CORRESPONDING TO a 'reduced relation' (something like that of Thomason, 1976) which is a relation between stages in this case. Following Thomason's notation, this reduced relation will be signified by superscripting a daggar. The translation of just the verb *bite* (event reading) is suggested to be exemplified below.[6]

(48) $\lambda P \lambda x^{i}[{}^{\vee}P(\hat{y}^{i}\, \exists z^{s}\, \exists w^{s}[R(z,x) \;\&\; R(w,y) \;\&\; \mathit{bite}^{+}(z,w)])]$

Let us now give derivations for (46a) and (46b). In each case we will be introducing the NP *every mailman* with narrowest possible scope, and the bare plural NP will be introduced with wide scope. We see in both of these cases that the universal quantifier in the end holds scope over the existential quantifier that gives rise to the indefinite

plural reading of the bare plural. The resulting translations then do not entail that each mailman bit, or was bitten by, the same dog-stages (and thus, not necessarily the same particular dogs).

(49) a. Syntax:



Translation of *every mailman*:

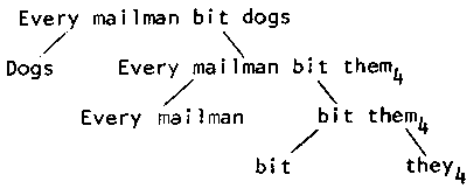
$\lambda P \forall x^{i}[\underline{\text{mailman}}'(x) \rightarrow {}^{\vee}P(x)]$

Translation:

$\lambda P {}^{\vee}P(d)(\hat{x}^{i}[\lambda P \lambda y^{i}[{}^{\vee}P(\hat{z}^{i} \exists z^{s} \exists w^{s}[R(z,y) \,\&\, R(w,z) \,\&\, bite^{+}(z,w)](\lambda P \forall w^{i}[\underline{\text{mailman}}'(w) \rightarrow {}^{\vee}P(w)])](x))$

$= \forall w^{i}[\text{mailman}'(w) \rightarrow \exists z^{s} \exists w^{s}[R(z,d) \,\&\, R(w^{s},w^{i}) \,\&\, bite^{+}(z,w^{s})]]$

b. Syntax:



Translation:

$\lambda P {}^{\vee}P(d)(\hat{u}^{i}[\lambda P \forall w^{i}[\underline{\text{mailman}}'(w) \rightarrow {}^{\vee}P(w)](\lambda P \lambda x^{i}[{}^{\vee}P(\hat{y}^{i} \exists z^{s} \exists w^{s}[R(z,y) \,\&\, R(w,x) \,\&\, bite^{+}(z,w)])](\lambda P {}^{\vee}P(u^{i})))]) =$

$\forall w^{i}[\underline{\text{mailman}}'(w^{i}) \rightarrow \exists z^{s} \exists w^{s}[R(z^{s},w^{i}) \,\&\, R(w^{s},d) \,\&\, bite^{+}(z^{s},w^{s})]]$

In neither of these translations is there an existential quantifier that holds scope over the universal. So, apparently, the bare plural is accorded only 'narrow' scope, even though we might syntactically introduce the bare plural NP with wide scope, as we might have done above.

There are of course some cases where the existential quantifier appears to hold scope over other quantifiers in the sentence. An example of this is the following sentence.

(50) Dogs tried to bite every mailman.

I find two distinct readings for this sentence. On the one hand, for each mailman there are some dogs that are trying to bite him. On the other hand, there are some dogs that are trying to bite all mailmen. This latter reading would appear to be appropriately represented with an existential holding scope over the universal. However, this ambiguity is not, strictly speaking, one simply of relative scope with respect to quantifiers, for it trades crucially on the presence of another independently-motivated ambiguity in the sentence. Note that even if there is a proper name in subject position, the sentence is still ambiguous.

(51) Bob tried to bite every mailman.

The ambiguity here is one of relative scope of the object NP of *bite* with respect to the intensional context created by the verb *try*. It is this ambiguity that appears in (50) and not simply an ambiguity of the relative scope of two NP quantifiers.

We see that the treatment of the existential use of the bare plural here predicts that the bare plural will not interact with other quantifiers or negation in terms of scope ambiguity. There is no reason to expect any such ambiguity at all, as the bare plural itself is like a proper name, and proper names do not exhibit such interaction.

3.1 Opacity phenomena. It was observed that the existential use of the bare plural, when appearing in the scope of an opacity-inducing predicate, exhibited what appeared to be unambiguously an opaque reading. It never has a transparent reading. This is in contrast to the usual behavior of quantified NP's, which generally do participate in this sort of ambiguity in the appropriate contexts. An example of this is (52).

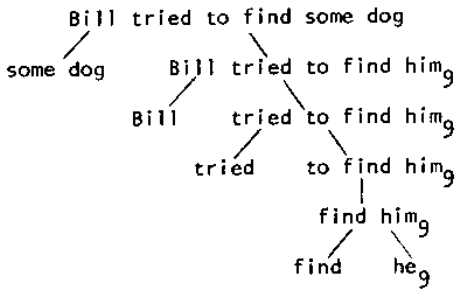
(52) Bill tried to find *some dog*.

There are two possible distinct semantic interpretations that we can associate with (52). On the reading where there is some particular dog Bill tried to find, the transparent reading, the NP *some dog* is

introduced outside the scope of the opacity-inducing predicate *try*. On the reading where Bill was simply trying to find some dog or other, it makes little difference which, the NP *some dog* is introduced within the scope of *try*. This is the opaque reading. Below are given the APPROXIMATE syntax and interpretations of these. We treat *try* here in an approximate way only. The object of *try* is a property of individuals.

(53) a. Transparent reading

Syntax:

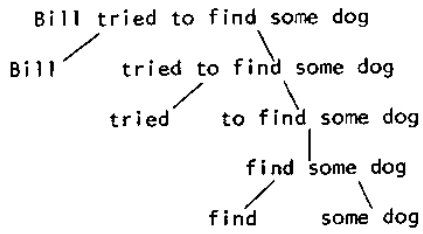


Interpretation: (Reduced)

$$\exists x^{i}[\underline{\text{Dog}}'(x) \;\&\; \underline{\text{try}}'(\hat{w}^{i}\exists z^{s}[R(z,x) \;\&\; \mathit{find}^{+}(w,z)])(b)]$$

b. Opaque reading

Syntax:



Interpretation (Reduced):

$$\underline{\text{try}}'(\hat{w}\exists z^{i}[\underline{\text{Dog}}'(x) \;\&\; \exists z^{s}[R(z,x) \;\&\; \mathit{find}^{+}(w,z)]])(b)$$

If the existential quantifier that is associated with the translation of *some* is outside the scope of *try*, we find the transparent reading,

and if it is within the scope of *try* we find the opaque reading.

An examination of the bare plural in such contexts on the existential reading reveals no similar ambiguity. Consider sentence (54).

(54) Bill tried to find *dogs*.

We can associate two possible syntactic derivations paralleling (vi) and (vii) above with a sentence like (54), but notice that the existential claim -- that there is some dog-stage Bill is trying to find -- must occur within the scope of *try*, as the existential quantifier is really part of the predicate embedded under 'try'. There is no way for THIS existential quantifier to hold scope over 'try'. So there are no particular 'stages' that are being sought. What may or may not hold scope over 'try' is the introduction of the name *dogs*, which names a kind of thing. At no point is there reference made to any individual dogs at all -- we are speaking in (54) of kinds and stages of kinds, but not of any objects that must be dogs. So, on this basis alone, we would not expect there to be a reading of the sentence which speaks of particular individual dogs, for none are even mentioned in the semantic interpretation. We can INFER that Bill tried to find some individual dogs (though no PARTICULAR ones) for it seems reasonable to assume that all stages of the kind *dogs* are also stages of individual dogs. But in (54), as no particular stages are picked out, they could be the stages of any individual dogs at all. This is the inference we make when we think that a sentence like (54) ought to have a reading speaking of some particular dogs on a wide-scope reading. But given the semantic interpretation of (54), such a reading is not even remotely possible.

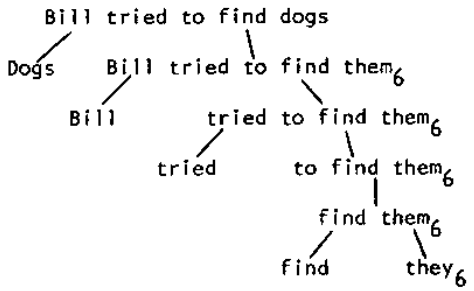
Something approaching an ambiguity MIGHT possibly be argued for. For example, it might be suggested that there is one reading on which Bill knows that dogs are called *dogs*, and he is hunting for them. On another reading, Bill might be trying to find what we call *dogs*, but for some reason he thinks they are called *cats*. While I feel that a sentence like (54) may be thought of as having such an ambiguity, it is by no means agreed-upon as to how such ambiguities, if that's what they are, should be handled. In any case, it is exactly the same sort of ambiguity that appears with proper names, something we would expect if we treat bare plurals as being proper names. A sentence like the following might be thought of as being ambiguous in the same way.

(55) Bill is trying to find Vlad.

On the one hand, Bill might know who Vlad is and that he has the name *Vlad*. On the other hand, Bill might know Vlad as *Dr. O'Reilly*, and not know that Dr. O'Reilly is also Vlad. If we treat this as a real ambiguity of scope, we would be in the position of having to

explain how it is that NP's like proper names exhibit scope in cases like these, but in no other cases at all. I am going to henceforth follow the lead of Kripke, Montague, and others and treat proper names as not ever holding scope, and leave the above-mentioned 'ambiguity' to be accounted for by some other mechanism. Therefore, the following two structures are treated as equivalent, and the claim is that there is no ambiguity in (54), (other than the possibly dubious one mentioned above).

(56) a. Syntax:

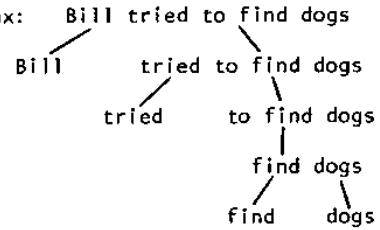


Interpretation:

$$\lambda P^{v} P(d)(x^{i}[\underline{try}'(\hat{w}^{i}\, \exists z^{s}[R(z,x)\ \&\ \underline{\underline{find}}^{+}(w,z)])(b)])$$

$$= \underline{try}'(w^{i} \exists z^{s}[R(z,d)\ \&\ \underline{\underline{find}}^{+}(w,z)])(b)$$

b. Syntax:



Interpretation:

$$\underline{try}'(\hat{w}\, \exists z^{s}[R(z,d)\ \&\ \underline{\underline{find}}^{+}(w,z)])(b)$$

(In these interpretations, certain reductions have been carried out automatically for the sake of perspicuity, such as the treatment of the subject NP *Bill*, and the object of *find*, which is to be treated just like *bite* in this respect).

One will see that as a result of treating bare plurals like proper names the two derivations above reduce to identically-interpreted structures. Hence, there is no predicted ambiguity for any sentence like (54).

In none of these sentences, whether the object of *find* is a quantified NP or a bare plural, does the subject ever stand in relation to any particular stages at all, even though in all cases there is an existential quantifier that ranges over stages present. This is because it is present only as a part of the interpretation of the verb *find*, which must appear within the scope of *try* (as we have no mechanism in the grammar for quantifying in verbs). So no matter what the direct object of *find* is, whether it be a bare plural, a name of a person, or a quantified NP, the subject of the sentence is never trying to find any particular STAGES of something. So this factor of the interpretation never gives rise to any ambiguity in such cases.

Before going on to the next section, a brief observation is in order. The semantics of the bare plural proposed make it so that we interpret (54) as being a relation between Bill and some particular thing, just as when Bill is trying to find John, Bill stands in a relation to some particular thing -- John. However, in a case like (54) the particular thing Bill is trying to find is not any object whatsoever, but rather a particular kind -- dogs. When we look at a sentence like (54) with the view that bare plural NP's refer to objects, it appears to be enigmatic at first sight. But once we think of bare plurals as referring to kinds, the sentence is no longer so puzzling.

3.2 Differentiated scope. It was observed that there are cases where the existential use of the bare plural, if thought of as being existentially quantified, appeared to be capable of exhibiting narrower scope than any other quantified NP. For instance, there is something that is very strange about (57a) that is not strange about (57b).

(57) a. {Some dogs / Three dogs / Lots of dogs / ...} were everywhere.

b. Dogs were everywhere.

With the quantified NP's as subjects, the generalization appears to be that the quantifier of the subject must hold scope over the universal quantifier present in the predicate. If we think of the bare plural as being existentially quantified, then the bare plural in (42) behaves exceptionally in that it may appear to hold narrower scope than the universal of the predicate. But the treatment proposed here does not have to treat the bare plural as exceptional with respect to this construction in any way.

Let us first examine the interpretation of the sentence *some dog was everywhere*. We translate the predicate *be everywhere* as

a predicate that denotes a set of individuals that have a realization in each place:

(58) $\lambda x^{i} \forall y^{i}[\text{place}'(y^{i}) \rightarrow \exists z^{s}[R(z,x) \ \& \ At(z,y)]]$

Here, place' is a set of places, and *At* is a 2-place relation meaning one is at the other.)

Translating *some dog* as: $\hat{P}\exists x[\text{Dog}'(x) \ \& \ \check{P}(x)]$, and treating *some dog* as subject, and *be everywhere* as predicate, we arrive at the following translation.

(59) $\hat{P}\exists x^{i}[\text{Dog}'(x) \ \& \ \check{P}(x)](\hat{}\lambda x^{i}\forall y^{i}[\text{place}'(y) \rightarrow \exists z^{s}[R(z,x)$

$\& \ At(z,y)]]).$

$= \exists x^{i}[\text{Dog}'(x) \ \& \ \forall y^{i}[\text{Place}'(y) \rightarrow \exists z^{s}[R(z,x) \ \& \ At(z,y)]]]$

This says that (with respect to a given world and time) there is some dog which, for all (relevant) places, has a stage in every one of those places. Given the nature of objects, such an assertion speaks of a strange state of affairs, where a given object is able to be in more than one place at a given time. Thus the sentence is necessarily false when taken literally. Note that we are not claiming this sentence to be syntactically or semantically ill-formed in any way. It is just a strange literal assertion to make. All other quantified NP's will work in a similar way.

When we compare this to a semantic structure accorded the bare plural, we find that a natural interpretation arises if the bare plural is the subject of the sentence. (57b) is given the following translation.

(60) $\hat{P}\check{P}(d)(\hat{x}^{i} \ \forall y^{i}[\text{Place}'(y) \rightarrow \exists z^{s}[R(z,x) \ \& \ At(z,y)]]) =$

$\forall y^{i}[\text{Place}'(y) \rightarrow \exists z^{s}[R(z,d) \ \& \ At(z,y)]]$

This says that at every place, there is some stage that is the stage of the individual denoted by *d*. Since d is a KIND, and not an object, d can have various stages appearing in different places at a given time, so there is nothing particularly odd about the interpretation given (57b) and it could be true as well as false depending on how dogs are distributed. The crucial difference is whether or not the stages that appear in every place have to be the stages of the same object or not. In (57a) they must be; in (57b) there is no need for the stages to be the stages of the same object (a particular dog), so long as they are stages of the same KIND.

A similar sort of solution sheds light on the nature of the 'for' time adverbials. Sentence (61a) speaks of a strange state of affairs, but there is something perfectly natural about (61b), which requires no special assumptions in order to be true.

(61) a. John killed $\left\{\begin{matrix}\text{several dogs}\\ \text{some dogs}\\ \text{lots of dogs}\end{matrix}\right\}$ for twenty minutes.

b. John killed dogs for twenty minutes.

Let us adopt a variant of the analysis of Dowty (1972) with respect to 'for' time adverbials as a means of showing again the manner in which the proposed analysis can account for cases of differentiated scope. I treat *kill* on the happening reading as being again a relation that holds between stages. Dowty treats that 'for' time adverbial as being a universal quantifier over a restricted range of times, and the times are related to propositions by the predicate *At*. Let us now give a possible semantic interpretation for *John killed some dogs for twenty minutes.*

(62) $\exists x^{i}[\underline{\text{Dog}}'(x) \ \& \ \forall t: t \subseteq 20 \text{ minutes } [At(t, \exists x \exists z[R(y,j) \ \&$

$[R(z,x) \ \& \ kill^{+}(y,z)]]]$

The claim made here in this structure is that there is some dog such that for all (relevant) times that are members of some particular 20-minute period there was a John-stage that killed a stage of that dog. This requires that the same dog have two or more stages that were killed -- the same dog must be killed repeatedly. Again, in the world we live in, this is a rather strange state of affairs indeed.

The sentence *John killed dogs for twenty minutes*, however, requires no resurrected dogs to make sense of it. We can see why this is so if we examine the following structure which we would associate with the sentence.

(63) $\forall t: t \subseteq 20 \text{ minutes}[At(\exists y^{s} \exists z^{s}[R(y,j) \ \& \ R(z,d) \ \& \ kill^{+}$

$(y,z)])(t)]$

This makes the claim that at each instant (of relevance) in the twenty-minute period, there was a John-stage that killed a stage of the individual d (dogs). There is no necessity in the stages that were killed to be stages of the same dog, and in fact the natural interpretation is the one where the stages are in fact stages of different individual dogs. But all the stages are stages of the same individual -- the kind DOGS. This can be derived even though we introduce the expression *dogs* outside the scope of the universal quantifier. But if we introduce the quantified NP's outside the scope of the universal quantifier (which we must, apparently, in the case of 'for' time adverbials, though Dowty's analysis does not account for this), the quantified object NP must hold scope over this universal. But in treating bare plurals like proper names, we find that we can come to an understanding of why it is that the bare plural on the existential interpretation behaves as it does with respect to these time adverbials in

contradistinction to all other quantified NP's.

It is predicted that cases of differentiated scope will arise whenever the following sort of situation holds. There must be an existential quantifier that ranges over stages that appear as part of a predicate. In the presence of certain material (for any number of reasons), that predicate cannot be applied directly to an argument, but must first have this extra material added before applying to an argument. This extra material may contain quantification which holds scope over the existential quantifier that ranges over stages, but it may or may not hold scope over the argument that the predicate is ultimately applied to. If it holds scope over the existential quantifier ranging over stages, but not the quantification present in the argument NP, differentiated scope will arise. This is because the stages within the scope of the intervening quantifier need not be stages of the same OBJECTS if a bare plural is the argument, but they must be stages of the same objects if a quantified NP is the argument.

3.3 Anaphora. For the purposes of this section, we will be making the assumption that all cases of intra-sentential pronominalization arise via semantic bending of variables. While this assumption is perhaps dubious in fact (see chapter 5), it will not seriously affect the form of the argument presented here, and it greatly facilitates exposition.

It was noted in Chapter 2, that unlike quantified NP's, in contexts such as those presented in (64) bare plurals do not require identity of reference of particular individuals.

(64) a. Bill is trying to find {some / two / many} books, and Jill is trying to find them, too.

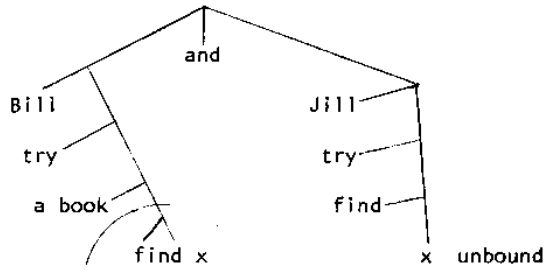
b. Bill is trying to find a book, and Jill is trying to find it, too.

c. Bill is trying to find books, and Jill is trying to find them, too.

In (64a) and (64b), Bill and Jill must be trying to find the same particular books. In (64c), however, the books they are looking for may be quite different ones, and I think it is true that there is no reading of (64c) which means they must be looking for the same books. In addition, it is further noted that the first conjuncts of (64a) and (64b) must be interpreted on the transparent reading, where some particular books are being sought.

These facts can be accounted for in a relatively straight-forward manner, as presented in PTQ. A quantifier can only bind those variables that are within its scope, and it will leave unbound any variables that do not fall within its scope. Let us use (64b) as an example. If we build up the sentence in roughly the following way, we find that the scope of the existential quantifier does not include the variable in the second conjunct (the pronoun).

(65)

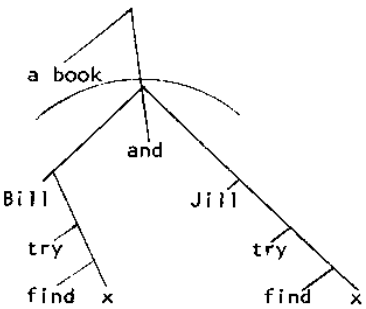


Since we are assuming that pronouns only arise through semantic binding of variables, this structure cannot give us sentence (64b). In rough form, its translation would be:

(66) [Bill try[∃x[Book(x) & Bill find x]] & [Jill try Jill find x].

This, too, is the sort of structure that would be associated with the opaque reading of the first conjunct. This is what blocks (64b) from having an opaque reading in the first conjunct. In order to bind the variable in the second conjunct, it is necessary to introduce the NP *a book* outside the scope of the opacity-inducing *try* in the following manner.

(67)

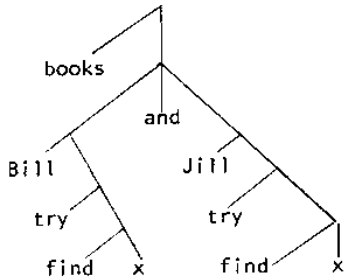


∃x[Book(x) & [Bill try to find x & Jill try to find x]]

In this case, both variables are bound by the quantifier, and thus the pronominal form in the second conjunct may arise. This entails that the first conjunct have a transparent reading only, as the NP *a book* is introduced outside the scope of *try*.

When we were thinking of the bare plural form in (64c) as being existentially quantified, the fact that we only find an opaque reading for the first conjunct appeared as an anomaly because there, too, we can successfully pronominalize. But given the treatment outlined here, this is the only expected reading we would anticipate finding. In order to obtain the pronoun, we must introduce the NP *books* outside the scope of *try* as we had to do with *a book* above.

(68)



Semantically, the syntactic structure sketched above would give rise to the following formula, to which more detail has been added in order to obtain reference to stages (though this remains schematic in certain respects). (b = books, the individual)

(69) $\lambda P^{\vee} P(b)(\hat{x}^{i}[\text{Bill try}[\hat{y}^{i} \exists z^{s}[R(z,x) \;\&\; \textit{find}^{+}(y,z)]]] \;\&$

Jill try $[\hat{w}^{i} \exists u^{s}[R(u,x) \;\&\; \textit{find}^{+}(w,u)]]). =$

Bill try $[\hat{y}^{i} \exists z^{s}[R(z,b) \;\&\; \textit{find}^{+}(y,z)]] \;\&$ Jill try $[\hat{w}^{i} \exists u^{s}$

$[R(u,b) \;\&\; \textit{find}^{+}(w,u)]]$

Compare with more detailed analysis of (64b):

(70) $\exists x^{i}[\underline{\text{Book}}'(x) \;\&\; [\text{Bill try}[\hat{y}^{i} \exists z^{s}[R(z,x) \;\&\; \textit{find}^{+}(y,z)]]] \;\&$

Jill try$[\hat{w}^{i} \exists u^{s}[R(u,x) \;\&\; \textit{find}^{+}(w,u)]]]$

The first formula above makes the claim that there is some individual b such that Bill is trying to find some stage of b, and Jill is trying to find some stage of b. Though the stages may be different, and thus may be stages of different individual books, they ARE trying to find the same KIND of thing -- books. Just because they are looking for the same kind of thing, it does not mean that they are looking for the same OBJECTS. This is what gives rise to the paradox, then, the notion somehow that *books* makes reference to objects. Once we dispense with that notion, we are able to gain an understanding of the processes that are at work here.

In the second formula, the variable *x* ranges over objects, and the formula makes the claim that there is some object that is a book, and Bill is trying to find one of its stages, and Jill is trying to find one of its stages as well. They are seeking stages of the same object in both cases, and hence the identity of reference.

I should stress that in both cases, with bare plurals and with quantified NP's, we are obtaining identity of reference. It is just that in the former case, the identity of reference is required of the KIND sought, but in the latter the identity of reference is required of the OBJECTS sought.

This treatment also allows us to account for the cases noted in Chapter 2 where there was pronominalization occurring between a *generic* useof the bare plural and an existential use.

(71) I see *eagles* every day, even though *they* are nearing extinction.

Essentially, the sentence says that I see STAGES of a certain kind of thing (eagles) every day, even though that kind of thing is nearing extinction (and not its stages). In both cases what I see and what is nearing extinction are the same entity -- eagles. It is the fact that we can only 'see' stages of things that gives rise to the existential reading in the first clause, and it has nothing to do with an ambiguity of the bare plural per se.

3.4 Summary. In this section, we have seen how a unified analysis of the bare plural not only lets us account for the arguments which show that a unified analysis is called for, but also leads us to an understanding of why it is the existential use of the bare plural behaves in the peculiar ways it does when opposed to the quantified NP's. The analysis given here predicts these properties exactly in the way in which they in fact occur, and as such adds further support to the notion that a correct analysis of the bare plural lays along the lines of a unified analysis.

To this point, formalism has been largely ignored in favor of exhibiting the intuitive significance of the sort of analysis offered here. We will move fairly slowly, though in the direction of increasingly rigorous formalization. In the next section, other possible non-quantificational approaches are discussed. We will then follow with some further applications and extensions of the lines of analysis

pursued, and then present a preliminary syntax and semantics. The preliminary syntax and semantics will serve as a base from which to go on to further duscussion to the chapters that follow.

4. Other Possible Non-quantificational Approaches

4.0 Introductory remarks. It has been proposed that kinds of things are to be considered individuals in the sense outlined above. But this is just one of a number of possible non-quantificational representations that can be accorded the bare plural. In this section, we will briefly examine other possibilities that have been raised, and argue that the path chosen is, so far, the optimal one to take.

4.1 Kinds as sets. One possiblity is that kinds of things are to be regarded simply as (characteristic functions of) sets. We may wish to represent what the NP *dogs* denotes as simply the set of all dogs. Or, in more formal notation: λxdog'(x). As pointed out by Cartwright (1975) and Mates (1968), this is simply incorrect, as the set of all dogs will vary in membership from one time to the next (not to mention from one possible world to the next). In set theory, two classes or sets are identical just in case they contain the same members, otherwise, they are different sets. As Mates points out, though, this is not in accord with our intuitions concerning the way we speak. It would be sheer nonsense, under this hypothesis, to say *suppose men were less numerous than they are*, for then we would be saying something like *Suppose the class of men, which has so many members, had less members* then the class of members would be a DIFFERENT class, for it would have different members. But supposing men to be less numerous appears to make perfect sense. In addition, we would wish to be able to distinguish different kinds of things even though these kinds of things may not be exemplified in the real world. We know that 95-lb. house cats are quite different from square circles, for example, and treating the bare plural as simply a set would not distinguish these two.

A far more reasonable approximation, then, would be to treat the denotation of *dogs* as being something that picks out all possible dogs, and not simply the existent ones. In terms of the semantic system used here, this would be to say that *dogs* denotes an intension of a set -- a function that picks out all existent dogs in any possible world at any given time. This would distinguish 95-lb. house cats from square circles, and it would allow us to suppose that men were less numerous in a rather straightforward manner (the supposition being, then, that there is a possible world in which the objects picked out by *men* has fewer members than in the real world). This approach has an undeniable relevance to the study of kinds of things. However, it has at least two general sorts of weaknesses, both of which have to do with actual implementation of this possibility in

terms of the formal system presupposed here.

First of all, if *dogs* denotes the intension of a set, then its extension at any given points of reference should then be the set of all existing dogs. However, in the classically extensional contexts, one finds most often that the interpretation is SOME dogs, and clearly not the set of all dogs. In other extensional contexts, though, the interpretation of 'the class of all existing dogs' (or something along those lines) appears called for. By conventional criteria, the underlined NP in (72a) are in extensional contexts, yet in (72a) the interpretation is clearly existential, and in (72b) it appears to be universal.

(72) a. *Dogs* are barking at me.

b. *Dogs* are mammals.

So some ambiguity appears in extensional contexts where we would expect none, and the reading that appears most often is an existential rather than the predicted 'universal' reading (that is, meaning something like 'the set of all dogs'). So treating *dogs* as the intension of a set makes some initially incorrect predictions with respect to extensionality.

Distributionally, and by all other known criteria, it is apparent that *dogs* is an NP, which in a Montague framework denotes a set of properties. However, *dogs* simply denotes a property if it is the intension of a set, and not a set of properties. So we need to do something to the expression *dogs* to make it act semantically like an NP. There are two means of doing this that I can think of. The first involves additional complexity in the syntax and semantics that can be avoided by the approach that I am advocating, and the second, to be discussed in the next section, destroys the initial proposal entirely.

One might propose that *dogs* is the set of higher-order properties that are associated with the property *dogs*, or the set of sets of which the intension of the set of dogs is a member (rather than, in the case of *John*, the set of sets of which John is a member (ignoring intensions)). That is, the NP *dogs* would be of type <<s, <s, <e,t>>,t> ,t>, while *John* or *every man* would be of the type <<s, <e,t>> , t>. In order to be able to say anything meaningful about *dogs*, then, and treat it as sketched, we immediately give up the notion that (in a Montague framework) *dogs* is of category NP, for there is intended to be a functional relation between syntactic categories and semantic types. This notion is violated by the treatment sketched. Even supposing that we grant *dogs* an NP status, but allow it to have the suggested semantic type, it would entail that the whole verbal system be completely restructured syntactically, along with many other parts of the grammar. Instead of

just denoting sets of entities, all verbs (and adjectives, and so on) would also have to be able to denote sets of properties as well. In order to say *dogs run*, *run* would have to be of type <<s, <e,t>> , t> rather than simply of type <e,t>. That is, we would be making the claim that *run* in, *dogs run* is entirely different from *run* in *John runs*; and that *be big* in *Dinosaurs were big* is a different predicate from *be big* in *Lincoln was big*; and so on and so forth for every predicate for every argument position. The net effect of this program is simply to take a given predicate of the familiar sort, find the 'innermost' occurrence of e, erase it, and replace it with <s, <e,t>> for your new predicate that can apply to kinds of things. This makes kinds of things look suspiciously similar to things of type <e> (entities). There is the further problem that having every predicate systematically ambiguous appears to lead us to incorrect assumptions about the relationship of the two faces of any given predicate. If they are really ambiguous, one would not anticipate one predicate serving as an antecedent to the other, controlling the latter's deletion. In (73), though, we find perfectly felicitous examples of such deletion.

(73) a. Dinosaurs were *big*ger than my house is (x much *big*).

b. Since cows *eat grass*, my little nephew thinks that he should (eat grass), too.

c. Those men *run* like ducks do (run).

d. Small puppies *like* George, and George, (likes) small puppies.

Here we see Comparative Deletion, VP Deletion, Ellipsis in the complement of *like*, and Gapping 'ignoring' the proposed ambiguity. These processes are normally sensitive to even quite subtle ambiguities, as noted in (74).

(74) a.??Bill commands the troops, and George, (commands) my respect.

b.??Margie is sadder than the book she read is (x much sad).

c.??Barbie asked to leave like Bill did (ask) for a piece of cake.

For these reasons, implementing the notion that *dogs* is the intension of a set appears to be a difficult process to accomplish within the framework presupposed here. However, this particular suggestion has a good deal of merit in its general line of thought. It will be reflected in later formalism.

4.2 Kinds as non-referring predicates. Another tack to take would be to treat the NP *dogs* (and, of course, all other bare plural NP's) as being a set of properties. As Robin Cooper pointed out, this line of thought represents an extension of a notion presented by Leibniz for representing non-existent objects, such as Pegasus (Mates, 1968). Terry Parsons also uses such a notion in an exposition of Meinong. Formally, the NP *dogs* would be an unanalyzed expression having the type of other NP's, <<s <e,t>> , t>. This set of properties is the set of properties that are true of dogs; there is no mechanical means of telling what set of properties this is by looking at the formula, which is our desire (as we are supposing that most properties are discovered to be there or not by use of various strategies). We cannot think of this as being built up from the intension of a set (of type <s, <e,t>>), which is the intension of the set of dogs, by having something akin to a null determiner mapping an expression of type <s, <e,t>> to type <<s, <e,t>> , t>, for this intuition would have the latter expression mapping only those intensions of sets to true just in case it is the intension of the set of dogs. We want to be allowed to interpret this as meaning *bark* could be in that set, or *be a mammal*. So this null determiner would be a mapping that allows these properties to hold, virtually erasing the notion that NP is somehow 'based on' the intension of the set of dogs.

There are at least three problems that I can discern with this approach. Perhaps the most serious is that if this is simply a set of properties, there is no way to state any equivalence relations that would have the effect of eliminating scope ambiguities. The prediction of this is that the bare plural will exhibit scope properties just like any other quantified NP. We have seen this to be false, and we have seen certain advantages in treating the bare plural like a proper name, rather than a quantified NP. A means of rectifying this would be to follow a hypothesis set forth informally in Carlson (1973). The hypothesis is that the bare plural NP can never be introduced by any means but directly (i.e. it can never be quantified in). But this move leads quite squarely to a second problematic aspect of the suggestion that bare plurals are but sets of properties, the problem of pronouns. If pronouns associated with the bare plural cannot arise by quantifying in, then how do they arise?

In Cooper (1976) the problem of pronouns which do not arise via variable binding (quantification) is discussed. The general form of the solution (more detail is found in chapter 5) is to treat pronouns as corresponding to expressions containing free variables; in particular, one of the free variables must be an entity. Its meaning is assigned by the context of use (or in other words a value is assigned to the free variables by an assignment function). Thus, a sentence like *He is late* has as part of the translation of *he* a free entity variable -- for example $he = \hat{P}^{\vee}P(x_6)$. This can be used

to make reference to *John* as John is among the possible values that can be assigned to the variable x_6 (or the context of use might have assigned Gustavus Adolphus, the first man on the moon, Arthur Ashe, etc.). In order to obtain a pronominal form as we find in (75), it would not be at all possible to use this particular approach.

(75) Dogs bark. *They* are also quite intelligent.

This is because, under the hypothesis that bare plurals are but sets of properties, there is no value that can be assigned to any entity-level variable to end up with a pronoun like *they* being interpreted as *dogs*. We must therefore do something else, as we see from (75) that the pronoun is quite readily interpretable as *dogs*. By far the most natural thing to do would be to treat the pronoun in (75) as being a free variable over sets of properties, P, without internal structure. Then the context of use could assign as a value the set of properties *dogs*, and the interpretation would come out as hoped. This is fine in this case, but it has the effect of allowing there to be far too wide a range of possible interpretations for pronouns. As Robin Cooper pointed out to me, there are very many sets of properties that cannot serve as values for pronouns. If a pronoun like *they* could be interpreted as simply a set of properties, it could be interpreted at least as any NP of the language. But it cannot. A sentence like *They are here* cannot be interpreted as meaning any of the following.

(76) a. *Mary and Joan, or Phyllis and Susan* are here.

b. *No men* are here.

c. *Some men* (or other) are here.

d. *Few alligators* are here.

e. *Whoever is here* is here.

But there is no way under the current hypothesis to allow *they* to be interpreted as a set of properties like *dogs* denotes, but not as a set of properties denoted by the underlined NP's in (76). Though it is not fully clear at this time how pronouns are to be represented, it is evident that simply treating them as sets of properties is incorrect.

An additional problem with pronominalization under this current hypothesis arises from cases such as the following.

(77) Bill believes that *dogs* have horns. *They* don't look so vicious to me.

It is the general case with quantified NP's that such pronominalization is not possible if the antecedent NP is interpreted as being

within the scope of some opacity-inducing predicate (such as *believes*). (78) cannot have the pronoun interpreted as having its antecedent the underlined NP if the sentence is interpreted on its opaque reading.

(78) Bill believes that *some men* are after him. They don't bother me, though.

If as previously mentioned we must introduce the bare plural *in situ*, and not quantify in, we would have to account for why (77) allows the pronominalization, but why (78) does not allow it on the opaque reading. We will be returning to pronominalization in the next chapter with a different set of problems in mind, and there we will further pursue this problem. In any event, it appears that treating the bare plural NP as a set of properties has some quite thorny problems associated with it when it comes to the interpretation of pronouns.

A final sort of problem with treating bare plurals as sets of properties has to do with those properties, like *widespread*, that seem only felicitously predicable of kinds of things. It is quite clear that the structure of the sentence *Dogs are widespread* cannot be the following, where x is interpreted as being a variable over objects.

Dogs'($\hat{x}$[x be widespread])

The predicate *be widespread* will never be true of any value of x, and hence cannot be true of anything. The predicate might as well be *be a square circle*, for under this interpretation *be widespread* and *be a square circle* will pick out the same set of objects in every possible world -- the null set. To distinguish these predicates, as we must, we cannot have *be widespread* applying to objects. The only other reasonable means of doing this that I can see is to have *be widespread* apply to sets of properties (i.e. NP's). Something in the semantics would then have to tell us if that set of properties is associated with some entity, it must be false. It is not clear how to do this; but the worst part for this analysis is that it requires that the function-argument relation be reversed in just these cases, so that the predicate is now the function and the subject is the argument (and not the reverse, as is usually the case). This requires a new rule of syntax for putting together subjects and predicates, if we are to remain within the Montague framework. This is because the rules of syntax and the rules of semantics are to be related functionally, so one syntactic rule cannot have two or more semantic reflexes. Since there appears to be nothing SYNTACTICALLY unusual about these special predicates, it seems the best analysis is one that doesn't make it look like there ought to be anything syntactically unusual, as a separate syntactic rule would have the effect of doing. This last objection certainly could be endured if it were the sole objection, but in light of the other problems it has a certain significance.

4.3 Kinds as mereological individuals. The notion that mass terms are to be analyzed in terms of mereological individuals is a recurrent theme (see, for example, Cocchiarella (1976) and Moravcsik (1970), among others), and we might momentarily consider its extension to count terms as well. A 'mereological' individual is an individual consisting of the sum of all the parts of some scattered thing -- in most cases this comes out as being a 'big' object. For example, *gold* might be considered to denote that individual formed by taking all the scattered instances of gold and summing them up into one big individual. We might likewise consider doing the same for a plural like *dogs*, translating *dogs* as $\hat{P}^{\vee}P(d)$, with *d* being that individual that is the result of taking all the dogs in the world and summing them together. One of the immediate disadvantages of this course of action for count nouns is that while the sum of all parts of gold is still gold, the sum of all dogs is clearly not a dog, (as Quine 1960 pointed out). Now this new 'big' object consisting of the sum of all dogs may be treated as an individual like any other. Its parts are in relatively slow flux, individual dogs constantly going out of existence and others coming into existence, and the parts constantly changing location, and so on and so forth. So in this respect, this fusion of all the parts is quite easy to think of as being an individual, just like a river or a person or a desert, with the same sorts of principles involved in accounting for the dissimilarity exhibited by that individual from one moment to the next.

The failure of this account (which applies to treating mass terms as mereological sums, as well) is that this fails to distinguish bare plurals from other 'big' objects whether or not its parts are thought of as being scattered -- such as the British Empire (of 1890), the Pacific Ocean, the asteroid belt, or PIE's truck-fleet. But differentiation is required if we are to capture certain facts about bare plurals vis-a-vis 'big' objects.

First of all, there are predicates that apply to big objects and bare plurals in quite different ways. If we report that the asteroid belt or PIE's truck fleet is big, it seems we can only interpret this as meaning something like 'the asteroid belt or PIE's truck-fleet has many members', and a belt of big asteroids might still be a small asteroid belt, or a fleet of large trucks might also be a small truck fleet. But with the bare plurals, using the predicate 'be big' CANNOT mean have many menbers. If we say that elephants are big, this means something about the size of individual elephants, and not about how many elephants there are. Elephants may be big and chipmunks small even if there are a thousandfold more chipmunks than elephants. We would likewise anticipate that a sum of individuals would have a specific weight. Clearly, we can report an estimate of the weight of the Pacific ocean, or the gross weight of the asteroid belt by weighing their parts and summing them up. One might

estimate that PIE's truck-fleet weighs 300,000 tons, or that the asteroid belt weighs $3x10^{25}$ tons. One cannot do the same with 'dogs', for instance. If I estimate that dogs weigh two trillion tons, I am making an estimate about the (average) weight of an individual dog, and certainly not about what all dogs collectively placed on a scale would weigh. Likewise, *gold weighs x number of tons* seems to be a senseless statement if it is to be taken as reporting what all gold collectively in the universe would weigh. We would expect also to be able to report that whooping cranes have 80 legs, as that is about the number of legs possessed collectively by all whooping cranes. If we report that PIE's truck-fleet has 60,000 wheels, however, this can only be taken as a total and not as a report about the average number of tires per truck. So the general form of this objection is that if we treat a kind of thing as a mereological object, that object should have various sorts of characteristics that are simply a result of summing the parts. We see this is so for certain big objects, but that this is not so for kinds of things.

The failure to distinguish kinds of things from big objects also fails to account for the special list of predicates discussed in chapter 2. If we are to treat *dogs are common* as meaning that a certain object has parts in many places (for example), it is not at all clear then what is wrong with *the asteroid belt is common*, or *the British empire was common*. Apparently being a big object with scattered parts in many different places is not a sufficient reason to be able to say something is common (rare, widespread, numerous, in short supply, etc.). This, too, would be a failure of an analysis which treats kinds as being objects in the world.

Big objects and kinds of things are simply not to be considered akin to each other in the way that a mereological interpretation would have it. Perhaps there is another interpretation of what is meant by a 'sum' of parts which answers these objections, but as construed here a mereological interpretation of kinds of things is not adequate.

4.4 Conclusion. In this section we have examined briefly some other possible treatments of kinds of things. While we clearly have not examined all logical possibilities by any means, we have seen that a few very likely notions are found to be wanting. It has not, of course, been shown that the notion of an individual as presented earlier escapes all the difficulties presented above. We will do this in the course of further discussion, though certain advantages of the treatment pursued here with respect to the treatments presented above are apparent. For instance, in treating kinds of things as individuals we avoid the problems associated with treating kinds of things as intensions of sets, and the grammatical distribution of bare plurals as NP's falls out automatically. We avoid the scope problem and pronominalization problems inherent in the analysis of

kinds of things as being sets of properties, and we at least avoid making the wrong predictions about kinds as the mereological approach does (though it remains up in the air for now exactly what predictions do fall out from the suggested analysis). In what follows, we will be working towards a complete characterization of kinds of things, stages, individuals, objects, and the like, so we will be better able to see what predictions do arise.

5. A General Description

5.0 Introduction. In this section a general description of various constructions of English that appear to affect the interpretation of the bare plural will be given. The treatment will not in any way be an exhaustive one, but the description given here should be detailed enough to illustrate the general format of the program. For those cases not discussed, it is hoped that the application of the sort of approach taken here will be possible to construct.

We will proceed to examine various English constructions and in so doing translations of certain constructions will be given. While at this point we are merely translating into an uninterpreted language and we are thus technically remiss, it will nonetheless be of value to proceed in this manner. I do, of course, assume that there is an interpretation of the formulae presented as I did in the last sections, and that it would proceed along the lines of Bennett (1974) or Montague PTQ.

The basic claim being made here is that the English bare plural is by itself unambiguous. If there is an apparent ambiguity in some particular occurrence of the bare plural, then to be true to the basic claim we must find some independently-motivated ambiguity already present in the rest of the sentence which will in a principled way account for the observed ambiguity. This is the sort of approach taken in the last few sections, where we noted that a verb like *ran* is ambiguous in a certain way, and it is to that ambiguity that we attributed the ambiguity of *Dogs ran*.

As we saw, in other cases the bare plural is not interpreted as ambiguous (or apparently so), but in some cases it was unambiguously universal, and in others it was unambiguously existential. So even when the bare plural appears unambiguous is the context of interest. We attribute the 'universal' reading to those contexts which attribute something to individuals directly, and we attribute the existential reading to those places where a predicate applies to stages of things.

5.1 Intransitives.

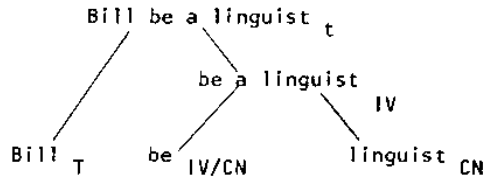
5.1.0 Predicate nominals. Predicate nominals as previously noted select only the 'universal' reading of the subject.

(79) *Dogs* are mammals.

(79) does not seem to mean that some dogs are mammals, but rather that all are mammals. The treatment of predicate nominals in the fragment to be presented treats predicate nominals as not being NP's, but rather as nominals (CN's). While this may be an incorrect treatment, I don't know the correct one, and the path chosen here is simply for sake of convenience and its straightforward nature.

All CN's are considered to be predicates that apply only to individuals, and never to stages. When in predicate position, a semantically empty verb 'be' is added, and the indefinite article is added to singular CN's. In the interpretation, though, only the interpretation of the predicate nominal and the subject of the sentence will appear. I illustrate a likely derivation of *Bill is a linguist*.

(80)



Translation: $\hat{P}^{\vee}P(b)(\hat{}\underline{\text{Linguist}}') = \underline{\text{Linguist}}'(b)$

Here, Linguist' is a function that applies only to individuals, and not to stages of individuals.

We will in many cases wish to state meaning postulates so that entailments come out correctly. For example, if cats are mammals we wish then to state that it follows that ALL cats are mammals. However, this is not a meaning postulate that would apply to all sentences of this form. Consider the differences between *physicists are scientists* and *MIT graduates are scientists*. The former entails the universal, but not the latter. This is because physicists are a kind of scientist, but MIT graduates are not a kind of scientist. Likewise, cats are a kind of mammal, so it follows that all cats are mammals.

There will be further discussion of predicate nominals as they are introduced in the fragment.

5.1.1 Adjectives. The classes of adjectives have already been exhibited to a certain extent. It appears that adjectives divide themselves into three classes with respect to the criteria established here. First, there are those adjectives that range over

stages only, such as *alive*, *available*, *drunk*, etc. Then there are the adjectives which apply to individuals, and not to stages. Included here are *intelligent*, *fat*, *female*, *incredible*, and so on. Finally, there is a small class of adjectives whose domain of application is limited to kinds of things: *widespread*, *rare*, *extinct*, *numerous*, *indigenous to...*, *common* are in this class of adjectives.

The distributional characteristics of these classes of adjectives are very much in accord with the theory of adjectives proposed in Siegel (1976). In her theory, adjectives generally fall into two broad classes. The first class is that set of adjectives which when modifying a noun do not seem to require 'knowledge' of what the noun modified is in order to specify its meaning. An example is *red*. A red mechanic is also a red person, and it is also a red citizen. *Red* modifying a noun can be represented simply as a set of red things, and the noun as a set of things, and the resulting nominal can be regarded as a set of things that results from the intersection of the class of red things with the class of things denoted by the nominal modified. These adjectives are INTERSECTIVE. On the other hand, there are adjectives which do not behave in this manner. For instance, an excellent student is not also necessarily an excellent person, (though he/she may be), nor necessarily an excellent citizen. Hence, *excellent* cannot be regarded simply as a set of things, but rather one must know what sort of nominal is modified by *excellent* in order to know whether the attribution of *excellent* is correct. These adjectives are NON-INTERSECTIVE. Semantically, Siegel treats the intersective adjectives as denoting a set of things (of type <e,t>), and the non-intersective adjectives as mappings from intensions of nominals (CN's) to other nominals (of type <<s, <e,t>> , <e,t>>).

Both sorts of adjectives may appear in predicate position. However, when the non-intersective adjectives appear there (such as *excellent*) they require, according to Siegel's analysis, a 'dummy' CN, which is interpreted relative to the context. *Bill is excellent* is roughly, 'Bill is (an) excellent CN', where the CN here might be normally thought of as 'person', though it might mean 'man', 'football player', or any number of things in a given context of use. The intersective adjectives, though, do not have any such dummy CN associated with them, as they simply denote sets of things. As a net result, the non-intersective adjectives like *small* in predicate position are analyzed like predicate nominals, whereas the intersective adjectives are analyzed as simply adjectives in this position.

Those adjectives that apply only to stages, as Emmon Bach pointed out to me, represent a subset of the intersective adjectives and have no members in the non-intersective category. The reason for

this is apparent. With respect to the criteria used, any category of type CN/CN (non-intersective) in predicate position is analyzed as a predicate nominal. Since all predicate nominals apply only to individuals, and never to stages, such sentences as *bats are excellent* only select the universal reading of the subject as the predicate may apply only to individuals. An adjective of category /// (intersective) in predicate position CAN denote a set of stages of things, since these are not analyzed as predicate nominals. Of course, we find many of this category that map individuals to truth values as well, as there is an option in this category as to what sorts of entities the adjective ranges over (stages, individuals, or kinds of things).

In some cases, we find adjectives of category t///e which have homophonous forms, one of which applies to stages of things, and the other to individuals. A particularly interesting example is the adjective *sick*. On the one hand, it can mean 'physically ill', and on the other 'mentally ill'. When it appears in a context which selects only stages, as in (81), we find it to be unambiguously meaning 'physically ill'.

(81) There were five passengers *sick*.

Such sentences as (82) are ambiguous. We find that the physically ill sense of the word *sick* selects the existential reading of the bare plural, and the mentally unbalanced sense selects only the universal reading.

(82) Passengers are sick.

We also see that *sick* in the context below cannot be interpreted as meaning mentally ill.

(83) a. A man was sick. (non-generic reading)

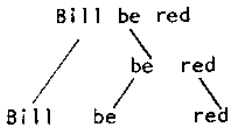
b. Sm men were sick.

So the physically ill sense of *sick* applies to a stage, and the mentally ill sense applies to individuals. There is in English an adjective which means 'habitually sick', and that is *sickly*, which only applies to individuals.

Adjectives that apply to stages (and the remainder of the intersective adjectives as well) in attributive position are regarded here, following Siegel, to have been derived from an underlying relative clause. There is a rule of Whiz-Deletion, and a rule of adjective preposing. Thus, *some available man* is derived from something like 'some man who be available'.

In the treatment proposed here, those adjectives that apply to individuals take the empty verb 'be' just like predicate nominals (be_1). Those adjectives that denote sets of stages, however, take a homophonous verb 'be' (be_2) which has a translation that maps the adjectives that apply to stages to sets of individuals that have stages that the adjective is true of. Below are sample derivations of *Bill is available* and *Bill is red*.

(84)



Bill - $\lambda P^{\vee}P(b)$

red - $\underline{\underline{red}}'$

be_1 - no translation

$\lambda P^{\vee}P(b)(\hat{}\underline{\underline{red}}') = \underline{\underline{red}}'(b)$

(85) Bill is available

available - A'

be_2 - $\lambda P\lambda x^{i}[\exists y^{s}[R(y,x) \,\&\, {}^{\vee}P(y^{s})]]$

$\lambda P^{\vee}P(b)(\hat{}\lambda P\lambda x^{i}[\exists y^{s}[R(y,x) \,\&\, {}^{\vee}P(y^{s})]](A')) =$

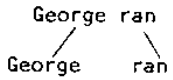
$\exists y^{s}[R(y,b) \,\&\, A'(y)]$

5.1.2 Intransitive verbs. The majority of the intransitive verbs pattern like the verb *run*. In the past and future 'tenses', as well as in infinitive form and in gerundive form (under various circumstances), the verb is ambiguous between a happening and a characteristic. (86) exhibits this ambiguity.

(86) George ran. (fast)

For the time being, we are assuming there are two homophonous forms of the English verb *run*. The first form -- $\underline{\underline{run}}'$ -- is a set of individuals who have a running stage. This form corresponds to the reduced predicate *run*, which applies directly to stages. The other predicate, $\underline{\underline{run}}''$, is the set of individuals that characteristically run. Both are basic expressions of category IV (or are basic verb phrases). Below are illustrated the two readings for sentence (86). Once again, tense is ignored.

(87) (Event reading)



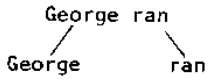
George: $\lambda P^{\vee}P(g)$

ran: $\lambda x^{i}[\exists z^{s}[R(z,x) \,\&\, run'(z)]]$

Translation (reduced):

$\exists z^{s}[R(z,g) \,\&\, run'(z)]$

(88) (Characteristic reading)



ran: *run''*

Translation (reduced): *run''*(g)

The fact that the simple present tense (as in *George runs*) is under most circumstances unambiguously generic is not predicted by this analysis. We will assume the simplification that it is ambiguous for now in the same way as the past tense. In Chapter 7 the simple present tense will be discussed with respect to this particular matter.

We are also momentarily begging the nature of the exact relationship between the two homophonous forms of *run* and the rest of the intransitive verbs that pattern likewise. The reader should not be misled into thinking that using the visual convenience of prime markingsexplicates this relationship in any way. *run'* and *run''* are different funcitons, and we might as well for all that has been said here translate one as #399' and the other as #402', or some other equally arbitrarily chosen pair of symbols to stand for the constants.

A further characteristic of the verbs is that those which apply to stages of things also have progressive forms. These progressive forms apply unambiguously to stages of things. For example, the sentences of (89) are unambiguously existential.

(89) a. Dogs were running.

b. Dogs will be running.

c. Dogs are running.

There are some uses of the progressive which I wish to exclude from this treatment. Let us refer to the above use as the PRESENT progressive. We find a sentence like the following to be ambiguous. Much of what follows is to be found in Macauley (1970) and the example sentences in many cases are based directly on his.

(90) Fred is eating a sandwich today.

This can either be taken as a report of what Fred is doing right now, or else a statement about what Fred (roughly speaking) intends to do sometime later today. There is an important difference between these two interpretations. If it is taken as a true report of Fred's current actions, it does not entail that Fred actually ate the whole sandwich. It indicates what he is in the process of doing. The latter reading, though, is taken to indicate that the intended activity is the eating of the whole sandwich, not merely to be in the process of eating a sandwich at some later time. This 'progressive of intent' is excluded from the treatment suggested here.

Another use of the progressive aspect is one we will call the 'comparative progressive'. This use, exemplified in (91), appears to apply only to individuals, and not to stages of individuals. Included in this case is the 'these days' locution.

(91) a. Kids are getting smarter.

b. People are attending more pep rallies.

c. Parisians are wearing their hair shorter.

d. Geese are migrating a lot these days.

In all cases, there is at least some covert comparision being made. Again, excluded from consideration is this particular use.

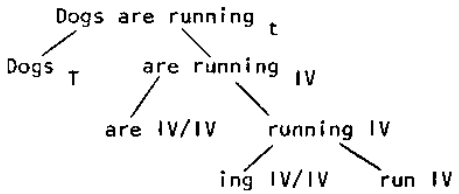
The present progressive will be considered to be the result of suffixing -ing to a verb, though semantically we will have the progressive applying to the whole VP. The resultant VP is to be of type $\langle e^s,t\rangle$, or a function that maps entities from the realm of stages to truth-values (and not individuals). The *be* that co-occurs with the progressive aspect is be_2, or the same instance of the verb *be* that occurs with certain adjectives and locatives. Be_2 is a mapping from sets of stages to sets of individuals.

In this chapter we will forego any formal attempt to limit which verbs the progressive aspect may apply to, as we will be reanalyzing the progressive in a more natural way in chapter 5. Informally, however, it appears that we would want the progressive to apply to just those VP's that have as initial elements verbs which in the non-

progressive form may apply to stages of individuals as well (as *run'* above). A proposed analysis of sentence (92) is given below.

(92) Dogs are running

Syntax:



Translation:

Dogs $\lambda P^{\vee}P(d)$

are $(=be_2)$ $\lambda Q\lambda x^{i}\exists z^{s}[R(z,x) \,\&\, {}^{\vee}Q(z)]$

-ing $\underline{Prog}'$ (of type $\langle\langle e^{i},t\rangle, \langle e^{s},t\rangle\rangle$)

run $\underline{run}'$

Translation of whole sentence:

$$\lambda P^{\vee}P(d)[\hat{}\lambda Q\lambda x^{i}\exists z^{s}[R(z,x) \,\&\, {}^{\vee}Q(z)](\hat{}\underline{Prog}'(\hat{}\underline{run}'))$$

$$=\exists z^{s}[R(z,d) \,\&\, \underline{Prog}'(\hat{}\underline{run}')(z)]$$

This illustrates how it is that (92) is unambiguously existential. The precise semantics of the $\underline{Prog}'$ operator will be very much left open. We would want it to be the case that a sentence with the verb in the non-progressive form entails the same sentence with the verb in the progressive form. Thus, if John ran, it definitely follows that (at some time) John was running. However, the progressive does not always entail the non-progressive. For example, if John was running across the street, it does not necessarily follow that he (at some time) ran across the street. Beyond this restriction on the interpretation of $\underline{Prog}'$, no more will be said here. See Bennett and Partee (1972) for a number of matters that must be taken into consideration for a complete semantic account of the progressive.

There are a few examples of intransitive verbs that do not pattern like the verb *run*, such as the verb *exist*. We will not attempt to deal with these verbs explicitly.

5.2 Transitives

5.2.0 Verbs. By far the largest class of transitive verbs behave like the verb *run* with respect to subject position. So in this respect, these verbs will be treated formally like *run* as far as subject position is concerned. What is of interest here is the direct object position.

The most common case is for a verb to be extensional with respect to direct object position. If Mary *hit* a unicorn, then it follows that there must be unicorns in the world in which that hitting took place. Other verbs that have this characteristic include *find*, *trip*, *see* (in the veridical sense), *date*, *strangle*, etc. Notice that these verbs are quite natural with existential *a* and *sm* quantifying over the object NP, and the existential use of the bare plural is selected.

(93) a. Bill hit a unicorn.

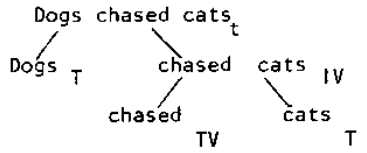
b. Mary tripped sm football players.

c. Max strangled frogs (yesterday evening).

On the happening reading of these verbs, we will treat them as corresponding to relations that hold between stages of the subject and object. The general schema for translation of these on the happening reading is as follows. If α is a verb in this class, α translates as $\lambda P \lambda x^{i}[^{\vee}P([\hat{}\lambda y^{i}\, \exists w^{s} \exists z^{s}[R(z,x) \,\&\, R(w,y) \,\&\, \alpha^{+}(z,w)]])$, where α^{+} is an expression that is a relation between stages.

Below we illustrate a possible derivation of the sentence *Dogs chased cats*, where the object and subject NP's are both interpreted existentially.

(94) Syntax:



Translations:

Dogs: $\lambda P^{\vee}P(d)$

Cats: $\lambda P^{\vee}P(c)$

Chase: $\lambda P \lambda x^{i}[^{\vee}P([\hat{y}^{i} \exists w^{s}\, \exists z^{s}[R(z,x) \,\&\, R(w,y) \,\&\, chase^{+}(z,w)]])$

Translation of sentence (reduced):

$$\exists w^{s}\, \exists z^{s}[R(z,d) \,\&\, R(w,c) \,\&\, chase^{+}(z,w)]$$

The extensional transitive verbs (and this would also hold of 3-place verbs like *give* or *show*) thus correspond to a relation that holds between stages of individuals.

There is another class of transitive verbs that has no progressive form, is unambiguous in the future and past, and appears not to be a relation that holds between stages of things. These verbs include *fear*, *hate*, *love*, *respect*, *loathe*, and *admire*. Sentences with these verbs do not entail the existence of what is referred to by the direct object NP. One can certainly fear ghosts or admire unicorns without it following from the truth of these assertions that there are ghosts or unicorns present in the world in which the statements are true. We find that the universal reading of the bare plural emerges in object position with these verbs. (95) cannot be used to report a circumstance where Betty hates only a FEW dogs, and generally likes all the rest.

(95) Betty hates dogs.

She must, in some sense, hate 'all' dogs. It does not follow that there are any PARTICULAR dogs she hates, though (in fact Betty may not even know any dogs at all). We also note that there is something vaguely strange about NP's quantified by *a* and *sm* with these verbs.

(96) a. ?Bill fears a duck.

b. ?John admires sm Congressmen.

There is another class of verbs which are not extensional with respect to direct object position, which are discussed in Montague's PTQ and in Partee (1974). A prime example is *seek*. If Betty seeks an apartment, it does not mean that there necessarily are any apartments, and one can seek unicorns without it following from this assertion that unicorns thereby exist. Within this rather small class of verbs we find the verbs *seek*, *look for*, *advertise for*, *owe(to)*, and a few others. There are several differences between these verbs and those in the previous class. Unlike those in the previous class, these verbs appear ambiguous between happening and characteristic readings in the past and future, and appear felicitously in progressive form (though *owe* does not pattern like this).

(97) a. Bill looked for wounded eagles. (ambiguous)

b. Betty is seeking an intelligent maid.

We also find that the direct objects of these are perfectly normal with NP's quantified by existential *a* and *sm*, and they select the existential use of the bare plural.

(98) a. Bill is seeking a unicorn.

b. Fred owes Sally sm paper clips.

c. Last night, we advertised for *night watchmen*.

Another important difference between these is illustrated by comparing (99a) and (99b).

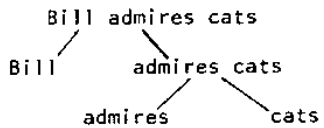
(99) a. Bill hates a couple of novels.

b. Bill is seeking a couple of novels.

On any reading of (99a), there are two specific novels that Bill hates -- e.g. *Gone with the Wind* and *Hawaii*. There is no reading where it is asserted that Bill hates 'any' pair of novels. There is a reading of (99b), however, where Bill is seeking no particular pair of novels, but seemingly 'any' pair of novels that might be found. In representing this specificity that seems to be required for verbs like *hate*, we will be treating these verbs as corresponding to relations that hold between INDIVIDUALS. The fact that the existence of the reference of the direct object does not follow in these cases arises from the representation here where no stages are claimed to exist in the world in which the claim holds (e.g. that Bill hates mermaids). However, the direct object is interpreted as referring to some specific individuals.

The general schema for verbs like *fear*, *love*, *respect*, etc. is as follows. If α is a verb of this class, then α translates as $\lambda P \lambda x^{\wedge} {}^{\vee} P(\hat{y}^{\wedge}[\alpha^{+}(x,y)])$, where α^{+} is a relation that holds between individuals (and not stages). Below is illustrated the sentence *Bill admires cats*.

(100) Syntax:



Translations:

Bill	$\lambda P^{\vee} P(b)$
cats	$\lambda P^{\vee} P(c)$
admire	$\lambda P \lambda x^{i} {}^{\vee} P(\hat{y}^{i}[admire^{+}(x,y)])$

Translation of sentence:

$$\lambda P^{\vee} P(b)(\hat{}\lambda P \lambda x^{i} {}^{\vee} P(\hat{y}^{i}[admire^{+}(x,y)])(\hat{}\lambda P^{\vee} P(c))$$

$$= admire^{+}(b,c)$$

Since the direct object here is ultimately represented by an individual, and not a stage of it, we find the universal-type reading for the bare plural in this context. In the next chapter, more will be said about the relationship to be found between stages and existence, so we will allow our cursory remarks here to stand unexpanded on for the time.

In the treatment of the verbs such as *seek* or *hunt for*, we cannot here follow the elegant treatment given in PTQ, where the direct object of these is treated as being the intension of a property set (or properties of properties). This is because we are presuming that a 'universal' reading will be found for the bare plural in any case where there is no mention of stages in it. If the direct object is but the set of properties associated with the bare plural, then we would expect to obtain something like a 'universal' reading for the bare plural. But intuitively, it appears that only the existential reading is to be found, though the presence of an intensional context in these cases clouds the intuitions somewhat. So we must then treat these verbs as making an existential claim about stages of the direct object, yet at the same time creating an intensional context in which this existential claim is being made.

This class of verbs would be quite easily accounted for if we were to treat them as being lexically decomposed, as Quine (1960) suggests, so that *seek* (for example) is treated as the sequence *try to find*. Here, the direct object of *seek* would be treated semantically as really being the direct object of *find*, which is extensional with respect to object position. The *try* part creates an intensional context, and the existential claim regarding stages of the direct object appears within the scope of *try*. However, a generative-semantics notion of lexical decomposition for such verbs has been argued against to my mind most convincingly in Partee (1974). However, a 'lexical decomposition' introduced by meaning postulate in a Montague-type system avoids the sorts of problems that she points out. Let me briefly illustrate before the actual formal proposal is made.

A sentence like *John wants a car by tomorrow* is semantically well-formed, though not all such similar sentences are as acceptable. For instance, *John buys a car by tomorrow* appears to have the same sort of syntactic structure, but is odd in comparison to the previous example. We can account for this difference if in the first case we treat the sentence as having a 'hidden' clause in it -- giving it essentially the structure of *John wants to have a car by tomorrow*. The adverbial *by tomorrow* is taken as being associated with the embedded clause, and not the clause containing the verb *wants*. The embedded clause is then removed from the sentence either by a simple deletion or some sequence of rules of predicate-raising and lexicalization, leaving the adverbial *by tomorrow* behind. We do not treat *buys a car by tomorrow* in the same way, but rather as being derived

from something much closer to its surface structure, so there is no hidden clause.

If we treat *seek* as being a lexical 'condensation' of the sequence *try to find*, though, this makes certain predictions about similar sorts of adverbials. It seems to make sense to say *Bill is trying to find a car by tomorrow*, but the sentence *Bill is seeking a car by tomorrow* is quite strange. If we treat *seek* as *try to find* in the same way we treat *want* as perhaps *want to have*, we are at a loss to account for the difference in their respective behaviors with regard to the adverbial *by tomorrow*. That is, the sentence containing *seek* does not appear to have a hidden clause in it as the sentence containing *want* does.

If we choose not to syntactically derive the verb *seek* from a more complex structure (e.g. *try to find*), but rather introduce the more complex internal structure via meaning postulate, the adverbial *by tomorrow* will never be introduced in the syntax in a position whereby it is associated with the embedded clause. This is because in the syntax these verbs (unlike *want*) are treated as being atomic, and a sentence like *Bill seeks a unicorn* is syntactically a subject, a verb, and a direct object, just like the sentence *Bill bought a car*.

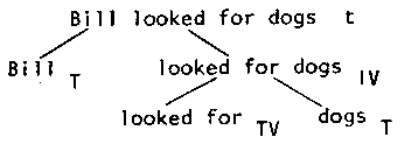
We will therefore offer a 'lexically-decomposing' meaning postulate for these verbs, which treats these verbs as corresponding to two predicates. One is a relation between properties and sets of individuals, and the other corresponds to a relation that holds between stages. Below is illustrated the general form of the meaning postulate that will apply for the list of verbs under consideration.

(101) $\exists W \exists S \Box[\delta'(x,P) \leftrightarrow W(\hat{y}^{i\vee}P(\hat{z}^{i}\ \exists u^{s}[R(u,z)\ \&\ S(y^{i},u)]))(x)]$

where δ' is the translation of *seek, look for, hunt (for)* etc.

As an example of a derivation, we present *Bill looked for dogs*.

(102) Syntax:



Translations:

Bill -- $\lambda P^{\vee}P(b)$

Dogs -- $\lambda P^{\vee}P(d)$

look for -- look for'

Translation of sentence:

$$\lambda P^{\vee}P(b)(\hat{}\text{look for}'(\hat{}\lambda P^{\vee}P(d))) = \text{look for}'\ (\hat{}\lambda P^{\vee}P(d))(b)$$

The meaning postulate ensures this is true iff:

$$W(y^{i}\ \exists u^{s}[R(u^{s},d)\ \&\ S(y^{i},u^{s})])(b)$$

This means that *Bill looked for dogs* may be true iff there are some dog-stages in some possible world that Bill is related to in that possible world. In the case of *look for*, the natural paraphrase is *try to find*; in the case of a verb such as *owe* or *advertise for* a natural-sounding paraphrase comes less readily to mind (though possibly *advertise to find* and *promise to give* are somewhat illuminating). However, the presence or absence of a convenient paraphrase in English is not really relevant to the analysis given.

An extremely wide variety of verbs have been left undiscussed here. Some are irrelevant in that they do not take bare plurals in certain argument positions (such as the object of the verb *hoped*). Many others do appear relevant, however, but are not included as it is hoped that the examples above will illustrate the general format of the proposed system and its workings. We will from time to time be discussing particular examples as they arise. Some problem cases are discussed in Chapter 7 as well.

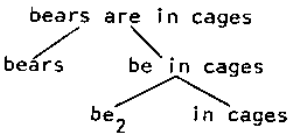
5.2.1 Prepositions. We will treat prepositions very much like we treat verbs. The prepositions of location correspond to transitive predicates that reduce to relations that hold between stages. A PP like *in the park* (in predicate position) is a relation that holds between stages of the subject and stages of the object of the preposition. The sentence *Bears are in cages* selects the existential use of the bare plural for both subject and object position. The PP *in cages* is treated as a set of stages, and combines with be_2 to obtain the set of individuals that have stages in cages. This is illustrated below.

(103) Bears $\lambda P^{\vee}P(b)$

Cages $\lambda P^{\vee}P(c)$

be_2 $\lambda M \lambda x^{i}\ \exists y^{s}[R(y,x)\ \&\ {}^{\vee}M(y)]$

in $\lambda P \lambda z^{s\vee}P([\hat{u}^{i}\ \exists w^{s}[R(w,u)\ \&\ in^{+}(z,w)]]$



Reduced translation:

$\exists z^{s}[R(z,b) \ \& \ \exists w^{s}[R(w,c) \ \& \ in^{+}(z,w)]]$

(There is a bear-stage and a cage-stage such that the former is in the latter)

As pointed out earlier, not all prepositions behave in this manner. Some require a 'universal' interpretation of their objects and/or subjects, such as *This book is on bears* (**This book is on a bear/sm bears*). These prepositions would be treated like the verbs of the class of *respect*, *fear*, and so on.

6. Transformations

The crucial element in the sentence that effects the interpretation of the bare plural as an existential or a 'universal' is the predicate that the NP in question is an argument of. Though in some cases the predicate may be a complex one, it is this element in the sentence and no other which dictates the ultimate interpretation rendered. This observation, if correct, is in accord with the syntactically-motivated need to posit certain transformations which rearrange the structure of the sentence in certain prescribed ways.

A sentence like (104) is unambiguously a generic statement about 'all' bears.

(104) Bears like to eat meat.

We account for this by having the verb of the sentence -- *like* -- have individuals in its domain, but not over stages (again, there is no progressive form). And since *bears* is the subject, the sentence is a predication on the individual 'bears'. But if we compare (104) with a similar sort of sentence, we see that such an account is not possible.

(105) Bears seemed to eat meat.

This sentence is ambiguous, either meaning that there were some bears that seemed to eat meat, or that it seemed that 'all' bears ate meat. The subject of the sentence is interpreted as an existential or a 'universal' depending upon how the predicate *eat meat* is interpreted. We also see that if the predicate serving as the complement of *seem* is unambiguously generic, the subject of *seem* is interpreted as unambiguously generic, and if the predicate is unambiguously a happening, the subject of *seem* is likewise interpreted as existential. This is illustrated in the following two sentences.

(106) a. Bears seemed to like to eat meat. (Generic)

b. Bears seemed to be in the next room. (Existential)

These facts follow from the familiar analysis of *seem* as a raising verb, and from regarding *like* as not being a member of this class of verbs. Under this analysis, *bears* begins as the subject of the verb of the complement and is raised into position as the subject of *seems* in surface structure.

A similar sort of observation can be made with regard to raising into object position. In (107) we see that in the first example the bare plural is interpreted as a universal, and in the second example as an existential.

(107) a. Bill believes bears to be animals.

b. Bill believes bears to be in the next room.

This, too, follows from a raising analysis of *believe*, where the object NP is syntactically derived by raising it from the subject position of the embedded clause. Though a semantic rule of 'lowering' (Thomason, 1976) may accomplish the same sort of effect, we will therefore incorporate these two rules of raising into the grammar presented here.

Cases of movement from object position are much less clear, as with Tough-Movement and Passive. As the Passive itself is regarded as 'changing meaning' with a bare plural shifted out of the object position in generic predicates, there is something else going on beyond a simple rearrangement of an interpreted syntactic structure. We will in the next chapter return to the problem of the Passive and its 'meaning-changing' effects.

7. Other Applications

7.0 Modals. In Lawler (1973), Lakoff (1972), and Dahl (1971), sentences like (108) are discussed.

(108) Football players can be sex maniacs.

This sentence is characterized as being at least three ways ambiguous. (1) 'all' football players are 'sometimes' sex maniacs; (2) 'Some' football players are 'always' sex maniacs; (3) 'Some' football players are 'sometimes' sex maniacs. Note with respect to the material in quotes that it appears that there is an anticipated reading that fails to appear -- that all football players are always sex maniacs. And if we treat the sentence as containing an ambiguous

quantification over football players (either as all or some), and another ambiguous quantifier over times or events (the 'always' or 'sometimes'), we also find that yet another anticipated reading fails to occur -- where the universal quantifier over times holds scope over the existential quantifier associated with the subject NP. This reading would mean something like 'there are always some football players who are sex maniacs'

Within the framework presented here, there is a rather natural solution to this set of possible interpretations. We will first of all treat the modal *can* as being at least two-ways ambiguous. The first sense is the 'ability' *can*, and is the one generally paraphrasable by *be able to*. It is treated semantically like an Equi-verb, taking a subject and an infinitival complement (though the *to* of the infinitive does not appear in the surface structure). This verb places certain restrictions on the sort of complement predicate it can take, though it is not entirely clear how to state these restrictions. Impressionistically speaking, the complement must involve an activity or an action, and cannot be interpreted statively. Thus, there is something quite wrong with *John can (is able to) know almost any answer* that is not wrong with *John can (is able to) find almost any book*. It appears that the appropriate set of complements is that set which may take a present progressive form, though this rules out the perfectly acceptable *George can be here by Thursday*. This ability sense of *can* corresponds to a relation with individuals in its domain. Hence, it always selects the universal interpretation of the bare plural, rejects the existential *a*, and is strange with sm Nom as subject.

(109) a. Dogs can bark. (Generic)

b. A dog can bark. (Generic only)

c. *Sm dogs can bark.

The other reading of *can* involves a quantification over realizations (or in Lewis' terminology, 'cases') of the subject. This reading of *can* maps a predicate onto another predicate. We give its translation below. Unlike the 'ability' sense of *can*, this sense cannot reduce to /kn̩/, but must retain its full vowel. Sentence (108') is no longer ambiguous in my judgment.

(108') Football players cn be sex maniacs.

Its translation involves an existential quantification over realizations of the subject that are OBJECTS, since only kinds of things, and not objects, have objects as realizations, we find that (108) does not have this same sort of ambiguity with a non-bare-plural subject.

(108'') John can be a sex maniac.

Its translation of *can* is as follows (we beg the question of the English syntax here for a time):

(110) $\lambda P \lambda x^{k}[\ \exists y^{o}[R(y,x)\ \&\ {}^{\vee}P(y)]]$

Here, y^{o} is a variable ranging over objects.

There is another ambiguous element in the sentence besides the modal *can* and that is the verb *be* which appears in the complement of (108). In Partee (1975b), the addition of an active homonym of the verb *be* is argued for, one which roughly means *is acting like*. It requires an animate subject, and may take the progressive form. This is also, presumably, the *be* that shows up in true imperatives (*Don't be a hero!*). This form of the verb is required to account for the differences exhibited below.

(111) a. The river made noise. The river was noisy.

b. The river was making noise. *The river was being noisy.

c. The girl was making noise. The girl was being noisy.

In addition to this form of *be*, there is the empty form of *be* which appears prior to non-verbal predicates over individuals. We will informally translate the active form of *be* as *act'*; the other form of interest here has no translation, being semantically null.

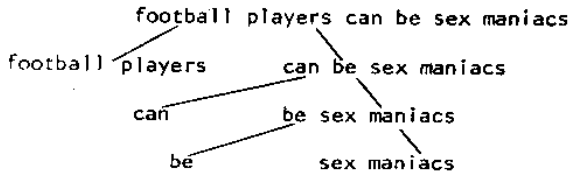
Of the two forms of *be*, the ability sense of *can* selects only the 'active' one, as that is the form that has a progressive form associated with it, and clearly fits the impressionistic bill of forming a predicate about *doing something*, involving an activity or action. The other form is ruled out because of its stative nature. Translating the ability sense of *can* as *able'*, we find the following a possible translation for (108).

(112) can $\lambda P \lambda x^{i}[able'(P)(x)]$

football players $\lambda P\ {}^{\vee}P(f)$

sex maniacs *sm'* (of type $<e^{i},t>$)

be_{ACT} $\lambda P \lambda x[act'(P)(x)]$



Translation (reduced)

able'(f, act'(^sm'))

That is, 'all' football players are able to act like (= *sometimes* be) sex maniacs. (i.e. 'all' football players are 'sometimes' sex maniacs)

With the ability sense of *can*, this is the only reading available for (108).

Turning now to the other sense of *can*, the quantificational sense, we find that this homonym exhibits no predicate restriction of the nature found for the other sense of *can*. For example, we find *football players can know every answer* as acceptable, on the reading intended, as *football players can play basketball as well* (meaning that there are some who play basketball). We find that as the complement of this modal, the VP *be sex maniacs* is ambiguous between the stative and the active form of *be*. This gives rise to two other possible translations for (108).

(113) a. $\exists y^{O}[R(y,f) \& sm'(z)]$

b. $\exists y^{O}[R(y,f) \& act'(\hat{}sm')(y)]$

With the structure (a) we may associate the intuitive characterization that 'some' football players are 'always' sex maniacs, at least in the same sense that if Bill is a loser he is 'always' a loser. With (b), it says that there are some football players that have the characteristic of (habitually) acting like sex maniacs -- that is, sometimes they are actually BEING sex maniacs (carrying on in indecorous manner, and all that attends the proper behavior), and other times they are not being sex maniacs. So we can say here that 'some' football players are 'sometimes' sex maniacs. They are sometimes sex maniacs in the same sense as *John runs* means that he is only sometimes actually running.

These are the only three readings I find for (108). There is no mystery in the fact that there is no reading meaning 'all football players are always sex maniacs', or that there is no narrow-scope interpretation for the existential quantifier. This is because there is no quantifier quantifying over events, and there is no ambiguous quantifier associated with the bare plural NP.

A sentence like *some men can be sex maniacs*, with the quantified NP as subject, appears to be unambiguous, having only the ability reading of the modal, as would any other quantified NP in subject position here. The reason for this is apparent. With the other form of *can*, the claim is made that there are some men who have realizations that are objects such that ... In formal terms, the proposed formula might look something like the following.

(114) $\exists x^{I}[man'(x) \& \exists y^{O}[R(y,x) \& sm'(y)]]$

But this cannot be, as only objects can realize kinds, and not other objects.

We have here seen two examples of modals that take subjects just like most normal verbs. Not all are to be analyzed like this. We will be analyzing sentences like *Dinosaurs could be mammals* as meaning 'Possibly, dinosaurs are mammals', with *could* in this case being treated as a sentential operator, much like *seem* which ends up syntactically in the middle of the sentence. We recognize at least two different forms of *will*; there is the future form of course, which is treated as a sentential operator, and a form of *will* which takes individuals as subjects and relates them to properties -- the dispositional sense of *will*. This accounts for the three-way ambiguity of *Dogs will bark*. On the 'future' reading of *will*, it either means at some future time there will be some barking dogs, or that in the future barking will be a general characteristic of 'all' dogs. But there is a third reading, which means that it is a general characteristic of 'all' dogs at this time, and has a strong dispositional flavor. We will represent these three readings of *dogs will bark* as follows.

(115) a. $W(\exists x^{S}[R(x^{S},d) \& bark'(x^{S})])$

b. $W(bark''(d))$

c. $Will'_{2}(bark'')(d)$

We will make no further specification as to the truth-conditions of the dispositional sense of *will*, though it is very difficult to separate from the simple generic statements.

The other modals will not be presented in the fragment, though it is understood that these should illustrate how the others might be handled.

7.1 Adverbs of quantification. Lewis (1975) discusses a class of adverbs, all of which may appear between subject and predicate in the sentence, that appear to be quantifying over what he calls 'cases'. As a prime example of the need for such a concept, consider the following variant of a sentence he presents.

(116) Quadratic equations usually have two different solutions.

It seems clear that *usually* cannot be simply a temporal operator here, meaning 'for most times', or something of that nature. That would be making the claim that quadratic equations have two solutions at most times (Monday through Saturday), but at others they don't (e.g. on Sundays). What the sentence seems to be saying in essence

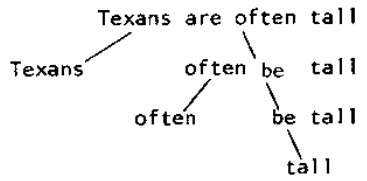
is that most quadratic equations have two solutions, or that it is the normal case.

We can quite readily account for such sentences in the framework established here. We will treat *often*, *usually*, *always*, *never*, and the like as quantifying over realizations of the subject of the sentence. We will treat these adverbs as being of the category that takes a predicate and maps it to another predicate. We will use *often* to illustrate. The sentence is *Texans are often tall.*

(117) Often $\lambda P \lambda x^{k}[\text{Many}'z^{o}[R(z,x^{k}) \ \& \ {}^{\vee}P(z)]]$

Texans $\lambda P {}^{\vee}P(t)$

tall $\underline{\text{tall}}'$ (of category $\langle e^{i},t\rangle$)



Translation: $\text{Many}'(z^{o})[R(z,t) \ \& \ \underline{\text{tall}}'(z)]$

Compare this with *Some man is often tall.*

(118) Some man $\lambda P \exists x^{o}[\underline{\text{Man}}'(x) \ \& \ {}^{\vee}P(x)]$

Translation: $\exists x^{o}[\underline{\text{Man}}'(x) \ \& \ \text{Many} \ z^{s}[R(z,x) \ \& \ \underline{\text{tall}}'(z)]]$

The translation of *Texans are often tall* makes the claim that there are many realizations of Texans (i.e. individual Texans) such that they are tall. On the other hand, the translation of *Some man is often tall* says that there are many realizations of some man such that those realizations are tall. But once again, $\underline{\text{tall}}'$ is a set of INDIVIDUALS, but what realizes some individual man cannot also be an individual, but can only be a stage. But $\underline{\text{tall}}'$ cannot apply to stages, and thus the anomaly. Note that such a formula would be acceptable, however, if the predicate were *be available*, or one that applies to stages of things. *Some man is often available* seems to make perfect sense. Unfortunately, the claim that there are many stages of some man that are available is made at the PRESENT time, and does not include a range of times. If this could be corrected, it would be a natural means of collapsing the uses of *often* that appear both in *Texans are often tall* and *Jill is often angry.* Both instances of *often* would then quantify over realizations of the subject.

7.2 The *see them drunk* construction. In Siegel (1976), Dowty (1972) and Dowty (1975), the following sort of sentence is discussed (among many others).

(119) Martha saw the policeman drunk.

Siegel argues quite convincingly that the predicate *drunk*, or whatever occupies the position, is not to be derived from a truncated relative or adverbial clause, nor can the adjective be considered a part of the direct object NP.

We note that the following range of predicates can occupy the position. Not all adjectives can appear here, and not all verb phrases.

(120) Martha saw the policemen
- nude
- *intelligent
- run into the bar
- running into the bar
- *own a car
- *nice guys to old ladies
- being heroes
- be heroes
- chased by the robbers
- *be mammals
- in the cruiser
- with the monster
- *liked by the robbers

The following pattern emerges from this sort of array. What may follow the direct object is the class of predicates that may apply to stages of things. For example, the VP *running across the street* may apply to stages, but the VP *own a car* may not (notice the absence of a present progressive form for *own*). Likewise, the adjective *nude* applies to stages by the criteria established, but *intelligent* applies only to individuals. We find also that locative PP's are allowed, which apply to stages, as well as the passive participles of verbs with extensional direct objects (such as *chase*, as opposed to *like*, which is extensional). At this time, we cannot directly account for the possibility of VP's like *run into the bar* or *be heroes*, for we have proposed that these VP's would apply to individuals (though correspond to predicates that apply to stages). In the next chapter, we will be modifying our view so that these verbs are treated as predicates that basically apply directly to stages, and so they will be naturally accounted for by the proposal to be made here. It should be noted that the *be* that may appear is the main verb active *be* introduced above. This *be* may co-occur with a role predicate nominal like *heroes*, but not with non-role *mammals* (this was pointed out in Bach (1968)). This is the only form of *be* allowed in this construction in the non-progressive form. All the sentences of (121) are unacceptable.

(121) Martha saw the policemen {*be nude. / *be chased by the robbers. / *be with the mobster.}

So this adds some motivation to our positing of an active *be*.

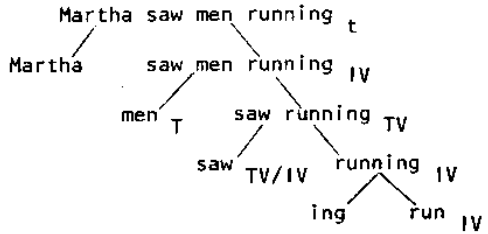
The generalization is that what may follow the direct object of *see* in this construction is any VP that applies to stages and not individuals. We will analyze the *see them drunk* as if it says that the subject saw a stage of the direct object, and that stage is mapped to true by the predicate following the direct object. In order to accomplish this, we will treat this version of the verb as being a function which takes an IV phrase to make a transitive verb (as suggested in Siegal (1976)). It is necessary to treat this version of *see* (see$_2$) as distinct from the normal transitive verb *see*. But there are not many verbs that behave like *see* in this respect, so this is just a means of saying that there is something special about this verb. It is given the following translation.

(122) see_2 $\lambda Q \lambda P \lambda x^{i} {}^{\vee}P(\hat{y}^{i}\ \exists w^{s}\ \exists u^{s}[R(w,x)\ \&\ R(u,y)\ \&$

$\underline{\text{see}}^{+}(w,u)\ \&\ {}^{\vee}Q(u)]]$

See_2 is syntactically of category TV/IV. When the direct object is added, it is placed between the verb and the IV phrase. Below is illustrated *Martha saw men running*.

(123) Syntax:



Translation (reduced):

$\exists w^{s}\ \exists u^{s}[R(w,\textit{Martha})\ \&\ R(u,\textit{men})\ \&\ \text{see}(w,u)\ \&$

$\underline{\text{Prog}}'(\hat{}\text{run})(u)]$

Though many other verbs take a subset of these IV complements, only *see*, *hear*, and (for me) *watch* take all possible stage-level IV's.

7.3 There-insertion. One of our initial observations regarding stages was that the rule of There-Insertion appears to be sensitive to whether or not the predicate following *be* is a predicate that ranges over individuals or stages. Exactly how to encode this fact into the grammar here remains unsettled; I will propose a treatment that differs from that of Milsark (1974), who proposed a rule of surface structure interpretation which could not apply to those predicates that only apply to individuals.

One of the elements that predicates which apply only to stages have in common is that they all must combine with be_2 in order to make a sentence (recall that be_2 has the effect of mapping a set of stages to a set of individuals whose stages are in the set operated on). We thus posit the crucial element of the there-insertion rule as being be_2, and the nature of the predicate will fall out naturally from the presence of be_2. Rather than postpone actual presentation of the rule until the presentation of the fragment, it is of sufficient interest and complexity to present here in its fullest form.

Rather than using the transformational format, we will write There-Insertion as a recursive rule. The reason for this is that the subject of the there-inserted sentence does not appear to be able to hold wider scope than the sentence it appears in. For example *A man believes there is some fox in his basement* does not appear to be able to convey the thought that a man had a belief about some specific fox, unlike *A man believed that some fox was in his basement*. Bach (1976) gives further reasons, which, to my mind, show that it is desirable to state that the subject of There-inserted sentences cannot have gotten there by quantifying in, but rather that it results from the direct introduction of the lexical NP in subject position. We will here write the rule as a recursive rule which applies when subject and predicate are combined, though any number of other possible ways of writing the rule may be possible. The rule requires that the subject NP be lexical, and that the predicate begin with be_2. The corresponding semantic rule is functional application of subject to predicate, or the usual subject-predicate rule.

There-Insertion

S 27. If $\alpha \in P_{IV}$ and α is of the form $[_{IV}\text{be}_2\ X]$, and if $\beta \in P_T$ and β is not of the form $[_T\text{he}^{h}_{n}]$ or $[\$\text{they}^{h}_{n}]$, then $F_{22}(\alpha,\beta) \in P_T$, where $F_{22}(\alpha,\beta) =$ $[_t[_T\text{There}]\ \text{to}][_{IV}\text{be}_2\ \beta\ X]]$

The rule will not operate if the predicate does not begin with be_2 (thus avoiding **There are men intelligent*) or if the subject NP is a variable (avoiding wide-scope readings for the subject).

Of course, the rule is incomplete in a number of ways. There is nothing said about the definiteness restriction on the subject NP (??*There is the man over here*), not is the passive *be* included, nor will this work with predicates other than *be* (as *There arose a great turmoil*). In addition, this will not give us sentences like *There are kangaroos*, which may have a source distinct from other cases of there-insertion. Nonetheless, the rule will serve as a useful approximation for the time. While the rule would have to be modified if the perfective *have* were included in the fragment, the way the fragment is organized there is no need to make allowance for an intervening modal.

8. Further Considerations

8.1 Internal structure of the bare plural. Up to this time, we have been treating NP's like *dogs* and *funny old trees* as being unanalyzed wholes, just like one might think of proper names. However, these NP's have quite evident internal structure, and it appears to be the same sort of internal structure associated with quantified NP's.

For the most part in dealing with the internal structure of NP's we will be following Bennett (1974), though the account here will be considerably simplified by comparison, reflecting our dissimilar interests. Specifically, we will not be concerning ourselves with the group reading of plural NP's, nor will nearly as wide a range of quantifiers be presented. In addition, we will not specifically include Bennett's treatment of the vague quantifiers, such as *many* and *some* in this fragment. Instead things will be left at a quite intuitive level on the status of the vague quantifiers. The purpose of these exclusions is to write a fragment that is relatively to the point without bringing in whatever else may be necessary for genuine completeness, the inclusion of which would serve no real purpose in furthering our investigation at this point.

The treatment of the plural marker will be Bennett's. In this treatment, all the singular forms of count nouns are listed in the lexicon, and are basic expressions of category CN (or Nominal). One always has the option, in building up the analysis tree from the bottom up, of taking any basic CN (these would be the nouns of the language) and forming a plural noun which is also of category CN. The formation of a plural in the syntax will be represented by adding a mark '$' prior to the noun. This is subsequently converted into the plural marker on the noun, whether it be the suffix or another form of the noun. The translation of the plural form of the noun and the singular form are identical -- there is no semantic effect of adding the plural marker. If we were considering group-readings, we would see that this marker would in some cases have a semantic effect. The rules are constructed in such a way that the addition of prenominal material will always result in the CN beginning with $ if the basic noun that is the head is in the plural form. This allows a quite simple means of letting certain quantifiers combine with only singular CN's (such as *every*), and others only with plural CN's (such as *all*).

Like Bennett, pronouns here are treated as being either basically singular or plural, although they receive the same translations. If a plural NP is quantified in (syntactically lowered), it may only replace and bind plural pronouns (they$_n$). The singular NP's may only combine with he$_n$, she$_n$, or it$_n$ (depending on the nature of the NP). Having the pronouns basically singular or plural, rather than having them agree with the NP that binds it by syntactic rule, has considerable utility in terms of making the syntax come out right.

NP's like *a man* or *every fish that swims* will be treated in much the same manner as in Bennett (1974) and Montague's PTQ. These will denote a set of properties that in the first case is the set of properties that some man has, and in the second the set of properties that every fish that swims has. The bare plural will also denote a set of properties, except this set of properties will be those associated with some entity. This is the entity that we have designated by the lower case letter, as in translating *dogs* as $\hat{P}^{\vee}P(d)$. However, we need a principled way of deriving a set of properties of some entity (or individual) from what appears to be a simple CN in the plural form. We will do this by using the realization function. First, let us give an example of the derivation of *dogs*. We stipulate that any plural CN at all can be a term phrase (an NP) as well, but in the conversion process from CN to NP there is an associated semantic operation. Consider first the syntax of the NP *dogs*.

(124)
T $dog (morphologically realized as 'dogs')
|
CN $dog
|
CN $dog

The translation of the CN 'dog' is a function from individuals to truth-values -- the set of individuals that are dogs. The translation of the plural CN is the same. We will denote this constant of the logic we are translating into by the symbol $\underline{\underline{dog}}'$. The term phrase 'dogs' will incorporate the meaning of the CN *dogs* into its translation. The translation of the term phrase is given as below.

(125) $\hat{P}^{\vee}P(\iota x^{k}[\forall z^{o}\Box[\underline{\underline{dog}}'(z)\leftrightarrow R(z,x)]])$

Here, x^{k} is a variable that ranges over kinds of things, z^{o} is a variable that ranges over objects, and the 'ι' before the first occurrence of x^{k} is the definite descriptor. What this says, in words, is that the NP 'dogs' is the property set of the unique entity such that for all objects, at every time in every possible world, that object

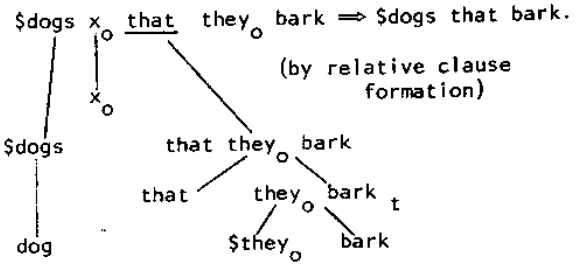
is a dog if and only if it is a realization (on the object-level) of the unique entity. So in every possible world, the set of objects that realizes the unique object will be precisely the same as the set of dogs in that possible world. Since this is going to hold in all possible worlds, the set of sets picked out by $\hat{}\underline{dog}'$ is exactly the same as the set of sets picked out by $\hat{x}\ R(x,d)$. It is in this way that the entity x^k CORRESPONDS to the intension of the set of dogs, though it is not IDENTICAL to that function. We thus incorporate the insight that seemed so compelling about thinking of *dogs* as denoting the intension of a set without having to claim that the NP is the property set of the intension of a set.

Is there anything that guarantees that there will be any such entity in all such cases? The answer to that is no, and we will discuss in the fifth chapter cases of bare plural NP's that appear to have no kind-level entity associated with them. We can, however, restrict the interpretations for the logic in such a way so that if there is one kind-level entity associated with a bare plural, there can only be one and no more. We do this by stating that any two kind-level entities that necessarily have all the same realizations are identical. As a real-life example of a situation like this, *ground hogs* and *woodchucks* all have the same realizations, and from this it seems that we can therefore conclude that woodchucks ARE groundhogs. These are simply two different names for the same entity, just like *Mark Twain* and *Samuel Clemens* are two different names for the same entity.

It should further be noted that we allow kind-level entities not to have any realizations in the real-world -- for instance *unicorns* or *fifty-foot tall field mice*. It is presumed that there are some possible worlds in which these kinds of things are realized; these kinds of things have the same status as *Sherlock Holmes* and *Santa Claus*, being realized in some possible states of affairs but not others (as in the real world).

Below is a sketch of an analysis for the bare plural NP *dogs that bark*.

(126) Syntax:



Translation of CN *dogs that bark*:

$$\lambda x^i[\underline{dog}'(x^i)\ \&\ \underline{bark}''(x^i)]$$

Translation of NP *dogs that bark*:

$$\lambda P^{\vee}P(\iota x^k[\forall z^o\ \Box[\underline{dog}'(z)\ \&\ bark''(z)\leftrightarrow R(z,x)]])$$

As one can easily see, the complexity of the translations becomes extremely unwieldy if spelled out in complete detail (consider momentarily what *Dogs chased cats* might look like). But this is a problem only of presentation and legibility, and not one of a technical shortcoming of the logic. In any case, we will continue to use small letters like 'd' to denote entities that are actually expressed by definite descriptions in the translations as a means of clarifying presentation. Keep in mind that this is only an informal means of representing the semantics of certain sentences, and is therefore not actually evaluated by the logic as true or false.

The function that converts a CN into an NP is here conceived of syntactically as the identity function. However, if one were so inclined, one could just as well treat this function as the result of adding a null determiner to the CN, and give the null determiner a semantic interpretation of its own. Within the framework of a Montague grammar, these two approaches are equivalent, and there is no way to decide between them. I will not try to examine the relative merits of this approach with respect to other frameworks, so the reader is invited to choose his or her favorite analysis, depending on whether or not he or she believes that all English NP's have a filled determiner position.

8.2 Syntactic categories and labelled bracketings. In the fragment presented, I follow Partee (1976) in assuming that the rules that build up sentences also assign to those sentences a tree structure. This is in addition to what Montague does. It is not entirely clear that a labelled bracketing is absolutely necessary, but it is certainly of value from the standpoint of convenience. This can be accomplished in a very straightforward manner.

One of the chief constraints on language imposed by the sort of system developed by Montague is that there be a correspondence between rules of syntax and rules of semantics. The correspondence is seen as a functional mapping from the syntactic categories of the language to the semantic categories. As a result, two different syntactic categories may turn out to have the same semantic correlate (for example, IV and CN both are of type <e,t> in Bennet's system), but since the relation is functional, no syntactic category can have two different associated semantic correlates. For instance, we cannot have something of category IV mapping onto something of type

<e,t> in one derivation, and onto something of type <<e,t>, t> in the next.

We are going to relax this restriction in a limited way, and not stipulate that this functional relationship holds for LEXICAL categories (that is, noun, verb, adjective, preposition, adverb, and possibly others). In doing this, we can claim that both the transitive verb *see* and the intransitive verb *run* are in fact both verbs. In Montague's system, these two things would have to be of different syntactic categories (IV/T and IV respectively), and no claim about the fact that both are verbs is made. But if we relax the correspondence between syntactic and semantic categories just on the level of lexical categories, we will be able to state this in a straightforward way. A similar relaxation of this restriction in the higher syntactic categories would radically change the nature of the theory, but holding the change to the lexical level only does very little, as far as I can tell, to change the basic nature of the theory. I think the reason for this is fairly clear, and it is simply that the rules for building up sentences are all stated in terms of higher-level categories, for it is only on the level of these categories that words combine with each other in semantically prescribed ways. (This remark does not deny that processes of word-formation may put words together to form other words -- *fox-hunting* or (a) *build-up* -- for the means by which these words are formed depends crucially on a relationship that is statable only in terms of higher-level categories. For example, in *fox-hunting* the noun *fox* in some sense bears the relationship of direct object to the verb *hunt*. See Roeper and Siegel (to appear) for a discussion of the sort of machinery required.)

To implement this conception of things, what we will do is to list all the words in the lexicon as ALREADY-BRACKETED. For example, where Montague's rule says:

$$B_{IV} = \{run, walk, talk, ...\} \quad \text{(Basic IV-phrases are...)}$$

ours will say:

$$B_{IV} = \{[run]_{V}, [walk]_{V}, [red]_{Adj}, \text{etc.}\}$$

And where a Montague tree would end up with a structure like the following: $[run]_{IV}$, ours will have the following structure: $[[run]_{V}]_{IV}$. The whole system might be thought of as being a variant of a system like that of Chomsky (1965), where the rules of lexical insertion themselves are responsible for the introduction of the lexical categories, with the complex symbols substituted for not being rewritten at the pre-terminal level, but at the pre-pre-terminal level instead.

This theoretical change in the system leaves open entirely the relationship that is to be found between semantic interpretation and lexical categories, and whether or not there is any semantic significance to the notion 'verb' or 'adjective' remains unexamined here. While I am inclined to think that there is some significance, this may possibly be expressed in terms of what higher-level syntactic categories (and thus semantic categories) the various lexical items may be basic phrases of.

8.3 Auxiliary system. The present fragment does not incorporate a treatment of the perfective aspect, nor of the passive *be*. The passive will be discussed later with respect to other problems that it gives rise to; the perfective aspect will not.

In this fragment, tensed sentences are derived from sentences that start out as infinitives, so infinitival structures are generated directly, and not derived from finite clauses as has been generally thought to be the case (though only rarely have any arguments for such an analysis been advanced). The fragment will produce such sentences as *John to run* and assign them an interpretation, but we will filter them out via a syntactic rule that filters any infinitives that have surface subjects.

There is a category of basic tensed verbs, which includes the modals plus $[\ do\ ]_{+pres}$ and $[\ do\ ]_{-pres}$, which are interpreted as present and past tense respectively. These verbs act on sentences as t/t syntactic operators, but syntactically replace *to* in the clause they take as argument. This process prevents recursion of auxiliary elements. In Montague's system, it is possible (though I'm not sure of this) to get the modal *will* recurring.

The rule of affix-hopping of the tense is treated as a rule which copies the feature of the verb *do* onto the verb to its immediate right, with concomitant deletion of *do*. It is assumed that morphological rules will spell out the verbs in their appropriate surface forms. There are no doubt other aspects of the auxiliary system excluded here, such as Be-Raising (Jackendoff 1972).

FOOTNOTES TO CHAPTER IV

[1]This chapter contains material from Carlson (1977).

[2]It is actually the case that the individual itself is assigned, regardless of whether or not there is some expression of the language that picks out that individual uniquely. The exposition here is designed to illustrate the notion of satisfaction without bringing in any more formalism than necessary.

[3]This is just another version of the story used by the ancient Greeks to illustrate the same point I am making, where it relates a tale about the ship of Theseus. See also Chandler (1975) and Strawson (1959) and references cited.

[4]We are not, however, granting ontological primacy to any member of this hierarchy. Indeed here, we define each in terms of the other, which reflects my hunch that none of these are ontologically more basic than any other.

[5]This does not claim that some sentences without this form cannot be contradictory, as *Bill is a rabbit and Bill is not a mammal*.

[6]We could, of course, introduce this via meaning postulate on some constant as in PTQ, but direct translation suits our purposes here better.

APPENDIX TO CHAPTER IV

The First Fragment

The fragment will be presented in four sections. First, the syntactic rules of a fragment of English will be stated, including the transformations. Then a syntax and an interpretation of the intensional logic will be presented. The rules for translating the English expressions into intensional logic will then be given. The final section will be an enumeration of meaning postulates that seem to be required in order to constrain the interpretation of the translations in reasonable ways.

Syntax of English

Let e and t be two fixed objects that are distinct from one another, and neither is an ordered pair or triple. The set of categories of English CAT is the smallest set such that (a) e is in that set and t is in that set (b) whenever A and B are in that set, then A/B, A//B, A///B, and A////B are in that set.

Basic categories. The set of basic phrases B_A of the categories of English are defined as follows.

$B_{CN(=t//e)} = \{[dog]_N, [cat]_N, [man]_N, [woman]_N, [fish]_N, [house]_N\}$

$B_{IV(=t/e)} = \{[run_1]_V, [run_2]_V, [walk_1]_V, [walk_2]_V, [sleep_1]_V, [sleep_2]_V, [bark_1]_V, [bark_2]_V, [available]_{Adj}, [drunk]_{Adj}, [widespread]_{Adj}, [everywhere]_{PP}, [here]_{PP}\}$

$B_{T(=t/t/e)} = \{[Bill]_N, [Mary]_N, [Amherst]_N, [Rover]_N, him_n^\gamma, \$them_n^\gamma$ (where n is a natural number, and $\gamma \in \{o,k,in\}$)$\}$

$B_{T/CN} = \{an, [some]_Q, the, \$the, [\$all]_Q, [every]_Q, [many]_Q\}$

$B_{TV(=IV/T)} = \{[see_1]_V, [see_2]_V, [hate]_V, [hit_1]_V, [hit_2]_V, [date_1]_V, [date_2]_V, [in]_p, [near]_p, [look\ for_1]_V, [look\ for_2]_V\}$

$B_{TV/IV} = \{[see_3]_V\}$

$B_{t/t}$ = {[necessarily]$_{Adv}$, [will$_1$]$_V$, [can$_1$]$_V$, not, [do]$_V$, [do]$_V$}

$B_{IV/IV}$ = {[slowly]$_{Adv}$, [rapidly]$_{Adv}$}

$B_{IV/t}$ = {[believe]$_V$, [expect$_1$]$_V$, [expect$_2$]$_V$}

$B_{IV/INF(= t/e\ /\ t////e)}$ = {[try$_1$]$_V$, [try$_2$]$_V$}

$B_{IV//IV}$ = {-ing}

$B_{IV///IV}$ = {[be$_2$]$_V$, [often]$_{Adv}$, [always]$_{Adv}$, [be$_3$]$_V$, [will$_2$]$_V$, [can$_2$]$_V$, [can$_3$]$_V$}

$B_{CN/CN}$ = {[good]$_{Adj}$, [beautiful]$_{Adj}$}

$B_{IV/IV\ /\ T}$ = {[in$_2$]$_P$, [near$_2$]$_P$}

B_A = Λ is A is not one of the categories above.

Syntax. By P_A is meant the set of phrases of CAT A. This set is defined as follows. Parentheses around variables indicate optionality in descriptions of form, and we omit the outermost brackets in these descriptions of form.

S1. $B_A \in P_A$ for every category A. If $\alpha \in B_A$, then $[\alpha]_A \in P_A$.

S2. If $\alpha \in P_{CN}$ and α is of the form (henceforth iotf)$[\beta]_N$, then $F_1(\alpha) \in P_{CN}$, where $F_1(\alpha) = [\$\alpha]_{CN}$

S3. If $\alpha \in P_{T/CN}$ and α iotf $\$\beta$, and if $\delta \in P_{CN}$ and δ iotf $\$\gamma$, then $F_2(\alpha,\delta) \in P_T$, where $F_2(\alpha,\delta) = [\alpha\delta]_T$. If α is not of the form $\$\beta$, and δ is not of the form $\$\gamma$ then $F_2(\alpha,\delta) \in P_T$.

S4. If α iotf $\$\beta$, and $\alpha \in P_{CN}$, then $F_3(\alpha) \in P_T$, where $F_3(\alpha) = [\alpha]_T$.

S5. If $\alpha \in P_{CN}$ and α iotf $\$\beta$, and if $\phi \in P_t$, then $F_{4,n,\gamma}(\alpha,\phi) \in P_{CN}$ where $F_{4,n,\gamma}(\alpha,\phi) = [\alpha[\text{that } \phi']_t]_{CN}$, where ϕ' is gotten from ϕ by removing the first occurrence of $\$they^{\gamma}_n$ or $\$them^{\gamma}_n$ and changing all subsequent occurrences to $\$they or $\$them respectively. If α is not of the form $\$\beta$, then $F_{4,n,\gamma}(\alpha,\phi) \in P_{CN}$ where ϕ' is gotten from ϕ by removing the first occurrence of he^{γ}_n or him^{γ}_n and changing all subsequent occurrences to he or him respectively.

S6. If $\alpha \in P_{CN/CN}$ and $\beta \in P_{CN}$ and β iotf $\$\delta$, then $F_5(\alpha,\beta) \in P_{CN}$, where $F_5(\alpha,\beta) = [\$\alpha\beta]_{CN}$. If β is not of the form $\$\delta$, then $F_5(\alpha,\beta) = [\alpha\beta]_{CN}$

S7. If $\alpha \in P_T$ and $\beta \in P_{IV}$ and β iotf $[\delta]_V(\gamma)$, then $F_6(\alpha,\beta) \in P_t$ where $F_6(\alpha,\beta) = [\alpha \text{ to } \beta]_t$. If β is not of the form specified, then $F_6(\alpha,\beta) = [\alpha \text{ to } [\text{be}_1]_V\beta]_t$

S8. If $\alpha \in P_{TV}$ and α is not of the form $[\delta]_V[\gamma]_{IV}$, and if $\beta \in P_T$, then $F_7(\alpha,\beta) \in P_{IV}$, where $F_7(\alpha,\beta) = [\alpha\beta]_{IV}$. If α is of the form specified, then $F_7(\alpha,\beta) = [[\delta]_V\beta[\gamma]_{IV}]_{IV}$

S9. If $\alpha \in P_{IV/t}$ and $\phi \in P_t$, then $F_8(\alpha,\phi) \in P_{IV}$, where $F_8(\alpha,\phi) = [\alpha\phi]_{IV}$

S10. If $\alpha \in P_{IV/INF}$ and $\beta \in P_{INF}$, then $F_9(\alpha,\beta) \in P_{IV}$, where $F_9(\alpha,\beta) = [\alpha\beta]_{IV}$

S11. If $\alpha \in P_{IV/IV}$ and $\beta \in P_{IV}$, then $F_9(\alpha,\beta) \in P_{IV}$

S12. If $\phi \in P_t$ and ϕ iotf him^{γ}_n to $(\text{be}_1)[\alpha]_{IV}$, then $F_{10,n,\gamma} \in P_{INF}$ where $F_{10,n,\gamma}(\phi) = [\text{to } (\text{be}_1)[\alpha]_{IV}]_{INF}$

S13. If $\alpha \in P_{CN}$ and α iotf $\$\beta$, then $F_{11}(\alpha) \in P_{IV}$, where $F_{11}(\alpha) = [\alpha]_{IV}$. If α is not of the form specified, then $F_{11}(\alpha) = [\text{an } \alpha]_{IV}$.

S14. If $\alpha \in P_{t/t}$, and α iotf $[\beta]_V$, and if $\phi \in P_t$ and ϕ iotf $[\delta]_T$ to $(\text{be}_1)\ [\gamma]_{IV}$, then $F_{12}(\alpha,\phi) \in P_t$, where

$F_{12}(\alpha,\phi) = [[\delta]_T[\beta]_V(be_1)[\gamma]_{IV}]_t$. If α is not of the form $[\beta]_V$, then $F_{12}(\alpha,\phi) = [\alpha\phi]_t$.

S15. If $\alpha \in P_{TV/IV}$ and $\beta \in P_{IV}$, then $F_{13}(\alpha,\beta) \in P_{TV}$, where $F_{13}(\alpha,\beta) = [\alpha\beta]_{TV}$.

S16. If $\alpha \in P_{IV//IV}$ and $\beta \in P_{IV}$ and β iotf $[\delta]_V(\gamma)$, then $F_{14}(\alpha,\beta) \in P_{IV}$ where $F_{14}(\alpha,\beta) = [[[\delta]_V\alpha]_{Adj}(\gamma)]_{IV}$

S17. If $\alpha \in P_{IV///IV}$ and $\beta \in P_{IV}$, then $F_9(\alpha,\beta) \in P_{IV}$ unless α iotf be_2, in which case β cannot be of the form $(\gamma)[[\delta]_V(n)]_{IV}$

S18. If $\alpha \in P_{IV/IV\ /\ T}$ and $\beta \in P_T$, then $F_{15}(\alpha,\beta) \in P_{IV/IV}$, where $F_{15}(\alpha,\beta) = [\alpha\beta]_{IV/IV}$

S19. If $\phi, \psi \in P_t$, then $F_{16}(\phi,\psi) \in P_t$, where $F_{16}(\phi,\psi) =$ $[\phi$ and $\psi]_t$

S20. If $\alpha, \beta \in P_{IV}$, then $F_{17}(\alpha,\beta) \in P_{IV}$, where $F_{17}(\alpha,\beta) =$ $[\alpha$ and $\beta]_{IV}$

S21. If $\alpha, \beta \in P_T$, then $F_{18}(\alpha,\beta) \in P_T$, where $F_{18}(\alpha,\beta) =$ $[\$\alpha$ and $\beta]_T$

S22. If $\phi, \psi \in P_t$, then $F_{19}(\phi,\psi) \in P_t$, where $F_{19}(\phi,\psi) =$ $[\phi$ or $\psi]_t$

S23. If $\alpha, \beta \in P_{IV}$, then $F_{20}(\alpha,\beta) \in P_{IV}$, where $F_{20}(\alpha,\beta) =$ $[\alpha$ or $\beta]_{IV}$

S24. If $\alpha, \beta \in P_T$, then $F_{21}(\alpha,\beta) \in P_T$, where $F_{21}(\alpha,\beta) =$ $[\alpha$ or $\beta]_T$

S25. If $\alpha \in P_T$ and α is not of the form him_n^γ or $\$them_n^\gamma$, and if $\phi \in P_t$, then $F_{22,n,\gamma}(\alpha,\phi) \in P_t$ where $F_{22,n,\gamma}(\alpha,\phi) = \phi'$, where ϕ' is gotten from ϕ by (a) if α iotf $\$\beta$, replacing the first occurrence of $\$they_n^\gamma$ or $\$them_n^\gamma$ in ϕ with α and changing all subsequent occurrences to $they or $them respectively (b) if α is not of the form $\$\beta$ replacing the first occurrence of he_n^γ or him_n^γ with α and changing all subsequent occurrences to he or him, respectively.

S26. If $\alpha \in P_T$ and α is not of the form $\$them_n$ or him_n, then $F_{23,n,\gamma}(\alpha,\beta) \in P_{IV}$. F_{23} operates like F_{22} above.

S27. If $\alpha \in P_T$ and α is not of the form $\$them_n^\gamma$ or him_n^γ, and if $\beta \in P_{IV}$ and β iotf $[be_2][\delta]_{IV}$, then $F_{24}(\alpha,\beta) \in P_t$, where $F_{24}(\alpha,\beta) = [[\text{There}]_T$ to $[[be_2]_V\alpha[\delta]_{IV}]_t$

Transformations

All transformations are obligatory and apply on the t (S) cycles.

SUBJECT CASE-MARKING

$$X \begin{Bmatrix} \$then_n^\gamma \\ him_n^\gamma \end{Bmatrix} \begin{bmatrix} V \\ \pm pres \end{bmatrix} Y$$

1 2 3 4

$$1 \begin{Bmatrix} \$they_n^\gamma \\ he_n^\gamma \end{Bmatrix} 3 \quad 4$$

MODAL RAISING

$$X \quad T \quad to \quad (Adv) \begin{bmatrix} V \\ \pm pres \end{bmatrix} IV \quad Y$$

1 2 3 4 5 6 7

1 2 5 4 Ø 6 7

NEG PLACEMENT

X	Not	T	$\begin{bmatrix} V \\ \pm pres \end{bmatrix}$	Y
1	2	3	4•	5
1	Ø	3	4+2	5

SUBJECT-VERB AGREEMENT

X	$[\$\ Y]_T$	$\begin{bmatrix} V \\ \pm pres \end{bmatrix}$	Z
1	2	3	4
1	2	$\begin{bmatrix} 3 \\ +plur \end{bmatrix}$	4

AFFIX HOPPING

X	$[do]_V$ $\alpha pres$	V	Y
1	2	3	4
1	Ø	$\begin{bmatrix} 3 \\ \alpha pres \end{bmatrix}$	4

RAISING

X	$\begin{Bmatrix} expect \\ believe \end{Bmatrix}$	[	(not)	T	to	(be_1)	$IV]_t$	Y
1	2		3	4	5	6	7	8
1	2+4		3	Ø	5	6	7	8

ADJECTIVE SHIFT

X	CN	[that	to	$\begin{Bmatrix} be_1 \\ be_2 \end{Bmatrix}$	$Adj]_t$	Y
1	2	3	4	5	6	7
1	5+2	Ø	Ø	Ø	Ø	7

Surface Structure Operations

(a) Replace all verbs bearing features with the appropriate forms (which are not explicitly specified here)

(b) Replace all nouns appearing in the configuration $[\$\ N]_{CN}$ with the plural form of that noun, and erase all occurrences of \$ that appear in the tree.

(c) Filter any infinitives with subjects, that is, any sentence containing a structure of the form $[\ T$ to $(be_1)\ IV]_t$ is to be marked as ungrammatical.

Sorted Intensional Logic

For the most part, the syntax and semantics of the following logic follows that of PTQ, except that here the entities are divided into three subtypes. I follow Cooper (1975) for the sorting.

The notion of a PARTIAL FUNCTION is any function from a set X to a set Y where if a is a member of X, f(a) $\in$ Y OR f(a) is undefined. A COMPLETE function would map all members of X to members of Y; a NULL is one the value of all of whose applications to members of X is undefined. For every partial function F there is a COMPLETE SUB-FUNCTION, F', such that F'(a) is defined for all a that are members of a subset of X, X', and for which F'(a) is undefined for all a that are members of CompX'.

We now define the set of types, Type, in the following way. Let e,t,s be three distinct objects, none of which are an ordered pair or triple. Type is the smallest set such that (a)$\langle e,t\rangle \in$ Type (b) whenever A and B $\in$ Type, $\langle A,B\rangle \in$ Type (c) whenever A $\in$ Type, $\langle s,A\rangle \in$ Type. The possible denotations of each type are defined as follows. We take A,I,J as any sets, regarded as the set of entities, the set of possible worlds, and the set of moments of time, respectively. $D_{\alpha AIJ}$, or the possible denotations of type α with respect to A,I,J are:

$D_{eAIJ} = A$

$D_{tAIJ} = \{0,1\}$ (falsity and truth, respectively)

$D_{\langle\alpha,\beta\rangle AIJ} = \{x:$ x is a partial function with domain $D_{\alpha AIJ}$ and range included in $D_{\beta AIJ}\}$

$D_{<s,\alpha>AIJ}$ = {x: x is a partial function with domain IxJ and range in $D_{\alpha AIJ}$}

We now sort the set of entities A into certain subsets, and define some type <α,β> in terms of its complete sub-function. We define the set of subtypes, SType, relative to a basic set of sorts M. Let M ∪ {t'} be a set of objects distinct from <e,t,s>, none of whose members is an ordered pair or triple. By SType we mean the smallest set such that

m(e) ∈ SType for all m ∈ M

t' ∈ SType

If α,β ∈ SType, then <α,β> ∈ SType

If α ∈ SType, then <s,α> ∈ SType

We further specify that for any α ∈ SType, α ⊆ T if α differs from T, T ∈ Type, only in that every occurrence of t in T is replaced with t', and every e in T is replaced with m(e), m ∈ M.

We define $D_{\alpha'AIJ}$, or the set of possible denotations of a sorted type α' corresponding to A, I, J as follows:

$D_{m(e)AIJ}$ = m'(A) (where m ∈ M and m' is a function corresponding to m such that m'(A) ⊆ A)

$D_{t'AIJ}$ = {0,1}

$D_{<\alpha',\beta'>AIJ}$ = {x: x ∈ $D_{<\alpha,\beta>AIJ}$ (where α, β ∈ Type and α' ⊆ α β' ⊆ β) and x has as its complete sub-function a function with domain $D_{\alpha'AIJ}$ and range included in $D_{\beta'AIJ}$}

$D_{<s,\alpha'>AIJ}$ = {x: x is a partial function with domain IxJ and range included in α'}

In particular, we wish to regard M as containing the elements st, o, k, in, where st'(A) ∩ o'(A) = Λ, st'(A) ∩ k'(A) = Λ, and o'(A) ∩ k'(A) = Λ. Also, o'(A) ∪ k'(A) = in'(A), so st'(A) ∩ in'(A) = Λ, where st', o', k', in' are functions that correspond to st, o k, in respectively. st'(A) is the set of STAGES, o'(A) is the set of OBJECTS, k'(A) is the set of KINDS, and in'(A) is the set of INDIVIDUALS (the union of the set of objects and the set of kinds).

We employ denumerably many variables of each SType and infinitely many constants. In particular, if n is a natural number, then $v_{n,a}$ is to be regarded as the n^{th} variable of SType a (a ∈ SType). By Con_a we mean the set of constants of SType a. By ME_a we mean the set of meaningful expressions of Type a. ME_a is defined below:

1. Every variable and every constant of SType a ∈ ME_b, where b ∈ Type and a ⊆ b.
2. If α ∈ ME_a, u a variable of type b, then λ u α ∈ $ME_{<b,a>}$
3. If α ∈ ME_a, β ∈ $ME_{<a,b>}$, then β(α) ∈ ME_b
4. If α,β ∈ ME_a, then α = β ∈ ME_t
5. If φ,ψ ∈ ME_t, then φ & ψ, φ ∨ ψ, ψ → φ, φ ↔ ψ, Wφ, Hφ, □φ, ∿φ ∈ ME_t; if u is a variable, then ∀uφ, ∃uφ, Many u φ ∈ ME_t; if u is a variable of type e, then ιuφ ∈ ME_e.
6. If α ∈ ME_a, then [^α] ∈ $ME_{<s,a>}$
7. If α ∈ $ME_{<s,a>}$, then [^α] ∈ ME_a
8. Nothing is in any set ME_a except as required above.

An INTERPRETATION of the sorted logic is a quintuple <A,I,J,≤, F>, which interpretation we shall call UE.

Let A, I, and J be non-empty sets (regarded as above) with ≤ being a linear ordering imposed on J. We let F be a function which assigns an intension to every constant, so that for any α ∈ SType, if β ∈ Con_α, F(β) ∈ $D_{<s,\alpha>AIJ}$. Let g be an assignment of values to variables with respect to an interpretation UE such that whenever u is a variable of $SType_\alpha$, then g(u) ∈ $D_{\alpha AIJ}$. If α is a meaningful expression, then we understand by $\alpha^{UE,g}$ the INTENSION of α with respect to UE and g, and if <i,j> ∈ IxJ, then $\alpha^{UE,i,j,g}$ is the EXTENSION of α with respect to UE, i, j, and g; that is $\alpha^{UE,g}$ (<i,j>). We follow the definitions in PTQ in explicating these notions.

1. If α is a constant, then $\alpha^{UE,i,j,g}$ is F(α)(<i,j>).
2. If α is a variable, then $\alpha^{UE,i,j,g}$ is g(α).
3. If a ∈ ME_β and u a variable of SType α', then $\lambda u a^{UE,i,j,g}$ is that partial function h with domain $D_{\alpha AIJ}$(α' ⊆ α) whose complete

sub-function has as its domain $D_{\alpha' AIJ}$ such that whenever x is in that domain, h(x) is $\beta'^{UE,i,j,g'}$ where g' is an assignment of values to variables like g except for the possible difference that g' assignes x as the value of u.

4. If $\dot{a} \in ME_{<\alpha,\beta>}$ and $b \in ME_{\alpha}$, then $[a(b)]^{UE,i,j,g}$ is $a^{UE,i,j,g}(b^{UE,i,j,g})$.

5. If $a, b \in ME_{\alpha}$, then $[a=b]^{UE,i,j,g}$ is 1 iff $a^{UE,i,j,g}$ and $b^{UE,i,j,g}$ are defined and $a^{UE,i,j,g}$ is $b^{UE,i,j,g}$; 0 if both are defined and $a^{UE,i,j,g}$ is not identical to $b^{UE,i,j,g}$; undefined otherwise.

6. If $\phi \in ME_t$, the $[\sim\phi]^{UE,i,j,g}$ is 1 iff $\phi^{UE,i,j,g}$ is 0, 0 iff $\phi^{UE,i,j,g}$ is 1, and undefined otherwise. If $\phi, \psi \in ME_t$, then $[\phi \& \psi]^{UE,i,j,g}$ is 1 iff $\phi^{UE,i,j,g}$ is 1 and $\psi^{UE,i,j,g}$ is 1; 0 iff $\phi^{UE,i,j,g}$ or $\psi^{UE,i,j,g}$ is 0 and both are defined; undefined otherwise. If $\phi, \psi \in ME_t$, then $[\phi \vee \psi]^{UE,i,j,g}$ is 1 iff $\phi^{UE,i,j,g}$ or $\psi^{UE,i,j,g}$ is 1 and both are defined; undefined otherwise. Similarly for $\rightarrow$ and $\leftrightarrow$.

7. If $\alpha \in ME_t$, u a variable of $SType_{\beta}$, the $[\exists u\ \alpha]^{UE,i,j,g}$ is 1 iff for all g $\alpha^{UE,i,j,g}$ is defined and there exists an x such that $\alpha^{UE,i,j,g'}$ is 1, where g' is as in clause 3; 0 if for all $x \in D_{\beta AIJ}$, $\alpha^{UE,i,j,g}$ is 0 and for all g', $\alpha^{UE,i,j,g}$ is defined. Similarly for $\forall$, Many. If $\phi \in ME_t$ and u a variable of $SType_{m(e)}$, then $\iota u\phi^{UE,i,j,g}$ is that unique member of m'(A), x, such that $\phi^{UE,i,j,g'}$ is 1 where g' is as above; undefined otherwise.

8. If $\phi \in ME_t$, then $[\Box\phi]^{UE,i,j,g}$ is 1 iff there is for all i', j', $i' \in I$ and $j' \in J$, that $\phi^{UE,i',j',g}$ is 1; 0 iff $\phi^{UE,i',j',g}$ is 0 for some i', j'; undefined otherwise. If $\phi \in ME_t$, then $[W\phi]^{UE,i,j,g}$ is 1 iff there is some $j' \in J$ such that $j \leq j'$ and $j \neq j'$ such that $\phi^{UE,i,j',g}$ is 1; 0 iff for all $j' \in J$, $j \leq j'$, and $j \neq j'$, $\phi^{UE,i,j,g}$ is 0; undefined otherwise. If $\phi \in ME_t$, then $[h\phi]^{UE,i,j,g}$ is 1 iff there is some $j' \in J$, $j \neq j'$, and $j' \leq j$, such that $\phi^{UE,i,j',g}$ is 1; 0 iff for all $j' \in J$, $j \neq j'$, and $j' \leq j$, $\phi^{UE,i,h',g}$ is 0; undefined otherwise.

9. If $a \in ME_{\alpha}$, then $[\hat{}a]^{UE,i,j,g}$ is that function h with domain IxJ such that whenever $<i,j> \in IxJ$, $h(<i,j>) = a^{UE,i,j,g}$.

10. If $a \in ME_{<s,\alpha>}$, then $[\check{}a]^{UE,i,j,g}$ is $a^{UE,i,j,g}(<i,j>)$

If $\phi \in ME_t$, then ϕ is TRUE with respect to UE, i,j iff $\phi^{UE,i,j,g}$ is 1 for every UE-assignment g.

For our purposes here, a number of problems that arise from admitting partial functions are ignored. For example, if one disjunct of a disjunction is not defined, the whole sentence is not defined, though such a sentence as *Either the speed of light is shiny or the sun rises in the east* may be deemed in fact true by many speakers of English, though we would probably wish to construct our semantics so the sentence *The speed of light is shiny* is not defined. See Thomason (1972), Cooper (1975), and Waldo (1977) for suggested means of handling this and like problems.

Translating English into the Intensional Logic

We first introduce a mapping f from the categories of English into the types of intensional logic. f is a function with CAT as its domain such that:

$f(t) = t$

$f(IV) = f(CN) = f(INF) = <e,t>$

Whenever A,B $\in$ CAT, then: $f(A/B) = f(A/B) = f(A///B) = <<s,f(B)>, f(A)>$

Let c be a function from the set of members of the basic expressions of the categories of English to categories of the sorted intensional logic. It is defined as follows. If a B_A of English,

then $c(a) \in CAT_{f(A)}$ in the sorted logic. Brackets on the lexical items have been omitted.

1. $c(man) = c(woman) = c(fish) = c(book) = c(house) = c(cat) = c(dog) = \langle in(e), t\rangle$
2. $c(available) = c(drunk) = c(here) = \langle st(e), t\rangle$
3. $c(run_1) = c(run_2) = c(bark_1) = c(bark_2) = c(sleep_1) = c(sleep_2) = c(everywhere) = c(intelligent) = c(walk_1) = c(walk_2) = \langle in(e), t\rangle$
4. $c(widespread) = \langle k(e), t\rangle$
5. $c(John) = c(Mary) = c(Bill) = c(Rover) = c(Amherst) = \langle\langle s,\langle o(e), t\rangle\rangle , t\rangle$
6. $c(an) = c(some) = c(every) = c(all) = c(the) = c(many) = \langle\langle in(e), t\rangle, \langle\langle s, \langle in(e), t\rangle\rangle , t\rangle\rangle$
7. $c(see_1) = c(see_2) = c(hit_1) = c(hit_2) = c(date_1) = c(date_2) = c(hate) = c(in) = c(near) = c(look\ for_1) = c(look\ for_2) = \langle\langle\langle s, \langle in(e), t\rangle\rangle, t\rangle, \langle in(e), t\rangle\rangle$
8. $c(see_3) = \langle\langle in(e), t\rangle, c(see_1)\rangle$
9. $c(necessarily) = c(will_1) = c(\underset{+pres}{do}) = c(\underset{-pres}{do}) = c(can_1) = c(not) = \langle\langle s,t\rangle, t\rangle$
10. $c(slowly) = c(rapidly) = c(be_3) = c(good) = c(beautiful) = \langle\langle s, \langle in(e), t\rangle\rangle, \langle in(e), t\rangle\rangle$
11. $c(believe) = c(expect_1) = c(expect_2) = \langle\langle s,t\rangle, \langle in(e), t\rangle\rangle$
12. $c(can_2) = c(will_2) = c(try_1) = c(try_2) = \langle\langle s, \langle in(e), t\rangle\rangle, \langle in(e), t\rangle\rangle$
13. $c(can_3) = c(often) = c(always) = \langle\langle s, \langle in(e), t\rangle\rangle, \langle k(e), t\rangle\rangle$
14. $c(be_2) = \langle\langle s, \langle st(e), t\rangle\rangle, \langle in(e), t\rangle\rangle$
15. $c(\text{-}ing) = \langle\langle s,\langle in(e), t\rangle\rangle, \langle st(e), t\rangle\rangle$
16. $c(in_2) = c(near_2) = \langle\langle s,\langle s, \langle in(e), t\rangle\rangle, t\rangle\langle s, \langle in(e), t\rangle\rangle \langle in(e), t\rangle\rangle$

The actual translation into the sorted logic is accomplished by a biunique function g from the basic expressions of the categories of English to expressions of the intensional logic. Many of the translations are not simply into constants of the logic, but rather into complex expressions. Let j,m,b,r,a be particular distinct constants of type e. Let x_n^γ, y_n^γ, z_n^γ, w_n^γ, u_n^γ be variables over entities, that is $v_{n,\langle\gamma(e)\rangle}$ (n is a natural number, and $\gamma \in \{o,k,in\}$). P,Q are variables that range over properties of individuals, ranges over properties of properties of individuals, S, T range over characteristic functions of sets. We let run^+, $walk^+$, $bark^+$, and $sleep^+$ be constants of type $\langle st(e), t\rangle$. place' is a constant of type $\langle in(e), t\rangle$, at' is of type $\langle st(e), \langle st(e), t\rangle\rangle$ as well as see^+, hit^+, and $date^+$. $seek^+$ is a constant of type $\langle P, \langle st(e), t\rangle\rangle$; $expect^+$ a constant of type $\langle\langle s,t\rangle,\langle st(e), t\rangle\rangle$; try^+ is a constant of type $\langle\langle s,\langle in(e), t\rangle\rangle,\langle st(e), t\rangle\rangle$; in^+ and $near^+$ are constants of type $\langle st(e), \langle st(e), t\rangle\rangle$ $in^{+\prime}$ and $near^{+\prime}$ are constants of type $\langle\langle st(e), \langle\langle in(e), t\rangle, \langle in(e), t\rangle\rangle\rangle$. We introduce further the relations R and R', R being of type $\langle st(e), \langle in(e), t\rangle\rangle$, and R' is of type $\langle o(e), \langle k(e), t\rangle\rangle$.

Translation Rules

T1. a. *John*, *Mary*, *Bill*, *Rover*, and *Amherst* translate as $\lambda P^\vee P(\delta)$, where δ is j,m,b,r,a respectively.

b. him_n^γ and $\$them_n^\gamma$ translate as $\lambda P^\vee P(x_n^\gamma)$

c. *an*, *some* translate as $\lambda Q\lambda P\exists x_n^\gamma[^\vee Q(x) \,\&\, ^\vee P(x)]$

the and *$the* translate as $\lambda Q\lambda P^\vee P(\iota x_n[^\vee Q(x)])$

$all and *every* translate as $\lambda Q\lambda P\forall x_n^\lambda[^\vee Q(x)\rightarrow ^\vee P(x)]$

$many translates as $\lambda Q\lambda P$ Many $x_n^\gamma[^\vee Q(x) \,\&\, ^\vee P(x)]$

d. be_2 translates as $\lambda Q\lambda x^i[\exists y^s[R(y,x) \,\&\, ^\vee Q(y)]]$

e. $\underset{-pres}{do}$ translates as $\lambda p[H(^\vee p)]$

can_1 translates as $\lambda p\sim\Box\sim(^\vee p)]$

$will_1$ translates as $\lambda p[W(^\vee p)]$

not translates as $\lambda p[\sim(^\vee p)]$

necessarily translates as $\lambda p[\Box(^{\vee}p)]$

do translates as $\lambda p[Pres(^{\vee}p)]$
+pres

f. *often* translates as $\lambda P\lambda x^{k}[Many\ y^{o}[R(y,x)\ \&\ ^{\vee}P(y)]]$

always translates as $\lambda P\lambda x^{k}\forall y^{o}[R(y,x)\rightarrow\ ^{\vee}P(y)]$

g. run_1, $walk_1$, $sleep_1$, $bark_1$ translate as $\lambda x^{i}\exists y^{s}[R(y,x)\ \&\ \delta(y)]$ where δ is run^{+}, $walk^{+}$, $sleep^{+}$, $bark^{+}$ respectively.

h. see_1, hit_1, $date_1$, $near_1$, in_1, translate as $\lambda P\lambda x^{i}\ ^{\vee}P(\hat{y}^{i}\exists z^{s}\exists u^{s}[R(z,y)\ \&\ R(u,x)\ \&\ \delta(u,z)])$, where δ is see^{+}, hit^{+}, $date^{+}$, $near^{+}$, in^{+} respectively

i. *look for*$_1$ translates as $\lambda P x^{i}\exists z^{s}[R(z,x)\ \&\ seek^{+}(P)(z)]$

j. see_2, hit_2, $date_2$ translate as $\lambda P\lambda\hat{x}^{i\vee}P(\hat{y}^{i}\exists z^{s}[R(z,y)\ \&\ \delta(z)(x)])$ where δ is *see'*, *hit'*, *date'* respectively.

k. try_1 translates as $\lambda P\lambda x^{i}\exists y^{s}[R(y,x)\ \&\ try^{+}(P)(y)]$

l. $expect_1$ translates as $\lambda p\lambda x^{i}\exists y^{s}[R(y,x)\ \&\ expect^{+}(p)(y)]$

m. *hate* translates as $\lambda P\lambda x^{i\vee}P(\hat{y}^{i}[hate^{+}(x,y)])$

n. be_3 translates as $\lambda P\lambda x^{i}\exists y^{s}[R(y,x)\ \&\ act'(P)(y)]$

o. $near_2$, in_2 translate as $\lambda P\lambda P^{\vee}P[\hat{y}^{i}\exists z^{s}[R(z,y)\ \&\ \delta(z)(P)]]$

p. Any expression of a basic category of English not translated above is in the domain of g such that if α is in its domain, α translates as $g(\alpha)$.

T2. If $\alpha \in P_{CN}$ and α translates as α', then $F_1(\alpha)$ translates as α'(the identity function).

T3. If $\alpha \in P_{T/CN}$ and $\beta \in P_{CN}$ and translate as α' and β' respectively, then $F_2(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$.

T4. If $\alpha \in P_{CN}$ and translates as α', then $F_3(\alpha)$ translates as $\lambda P^{\vee}P(\iota x^{k}[\forall z^{o}[\Box R(z,x)\rightarrow \alpha'(z)]])$

T5. If $\alpha \in P_{CN}$ and $\phi \in P_t$ and translate as α' and ϕ' respectively, then $F_{4,n,\gamma}(\alpha,\phi)$ translates as $\lambda x^{\gamma}[\alpha'(x)\ \&\ \phi']$

T6. If $\alpha \in P_{CN/CN}$ and $\beta \in P_{CN}$ and translate as α' and β' resp., then $F_5(\alpha,\beta)$ translates as$'\alpha'(\hat{}\beta')$

T7. If $\alpha \in P_T$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_6(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T8. If $\alpha \in P_{TV}$ and $\beta \in P_T$ and translate as α' and β' resp., then $F_7(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T9. If $\alpha \in P_{IV/t}$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_8(\alpha,\phi)$ translates as $\alpha'(\hat{}\phi')$

T10. If $\alpha \in P_{IV/INF}$ and $\beta \in P_{INF}$, and translate as α' and β' resp., then $F_9(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T11. If $\alpha \in P_{IV/IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_9(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T12. If $\phi \in P_t$ and ϕ translates as ϕ', then $F_{10,n,\gamma}(\phi)$ translates as $\lambda x_n^{\gamma}\phi'$

T13. If $\alpha \in P_{CN}$ and α translates as α', then $F_{11}(\alpha)$ translates as α'

T14. If $\alpha \in P_{t/t}$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_{12}(\alpha,\phi)$ translates as $\alpha'(\hat{}\phi')$

T15. If $\alpha \in P_{TV/IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{13}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T16. If $\alpha \in P_{IV//IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{14}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T17. If $\alpha \in P_{IV///IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_9(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T18. If $\alpha \in P_{IV/IV\ /\ T}$ and $\beta \in P_T$ and translate as α' and β' resp., then $F_{15}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T19. If $\phi, \psi \in P_t$ and translate as ϕ' and ψ' resp., then $F_{16}(\phi,\psi)$ translates as $\phi' \& \psi'$

T20. If $\alpha, \beta \in P_{IV}$ and translate as α' and β' resp., then $F_{17}(\alpha,\beta)$ translates as $\lambda x^i[\alpha'(x) \& \beta'(x)]$

T21. If $\alpha, \beta \in P_T$ and translate as α' and β' resp., then $F_{18}(\alpha,\beta)$ translates as $\lambda P[\alpha'(P) \& \beta'(P)]$

T22. If $\phi, \psi \in P_t$ and translate as ϕ' and ψ' resp., then $F_{19}(\phi,\psi)$ translates as $\phi' \vee \psi'$

T23. If $\alpha, \beta \in P_{IV}$ and translate as α' and β' resp., then $F_{20}(\alpha,\beta)$ translates as $\lambda x^i[\alpha'(x) \vee \beta'(x)]$

T24. If $\alpha, \beta \in P_T$ and translate as α' and β' resp., then $F_{21}(\alpha,\beta)$ translates as $\lambda P[\alpha'(P) \vee \beta'(P)]$

T25. If $\alpha \in P_T$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_{22,n,\gamma}(\alpha,\phi)$ translates as $\alpha'(\hat{x}_n^\gamma \phi')$

T26. If $\alpha \in P_T$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{23,n,\gamma}(\alpha,\beta)$ translates as $\lambda y^i \alpha'(\hat{x}_n^\gamma[\beta'(y)])$

T27. If $\alpha \in P_T$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{24}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

Meaning Postulates

MP1. $\exists u \Box[\alpha = u]$ where α is j,b,m,r,a

MP2. $\Box[\alpha(\beta)(x) \rightarrow \beta(x)]$ where α translates *slowly* or *rapidly*

MP3. $\exists T \exists S \Box[\delta(P)(x) \leftrightarrow T(\hat{x}_o P(\hat{y}^i \exists z^s[R(z,y) \& S(z)(x_o)]))(x)$

MP4. $\Box \forall x^s \forall y^o[R(x,y) \rightarrow \forall z^o[R(x,z) \leftrightarrow z = y]]$

MP5. $\forall x^s \forall y^o \forall z^k \Box[R(x,y) \& R'(y,z) \rightarrow R(x,z)]$

MP6. $\Box \forall x^s \exists y^i[R(x,y)]$

MP7. $\Box \forall x^s \forall y^k[R(x,y) \rightarrow \exists z^o[R'(z,y) \& R(x,z)]]$

MP8. $\forall x^k \forall y^k \forall z^o[\Box[[R(z,x) \leftrightarrow R(z,y)] \leftrightarrow y = x]$

MP9. $\Box Pres(^\vee p) \leftrightarrow {}^\vee p$

MP1 guarantees the rigid designation of names. MP2 guarantees that, for instance, if someone runs slowly, then that person also runs. MP3 is the 'lexical decomposition' for the class of verbs intensional with respect to direct object position that nonetheless makes reference to stages. MP4 through MP7 constrain the interpretation of the realization relations. MP4 guarantees that any stage realizes one and only one object. MP5 guarantees a transitive relation between R and R' so that if some stage realizes an object and that object realizes some kind, then the stage also realizes the kind. MP6 guarantees that all stages are stages of some individual, and that we do not have any 'free' stages. MP7 makes certain that if a stage is a stage of some kind then there is some object that that stage realizes as well which is of that kind. MP8 states that any two kinds that have all the same realizations are the same kind. In conjunction with the translation accorded the bare plural, this has the effect of making the bare plural a rigid designator. MP9 states the vacuousness of the present tense operator.

CHAPTER V

AMENDMENTS TO THE FRAGMENT

0. Introduction

It is the purpose of this chapter to examine certain issues raised by the treatment accorded the bare plural in the previous chapter. Means will be proposed for correcting some shortcomings noted here as well as to account for certain material not covered already.

We have introduced a three-level hierarchy among the entities in the model -- stages, objects, and kinds -- with the latter two distinguished from the former in that they are individuals (i.e. represent abstract organizations of entities on a lower level). It was noted that we have a large number of predicates that apply only to stages of individuals, examples being most PP's, adjectives such as *drunk* or *available*, the present progressive form of verbs, as well as many verbs themselves. We also found there to be a lesser number of predicates that applied only to individuals (objects and kinds), as the adjectives *intelligent* or *large*, the ability sense of the verb *can*, most verbs that lack a progressive form (such as *resemble*), and all CN's (predicate nominals). But this leaves an unexplained gap in our stock of basic predicates, for there were observed to be no predicates that apply only to objects, to the exclusion of kinds and stages of individuals. So far as I know, there is no basic predicate of English that behaves like the hypothetical predicate 'klud'. This word might be here considered an adjective, and native speakers of English-plus-'klud' have the following intuitions.

(1) a. Rover is klud.

b. *Dogs are klud.

c. These dogs are klud.

d. *This kind of dog is klud.

This situation fails to arise in English, but the analysis presented in the previous chapter leaves us with no hint as to why this is.

The basic fact to keep in mind seems to be that whatever may be meaningfully predicated of an object may also be meaningfully said of a kind (though a given predicate may be true of certain objects, and false for certain kinds, or vice-versa). We know that if one can say meaningfully that Fido X's, we can also say meaningfully that Dogs X (making the necessary adjustments for plurality) provided Fido is a dog. This is a very pervasive fact about the language which deserves consideration.[1]

We will also find that there are certain inadequacies with respect to pronominalization that appear upon examination of the fragment presented in Chapter 4. In treating bare plurals as akin to proper names, it turns out that we do not ever anticipate finding object-by-object coreference required between a pronoun and its antecedent bare plural form. However, there do appear to be such cases. Consider sentence (2).

(2) Dogs obey their masters.

Here, we do not find the anticipated interpretation whereby it is being said that dogs obey dogs' masters. Rather, it says that for most (?) individual dogs, that dog obeys ITS master.

These two problems presented above at first sight appear to be quite different sorts of questions. However, we will see that both may be resolved at once with the introduction into the semantics of English a verb phrase operator, symbolized as G, which has the effect of "elevating" predicates a level in the semantics. It takes a VP that applies to stages, and makes it into a VP that may apply to individuals, as well as mapping predicates that apply to objects to predicates that apply to kinds.

The chapter will proceed as follows. Section 1 will be a discussion of coreference and bare plurals. In this section we will be introducing the G operator and show how it accounts for the problems raised with respect to pronominalizaiton. The second section is a discussion of how it is that the positing of this G can account for the apparent gap in the stock of English predicates. Here, the workings of G will be discussed at some length, along with a number of formal issues that it raises in terms of the representation of the English verbal system. In this section is included an exposition of some applications of G. Specifically, we here discuss the indefinite singular generic ('a dog'), and talk about the meaning-changing-characteristic of the passive transformation that has been observed a number of times in the literature.

The third section is a brief discussion of the relationship between stages and extensionality, which was only hinted at in the previous chapter. The possibility of obtaining certain entailments from sentences will be shown.

Section four turns toward a matter which will remain unresolved in this work, and that involves a class of bare plural NP's that do not appear to be able to refer to kinds of things. Though an analysis of this class is not forthcoming, it is of a good deal of interest

due to the fact that I believe an examination of these NP's reveals interesting clues as to what our concept of a kind of thing may be.

1. Coreference

1.0 Discourse reference

1.0.0 Reference to kinds. The most straightforward sort of coreference is when a pronominal form is assigned the same denotation as its antecedent. Sentence (3) is an example.

(3) Dogs bark. This is because *they* have a certain sort of vocal tract.

In this case, 'they' might as well be replaced by the whole NP 'dogs', which would preserve the truth-value of the utterance (though such replacement has an effect of some sort on the nature of the utterance). In order to account for this, we will be following Cooper (1976). The translation of *they* will be as suggested in Bennett (1974), with *they* being translated as the set of properties associated with some individual entity: $\lambda P^{\vee}P(x^{i}_{n})$. In the context of the sentence *This is because they have a certain vocal tract* the variable will remain a free variable. The denotation of the free variable will be assigned a value by the context of use; in the case of (2) the most natural assignment would be to assign the entity 'dogs' as the value of the variable (though other assignments are possible in (2), none are more likely given the way the discourse is set up).[2] We will henceforth assume that all cases of pronominalization with a bare plural as antecedent where the replacement of the full antecedent NP preserves the truth-value of the sentence are to be handled in like manner (but see also section 1.1).

1.0.1 Reference to subsets of a kind. If all intersentential pronominalization were to be treated as above, we would have difficulty accounting for the meaning of the pronoun in (4).

(4) *Dogs* entered the room. *They* began tearing apart the couch.

While I feel that there is an extremely unlikely reading of this pair of sentences that is faithfully rendered by replacing the pronoun 'they' by the full NP 'dogs', this is not the chief reading found. To show that such a reading is possible, examine (5).

(5) *Salesmen* entered my house. *They* also entered my garage.

But the reading of concern here is the one that would be paraphrased as (6).

(6) *Dogs* entered the room. *The dogs that entered the room* began tearing apart the couch.

Here we see that there is reference made to just a certain subset of the set of realizations of the kind dogs, and the sort of pronominalization briefly discussed in the previous section cannot account for this.

How can we handle such examples without giving up the notion that the bare plural is a unified phenomenon? Would it in fact be necessary to treat (4) as containing a bare plural NP that does not make reference to a kind, but rather to a specific set of individuals? One preliminary hypothesis to be advanced might be that the pronominal form in (4) is to be syntactically derived from the italicized NP in (6), which would account for the meaning of the pronoun. Without going into details, I believe that this sort of solution is simply unworkable, and should not be considered as a serious possibility (see Cooper (1976) for further explanation).

There is, however, a slightly different sort of approach that can be taken regarding the interpretation of pronouns, which will ultimately account for the case of a sentence like (4). This is the theory presented in Cooper (1976) to account for cases of pronominalization which at first sight appear to be very closely related to (4).

Consider the interpretation of the italicized pronoun in sentence (7) (=Cooper's (35c)).

(7) Mary hasn't yet found the man she will marry. Now that she has a job in Washington, she hopes she will meet *him*.

The relevant reading is one where there is no particular man who can be said to be Mary's future husband, and which leaves open the possibility that Mary will never marry anyone at all. If *him* were translated as $\lambda P^{\vee}P(x^{o})$ in (7), and the value of x^{o} were assigned by the context of use to some individual, the wrong interpretation of the sentence would be arrived at. Suppose that Bob is in fact (unbeknownst to both Bob and Mary) the man that Mary will marry in the future, and the context of use assigns Bob as the value of x^{o}. The translation of the second sentence will then entail that Mary hopes she will meet Bob; but this is false on the intended reading of the sentence. Instead, Mary hopes to meet *the man that she will marry*, whoever he may be.

In order to interpret the pronoun in the appropriate way, Cooper suggests that certain occurrences of pronouns be treated as definite descriptions that contain a free property-variable which is also assigned a value by the context of use. The proposed translation of

him above would then be the following.

(8) $\lambda Q[\exists x \forall y[\check{}P(y) \leftrightarrow x=y] \ \& \ \check{}Q(x)]$

This formula is to be read 'the set of properties associated with that unique entity x such that P is true of x', where P is the free property-denoting variable. Now if this is put in the context of the sentence 'she hopes she will meet *him*, this definite description that serves as the translation of the pronoun may appear in the intensional context created by the verb *hope*. The approximate translation of *she hopes she will meet him* comes out as follows (I substitute *m* for *she* for sake of presentation)..

(9) $\text{hope}'(\hat{}(\exists x[\forall y[\check{}P(y) \leftrightarrow x=y] \ \& \ \text{meet}'(m,x)]))(m)$

Here, the context of use can assign to P the property of being a man that Mary will marry (of course, many other interpretations are logically possible here). The resultant sentence makes the claim that Mary hopes that she will meet that unique entity which has the property of being a man that she will marry. Even if Bob turns out to be that unique entity, this does not entail that she hopes to meet Bob.

By use of a slight modification in the translation of the pronoun as a definite description, Cooper is able to give an account of a well-known example noted by Karttunen.

(10) The man who gave *his paycheck* to his wife was wiser than the man who gave *it* to his mistress.

(On the reading where the two men each gave away his own paycheck).

To accomodate the interpretation of the pronoun in (10), Cooper suggests that in place of the free property variable in the translation of *him* above in (9), there can be a relational predicate which represents a relation between the unique entity of the translation of the pronoun and some free entity variable. So the translation of *it* above might then be:

(11) $\lambda Q \exists x[\forall y[\check{}S(z)](y) \leftrightarrow x=y \ \& \ \check{}Q(x)]$

Here, z is a free entity-variable, and S is a free variable over relations that hold between entities (a mapping from entities to properties of entities). For the example given above, if (z) is interpreted as being a variable bound to the head of the NP by the relative clause rule, and S is interpreted as being a unique relation that holds between z and y, say in this case z was paid x with y, or z has y at a certain time and place (any number of interpretations will work), then the interpretation of the pronoun comes out as it should. Cooper goes on to discuss the application of such translations of pronouns to Geach's 'donkey' sentences.

Let us now see how it is that this treatment of pronouns can be used to account for the interpretation of the pronoun in (4), repeated here.

(4) Dogs entered the room. They began tearing apart the couch.

What follows is not a definitive analysis due to the fact that it requires a treatment of group-readings of NP's, a matter left unresolved in this work. Nonetheless, I believe that the general program can be clearly enough presented to make the discussion worthwhile. So we will be making some rather gross systematic distortions of the semantic interpretation associated with sentences such as (4) which, it is hoped, will not ultimately affect the main point.

The semantics of (4), in the system devised here, would be the following (treating *enter the room* as a predicate abbreviated as Ent').

(12) $\exists x^{s}[R(x,d) \ \& \ \text{Ent}'(x)]$

In this formula there are two entities spoken of -- the kind d (which we take to be the kind dogs) and some stage-level entity. Suppose that the stage-level entity that entered the room is represented here as a. Now let us propose a translation of *they began tearing apart the couch*, translating the subject pronoun as Cooper suggests, with a free relation variable and a free entity variable in it. We will take the free entity variable here to be a stage-level variable, though its sub-type may vary from case to case. We represent the translation of *began tearing the couch apart* as *Beg* to avoid complexity. The proposed translation would then be as follows. (Lambda conversion has been applied).

(13) $\exists x^{o}[\forall y^{o}[S(w^{s},y^{o}) \leftrightarrow x^{o}=y^{o}] \ \& \ \exists z^{s}[R(z^{s},x^{o}) \ \& \ \mathit{Beg}(z^{s})]]$

This formula states that there is some unique object, x, which is uniquely related to some stage in some way, and that object x has a realization that began to tear the couch apart. This formula contains two free variables -- a relation variable S and a stage-level variable w^{s}. There are many possible values that can be assigned to these variables, but among them will be two of interest here. Suppose we assign *a* as the value of the stage-level variable; and suppose we assign the realization relation R as the value of S. To illustrate the resultant interpretation, we replace S with R and w^{s} with *a*.

(14) $\exists x^{o}[\forall y^{o}[R(a,y^{o}) \leftrightarrow x^{o}=y^{o}] \ \& \ \exists z^{s}[R(z^{s},x^{o}) \ \& \ \mathit{Beg}(z^{s})]]$

This says that there is some unique object x such that a is a realization of x, and x has a stage that began to tear the couch apart (which may or may not be identical to a). As matters turn out, there always IS some unique object that any given stage is a realization of, as was

formulated in Chapter 4. Thus, there will be an interpretation of the formula which will pick out just those individual dogs that had a stage that entered the room. In this way, by knowing the stages we can 'work back to' the individuals that those stages are stages of. Notice that when the antecedent bare plural is not in a context which makes reference to stages, a similar sort of phenomenon is not at all possible.

(15) Dogs are intelligent. They $\left\{\begin{array}{l}\text{bark} \\ \text{are entering the room}\end{array}\right\}$.

In this case, *they* cannot be interpreted as *the dogs that are intelligent* on a par with the interpretation of (4), in which the pronoun could be interpreted as *the dogs that entered the room*. This is because in the interpretation of the sentence *Dogs are intelligent* there is no quantification over stages, and thus in the translation of *they are entering the room* any free stage variable will not give the impression of anaphora. Only the kind *dogs* may serve as antecedent. No stages are mentioned.

So we recognize two different sorts of pronominalization processes in discourse corresponding to the translations of pronouns posited in Cooper (1976). When we turn to intrasentential pronominalization with respect to bare plural NP's, these two sorts of pronominalization show up as well. But there is an unexpected third type that shows up, too, which appears to correspond to bound-variable pronominal forms. This will lead us back to the problem discussed at the beginning of this chapter.

1.1 Intrasentential pronouns. We observe that, within the confines of the sentence, the same sorts of prcesses as were discussed above appear to be at work. The sentences of (16) can be handled in a straightforward way by using a pronoun that is treated as a free variable which is assigned as its value the denotation of the italicized antecedent NP.

(16) a. Until I saw *goats* eating *tin cans*, I didn't think *they* liked *them*. (= I didn't think goats liked tin cans).

b. *Cats* eat grass because *they* must maintain a balanced diet.

c. Bob the Hunter killed *buffalo* until *they* were extinct.

d. Even though my brother hates *snakes*, I've had *them* for pets my whole life.

In all these cases, and in many more like these, the correct reading will be obtained if the pronoun is simply assigned the denotation of the antecedent. The test for such cases as these is whether or not replacement of the pronoun by its full NP antecedent will retain the truth-value of the sentence. If this replacement does, then this sort of pronominalization is adequate. For example, the truth value of (16b) is preserved if *cats* replaces *they*.

(16) b'. *Cats* eat grass because *cats* must maintain a balanced diet.

Of course the repetition of the NP produces an effect that alters the utterance in some way, but I do not think that this effect alters the truth-value in any case.

There are other cases of intrasentential pronominalization for which this replacement criterion does not appear to hold. Such an example is (17).

(17) Someone who was gathering *chestnuts* eventually sold *them*.

(The relevant reading is the one where the chestnuts sold were those gathered). In this case, replacement of the pronoun with the full NP *chestnuts* yields a different meaning on the reading intended. But this appears to be the same sort of case as we saw in the previous section, where an indefinite plural use of a bare plural could serve as antecedent for a pronoun that ranges over objects. If we treat the pronoun in (17) as we suggested in (4), the correct reading will arise. (It would roughly be construed as meaning the unique set of objects whose realizations were gathered were eventually sold). Treating the pronominal forms as definite descriptions would also appear to be quite capable of accounting for one interpretation of the pronouns in (18)(the other interpretation being handled in the previous manner).

(18) a. *People* ran from the theater because *they* were so offended.

b. *Books* fell on the floor after John pushed *them*.

c. The man who happened upon *burglars* in his house was attacked by *them*.

Can all cases of intrasentential pronominalization be reduced to one of these two cases, then? Of course, the answer to that is negative, at least for some type of antecedents. One sort of pronominalization phenomenon that we find within the confines of a given sentence, but which we do not find in discourse, is 'bound-variable' pronominalization (henceforth BV). This is exemplified in the following sentences, where quantified NP's serve as antecedents.

(19) a. *Each man* thought that *he* should win.

b. *No one* expected to have *his* pocket picked in church.

c. *Every woman* talked about *her* greatest gripe.

We do not appear to be able to find the same sorts of relationships holding between pronoun and antecedent in discourse.[3]

(20) a. *Each man* walked in. *He* found a seat.

b. *Nobody* got off the train. John doesn't like *him*.

c. *Every woman* found a seat. *She* listened intently.

Returning to the matter of bare plural, we would expect them to behave like proper names of objects in contexts where a bound-variable reading is possible for a given pronoun. As matters turn out, it is extremely difficult to determine with a proper name what sort of pronominalization phenomenon is occurring. Semantic criteria of unusual subtlety must be invoked in order to even begin to separate out bound-variable readings from 'laziness' readings with regard to proper names (see Partee 1975c). The reasons for this are apparent when we examine the semantics. Let us take a simple sentence like (21) and see how a bound-variable reading and a laziness reading would differ.

(21) Bill obeys *his* master.

In schematic fashion, we might represent the two possible sources of the pronoun (if there aren't three) as follows. (22a) would be the bound variable reading, and (22b) the 'laziness' reading.

(22) a. $\underline{\lambda x[x \text{ obeys } x\text{'s master}]}$ (b)

b. $\underline{\lambda x[x \text{ obeys } y\text{'s master}]}$ (b)

The semantics treats the underlined portion of (22a) as that function which yields a truth-value (either true or false) when (b) is assigned as the value of *x*. So (22b) is the same as (23).

(23) b obeys b's master.

(22b), on the other hand, has as its underlined portion a function which yields a truth-value when b is assigned the value of x, with respect to an assignment of values to free variables g. So, (22b) in part will be (24).

(24) b obeys y's master.

Now suppose that the assignment function g already assigns b as the value of y. So (20) will be equivalent to (24').

(24') b obeys b's master.

But (24') is the same as (24), which was derived from a formula containing a bound variable. Thus the laziness reading and the bound-variable reading for proper names come out the same -- they have the same truth conditions.

Given this line of reasoning, and given that there are only three sorts of pronominalization operations that we have in our repertoire, we would therefore anticipate that all pronominal forms connected with bare plural NP's could be analyzed either in terms of definite pronominalization in terms of laziness pronominalization, bound variable pronouns collapsing with the latter category. As the definite pronominalization appears possible where the antecedent bare plural has an existential reading, all cases of generic uses of the bare plural then should therefore be connected only with laziness readings of pronouns, and hence replacement of the pronoun by the full NP that serves as antecedent should preserve truth-value.

These expectations are not met when we examine the data with a bit more care. Let us look at the sentences of (25).

(25) a. *Dogs* obey *their* masters.

b. *Cats* clean *themselves*.

c. *Congressmen* like to think that *they* are exceedingly important.

d. *People who own mountain lions* don't mind irritating *their* neighbors.

e. *Goldfish* like everyone who likes *them*.

Though some of these sentences are ambiguous, they all have at least one reading where individual-by-individual coreference is necessary to obtain the correct reading. (25a) suggests that any (?) given dog obeys ITS master, and is not readily interpretable as meaning that dogs obey DOGS' masters. (25b) does not mean, necessarily, that cats clean cats, but requires each (?) individual cat to clean itself. Likewise (c) can be construed as saying that each (?) congressman thinks HE is important, (d) that the neighbors of each (?) person owning mountain lions may be bothered by that person, and (e), on one reading, indicates a reciprocal relation between people and any given (?) goldfish. Notice that all these paraphrases treat the pronoun as if it is a bound variable pronoun. But, if these are BV pronouns, we should be able to obtain the correct readings by simply replacing the pronoun with its antecedent -- assuming our assumptions are correct about bare plurals and pronouns. But patently such replacement fails.

There is good reason to believe that the pronouns of (25) are in fact BV pronouns. First of all, we do not find that same sort of variable binding going on in discourse. Compare the interpretation of the pronoun in (26) with that of (25e).

(26) *Goldfish* like most people. Most people like *them*.

Here, the pronoun can only be interpreted on its 'laziness' reading. This is in accord with the prior observation that BV pronominalization is intrasentential.

Second, it does not appear that BV pronominalization cannot go 'backwards' in a sentence. Thus the difference between (27a) and (27b).

(27) a. *Each man* likes everyone who likes *him*.

b.??Everyone who likes *him* is liked by *each man*.

We find a similar difference arising in the case of the bare plurals with the individual-by-individual coreference required.

(28) a. *Goldfish* like everyone who likes *them*.

b.??Everyone who likes *them* is liked by *goldfish*.

(28b can only mean that everyone who likes goldfish is liked by goldfish).

A third reason for thinking the pronouns of (25) to be cases of true bound variables is that bound variable NP's cannot be epithetics, while cases of non-bound variable pronouns can just as easily be replaced by some epithetic NP. A few examples of cases where such replacement is acceptable are as follows.

(29) a. One crook was attacked by several policemen who had sworn that they would get $\left\{\begin{matrix} him \\ the\ bastard \end{matrix}\right\}$.

b. The fact that Bob is here means that $\left\{\begin{matrix} he \\ the\ idiot \end{matrix}\right\}$ has forgotten his date with Susan again.

But when we must have a bound variable interpretation, replacement of the pronoun with an epithetic NP yields unacceptable results.

(30) a. **Each man* hates cops who attack *the bastard*.(OK: him).

b. **Nobody* was attacked by crooks who had sworn that they would get *the idiot*. (OK: him).

Quite clearly, all the sentences of (21) resist this sort of replacement.

(25') a. *Dogs* obey *the little devil's* masters.

b. *Cats* clean *the wretched creatures*.

(25') c. *Congressmen* like to think that *the bastards* are exceedingly important.

d. *People who own mountain lions* don't mind irritating *the assholes'* neighbors.

e. *Goldfish* like everyone who likes *the little cuties*.

Given the underlined NP's are interpreted as coreferential with their antecedents, there appear to be no readings for (25') that are the same as those of interest for (25).

The conclusion that the pronouns of (25) are to be thought of as bound variables leaves us with a problem. For quite clearly, they are BV pronouns that are assigned values from the realm of OBJECTS; but the bare plural NP could only possibly bind variables that range over kinds provided our analysis is correct. Therefore, if we are to retain the analysis proposed here for the bare plural, it is incumbent upon us to show how it is that sentences such as those in (25) could possibly come about.

1.2 Inductive generalization. Consider a sentence like (25), repeated here.

(25) Goldfish like everyone who likes them.

On one reading, it means that goldfish like everyone who likes goldfish, a reading that would easily be accounted for by quantifying in the subject NP, binding the kind-level variable that appears in the relative clause. Schematically, the resultant translation would be of the following form. (*g* is the individual kind 'goldfish').

(31) λx^{k}[x likes everyone who likes x](g)

(31) is equivalent to (31').

(31') g likes everyone who likes g

However, there is the other reading of (25) in which it is required that a given goldfish like those people who like *that goldfish* (and not necessarily any others). There seems to be an object-level predicate in (25) that is of the form of (32).

(32) λx^{o}[x likes everyone who likes x]

(This is the property of being something that likes everyone who likes it). Intuitively, it is as if this predicate here is being applied to the bare plural. It might be initially thought of as being applied as in (33).

(33) $\lambda P^{\vee}P(g)(\hat{x}^{O}$[x likes everyone who likes x])

But of course (33) cannot be meaningfully interpreted, as g is a kind-level entity, but the property is one that applies only to OBJECTS. (33) is equivalent to (33').

(33') λx^{O}[x likes everyone who likes x](g)

This asserts that the kind-level entity g is in the set of objects that likes everyone who likes it, which is not meaningful, much less true.

However, there appears to be an intuitive sense in which we would like to be able to assign the property of (32) to the set of properties of a kind of thing (e.g. goldfish).

Let us imagine first how it is we basically may come to know whether or not goldfish like everyone who likes them (on the reading we are now interested in). Practicalities aside, we come to know this to be true or false by observing individual goldfish. We observe that Goober likes everyone who likes her, Milton likes everyone who likes him, Alice likes everyone who likes her,..., and so on, until we have observed enough goldfish to decide we can make a valid generalization. The generalization might be cast in the form 'goldfish like everyone who likes them', meaning that we have observed a sufficient number of objects of whom the predicate holds to attribute that property generally to the kind. But, as we have seen, the predicate in question is not one that can be meaningfully applied to a kind of thing. However, there is a sense in which we were not applying the predicate directly to the kind 'goldfish', for we made this attribution as a result of inductive generalization, based on the truth of the predicate in question with respect to particular object-level goldfish.

We are going to reflect this process of inductive generalization in the semantics by positing there to be a VP-operator which has the effect of taking predicates that apply to objects, and making it so they can apply to kinds. The operator is symbolized as *G*. In schematic terms, the means by which we will symbolize sentence (25) is as represented below.

(34) $G(\hat{x}^{O}$[x likes everyone who likes x](g)

That is, *g* (goldfish) have the inductively generalized property of being objects that like everyone who like them. G is a mapping from the predicate of type $\langle s,\langle e^{O},t\rangle\rangle$ to a predicate of type $\langle e^{k},t\rangle$. We are not going to specifically attempt to say WHICH function G represents, except that if $G(\hat{}\beta)$ holds of some kind of thing, then necessarily there must be some realization of that kind of which the predicate β holds. Leaving it open exactly which function G denotes is perfectly in keeping with treating it as a constant of the logic, just like man' or slowly'. The grammar does not tell you how to determine if some object is a man, or if something is being done slowly, nor will it tell you how to determine if a given object-level predicate is to be truly generalized to a given kind. These decisions require various acts of cognition, judgment, deduction, and a host of other human activities in order to evaluate properly.

It remains to be shown how to derive a sentence such as (25) in a reasonable manner with the rules of syntax and semantics we have before us. We will for the sake of brevity introduce another example for our inspection at this time.

(35) Cats like themselves.

The reading we are interested in is where any (?) individual cat likes itself. We must add a couple of rules to the grammar in order for us to be able to derive this sentence. First of all, we must have some mechanism for obtaining reflexive pronouns, the statement of which I forego at this time. We also need a means of getting G into the interpretation. As G in English has no surface reflex, the rule that syntactically introduces it is the identity function that applies to VP's. These approximate the final versions to be found in the second fragment.

S22. If $\alpha \in P_{IV}$, then $F_{20}(\alpha) \in P_{IV}$, where $F_{20}(\alpha) = [\alpha]_{IV}$

There is one further syntactic rule which will be adopted here. This is Partee's (1976a) rule of Derived Verb-Phrase formation. The effect of this rule is to take a sentence with a free variable subject, and make that sentence into a derived VP by forming an abstract on the subject of that sentence. The version of Derived VP presented below is a modification of Partee's original suggestion.

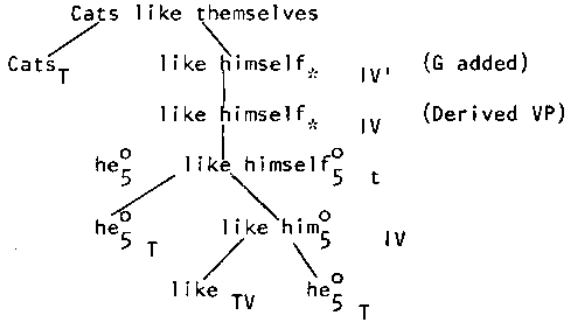
Derived VP: If $\phi \in P_t$, and ϕ has the form $[_t he^{m}_{n}$ to (be_1) IV$]_t$ then $F_{104}(\phi) \in P_{IV}$ where $F_{104}(\phi)$ is $[\phi']_{IV}$, where ϕ' is the result of removing he^{m}_{n}, *to*, and be_1 (if present) from ϕ.

Translation: If $\phi \in P_t$ and ϕ translates into ϕ'', then $F_{104}(\phi)$ translates as $\lambda x^{m}_{n}\phi''$.

Be$_1$ is the semantically empty form of *be* which occurs with predicate nominals and individual-level adjectives.

We are now in a position to give a derivation of sentence (35). We omit brackets and consideration of tense.

(36) Syntax:



Translation of elements: Cats -- $\lambda P^{\vee}P(c)$

like -- $\lambda P\lambda x^{i\vee}P(\hat{y}^{i}[\text{like}'(x,y)])$

Translation of sentence: $G(\hat{x}_5^{o}\ \text{like}'(x_5,x_5))(c)$

This says that the kind cats have the generalized property of liking themselves (on an object-by-object basis), and represents intuitively a generalization based on the truth of the predicate G operates on when applied to object-level realizations of the kind cats.

The other cases of apparent BV pronominalization illustrated in the previous section would be handled likewise on the reading where object-by-object identity is required. The variable-binding that goes on here is accomplished by the derived VP rule which forms an abstract, and these cases do not, as Lawler (1973) would appear to claim, definitely show that there is a quantifier of some sort associated with the bare plural NP.

2. Generics and Existentials, and Absence of Object-Level Predicates

2.0 Introduction. In this section we will be expanding the analysis offered for G, and talking about the apparent lack of object-level predicates noted in the introduction to this chapter. We also take up the question once again of the relationship between the existential use of a verb, and its generic use (or the happening reading vs. the characteristic reading).

2.1 Intensionality. In chapter 4 it was proposed that the differences between the happening reading of a sentence and its generic reading is to be represented in terms of the predicate saying something about a stage of the subject on the happening reading, and the predicate is attributed directly to the individual for the generic reading.

At the time, we did not discuss the relationship between happening senses of verbs as opposed to their generic senses, but as a stop-gap measure it was supposed that there were two distinct verbs *run*, for example. However, since every verb that has a happening sense also has a generic sense (but not necessarily vice-versa), it would appear that we would wish to devise some principled means of relating these two senses in an intuitively satisfying way.

Besides the difference between the two uses of verbs such as *run* represented in terms of having one apply to stages of individuals, and the other directly to individuals, there is another difference that must be accounted for in some way. This is the fact that the generic reading creates an intensional context for objects of the verb. An excellent example of this is given in Bennett (1974). He claims that the verb *pick out* is a paradigm case of an extensional verb for the direct object.[4] If Bob picks out a hat, then there is some particular hat that he picked out. But if the verb is taken in its generic sense, we find that an intensional context is created for the direct object. Suppose that the coldest state is the least populous state (as with Alaska). Now consider the following sentence of Bennett's.

(37) Procedure P picks out *the coldest state*.

Since the coldest state is the least populous state, we would be able to substitute in (37) *salva veritate*.

(37') Procedure P picks out *the least populous state*.

But substitution evidently fails here, as in other intensional contexts.

This intensionality (or at least the fact that something holds scope over the VP of the sentence) is not limited to arguments of the verb, but extends to IV/IV modifiers as well. Consider the sentences of (38).

(38) a. Bill eats peas with *a knife*.

b. Ned builds garages in *an hour*.

c. Greta mugs people in *the newest building in town*.

In (38), no specific knife or hour is referred to, and if the newest building in town is the Lawrence building, it does not follow that Greta mugs people in the Lawrence building (on one reading).

As the intensionality appears at least to extend to IV modifiers, it would be quite difficult to treat the ambiguity of a sentence like *Bob repaired automobiles* as being a lexical ambiguity on the part of the verb *repair*. If we were to insist on a lexical ambiguity, as assumed momentarily in the last chapter, we would have no natural means of positing a translation of the generic sense of the verb that would obtain an

intensional context not only for objects, but adverbial modifiers as well. The most reasonable option left open is to posit the existence of some higher-level syntactic process which is responsible for the creation of this intensional context.

2.2 The G operator. It was noted that among the verbs of English that there are, with respect to subject position, basically two sorts. There are those like *run* and *eat* which in the past and future exhibit a generic/existential ambiguity and which appear unambiguous in the simple present, also exhibiting a present progressive form. Then there is the other class which in all tenses is unambiguous, and lacks a present progressive form. This class includes *resemble*, *weigh*, *believe* and so forth. Let us look at the former class as BASICALLY being predicates over stages (in subject position); the latter class is the class of predicates that BASICALLY apply to individuals, and never apply to stages. All the verbs that apply basically to stages can be made to apply to individuals (have generic readings). So there must be some general process in the grammar by which any verb that applies basically to stages may be made to apply to individuals, and apparently this process is also responsible for the creation of an intensional context.

Let us then posit an operator that does not show up as a morphological form in English which maps predicates that apply to stages to predicates that apply to individuals. It is therefore of sorted type $\langle\langle s, \langle e^s, t\rangle\rangle, \langle e^i, t\rangle\rangle$. Let us call this predicate *G*.

The basic intuition behind G is this. If someone makes the claim that Bill smokes cigarettes, that person in some not clearly understood way is saying something about what Bill does on given occasions; what sort of activity Bill-stages participate in. It is clear that Bill-stages actually smoking serve as the basis for such a statement, and that the truth or falsity of the statement is verified in the end only by examination of Bill-stages. Bill in the act of smoking serves as evidence for the knowledge that Bill smokes. It is as if the human mind reasons in the following sort of way. Let us take Φ as a predicate that applies to stages, and small letters from the middle of the alphabet to represent stages. If $\Phi(n)$, $\Phi(m)$, $\Phi(l),\ldots,\Phi(r)$ is true for enough times, and $n,m,l,\ldots,r$ are stages of *b*, then we consider $G(\hat{}\Phi)(b)$ to hold. Let us call this process 'generalization', thus the choice of G for the means of representing this predicate. This is a cognitive process, and will not be entirely represented in the grammar. In particular, there is no mention made of a necessary and sufficient number of times for some stage-level predicate Φ to hold of stages of x to say $G(\hat{}\Phi)(x)$. We will, however, set necessary conditions for such generalization, and that is that if $G(\hat{}\Phi)(x)$ holds, then on at least two different occasions there must be realizations of x, m, and n, such that $\Phi(m)$ and $\Phi(n)$ both hold. Thus, if Bill smokes, then there have to be two or more occasions on which Bill is actually smoking. This condition will be formalized as a meaning postulate and discussed at a later time.

Let us then see how we might represent the ambiguity of *Bill smoked*. The generic reading would be as follows.

(39) $\lambda P^{\vee}P(b)(\hat{}G\hat{}smoke') = G(\hat{}smoke')(b)$

Syntactically, in order to obtain this formula, we will have to introduce a new syntactic rule for G. It would be as follows.

S21. If $\alpha \in P_{IV}$ and α is of the form $[[\beta]_V(\gamma)]$, then $F_{19}(\alpha) \in P_{IV'}$ where $F_{19}(\alpha) = [\alpha]_{IV'}$

Here, IV and IV' are syntactically differentiated 'levels' in the VP, semantically nondistinct. IV' but not IV, now may combine with subjects to form sentences. Semantically, the operation that corresponds to this syntactic rule would be:

T21. If α translates as α', $F_{19}(\alpha)$ translates as $G(\hat{}\alpha')$

The event reading of *Bill smoked* (continuing to ignore tense) cannot be represented as in Chapter 3 any longer, as we are taking *smoke* as a predicate that basically applies to stages. If we left this predicate unchanged and added a subject, we would obtain an undefined formula as the subject is in all cases the property set of some INDIVIDUAL, and not a stage. The crucial element that is missing here is the means by which we say that there is some stage of the subject that smoked. To accomplish this, we add a rule that works on verbal IV's that serves the same semantic function as be_2 does with non-verbal IV phrases.

S23. If $\alpha \in P_{IV}$ and α is of the form $[[\beta]_V(\delta)]$, then $F_{21}(\alpha) \in P_{IV'}$ where $F_{21}(\alpha) = [\alpha]_{IV'}$

T23. $F_{21}(\alpha)$ translates as $\lambda x^i \exists z^s[R(z,x) \& \alpha'(z)]$

So then the event reading of *Bill smoked* comes out represented in this way.

(40) $\exists z^s[R(z,b) \& smoke'(z)]$

One will note that when G is semantically added to the IV phrase, it creates an intensional context for that IV phrase. This is a desirable result, as we have seen. On the event reading, when there is an existential claim made about some stage of the subject, no intensional context is introduced, and hence the extensionality of certain verbs in the event sense, but there is apparent intensionality on the generic reading.

It is noted here that G syntactically patterns as part of the aspectual system of English. It is not represented as a modal, as G

may syntactically appear even in the presence of another modal or in places where we can find no modals (infinitives and gerunds). It is not represented as a verb operator for the reasons stated above. Having it as part of the aspectual system of English is at this time more of a hunch than a motivated, arguable analysis. Nonetheless, it should be pointed out that G seems to be incompatible with the presence of the perfective aspect (and clearly the present progressive), and in those few cases I know of where it seems that a bare IV phrase appears no ambiguity between generic and existential shows up. The underscored IV phrases do not appear to have a generic interpretation.

(41) a. Bill likes to see Sally *run around in circles*.

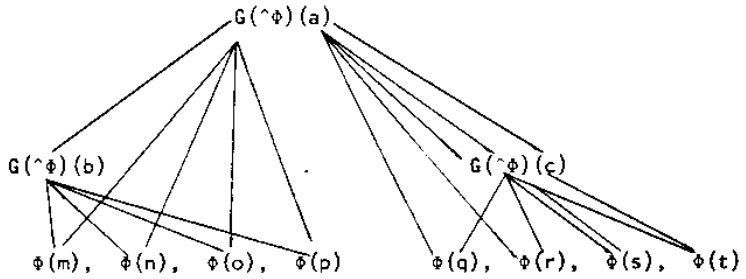
b. Sam helps Fred *load trucks*.

However, it is recognized that the exact nature of these constructions is not entirely understood, and that the judgments are of a very subtle nature. In spite of this, we will hold to the analysis proposed.

2.3 Predicates that basically hold of objects. This proposed analysis whereby we introduce G into the aspectual system makes the prediction that any verb whatsoever that basically applies to stages may be generically attributed to both objects and kinds. This generalization appears to be correct. This still leaves us in doubt about the gap in the distribution of predicates mentioned earlier, whereby there appeared to be no predicates at all that applied exclusively to objects, and not to kinds as well.

Let us intuitively characterize the generalization function once again, so that we might then have an intuitive grasp on why the predicted gap does not appear. We have in our ontology a hierarchy of stages, kinds, and objects. The G function allows one to generalize a predicate from one that applies to stages to one that applies to an individual that the stages are of. A possible situation might be as follows. *a* is a kind, *b* and *c* are objects; m, ... t are stages.

Figure 1



The fact that Φ holds of the stages allows the possibility of generalization to occur, attributing G(^Φ) to any one of the individuals a, b, or c, since all these stages are realizations of these individuals. But suppose for the time being that there were some predicate ψ which basically applied to objects, and thus could be true of *b* and *c*, but not of *a* (the kind). What the generalization function above does is to allow one to go up a tree, from a lower level to a higher one (and not the other way around).

We have now exhibited two intuitively similar operators, both of which we have symbolized as G, and both of which map predicates of a 'lower' level to predicates of a higher level. The version of G just explicated maps stage-level predicates to individual-level predicates, and this only operates on IV's that begin with a verb. If this syntactic stipulation were not made, we would not be able to account for why it is that the non-verbal predicates over stages (e.g. adjectives and PP's) fail to exhibit generic/existential ambiguities.

The version of G introduced to account for the pronominalization facts was introduced simply as a mapping from object-level IV's to kind-level IV's. We introduced it in the context of applying to certain object-level predicates that involved an abstract formed over at least two variables. There is no reason why G', being a mapping from object-level predicates to kind-level predicates, would not be able to apply to any other object-level predicate, whether or not there was some coreference business to account for. I believe there is some intuitive justification for thinking this is so. Consider a predicate like *has four legs*. If I were to assert that this is a predicate that BASICALLY applies only to objects, this would strike an intuitive chord. For there is some sense in which having four legs is something that is true of objects, and if we say it to be true of some kind, such as *dogs*, we know it to be true or false on the basis of observing particular individual dogs, and seeing if THEY have four legs. This is very similar to judging the truth of *John smokes*, where the truth or falsity of this sentence ultimately depends on the truth or falsity of whether or not smoking is a property of John's stages. That is, the truth of these sentences is determined ultimately by examining properties of entities on a lower level of the hierarchy. We will henceforth use this as the basic test as to whether or not generalization has been accomplished.

Unlike G, G' apparently may apply to any object-level IV, unconstrained by syntactic considerations. We would want it to apply, for example, with adjectives. Thus, we have an adjective *four-legged*, which is plausibly a predicate that basically applies to objects. We can attribute this to the kind 'dogs', as in (42).

(42) Dogs are four-legged.

So we will assume that G' may apply to any IV, but that G may only apply to verbal IV's.

The two G functions together in a sense serve the inverse purpose of the realization relation R (which could be split up into two similar functions, R and R'). Realization makes 'available' entities of a lower level from those of a higher level; generalization makes available predicates from a lower level to those of a higher level.

The two G functions, though, quite clearly account for the puzzle mentioned at the beginning of the chapter -- why it is that there appear to be no specifically object-level predicates in the language. In actuality, there are many, but every one of them may be applied to a kind via the G' operator. Thus, on the surface, any predicate that ranges over objects may also be applied to kinds, and thus the apparent gap in our stock of predicates.

2.4 Applications of G and G'.

2.4.0 Predicate nominal CN's. Terry Parsons has pointed out the dilemma posed by the following paradigm.

(43) For everything that is a mammal, it is male or it is female.

Dogs are mammals.

Dogs are male or dogs are female.

In symbols, we might choose to represent (43) as (43').

(43') $(\forall x)(M(x) \rightarrow (Fe(x) \vee Ma(x)))$

$M(d)$

$Fe(d) \vee Ma(d)$

But the conclusion from the premises (which we are assuming to be true) is simply false. It is neither true that dogs are male or that dogs are females (it IS true, though, that dogs are either male or female).

However, let us take as a reasonable hypothesis that 'mammal' is basically a predicate over objects, and not over individuals, as previously assumed. In this case, the symbolization of the second premise would be undefined, for d is a kind, but M may only apply to objects. A more proper symbolization of the second line would involve the generalization function (as Fido is a mammal, Rover is a mammal, ..., Spot is a mammal, we sanction the generalization that Dogs are mammals as Fido, Rover, Spot, etc. all realize the kind dogs).

(44) $G(\hat{}M)(d)$

But if we replace this as the second line of the premise, the proposed inference does not go through. This is the desired result.

In Chapter 6 we will propose that there is a process that takes any basic CN that applies to objects and makes a new CN that applies to kinds of things. I believe that this ambiguity in the noun *mammal* appears rather clearly in contexts like (45), where we obtain an apparent optionality of agreement of the predicate nominal with the subject.

(45) a. Dogs are *mammals*.

b. Dogs are *a mammal*.

(46) a. Those dogs are mammals.

b. *Those dogs are a mammal.

I suggest that (45a) is the result of applying generalization to the basic predicate *mammal*, and that (45b) is an example of the derived predicate *mammal* meaning 'kind of mammal'. (45b) is true because dogs are a kind of mammal, and (45a) is true because 'enough' individual dogs are mammals to warrant the generalization.

I do not have an account of how it is that the predicate nominal is sensitive to this semantic information so that we can obtain the apparent optionality of agreement. I point it out as an example of how looking at predicates in the way proposed could possibly account for such an abberation in the grammar of English, and as an example that any adequate treatment of predicate nominals would have to account for.

It was mentioned above that while it is false that dogs are male or dogs are female, it seems nonetheless to be true that dogs are male or female. We have a rather straightforward means of accounting for this now. Assuming male and female to be predicates that basically hold of objects, their disjunction will hold of every object that realizes the kind dogs (every dog, forgetting about those few exceedingly strange dogs for the moment). For example, Fido is either male or female, Rover is male or female, etc. By generalization of this predicate, then, we can obtain the sentence that dogs are male or female. Its proposed translation would be as follows. (I follow Montague's translation of disjoined IV phrases.)

(47) $G(\hat{x}^{O}[Female'(x) \vee Male'(x)])(d)$

There is another reading of *dogs are male or female* which is false, and which is equivalent to *dogs are male or dogs are female*. This would be represented by having disjoined IV' phrases, each of which applies to kinds.

(48) $\lambda x^{k}[G(\hat{}Female')(x) \vee G(\hat{}Male)(x)](d)$

2.4.1 The *a* generic: a proposal. This predicate G can lead us to a certain understanding of certain properties of a generic NP left

undiscussed to this time, as exemplified in (49).

(49) a. *A dog* is a mammal.

b. *An owl* is not intelligent.

c. *A decent bookshelf* has steel shelves.

d. *A friend in need* is a friend indeed.

Jespersen characterized the *a* generic as follows: "With *a*, the subject refers to all members (or any member) of the class or species it denotes, but only as a representative of the members. It does not denote the class or species itself." Perlmutter (1970), has suggested that the source of the *a* generic is a weakened form of *any*, for indeed (as observed in Burton-Roberts (1976)) there are overwhelming similarities between *any dog barks* and *a dog barks*, etc. However, *any* to me appears to be a real universal, and *any dog barks* is falsified by one or more non-barking dogs, whereas *a dog barks* is not so easily falsified. There is something 'generic' about the *a* generic that is lacking in the universal *any* in terms of truth-conditions. Still, the accounts of Jespersen and Perlmutter surely bear some intuitively correct insights about the nature of this form of an NP.

Any number of people have pointed out that there are quite evident differences between the singular *a* generic and the bare plural in its generic use (Jespersen (1927), Stockwell et al (1974), Nunberg and Pan (1976), Lawler (1973), Perlmutter (1970), Burton-Roberts (1976), and many more). An illustrative contrast is provided by (50) and (51).

(50) a. {Owls are intelligent. / An owl is intelligent.}

b. {Dogs bark. / A Dog barks.}

c. {Old paintings demand a high price. / An old painting demands a high price.}

(51) a. {Owls are common. / *An owl is common.}

b. {Dogs are widespread. / *A dog is widespread.}

c. {Dinosaurs are extinct. / *A dinosaur is extinct.}

This illustrates the impossibility of predicating kind-level properties of the *a* generic NP. What appears to be the crucial generalization about the predicates that can be attributed to an *a* generic NP is that

all those properties are also properties of OBJECTS. This is what is behind the notion that the indefinite singular generic serves as speaking about the species by taking an arbitrary representative; it is that all possible predicates associated with it must also be object-level predicates.

This, I believe, is one entirely valid generalization about the *a* generic, though there are some apparent counterexamples to be discussed shortly. Another important feature of the *a* generic, though this observation is open to a good deal more debate, is that it appears only in subject position. The reason for the possible debate is that existential *a* in an intensional context is, on the level of sheer intuition, difficult to distinguish from the *a* generic. This is because in intensional contexts the existential *a* does not pick out any particular object-level referent in the real world, which observation also holds for the *a* generic. In any case, we find that where the universal reading of the bare plural may be found in non-subject position, the *a* generic may not be so felicitously substituted.

(52) a. Hans adores {*dogs.* / *??a dog.*}

b. The queen of England has a fear of {*mice.* / *??a mouse.*}

c. This is a dissertation on {*unicorns.* / *??a unicorn.*}

Burton-Roberts (1976) proposes to capture these facts (along with many others not discussed here) by deriving *a* generics from predicate nominals via a syntactic rule which would convert a structure like (53a) into one like (53b).

(53) a. To be a whale is to be a mammal.

b. A whale is a mammal.

Though he captures what is undoubtedly a real and interesting parallelism between sentences such as (53a) and (53b), one that is in need of explication, there seems to be good reason for not taking his analysis as the correct one. For one thing, there are a number of syntactic problems that arise when dealing with sentences like the following.

(54) a. A cat cleans *itself*.

b. ??To be a cat is to clean *itself*.

(55) a. ??A witness perjures *oneself*.

b. To be a witness is to perjure *oneself*.

In addition, the proposed rule would predict the possibility of generic readings for sentences which patently have none.

(56) a. To be a dog is to be barking at the mailman.

b. A dog is barking at the mailman.

(57) a. To be a weed is to be where one is not wanted.

b. ≠A weed is where it is not wanted.

(58) a. To be a sailor is to be drunk.

b. ≠A sailor is drunk.

And then there are assorted problems that arise with certain idiosyncratic predicates such as the predicative 'make' construction, which do not appear to be capable of appearing felicitously in infinitives with deleted subjects.

(59) a. Martha makes a good wife for John.

b. *Martha tried to make a good wife for John. (wrong reading)

(60) a. A drunk doctor is a lousy surgeon.

b. *To be a drunk doctor is to make a lousy surgeon.

For these reasons we will be taking a syntactically more straightforward approach to *a* generics.

In order to capture the observation that the *a* generic may take only those predicates associated with the bare plural that apparently only apply basically to objects, we will propose a translation which ensures that any property attributed to the *a* generic is a generalized property. Since predicates that apply basically to kinds are not generalized predicates, these are disallowed. The proposed translation of the NP *a dog* on the generic reading would be as follows.

(61) $\lambda P[G(P)(d) \vee G'(P)(d)]$

Thus, *a dog is common* is ruled out because the set of properties denoted by (61) contains only properties that basically hold of objects or of stages, and *common* is a property that holds of kinds and hence cannot be generalized.

Let us examine another context in which *a* generics do not felicitously occur to further illustrate the workings of the analysis. A sentence such as (62) cannot be interpreted as generically attributing some property to the kind hats.

(62) Bob wears a hat.

Given the translation of *wear* proposed here, we see that the property attributed to the direct object is one that applies to the domain of individuals, and not to stages or to objects alone. Since properties that apply to individuals are not generalizable properties, being of the incorrect type, this property will not be in the domain of the set attributed to the generic *a hat*. This is illustrated below.

(63) wear: $\lambda P\lambda x^{s\vee}P(\hat{x}^{i}[\exists z^{s}[R(z,x) \,\&\, wear^{+}(x,z)]])$

wear a hat: $\lambda P\lambda x^{s}[G(P)(h) \vee G'(P)(h)](\hat{x}^{i}[\exists z^{s}[R(z,x) \,\&\, wear^{+}(x,z)]])$

A problem arises, however, if we were to quantify in *a hat* for an object-level pronoun. Then a predicate of the appropriate type would be present, and we should then be able to obtain a reading for (62) of the type that we said does not arise. It is not entirely clear how this is to be resolved. We might bar the replacement of an object-level pronoun by a term phrase which is a set of properties associated with a kind-level entity on general grounds, but the formal mechanisms are unclear to me at this time. The most convenient means of avoiding this problem is simply to disallow *a* generics from being quantified in, which is the solution that will be adopted here. I know of no disadvantages of this solution at this time aside from its rather 'brute force' tenor.

In subject position, matters are quite straightforward. Consider a translation of (64).

(64) A dog is intelligent.

$\lambda P[(G(P)(d) \vee G'(P)(d)]$ (^Intelligent')

Here, *Intelligent'* is a predicate that basically applies to objects, and is in the set denoted by the translation of *a dog* (or, if one believes dogs are not intelligent, it is at least of the appropriate type).

If we return momentarily to the pronominalization facts which first led us to posit the G functions, we see that the *a* generics are quite acceptable there. Note that object-by-object coreference is required. The predicates in (65), one will recall, result from the application of the derived VP rule. In order to apply these predicates to a subject, quantifying in is not required.

(65) a. A cat cleans *itself*.

b. A goldfish likes everyone who likes *it*.

c. A dog obeys *its* master.

So we see that positing the G functions to account for the pronominalization facts is in accord with the treatment of *a* generics suggested here. It should be borne in mind that the analysis of *a* generics here is to be regarded as a preliminary sort of analysis, and not as complete. It is hoped that at the very least the essential nature of the indefinite singular generics is exhibited by the line of thought pursued in this section.

2.4.2 Beavers build dams and the passive. Chomsky (1975) notes the hoary problem of the appropriate interpretations of the following transformationally-related sentences.

(66) a. Beavers build dams.

b. Dams are built by beavers.

The former sentence seems to 'say something' about 'all' beavers, and not about 'all' dams. The latter speaks of 'all' dams, but not about 'all' beavers. This change of meaning is not a regular feature of the passive, as the following sentences are virtually synonymous. (on the 'event' reading)

(67) a. Beavers were building dams.

b. Dams were being built by beavers.

(68) a. Bill ate too many gumdrops.

b. Too many gumdrops were eaten by Bill.

Let us represent a translation of (66a). We treat *build* as a predicate that basically applies to stages of the subject, and takes realizations of the object (an extensional TV). The G function mediates.

(69) $\lambda P^{\vee}P(b)(\hat{}G(\hat{}\lambda P\lambda x^{S\vee}P(\hat{y}\ \exists z^{S}[R(z,y)\ \&\ build^{+}(x,z)])(\lambda P^{\vee}P(d))) = G(\hat{x}^{S}\exists z^{S}[R(z,d)\ \&\ build^{+}(x,z))(b)$

Since the generalized predicate is being attributed to the kind beavers here, psychologically this represents the noting of 'enough' realizations of beavers building dams to make the generalization warranted. We are inclined to express this criterion in terms of a quantification over the subject ("all beavers") in informal discourse, but nothing of the sort is implied here in the translation presented. There is no generalized predicate attributed to the direct object *dams*, but only stages of dams are mentioned. Hence, there is nothing said about 'all' dams. One will note that we could alternatively say *a beaver builds dams* and be saying almost exactly the same thing. It is further noted that *beavers build a dam* is not naturally interpretable as being a statement about 'all' dams.

The passive form of the sentence, (66b) will not have associated with it the same translation as (66a), because we do wish to reflect the differing interpretations. One matter worthy of note in this respect is that in the passive, the *a* generic is very naturally interpreted in subject position though it would not be acceptable in the object position from which it is supposed to be derived. Thus, the *a* generic has putatively an ungrammatical source.

(70) a. A dam is built by beavers.

b. ≠Beavers build a dam. (I'm not sure this is even grammatical)

The general analysis will have the NP *beavers* in subject position with a generalized predicate being associated with it, 'built by beavers'. As the passivized NP now appears in subject position, it may have a generalized predicate associated with it that would otherwise be unavailable in object position.

Accomplishing this goal requires the introduction of a Passive transformation. In particular, I make use of the form of the passive rule proposed in Partee (1976) in its strict form (i.e. only a variable may be moved out of object position). The form of the passive rule is the following.

S38. If $\phi \in P_t$ and ϕ is of the form $[\alpha]_T$ to $[(\beta)[[\delta]_V[\left\{\begin{matrix} him^{\gamma}_n \\ \$them^{j}_n \end{matrix}\right\}]_T (n)]_{IV}]$, then $F_{36}(\phi) \in P_t$ where $F_{36}(\phi) = [[\left\{\begin{matrix} him^{\gamma}_n \\ them^{\gamma}_n \end{matrix}\right\}]_T$ to $[(\beta)[[[\delta]_V en]_{Adj}(n)]_{IV}[by[\alpha]_T]]_{IV'}]_t$

Corresponding semantic operation: identity

Notice in particular here that we are NOT claiming that the passive transformation itself has any effect on the meaning in any way, as its corresponding semantic operation is identity. The 'meaning-change' in (66b) will not be attributed to the passive, but rather to the fact that once the passive has applied the derived VP rule can form an abstract over the subject variable, and then may combine with G'. As the derived VP rule was introduced prior to the introduction of the IV and IV' distinction we are making here, we will assume the minor modification that the derived VP rule creates a new IV phrase (and not an IV').

By making use of these rules, we can construct a derivation for the sentence (66b) as follows. What we are doing is taking a full sentence, making a passive out of it, making that passive sentence into

an IV phrase with the derived VP rule, adding G' to the beginning of that IV phrase to create a generalized predicate, and then adding the subject of the sentence (*dams*) and the tense. We present here a complete derivation, and illustrate the semantic effect of the syntactic rules step by step.

(71) Translations of lexical items:

$he_3^o = \lambda P^{\vee}P(x_3^o)$

dams = $\lambda P^{\vee}P(d)$

beavers = $\lambda P^{\vee}P(b)$

build = $\lambda P \lambda x^s {}^{\vee}P(\hat{x}\exists z^s[R(z,x) \ \& \ build^+(x,z)])$

[build him_3^o] IV

[$_V$build] [he_3^o]$_{NP}$ $\quad \lambda x^s[\exists z^s[R(z^s,x_3^o) \ \& \ build^+(x,z)]]$

[build him_3^o] IV' $\lambda x^i \exists w^s[R(w,x) \ \& \ \exists z^s[R(z,x_3) \ \& \ build^+(w,z)]]$

build him_3^o

[Beavers to build him] t

Beavers $\quad$ build him_3^o $\quad \exists w^s[R(w,b) \ \& \ \exists z^s[R(z,x_3^o) \ \& \ build^+(w,z)]]$

Passive:

$[_t[he_3^o]$ to $[_V be_1][[build+en]_V$ [by $[_{NP}$beavers]]] $]_t$

Same as above

Derived VP:

$[_{IV}$be[build+en][by beavers]]

$\lambda x_3^o[\exists w^s[R(w,b) \ \& \ \exists z^s[R(z,x_3^o) \ \& \ build^+(w,z)]]$

be[built by beavers]IV'

(G' added) $\quad$ G'($\hat{x}_3^o$[$\exists w^s$[R(w^s,b) & $\exists z^s$ [R(z,x_3) & $build^+(w^s,z^s)$]]])

be[built by beavers]IV

dams to be built by beavers

[dams] $\quad$ [$_{W'}$be built by beavers]

(final translation) $\quad$ G'($\hat{x}_3^o$[$\exists w^s$[R(w,b) & $\exists z^s$[R(z,x_3) & $build^+(w,z)$]]])(d)

Syntactically, to complete the system, the following happens:

Dams [do +pres] be built by beavers

[do +pres] $\quad$ Dams to be built by beavers

Affix-hopping applies, and the unstated rules of subject-verb agreement (and some morphological rules) -- resulting in:

(66) b. Dams are built by beavers.

The final translation has a generalized predicate that is attributed to dams, which corresponds to a review of individual dams to see if 'enough' (which we, again, tend to characterize as 'all' or 'most') dams are in fact built by beavers. There is nothing of this sort attributed to beavers, except it says that in some possible world, there are beavers that built x_3^o. But there is nothing here that leads us to think that the sentence is about 'all' beavers, in opposition to the case with dams in this sentence. There is a meaning postulate associated with G' that states that if the sentence is true, it has to be the case that there were at some time realizations of the subject for which the predicate 'beavers built it' is true. This appears to correctly characterize the differences to be found between (66a) and (66b). The analysis proposed here does not prevent (66b) from having the reading of (66a) so far as I know; as it is not entirely clear to me that (66b) does not have that reading, we will allow matters to stand as presented.[5]

2.4.3 The Port-Royal Puzzle reconsidered. In this section we will be returning to a problem that was raised in section 2.3.2 of chapter 3 regarding the interpretation of sentences such as (72).

(72) Dutchmen are good sailors.

It was argued that the positing of a generic quantifier associated with the interpretation of the bare plural NP would give us the wrong results in representing an interpretation of (72). It remains to be shown that sentence such as (72) are consistent with the approach taken here. We will not be able to offer a full analysis of the sentence, but the type of analysis sketched below accounts for certain aspects of its

interpretation and it shows promise as being the proper direction in which to head for an account of (72).

The most salient characteristic of sentences like (72) is that an entailment which normally holds appears to be suspended.[6] Consider momentarily the sentences of (73).

(73) a. John is a good sailor.

b. All Dutchmen are good sailors.

c. Those Dutchmen are good sailors.

d. Lots of Dutchmen are good sailors.

Each of the sentences of (73) entail the respective sentences found in (73').

(73') a. John is a sailor.

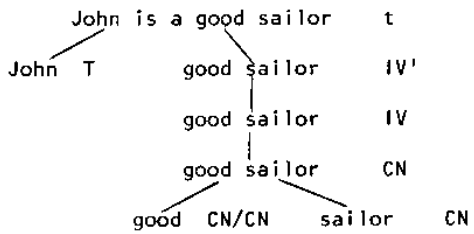
b. All Dutchmen are sailors.

c. Those Dutchmen are sailors.

d. Lots of Dutchmen are sailors.

We will follow Siegel (1976) in accounting for this entailment. We will analyze the adjective *good* as being an adjective of category CN/CN, operating on the meaning of the modified CN to arrive at a new CN. *Good* here is non-intersective. The interpretation accorded sentence (73a) is as follows.

(74) Syntax:



Translation: $\lambda P^{\vee}P(j)(\hat{}good'(\hat{}sailor)) = good'(\hat{}sailor)(j)$

Siegel posits a meaning postulate that operates on CN/CN adjectives such as *good* (though not on some others, such as *apparent*, or *fake*), which is of the following form.

MP 14. $\alpha'(\hat{}\beta')(x) \rightarrow \beta'(x)$ where α' translates adjectives of CAT CN/CN, β' translates any CN and x is an entity.

So the translation of (73a) presented above will yield the entailment that John is a sailor:

(75) $(sailor')(j)$

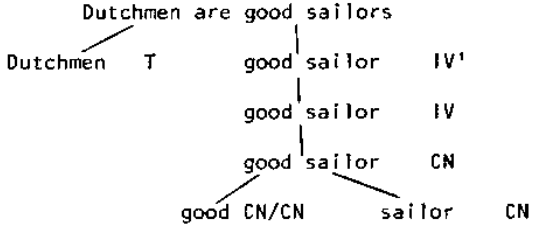
This meaning postulate would operate similarly on the translations of the remaining sentences of (73) to yield the entailments listed in (73').

Turning our attention back to (72), we note that sentence (72) does not entail the truth of (76), though (76) at first appears to bear the same relation to (72) that the sentences of (73') bear to their respective counterparts of (73).

(76) Dutchmen are sailors.

Our grammar will not yield this entailment, though it will give us the correct entailments for (73). The predicate 'good sailors' in (72), being a predicate that applies basically to objects and not kinds, cannot be predicated of the kind Dutchmen save via generalization. The translation accorded (72) would be as follows.

(77) Syntax:



Translation: $\lambda P^{\vee}P(d)(\hat{}G'(\hat{}good'(\hat{}sailor'))) =$

$G(\hat{}good'(\hat{}sailor'))(d)$

The meaning postulate presented above will not operate on this interpretation, as its 'stuctural description' is not met due to the presence of G'. Where G' is not present in the translation, as in the sentences of (73) with object-level subjects, the entailment goes through. Thus the proposed system makes the correct predictions in this respect.

We do not wish for the presence of G to preclude the deriving of all entailments, however. In the case of a sentence such as (78), we would seem to want to be able to conclude (78b) given (78a).

(78) a. Elephants are gray mammals.

b. Elephants are gray and elephants are mammals.

The adjective *gray* is an intersective adjective, represented semantically as specifying a set of entities, and modifying 'mammals' by intersecting the set of gray objects with the set of mammals. A representation of (78a) would be the following.

(79) $G'(\hat{x}^{O}[gray'(x) \& mammal'(x)])(e)$

In order to conclude (78b), we cannot do so by the normal rules of inference, but we must specify the distributive character of the G' operator (a condition which we would probably wish to allow to G as well). We propose the following meaning postulate.

MP12. $\forall P \forall Q \forall x^{k} \Box[G'(\hat{}\lambda y^{\vee}P(y) \& {}^{\vee}Q(y))(x) \leftrightarrow$

$G'(P)(x) \& G'(Q)(x)]$

This allows us to deduce (78b) from (78a). This will take care of all cases of conjoined IV phrases, intersective adjectives and/or restrictive relative clauses modifying the predicate nominal. In this respect, notice that sentence (80a) DOES seem to entail (80b), where the modification of the predicate nominal is accomplished via relative clause formation.

(80) a. Dutchmen are sailors that are good.

b. Dutchmen are sailors.

We do, nonetheless, wish entailments to follow even in some cases of CN/CN adjectives modifying the predicate nominal. Consider the sentences of (81), which contain non-intersective adjectives.

(81) a. Slobbovians are *utter* fools.

b. Diptharps are *veteran* sportscasters.

c. Klingons are *complete* clods.

These do appear to entail the sentences of (82).

(82) a. Slobbovians are fools.

b. Diptharps are sportscasters.

c. Klingons are clods.

So apparently we would wish G' to be 'transparent' to certain instances of entailments involving CN/CN modifiers. While we will not in any formal way attempt to distinguish the two classes of CN/CN adjectives noted here, it is useful to note some impressionistic characteristics of those adjectives that do allow the entailment of interest here as opposed to those that do not.

The subclass of adjectives that behave like *good* are those, right down the line, which allow an 'as' paraphrase, exemplified below.

(83) a. Dutchmen are good sailors.

b. Dutchmen are good *as* sailors.

This is in distinction to the examples of (81), which allow no such paraphrase.

(84) a.??Slobbovians are utter as fools.

b. ?Diptharps are veteran as sportscasters.

c.??Klingons are complete as fools.

In (85) are listed some more examples of adjectives which allow 'as' paraphrase, but block the entailment.

(85) a. Policemen are *excellent* witnesses.

b. Dogs are *fantastic* companions.

c. Cubans are *firm* negotiators.

d. Australians are *desirable* friends (to have).

e. Seals are *amusing* entertainers.

The class of adjectives that allows an *as* paraphrase and blocks the entailment with a kind-level subject is also, as far as I have noted, precisely the class of adjectives that appear in the predicative *make* construction (which requires the presence of some adjective). In (86) are the adjectives that block the entailment, while in (87) are exemplified other sorts of adjectives which do not pattern like those of (86).

(86) a. *Dogs make pets.

b. Dogs make $\left\{\begin{array}{l}\text{excellent}\\ \text{good}\\ \text{desirable}\\ \text{entertaining}\\ \text{infuriating}\end{array}\right\}$ pets.

(87) a. *Dogs make {brown / four-legged / angry / tall} pets.

b. *Dogs make {utter / complete} fools.

c. *Boxers make veteran sportscasters.

With respect to whether or not the entailment goes through, the CN's themselves appear to play a part in the ultimate interpretations of sentences such as (a). The CN cannot be any CN at all, but must, loosely, denote a ROLE or a FUNCTION that one may participate in. The sentences of (88) are quite odd, as the underscored CN apparently does not denote a role one may 'step in to', in spite of modification by an adjective of the appropriate class.

(88) a.??Australians are excellent *natives of Queensland*.

b.??Dutchmen are great *females*. (cf. 'great sailors')

c.??Books are amusing *paperbacks*.

However, if one were casting parts in a film, and were seeking individuals to play natives of Queensland or females, (88a) and (88b) could well be used to recommend where to look for the best prospects. It is far more difficult to imagine a similar circumstance in which (88c) would be usable. This is not due to the inanimacy of the subject NP, however. If one chooses a nominal that seems to denote a kind of object that has some sort of function associated with it, inanimate subjects are entirely acceptable.

(89) a. Pipe wrenches are fantastic *door-stops*.

b. Coffee mugs are great *flower-pots*.

c. Pillows are poor *weapons*.

Summing up these impressionistic remarks, it appears that the class of predicates that behave like 'good sailors' in (72) are those that have a role or function-oriented head noun, and a CN/CN modifier which has some evaluative content, allows an *as* paraphrase, and felicitously may appear in the predicative *make* construction. A full treatment of (72) would no doubt have to take into account these parallelisms, but this is a task not undertaken here.

2.4.4 Progressive aspect and IV adverbs. The deriving of both a generic and existential reading for many verbs from an underlying predicate that applies basically to stages gives us a means for expressing the distribution of the progressive marker, which appears to only be applicable to those verbs which are basically predicates over stages (in subject position).

We will, as in the previous section, treat the progressive aspect as being an IV operator (not an IV' operator), which only operates on those IV's of sorted type $\langle e^{s},t\rangle$ that begin with a verb. It converts that verb into an adjective, which then must combine with be_2 in order to be applicable to individuals, the *-ing* marker corresponding to a mapping from stage-level predicates to stage-level predicates.

SII: If $\alpha \in P_{IV/IV}$ and $\beta \in P_{IV}$ and β is of the form $[[\delta]_V(\gamma)]$, then $F_{10}(\alpha,\beta) \in P_{IV}$, where $F_{10}(\alpha,\beta) = [[[\delta]_V\alpha]_{Adj}(\gamma)]$

TII: If β' translates β, Prog' translates α, then $F_{10}(\alpha,\beta)$ translates as Prog'($\hat{}\beta'$).

The progressive marker will not be applicable to those verbs that are basically predicates over individuals, for then the IV will be of type $\langle e^{i},t\rangle$ and not applicable to stages. Hence, the seeming anomaly of *Jack is resembling Greta* or *Horses are believing everything told them*, as *resemble* and *believe* appear to be applicable only to individuals.

The introduction of the sub-typing system and having certain IV constituents applicable only to stages has some further advantages in avoiding a number of rather unusual sentences. In PTQ, the following sentences are generated.

(90) a. Bill is a unicorn slowly.

b. John loves Mary rapidly.

The adverbs *slowly* and *rapidly* are, in PTQ, of category IV/IV, and hence may co-occur with any IV at all. However, these adverbs are grammatical (or sensible) with only a subset of the IV's of the language. In (91) are examples of cases where they are strange, and in (92) they appear natural.

(91) a. *Bill believes that slowly.

b. *Those men are musicians rapidly.

c. *Max resembles Fred slowly.

d. *Dogs have four legs rapidly.

(92) a. John hit Mary slowly.

b. Dogs run slowly.

c. Yesterday, Max ate rapidly.

It appears that these adverbs are not at all natural with any IV phrases that apply directly to individuals, but they are far more acceptable in the case of verbs that apply basically to stages (as in (92)). Also, it appears that the IV phrases must be verbal, for adjectives and PP's that apply to stages are not wholly acceptable.

(93) a. *Bill is into the pit slowly.

b. *Fred is available rapidly.

We will suggest here that the adverbs *slowly* and *rapidly* are semantically of sorted type $\langle\langle s,\langle e^s,t\rangle\rangle,\langle e^s,t\rangle\rangle$, and syntactically of category IV/IV, combining only with verbal IV's. This will prevent us from trying to assign a meaning to sentences such as those found in (90), (91) and (93). The discussion in this section is reflected in the amended fragment to be presented at the conclusion of chapter 6.

2.5 Concluding remarks concerning G and G'. We have in this chapter posited there to be semantically realized verb-phrase operators, the G operators, which accounted for a number of matters discussed here.[7] We first noted some unanticipated (given the fragment of chapter 4) pronominalization facts, and the positing of a G' in the semantics not only had an intuitive plausibility, but accounted for the coreference facts presented as well. We then turned to our other problems noted concerning the fragment of the previous chapter, where we noted that there was an apparent gap in our stock of predicates, in that it appeared that there were no predicates of the language that applied solely to objects. In using the G operators, we could not only explain how it is that this apparent gap appears, but we then would have a natural way of representing the ambiguity exhibited by so many verbs between a generic/existential reading in a large number of cases. The result of this process is that we are not thinking about predicates in terms or what they are BASICALLY predicates over, and not simply in terms of surface distribution. We noted that there are predicates that basically apply to stages, those that apply to objects, and those few that apply basically to kinds. A reasonable conjecture to make at this point is that any given predicate is basically a predicate over just one sub-class of entities (stages, objects, kinds), and does not include more than one class. There is reason to think that this conjecture may well be false in that there may be predicates in the language which apply basically to the range of individuals. The adjective *popular* is a prime example. We note that it may apply to objects, for (94) is interpretable.

(94) a. John is popular.

b. Many people I know are popular.

We also note that it may apply (on the surface) to kinds as well.

(95) Dogs are popular.

Given our means of deriving a sentence like *Dogs are intelligent*, we might first suppose that *popular* is a predicate that applies basically to objects, and in (95) is generalized via G' to apply to the kind dogs. However, (95) does not lend itself to this treatment. Intuitively, the positing of G' was based on inductive generalization. Thus, the claim that dogs are intelligent was ultimately based on the noting of particular dogs that are intelligent. It would be unimaginable to claim that dogs are intelligent yet to have never seen an intelligent dog among the large number known. But (95) is of a different nature. In (95), it does not follow at all that any PARTICULAR dog at all must be said to be popular. In fact, (95) would be consistent with there being no object-level dogs that are popular. Suppose everyone in the world owned a dog, and no one knew their neighbor's dog at all. Thus, no dog would be popular, but it would appear to be quite true that dogs are popular in that sort of a world. So (95) does not rest on the truth or falsity of the predicate with respect to individual dogs at all.

A reasonable way to represent this is to have the adjective *popular* applicable to both objects and kinds (as opposed to *intelligent*, which is applicable only directly to objects). Thus, *popular* would be a predicate that is of type $\langle e^{\cup},t\rangle$. Lawler (1973) notes that this adjective has some peculiar properties, as it appears to be quite strange with the *a* generic, though acceptable with the bare plural.

(96) a. Dogs are popular.

b.??A dog is popular.

Even in a situation where all dogs ARE popular, he intuits that (96b) would still be strange. This follows from our analysis of the *a* generic. *Popular* is a predicate over individuals, whereas the *a* generic has just those generalized properties that the bare plural has. We cannot generalize *popular* with G', as G' only maps OBJECT-LEVEL predicates to kind-level predicates. *Popular* is not an object-level predicate, and hence cannot be generalized. Thus the anomaly of (96b).

The stock of predicates that behave like *popular* is no doubt quite small. Perhaps *famous*, *well-known*, and other synonyms and antonyms should be analyzed likewise, and perhaps troublesome predicate nominals such as *be a nuisance* might be looked at in this way.

After presenting G and G' as solutions to the two basic problems brought up in the introduction to this chapter, we examined some applications of these operators in other parts of the grammar, and found there to be even more reason to presume their existence. We now leave the issue of the generalization operators, and turn to two other matters that relate to the fragment itself.

3. Stages and Extensionality

To this point little has been explicitly said concerning such matters as intensionality, extensionality, existence, and their relationships to stages and individuals. While I shall not attempt to deal with these matters in any complete fashion, a few remarks do appear to be in order.

Many of the instances of Montague's extensional contexts as presented in PTQ appear in this treatment as contexts in which there is an existential claim about stages made for any NP occurring in the context. This holds for the subject position of *eat*, *lose*, *date* and *find*, for example, where in PTQ there is a meaning postulate ensuring extensionality of the subject NP (it appears Montague only considered the 'happening' reading of these verbs, though it is not entirely clear). The same holds for the objects of these verbs, as well as the object of the preposition *in*. One may entertain the notion that the hypothesis presented here concerning the realization relation, stages, and individuals is but a notational variant of a means of construing Montague's treatment. Suppose for the time that we regard kinds as entities of type <s,e>, and then associate with the extension of a kind an entity of type <e> which we will henceforth regard as a stage. Thus, the notation d will denote a dog-stage.

The immediate problem that arises with this approach, as has been noted before in another connection, is that we would have to regard the extension of a kind like dogs (now thought of as an individual concept, for the moment) as being (an entity that corresponds to) the set of all dogs in a world at a given time. But this would be an inaccurate representation of a sentence like *Bill saw dogs yesterday*, for he needs only to have seen some dogs, and clearly not all dogs.

All this may show is the necessity for including within the points of reference in the interpretation not simply possible worlds and times, but some other factors as well. One plausible candidate is presented in Montague's UG, called the context of use. We might then think of the extension of anything as being defined with respect to a world, time AND context of use. In this way, the indefinite plural sense of the bare plural *dogs* would only have to refer to some dogs in the world, and not all, for the dogs in the context of use in that world at that time would possibly be just SOME of the dogs in that world at that time (we might think of the context of use as a place in the world). I do not believe that this particular proposal is correct, though. Consider the following sentence.

(97) Everyone petted dogs.

In this case, it is clear that there is a reading where everyone need not have petted the same dogs. So the quantifier would have to be defined

in such a way as to not only affect the g-assignment of values to variables, but would also have to be able to affect the context of use coordinate as well in order to obtain a different set of dogs for each person. But this would have disastrous results elsewhere, provided that this context of use has other functions as well beyond simply delimiting extensions of a kind. The chief use in UG for the context of use is to assign values to indexicals, such as *this*, *you*, *me*, *there*, etc. It is because the context of use varies that a sentence like *This table is red* can be sometimes true and other times false in a given world at a given time. Now if the context of use may be a function of a quantifier holding scope over a sentence of the logic, that means that the following sentence should then be able to speak of a state of affairs where everyone painted a different table, or painted a different person.

(98) Everyone painted $\left\{\begin{matrix}\text{this table}\\ \text{me}\end{matrix}\right\}$. (not 'kind' reading)

But evidently, this is not so.

There would be the further problem in (98) above that if the NP *dogs* were introduced with wide scope, outside the quantifier, this proposal would grant the sentence a reading whereby everyone saw the same dogs (as then the extension of *dogs* would be evaluated with respect to a single set of points of reference). But, as observed previously, there is no reading of this sort for these sentences that can be detected.

This may simply show that another coordinate for determining extensions is required other than context of use. I cannot, of course, show all possible accounts like this to be misguided in any fundamental way, and it could very well be that ultimately this approach may in the end be more satisfactory than the one taken here. Nonetheless, any attempt on my part to construct an interpretation with a point of reference that seems to have any independent motivation has met with failure. To choose one more example, suppose the extension of a kind were evaluated with respect to time, world, and place (being distinct from context of use). One could easily imagine various uses for a place coordinate (Zemach (1975) has made this very suggestion). This, however, leaves us with the same sorts of problems as above. In a sentence like the following, suppose George and Harriet are sitting next to one another; it still does not follow that they were petting the very same dogs.

(99) George and Harriet were petting dogs.

The sentence below, though, which contains a place indexical (*here*) does not allow George and Harriet to be in different distinct locations.

(100) Harriet and George were sitting here.

It is for these reasons that the realization relation in conjunction with an extensional quantifier ranging over stages is opted for in spite of its notational complication. I reiterate that this does not in principle rule out any analysis making use of extensions of a kind with respect to other sorts of points of reference; I was unable to construct any at this time.

A subsidiary problem that would arise under such an analysis is that it appears to be fruitful to sub-type the entities into at least the domains of objects and kinds. This being so, the extensions of these subtypes (the extensions of their individual concepts, that is) would still be notationally distinguished. This would lead us to expect that there would be stage-level predicates which would distinguish the two, much in the same way that 'common' distinguished kinds from objects. I submit that no such case arises in English; this follows from the system presented in this work.

Just as there is an intuitive relationship between existence in a given world at a given time and extension of an individual concept, so there is a correspondingly close relationship between an entity having a stage in a world at a time, and existence. In fact, for material objects, it appears that 'having a stage' is very close to what we mean by 'existence'. If we argue whether or not King Arthur ever existed, we examine evidence that would relate to whether or not King Arthur ever had a stage in this world at some past time. If someone came up with convincing evidence that King Arthur, at such-and-such a time, ran between London and Bath, we would thereby be convinced that King Arthur existed. This is because running between London and Bath is true of a stage of King Arthur, and if he has a stage in this world at a given time, he existed at that time. I therefore submit that we wish to state a meaning postulate that ensures existence is entailed by having a stage.

MP8. $\forall z^{i}[\exists y^{s}\ R(y,z) \rightarrow \underline{Exist}'(z)]$

This is not a bi-conditional for at least two reasons. First, there may be all sorts of other entities within our domain of individuals for which existence is debatable, but patently have no obvious stages in the world (such as *intelligence*, *three*, or *point*). Secondly, in sentences which only make reference to individuals themselves and not to stages of them, we find there to be debatable results as well concerning existence. One case that clearly does not entail existence is the object of relations between individuals, such as *hate*, *fear*, etc. Clearly, if Billy fears ghosts, the existence of ghosts is not thereby sanctioned. The other major place we find individuals referred to without reference to stages of those individuals (in extensional contexts) is in subject position of 'generic' predicates. Here matters become considerably less clear. While such sentences as *Unicorns have horns* and *Santa Claus smokes a pipe* do not seem to imply the existence of either unicorns or of Santa Claus, other generic sentences do, as *Unicorns inhabit Greece* or *Santa Claus smokes my pipe* (not meaning the kind of pipe I own). So we see that there are factors beyond simple genericity of the predicate that affect whether or not we judge the sentence to entail existence of the subject.

In the treatment proposed here for generalized generic predicates, there is a meaning postulate which ensures that there is some realization of the subject on at least two occasions for which the predicate the G applied to holds. That is, generic sentence involving G ultimately entail the existence of the subject (if based on predicates that basically apply to stages). The intuition that this is supposed to mirror is that we generalize from instances of stages to generic predicates over individuals; if there are no stages, such generalization is not possible. This leaves us with a difficulty concerning such sentences as *Santa Claus smokes a pipe* or *Unicorns eat small shrubs*, which we may judge to be true. Whether or not these can be held to be true or false of THIS WORLD, though, is certainly open to debate, and will remain unresolved here.

Let us suppose for the moment that any sentence which does not make reference to a stage of some NP does not entail the existence of the referent of that NP. Given the system devised here, sentence (101) entails the existence of both the subject and direct object.

(101) Bill found Shirley.

The interpretation assigned would be (102), which makes the claim that there is a Bill-stage and a Shirley-stage.

(102) $\exists y^{s}\ \exists x^{s}[R(x,b)\ \&\ R(y,s)\ \&\ \mathit{find}^{+}(x,y)]$

Now consider sentence (103).

(103) Bill is trying to find some famous detective.

This sentence has the classic *de dicto-de re* ambiguity associated with it. The *de re* reading is represented as involving a wide scope introduction of the NP *some famous detective*, and may be paraphrased as *there is some famous detective that Bill is trying to find*. Though the issue is rather complicated, there appears to be a tendency to associate existence of the object NP with the *de re* reading. However, as matters turn out in the system suggested here, even the wide-scope interpretation of (103) will not entail existence of the object NP. This is because the existential claim concerning stages of that NP occurs within an intensional context, and thus says nothing about stages in the world in which (103) is true. This is illustrated in (105), which is an approximation of the interpretation assigned (104).

(105) $\exists x^{o}[\underline{famous\ detective}'(x)\ \&\ try^{+}(\hat{y}^{i}[\ \exists x^{s}[R(x^{s},x)\ \&\ \mathit{find}^{+}(y,x)]])(b)]$

But this is the desired result. (104) can be true even if Bill is try-

ing to find Sherlock Holmes, and no other famous detective. On the reading where this is the case, a *de dicto* reading is obviously not what is intended, so we must represent it in terms of a *de re* reading. What the wide scope interpretation of (104) represents is not the existence of some famous detective, but the specificity of the NP. I believe the reason that we tend to associate existence with wide-scope readings in cases such as (104) is that it is normally quite difficult to have something specific in mind that does not exist. For instance, a wide-scope reading of (106) would imply that there is some specific unicorn that Bill can pick out somehow that he is trying to find.

(106) Bill is trying to find a unicorn.

The most easily imagined circumstance under which there could be some specific unicorn that Bill is familiar with would be if there were some existent unicorn. But if Bill had read about Bob the Unicorn a great deal, and thought he lived in Canada, Bill's visiting Canada with the purpose of visiting Bob could be reported with (106), on a wide-scope reading of the object NP. So while we would wish to associate specificity with wide-scope readings of NP's that appear in intensional contexts (as well as other contexts in which there cannot be a logical reduction made to an existential claim about stages, as with negation and adverbs like *apparently*), it is doubtful that we would wish to associate existence in a given world with this reading.

4. Bare Plurals That Do Not Refer To Kinds

We have so far been concentrating our attention on NP's that make reference to kinds of things. However, there appears to be a rather enigmatic class of bare plural NP's which do not seem to denote kinds as we have imagined them. This class of bare plural NP's, so far as I konw, always is modified by a relative clause or a PP. A few examples are:

(107) a. parts of that machine

b. people in the next room

c. books that John lost yesterday

d. bears that are eating (*now*)

These sorts of NP's fail to behave like the sorts of bare plurals we have been examining in a number of crucial ways, in particular in ways that we have been using to test for whether or not an NP makes reference to a kind.

A. Kind-level predicates cannot be predicated of them.

*People in the next room are common/numerous/indigenous to Asia/widespread. (The behavior with *numerous* was noted in Kroch (1974) as well)

B. These NP's appear to allow opaque-transparent distinctions on an individual-by-individual basis in the appropriate contexts. The following appear to me to be ambiguous.

Bill believes that *people in the next room* are about to leave.

Betty is looking for *books she lost yesterday*.

C. These bare plural forms cannot have associated with them adverbs of quantification, nor similar readings with modals.

*People in the next room { *can* be intelligent / are *often* tall / are nice *when they* are born in the spring }

D. I also find that individual-level predicates cannot be applied to these forms with much success. For instance:

*Dogs in the next cage are intelligent/mammals/tall.

cf: Dogs in the next cage { are barking too loud. / are very hungry. / will soon be in the house. }

It is also noted that these bare plural NP's do not appear to conjoin with the kind-denoting bare plurals in a very convincing manner. There is something wrong with the following.

(108) ??People who mend shoes and people who are in the next room get along pretty well.

(note, however, the following is much better: People who mend shoes get along pretty well with people in the next room).

In spite of these differences, it still appears that these bare plurals may exhibit the property of differentiated scope, as the following seem to me to be quite acceptable.

(109) a. *Parts from the airplane* were everywhere.

b. Max discovered *pieces from that puzzle* for three hours.

c. Fred repeatedly destroyed *books that I lost yesterday*.

So except for this last set of data, the non-kind bare plural appears to pattern just like any NP quantified by existential *a* or *sm*.

What is it that induces a given bare plural NP to behave in one fashion or another? I do not believe it is the result of any grammatical FORM that we can attribute this distinction to as a necessary and sufficient condition, for we find pairs of NP's of the same form behaving quite differently.

(110) a.??Parts to this machine are quite common.

b. Keys to this door are quite common.

(111) a.??Dogs that are sitting here are rare.

b. Dogs that sit here are rare.

One of the key ingredients in the interpretation of the non-kind bare plural seems to be that the NP is taken as referring to a FINITE set of things, things that must exist at a certain time in a given world. Consider an NP like *dogs that are barking*. This has one reading, the most natural one, that is paraphrased roughly as *Dogs when they are barking* or *dogs if they are barking*, which denotes a kind of dog. For example, dogs that are barking can be often intelligent, can be widespread, etc. But there is another way of taking the NP (which is a bit less salient) which means *dogs that are, at this time, in the process of barking*. This latter NP picks out a finite set of dogs, a set of dogs that MUST exist in this world at the present time (or the time of utterance). If we try to keep this reading in mind, *Dogs that are barking are widespread* or *Dogs that are barking are often intelligent* are quite unacceptable utterances. On the first reading of *dogs that are barking* (= barking dogs), however, we find that it picks out any dog that is barking at ANY time (in any world), so that a given barking dog need not exist in a given world at a given time.

It is of interest that the former reading of the NP requires tense-agreement with the matrix clause in order for the kind-reading to come through. Notice that when we have a tense mismatch, a 'kind' reading is very difficult to obtain. When tenses match, the sentence remains ambiguous.

(112) a. Dogs that are barking are often intelligent.

b. Dogs that were barking were often intelligent.

c. *Dogs that are barking were often intelligent.

d. *Dogs that were barking are often intelligent.

So is it possible then to predict whether or not a given bare plural will denote a kind or simply a set on the basis of some aspect of the interpretation accorded the NP? Specifically, would it be possible to say that in all cases that any NP that only picks out a finite set of objects, all of which must exist at a given time, will not denote a kind? In this respect it is noted that all simple plural nouns, or a noun with any number of adjectives piled up before it appear to denote kinds. This is so even when we obtain unlikely combinations of adjectives that would pick out only a few individuals in the real world, as with *old ex-basketball players that drink ale* or *short-haired left-handed herniated bald sailors*.

I am going to suggest that there is possibly no necessary and sufficient set of GRAMMATICAL criteria that will serve to separate those bare plurals that denote kinds from those that denote only a set of objects. Rather what we are dealing with here in a conceptual scheme, one where we take a CN that denotes a set of individuals, and in some cases we can associate a kind with it, and in some cases we cannot. Let me illustrate the point with a couple of examples, the first of which was pointed out to me by Lisa Selkirk, and the second by Barbara Partee.

If we take an NP like *alligators in the next room*, it appears to fail all the relevant tests devised here for detecting reference to kinds. Now consider an NP that really is very much like this one, except the location suggested by the PP is a bit different, *alligators in the New York sewer system*. This NP, too, may appear offhand to fail all the tests for kinds, as *Alligators in the New York sewer system are often intelligent/common/numerous/etc.* seems at first sight a bit strange. But if we think of this NP a little differently, this sentence becomes entirely acceptable. Suppose that all the alligators in the New York sewer system were not those that just HAPPENED to be there at a given time, but constituted almost a race of alligators, those descended (say) from baby alligators originally bought by New Yorkers as pets and flushed down the toilets. So if we think of *in the New York sewer system* as defining the natural habitat of a set of alligators, we find a kind reading much easier to obtain, and *Alligators in the New York sewer system are often intelligent* becomes a perfectly natural, interpretable sentence. I do not know of any reason to think of these two possible ways of construing this NP as being associated with different syntactic structures, though it is certainly possible. It seems that it rather hinges on whether or not we take the New York sewer system as being just a place, or whether or not it is a natural habitat of some set of things, which constitute a kind due to their being defined by their habitat.

We also find pairs of sentences such as exemplified below, which appear to have all relevant syntactic and semantic structures in common, but the former appears to refer to a set, while the latter appears to refer to a kind.

(113) a. **Quarters that Bill gave to Bums yesterday* are common/ are often counterfeit/are widespread

(113) b. *Stamps that Monaco issued during the war* are common/ are often collector's items/are widespread.

So what is going on here?

I cannot answer this question in a wholly satisfactory manner, but I will make some observations that reflect a possible avenue of approach to this whole problem.

Consider a sentence like (114).

(114) *Figs that turn brown too early* are bitter-tasting.

Now I know virtually nothing about figs or their growing habits, but if someone were to utter this sentence to me, I would assume that there is some CAUSAL connection between a fig turning brown too early (if they ever turn brown at all) and a fig tasting bitter, and that the bitter taste is the result of its turning brown too early. We even find this same sort of 'causal' connection assumed in sentences that have no relative clauses.

(115) *Geese* migrate in the spring and in the fall.

This is not taken as a simple report about what a certain species does so much as it implies that there is some causal relationship between simply being a goose and migrating, as if 'gooseness' entails 'migrates.'

This seems very much in accord with a statement from Cocchiarella (1976), when he is attempting to illustrate what he means by a NATURAL KIND. He treats natural kinds as essential properties, and comments:

> These properties (= natural kinds:GNC), roughly speaking, are natural powers or capacities which things have to act, behave, function, etc., in certain specific determinate ways; and in this respect, they are the **causal structures** grounding the law-like behavior of things of that kind.
> (emphasis mine - GNC)

Cocchiarella takes a considerably narrower view of what might possibly constitute a natural kind, accepting among them species and genera of plants and animals, and substances such as gold, water, and oxygen, but leaving open to question "heterogeneous stuff, ...such as wood, or alloys,... sugary water, dirty water, mud or dirt, etc." I can only infer then that he would be exceedingly hesitant to call things like 'beat-up purple jalopies' a natural kind. In this work, I have made no attempt to distinguish between 'natural kinds' and another set of kinds of things that one might be tempted to call 'unnatural kinds'. This is because I know of no grammatical means of dividing NP's that denote kinds into two or more realms that would appear to shore up this intuition, with things such as lions and palm trees in one group, and dirty water or crushed shoe-laces in another. I believe that there is no grammatical distinction to be found because there is no distinction of this nature that exists.[8] Rather, all of the NP's that I have been claiming to refer to kinds satisfy Cocchiarella's informal characterization of natural kinds. That is, *dogs* as well as *old white houses that have been painted only once per decade* are both NP's that denote kinds which 'are causal structures grounding the law-like behavior of things'.

So in the light of these remarks, let us think about the case of the alligators in the New York sewer system. We note that if we are thinking of the sewer system as simply a location where some alligators happened to be, it is difficult to imagine that any long-lasting, predictable properties would follow for that group of alligators. But if we think of the sewer system as a natural habitat, what we are doing is somehow constructing a breed of alligators which has anticipated properties associated with it, and as a result with any future alligato in that location. This is exactly parallel to differentiating between Indian elephants and African elephants, and talking about one subspecies having larger ears than the other. There is something about being an elephant from India that CAUSES it to have smaller ears, and being an elephant from Africa gives it larger ears.

In some cases, it is very difficult to conceptualize a set as being involved in the causal structure of the universe, as with 'quarters that I gave to bums yesterday'. We cannot easily imagine any interesting set of properties that would follow for any given quarter that I gave to a bum yesterday. We find it considerably easier to imagine a set of interesting properties that would follow for a given stamp issued by Monaco during the war.

In some cases, we find that an NP, even though it denotes the property set of a kind, has predicated of it a property that we cannot easily fit in with our causal scheme of things. In (116), we witness a strange claim (I thank B. Partee for this particular example).

(116) Green bottles have narrow necks.

Even under a circumstance where most green bottles encountered in fact had narrow necks, (116) strikes one as strange. I believe that to make sense of (116) we must imagine some causal connection (or at least a satisfactory connection of some sort) between being a green bottle and having a narrow neck. Apparently, it is quite difficult to see any connection between something being a GREEN bottle, and having a narrow neck.

All this is, of course, extremely vague and in need of careful explication before it would be acceptable even as a hypothesis to be examined. Nonetheless, there seems to be something correct in pointing out that the dividing line between those bare plural NP's that denote

kinds, and those that do not seem to, can only be drawn at the CONCEPTUAL level, and not at the grammatical level, and that the notion of a kind is in some way bound up in the causal structures of the universe. We will not be attempting to grammatically represent bare plural NP's in two classes, but we will continue to treat all as denoting property sets of kinds. It should be borne in mind that this treatment may or may not be ultimately adequate as a treatment of all bare plural NP's.

5. Conclusions

In this chapter we have examined some selected issues raised by the fragment of chapter 4. We noted a few questions that were raised concerning the adequacy of the fragment, and we found that a number of them disappeared with the introduction of G operators into the semantics. We then exhibited some productive applications of G. In the next section we examined what significance we might attribute to stages and individuals in terms of existence, and made explicit some assumptions made in the presentation of the fragment. In the final section, a problem was raised for which no solution is forthcoming, but which served to uncover some interesting conceptual properties with respect to kinds of things that may ultimately be used to account for the fact that some bare plural NP's seemingly do not refer to kinds.

FOOTNOTES TO CHAPTER 5

[1]The only exception I know of, pointed out to me by T. Parsons, involves equative sentences.

i. Those dogs are my dogs.
ii.??Dogs are my dogs.

This involves a construction which is not particularly well-understood by me at this time. However, indefinites generally are bad here.

iii.??Some dogs are my dogs.

Thanks to Robin Cooper for this observation.

[2]I do not feel that the fact we must use *they* rather than a singular pronoun *it* to refer to the kind dogs has anything to do with the theory presented here. Note that if the referent of an object is a singular object, but its means of reference is customarily plural, one uses the pronoun 'they'. For example, only (ii) would be used to refer to scissors lying on the table if the speaker knows they are scissors.

i. *Hand *it* to me, please.
ii. Hand *them* to me please.

This no doubt involves pragmatics and grammar intertwined.

[3]Barbara Partee pointed out that sometimes we do find this relation obtaining, as in (i).

i. Mary examined *each apple* in turn. If *it* was rotten, she put it in the compost pile.

[4]A point that I believe is debatable. If Bill picked out the murderer, and the murderer is the auto thief, then I do not believe it follows that Bill picked out the auto thief (because if he was picking out the auto thief, he might have picked out someone else).

[5]If the treatment of the *a* generic proposed is correct, then (66b) would have to be ambiguous, as the *a* generic may also occur in the *by* phrase:

i. Dams are built by a beaver.

I find this completely acceptable as a paraphrase of (ii).

ii. A beaver builds dams.

(In (i) recall that the NP 'a beaver might also be in the intensional context created by G, which would be the esixtential *a* and not the

generic *a*. My intuition finds a reading corresponding to this possibility, though judgments tend to vary a great deal).

[6]I wish to thank Emmon Bach for drawing this to my attention.

[7]Naturally, we wish to hold that G and G' show up morphologically in other languages. Though an examination of other languages has not been undertaken here, it is our hypothesis that the aspectual particle that appears in gnomic sentences in such languages as Hopi, Chinese, and the Slavic languages is in fact a realization of G and G'.

[8]But see 6.1 in the following chapter for a construction which may prove this statement incorrect.

CHAPTER VI

NOMINAL STRUCTURES

0. Introduction

In chapter 2 it was noted that there is a relationship between NP's such as *dogs*, *this kind of animal*, and *this animal* on one reading. Here we will be introducing formal analyses of these two other sorts of NP's that refer to kinds of things in order to explicate their exact relationship to the bare plural construction.

Section 1 examines those NP's that are ambiguous between reference to kinds or objects, such as *some bird* or *this big device*. These are called 'simple CN's', and we will be proposing that there is a lexical rule that is responsible for the creation of kind-level nouns from corresponding object-level nouns.

Section 2 takes up those NP's that have an overt prenominal occurrence of the word *kind*, as in *this kind of mule*. In this section is proposed a condition on the interpretation of kind-level CN's which limits the number of kinds referred to when a quantifier is added to that CN. In that section, we explicate what it is that accounts for the strangeness of an NP such as *the kind of bird*, as opposed to *the kind of bird that I am talking about*.

The third section takes up the question of the English word *such* on the reading where it appears to be anaphorically related to some modificational structures of CN's. It will be proposed that the word *such* is to be analyzed as basically being a 'pro-kind' modifier, and that the notion of kind is crucial for a proper analysis of the semantics of this word. An analysis of *such-as* relatives is given, as well as the syntax of *such*.

1. Simple CN's

It was observed in Chapter 2 that many NP's are systematically ambiguous between object-readings and kind-readings. One example is *this animal*. I have observed more than once confusing exchanges between speaker and hearer, where the speaker may be intending to refer to some object, but the hearer takes *this animal* as meaning the kind of animal exemplified by the object in view. Even such attempts at disambiguation as *this particular animal here* or *the very animal we are now observing* sometimes fail due to this systematic ambiguity in the language. It was observed previously that this ambiguity is extremely pervasive, and that it may occur with most determiners or quantifiers in the NP.

In order to account for this particular sort of construction, we will be proposing that there is a lexical process which takes most (but not all) nouns, and turns them into nouns that may apply to kinds of things. This represents a slight change from Chapter 4 and builds on the modification presented in Chapter 5, where we will take nouns like *dog* to basically apply only to objects (instead of individuals, as in Chapter 4). Only derivatively can *dog* apply to kinds of things, then. Before we look at this lexical process, it would be beneficial to first discuss our notion of *kinds* a bit further.

We are taking kinds of things to be abstract individuals, the names of which are bare plural NP's (for at least a subset of these kinds). There will be at least as many of these individuals in our domain of individuals as there are bare plural NP's. Since our grammar will generate an unlimited number of such NP's (*dogs*; *dogs that bark*; *ugly dogs that bark or sleep*; ...), we will have a correspondingly unlimited number of kinds. Some of these kinds will be exemplified in the real world (*old shoes*), and others may not be (as *shoes with 60-mile long laces*), but these may be exemplified in other possible worlds. This is the case for objects as well, for we may posit and talk about objects that are not exemplified in the real world, such as Santa Claus and Sherlock Holmes, though presumably there is some possible world in which these characters appear.

Unlike objects, kinds are organized in a way so that all the realizations of one kind may turn out to be a subset of all the realizations of another. The most transparent examples are NP's with internal modificational structure. For example, in every possible state of affairs, all realizations of old dogs will also turn out to be realizations of dogs as well. The translation of the expression *old dogs* reflects this fact, and by a few simple rules of inference we can determine that if any object is a realization of old dogs it is old and a dog as well. If this state of affairs holds between two kinds -- where all realizations of one are also realizations of the other, but not vice-versa, we will call the latter the SUPERORDINATE kind, and the other the SUBORDINATE kind. Kinds then are at least partially hierarchically organized.

In many cases, we cannot determine simply from the grammatical FORM of an NP denoting a kind whether or not it is subordinate to or superordinate to another NP denoting a kind. For example, we cannot by rules of inference determine that *dogs* is subordinate to *mammals* (as we can with *mammals that bark*). We must have to know the meaning of the words involved in order to make this determination. When we reach this level, we are talking about kinds of things that correspond to nouns of the language that are entered in the lexicon (as *dogs* corresponds to the noun *dog*). We will represent the relationship between *dog* and *mammal* with a meaning postulate stating that necessarily all dogs are mammals.

Let us now return to the matter of the kind interpretation of an NP like *some animal*. We will first propose a lexical rule that is stated a bit strongly as a means of exhibiting what is actually necessary.

> Lexical Rule 1: If A is a noun, and A denotes a set of objects, then there is another noun, A', which is pronounced the same as A, except that A' denotes the set of all kinds whose realizations on the object-level are necessarily all in the set denoted by A. (If we are dealing with mass terms, we would have to further specify that A' is a count noun.)

This rule makes the claim that any noun of the language may be transformed into a noun that applies to kinds of things. However, this is not the case, for compare the examples in sentence (1) with those of sentence (2). The contexts that the NP's appear in force the interpretation for a natural reading of the sentence.

(1) a. This animal is extremely common.

b. Every mineral is in short supply.

c. Which plant is the most widespread?

d. Some whale is fast disappearing.

e. Three cars are made in five different countries.

(2) a. ?This mallard is extremely common.

b. ?Every gas-well is in short supply.

c. ?Which airport is the most widespread?

d. ?Which right whale is fast disappearing?

e. ?Three ball-bearings are made in five different countries.

In sentence (2), a natural kind-level interpretation of the subject NP is considerably more difficult. This cannot simply be because there are no KINDS of mallards, or kinds of airports, because the sentences of (3) appear to be quite natural.

(3) a. Some kinds of mallards eat only salmon.

b. This kind of airport is the worst kind to land at.

c. Which kind of gas-well are you talking about?

(3) d. One kind of right whale is a good pet.

e. You must have installed the wrong kind of ball-bearing.

I think what is going on here is that for the newly created N' to be able to apply to kinds is that there must be some N in the lexicon of the language which corresponds to a subordinate kind. Examples of lexically-entered nouns that correspond to subordinate cases of *animal*, as in (1a) would be *bear*, *dog*, *elephant*, and so on; for *mineral* we have *iron*, *bauxite*, etc.; for *plant* we find *tree*, *bush*, and so forth; for *whale* we have *sperm whale*, *right whale*, *blue whale*; for *car* we have *Ford*, *Chevy*, *Volvo*,.... Any number come readily to mind. But for *mallard* none comes to mind to me, even after a bit of thought; likewise for *gas-well*, *airport*, *right whale* or *ball-bearing*. The prediction, then, is that only nouns for which there are lexically-entered nouns that correspond to subordinate kinds may be operated on to form a new noun that applies to kinds. If someone were to know that there were kinds of ball-bearings or right whales for which there were corresponding lexically-entered nouns (as a car manufacturer or a zoologist might), no doubt the sentences (2d) and (2e) would improve in acceptability. Perhaps the reader knows of some. In this light, it is proposed that the lexicon of English has connected with it the following rule:

Lexical Rule 1': If A is a noun and the translation of A denotes a set of objects, then there is a noun A' such that the translation of A' denotes a set of kinds. Let B stand for the translation of A, and B' stand for the translation of A'. The set of kinds in B' is then constrained by the following conditions:

(i) $\forall x^{o} \forall y^{k} [B'(y^{k}) \in R(x^{o}, y^{k}) \rightarrow B(x^{o})]$

(ii) $\forall y^{k} [B'(y^{k}) \rightarrow \exists x^{o} [B(x^{o}) \in \cap R(x^{o}, y^{k})]]$

(iii) $\forall y^{k} B'(y^{k}) \rightarrow \exists S [\forall x^{o} [R(x^{o}, y^{k}) \leftrightarrow S(x^{o})]]$ where S is the translation of C where C is a member of B_{CN}.

We will represent the newly-created noun on the kind-level as being the original noun with a superscripted k. It is then of the type $\langle e^{k}, t \rangle$.

As this is perceived as being a lexical rule, making reference to other material in the lexicon, the standard rule format is not used here. What sort of formalism would be required in order to state lexical processes is currently an open question. In any event, rule 1' is sufficiently explicit to do the job intended. It will be amended somewhat in the fragment at the end of this chapter, reflecting developments in the next sections.

Perhaps the most controversial part of the claim made in rule 1' is that there be a lexically-entered noun that corresponds to each of

the kinds in the set denoted by the newly-created noun. In order for this claim to be at all accurate, a rather liberal view is taken here of what sorts of expressions should be counted as part of the lexicon. We do not wish to limit ourselves strictly to one-word expressions, as something like *this elephant* may refer to the African elephant, or to the Indian elephant. The claim that is made here is that the expressions *African elephant* and *Indian elephant* are thereby created as nouns in the lexicon. There is a sense in which this is not entirely implausible semantically, as these expressions are not precisely compositional. Indian elephants are not simply elephants that happen to be Indian, for not all need be from the Indian subcontinent. They are rather elephants of the species that has its origins (and characteristic habitat) in India, and that species is called the Indian elephant. Perhaps the claim that the subordinate kinds require lexical entries is not precisely what is meant. Lisa Selkirk has suggested that the distinction to be made is not so much that the subordinate kinds require dictionary entries, but that they instead require encyclopedia entries. For the moment, as I am uncertain as to how an encyclopedia would play a role in semantic theory, we will stay with the claim that a dictionary entry is required.

The presumption that rule 1' should be a lexical rule, and not a syntactic rule, deserves some comment, though a thorough defense of this position is not intended by the following remarks.

It does not appear that this process may take place at any higher levels in the syntax, as at the CN level. Let us suppose for the time being that there were a rule taking CN's that ranged over objects to CN's that ranged over kinds, and that this process could occur for any CN, complex or not. With this in mind, consider sentence (4).

(4) The Himalayan is *a (relatively) new cat* on the world scene.

The only possible interpretation for the NP *a new cat* here is 'a new KIND of cat', where the newness is judged relative to other kinds of cats. That is, (4) cannot be interpreted as meaning 'a kind of new cat', where the newness is judged on a cat-by-cat basis and is relative to other individual cats. But if there were a process that could take the CN that applied to objects of the form *new cat*, and make it into a kind-level expression, it would have to mean 'a kind of thing such that all its realizations are new cats'. I do not believe any such reading can be obtained, which would follow from having the process of creating nouns that range over kinds in the lexicon.

In addition, this same rule would have to be ultimately extended to cover cases of mass and abstract nouns, and the change in the composition of the noun from mass to count would be a kind of syntactic process I believe to have no parallel.

And finally, this process seems in general in keeping with the notion that processes present in the lexicon may only build up things out of other things in the lexicon. In this example we see that the new noun is derived only by reference to other nouns that are entered in the lexicon. As a kind like dogs that bark is not entered in the lexicon, but is only derived via syntactic processes, this sort of thing could not possibly be referred to by a lexical rule.

This, then, will account for the natural interpretations of sentences like those in (5). Below is an example of (5a).

(5) a. Some animal is often intelligent.

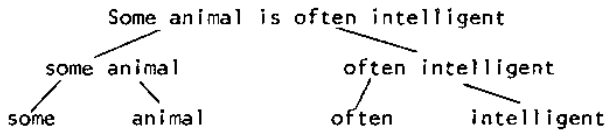
Translation of elements:

animal $\underline{animal}'$ (by lexical rule of type $\langle e^k, t\rangle$)

intelligent I'

some $\lambda Q \lambda P\, \exists x[{}^{\vee}Q(x) \,\&\, {}^{\vee}P(x)]$

often $\lambda Q \lambda x^k Many'(z^o)[R'(z^o, x^k) \,\&\, {}^{\vee}Q(z^o)]$



Translation:

$$\exists x^k[\underline{animal}'_k(x) \,\&\, Many'(z^o)[R(z,x) \,\&\, I(z)]]$$

In the following section, a few matters relevant to this section will be discussed, but they are perhaps better left for our discussion of NP's exhibiting overt occurrences of the word *kind*.

2. *Kind*

The paradigm example of an NP that refers to kinds of things is exemplified in (6).

(6) a. This NP refers to kinds of things.

b. What kind of person is he, anyway?

c. Several kinds of old guitars were strewn about the room.

d. The worst kind of headache to have is one that comes from watching too many late shows.

Unlike the simple CN's, this sort of NP may refer to any subordinate kind whatsoever, though it seems quite clear that certain conventions of usage dictate that the normal interpretation in most contexts presumes subordinate kinds that are lexically entered. In any event, the following all appear to be quite plausible.

(7) a. There are two $\left\{\begin{array}{l}\text{*people}\\ \text{kinds of people}\end{array}\right\}$ in the world: *those that give* and *those that take*.

b. *Small furry animals* are the best kind of pet.

c. My dealer tried to sell me another *car only driven by a little old lady once a week*. That kind of car is far rarer than my dealer imagines.

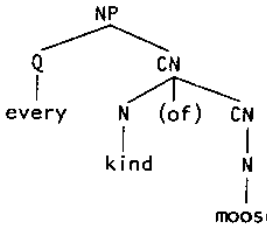
d. What kind of man is Steve? He's *a hard-working man*.

This sort of reference is possible because kind-NP's are not lexically derived, but are the result of a syntactic process. Hence, the subordinate kinds need not be lexically entered as well.

The syntax of the kind-NP construction appears to be not too far out of the ordinary. At least on the surface it looks as if the constituent that follows the word *kind* is a CN, and that the result of adding *kind* to the front results in another CN. So in this respect, *kind* behaves something like an adjective, though it seems to be a noun in that it may take plural morphology, and is separated from the head noun by *of*.

The following data appear to lead us to these conclusions. Let us assume the structure of an NP like *every kind of moose* to be of the following syntactic form.

Figure 1



Assuming this to be the sort of structure allows us to account for a number of properties such NP's possess. Since there are two CN nodes in this structure, it is possible to have a relative clause associated

with either one of them. Indeed, sentences such as (8) appear to be ambiguous in exactly the way predicted.

(8) There are several kinds of moose that eat kelp.

(8) may either be interpreted as meaning that there are among the mooses several kelp-eating kinds, or that there are among the moose that eat kelp several kinds.

Adjectives and other nominal modifiers may also appear either prior to *kind*, or prior to the nominal following *of*. This, too, is consistent with the sort of tree drawn above.

(9) I saw an unusual kind of old, ugly house yesterday.

It is noted that the adjectives that appear prior to the word *kind* are not to be directly associated with the word *kind*, but rather the whole CN *kind of moose*. Consider a sentence like (10).

(10) This is a recent kind of {moose. / rock. / dinosaur.}

Recency can only be judged relative to other kinds of things. A recent automobile may be perhaps the same age as an old newspaper. If *recent* were to just modify the word *kind* in here, the reading of the sentence would be 'this is a recent-for-a-kind moose'. But what recency in fact is determined by is not that it is recent for a kind (of anything), but rather recent for a kind of MOOSE. This would be reflected naturally by having the pre-kind modifiers associated with the whole following CN, and not just with the word *kind* itself.

By having the constituent following *of* be a CN and not a full NP, we account for the fact that that constituent can be neither questioned, relativized, nor pronominalized. Compare the sentences of (11) to those of (12).[1]

(11) a.??Those are the beans that Bob ate three kinds of ___.

b.??What did Bob see two kinds of?

c.??Bob saw three kinds of {them / it} yesterday.

(12) a. Those are the beans that Bob ate three pounds of ___.

b. What did Bob eat three pounds of ___?

c. Bob ate three pounds of {them / it} yesterday.

This leaves to be examined the possible interpolation of the indefinite article that is commonly heard.

(13) What kind of *a* man is Bill, anyhow?

I do not at this time know how to account for the optional presence of *a* in this construction; it is possible that the CN after *of* may be considered to be a predicate nominal, but since we are here treating predicate nominals as CN's this observation relies on a distinction not made here. It is doubtful that there is a determiner position in the post-*of* constituent, as a appears to be the only such element that may appear there. (But this could be a semantic fact, and not simply a syntactic one.)

(14) a. *Some kind of one man.

b. *This kind of several men.

c. *All kinds of all men.

etc.

We also find that the post-*of* constituent behaves like the head of the phrase in that it must agree in plurality with the Determiner or quantifier prior to *kind*.

(15) a. Several kinds of {man / *men}. (cf: One pound of {*bean / beans}.)

b. One kind of {man / *men}.

in some dialects, and according to Jespersen this was the standard case in early modern English, the word *kind* need not accept plurality though the post-*of* N must. Thus, one often hears *those kind of men*, but very rarely *those kinds of man* or *those kind of man*. The word *of* we will assume to be transformationally inserted as presented in Selkirk (1976), where *of* appears between nominal constituents (in this case it separates an N and CN).

With this syntax in mind, let us now take a look at the semantics of prenominal kind NP's. Most notably, these NP's are property sets of kinds of things, and not of objects.

(16) a. Some kind of animal is common.

b. This kind of whale is often intelligent.

c. Which kind of elm tree is fast disappearing?

We will thus treat the word *kind* as a function mapping CN's that range over objects to CN's that range over kinds such that all the kinds in

the derived CN are subordinate to the kind that corresponds to the CN operated on. Formally, *kind* receives the following translation.

(16) $\lambda Q \lambda x^{k}[[\forall z^{o} \Box[R'(z^{o},x^{k}) \rightarrow {}^{\vee}Q(z^{o})] \& [\sim\Box\sim \exists y^{o}$ $[{}^{\vee}Q(y^{o}) \& \sim R'(y^{o},x^{k})]]]$

Below is an example of how the CN *kind of mammal* would be interpreted. (We henceforth remove the second conjunct of the translation, which ensures that all the kinds in the set are subordinate.)

(17) $\lambda x^{k}[\forall z^{o} \Box[R'(z,x) \rightarrow \underline{\underline{\text{mammal}}}'(z)]]$

This is the set of entities from the domain of kinds such that for all objects, it is true that at all points of reference that if that object realizes that kind then it is a mammal. We now illustrate 'every kind of mammal is common'.

(18) $\forall y^{k}[[\forall z^{o} \Box[R'(z,y) \rightarrow \underline{\underline{\text{mammal}}}'(z)]] \rightarrow \underline{\text{common}}'(y)]$

This brings us to an interesting property of any CN that ranges over kinds of things. The predicate *kind of mammal* is true of many kinds of things -- elephants, pachyderms, mammals that eat hay, cows, sows, and small mammals. Now consider a sentence like the following.

(19) One kind of mammal is a cave-dweller.

We must first of all assume that the utterer of the sentence does not accept for an answer to this *Yes, I know, mammals that are cave-dwellers are cave-dwellers.* Though our semantics here would predict that the fact that mammals are cave-dwellers are cave-dwellers, there is a sense in which this is too obvious, and fails to dispense relevant information as such a conclusion may be derived from the form of the sentence itself. It would be something like saying *Bill, who is here, is here.* The suggestion, then, is that conversational maxims rule out a large number of possible interpretations of sentences like (19). A much more relevant response, though in the same vein, would be *Yes, I know, mammals that hunt only in the early evening and in the early morning are cave-dwellers.* Of course, the most natural response here would be to name a familiar species -- e.g. *bats* -- but as we see other possible responses are acceptable.

Suppose someone makes the claim of (20).

(20) Two kinds of dogs are in the next room.

Collies are a kind of dog, and watch-dogs are a kind of dog. Suppose Fido is in the next room and Fido is a Collie and a pretty fair watch-dog. Therefore, if Fido is in the next room, and no other dog is there,

(20) should be true. But this is counterintuitive, for if someone makes the claim of (20), it surely follows that at least two distinct dogs are in the next room if the claim is true. In fact, given that an unlimited number of kinds can be constructed which Fido realizes, (20) would then be true if the claim were that a thousand kinds of dogs were in the next room if we follow the treatment of *kind* initially proposed here.

I believe that the reason (20) implies that at least two distinct dogs are in the next room is that the kinds must be distinct from each other. We will define two kinds as distinct just in case they share no realizations. The most natural way of construing (20) is to suppose it is true if there is a collie and a beagle in the next room (for example), or if there is a lap-dog and a watch-dog in the next room. We choose kinds that are distinct from one another in assessing the truth of (20). (Perhaps this is the reason we are so often tempted to use the word *different*, as *in two different kinds of dogs are in the next room.*)

As a further illustration of this condition that the kinds in a case such as (20) must be distinct, note that (21) is very clearly a jibe at the quality of Ford automobiles.

(21) There are two kinds of cars in the world, cars that run right, and Fords.

The obvious implication is that the two kinds of cars mentioned must have as realizations two wholly disjoint sets of objects. Thus, no cars that run right are Fords, and no Fords are cars that run right. Likewise, if someone were to ask you to enumerate all the kinds of cars you could think of, the answer would not be *Fords, convertibles, road-racers, sedans, Chevrolets,....* One would instead list a series of disjoint kinds, in this case the most likely response would be to enumerate brand names, although other sets of responses (such as *passenger-cars, racers, taxis,...*) might be plausible. One will not 'mix' kinds, as would be the case with Chevrolets and sedans, for they share some realizations.

We will propose that there is a mechanism in the grammar that accounts for this set of facts, which we will now refer to as the disjunction condition. Intuitively, the disjunction condition makes sure that a CN that ranges over kinds of things will just range over a (contextually defined) subset of all the possible kinds that the CN is true of. All the kinds in this subset must be disjoint, and must collectively 'cover' all objects that realize any kind that the CN is true of.

Let us take a concrete example. Suppose we take an NP like *two kinds of dogs.* The disjunction condition will choose a subset of kinds from all the kinds of dogs that are disjoint, and every dog realizes some kind in this subset. So the quantifier *two* will range over a set

of kinds contextually defined. In this set, one will not find, at the same time, watch-dogs and collies, for they are not disjoint kinds. Nor will one find poodles and toy poodles. The other part of the condition, which makes sure that the subset of kinds are not only disjoint, but 'cover' all realizations collectively, will make sure that a sentence like (22) will be true in all cases where there is at least one dog in the next room.

(22) Some kind of dog is in the next room.

If we allowd the subset to be any subset of disjoint kinds, we might choose poodles and terriers to be our subset, and if the dog in the next room were a collie, we would me making the dubious claim that (22) is true on some readings, and false on others. (20), on the other hand, I believe IS true on some readings, and false on others. Suppose that two collies were in the next room, one being a watch-dog, and the other a seeing-eye dog. I make the statement that two kinds of dogs are in the next room to a passerby, who peeks in, notes that there are two collies, and disputes my claim. I explain that's not what I meant, but rather it is true if you think of watch-dogs, seeing-eye dogs, hunting dogs, etc.

As another example of this ambiguity, consider (23).

(23) Every kind of car is sold in the Soviet Union.

Now suppose Fords, Chevies, Porsches, etc. were sold there, but no convertibles. (23) might be true if we thought of the kinds as being brands of cars; it would be false if we thought of the kinds of cars along the dimension of body styles.

The formal statement of this disjunction condition cannot be stated as a meaning postulate, for then a meaning postulate would have the possible effect of taking a true sentence and somehow making it into a false one (as with one 'reading' of (20)). We must somehow, then, choose the subset in the actual interpretation assigned the sentence. There are two plausible places to do this -- in the translation of *kind* itself, or as an operation that takes place whenever a quantifier is added on. We will opt for the former case here, so that we may retain a single translation for the quantifiers and determiners.

The word *kind* is a function from sets of objects to sets of kinds. We are going to be adding the disjunction condition to this function, so that one arrives at a disjoined subset of all the possible kinds of the CN operated on. A free variable, S_o, which ranges over kinds is introduced into the translation as the set of kinds that the CN derived may denote. S_o may only contain kinds that are subordinate to the kind corresponding to the CN operated on, and the set of all possible realizations of the members collectively of S_o must be the same set as all possible members of the set of objects operated on. Let us illustrate with an example, the CN *kind of dog*.

$$\begin{aligned}(24)\quad &\lambda x^k[S_o(x^k) \,\&\, \forall z^o \exists y^k \Box[\underline{\text{Dog}}'(z^o) \leftrightarrow S_o(y^k) \,\&\, R'(z^o,y^k))] \\ &\&\, \sim\Box\sim\exists w^o[\underline{\text{Dog}}'(w^o) \,\&\, \sim R(w^o,x^k)] \,\&\, \\ &\sim\exists w^o \exists z^k \exists y^k[z^k \neq y^k \,\&\, S_o(y^k) \,\&\, S_o(z^k) \,\&\, \\ &R'(w^o,z^k) \,\&\, R'(w^o,y^k)]\end{aligned}$$

The first line says that the CN *kind of dog* is a function from kinds to truth-values, and that something is a dog if and only if it realizes some member of S_o, so the members of S_o are thus kinds of dogs. The second line ensures that all the kinds in S_o are subordinate kinds, eliminating the kind dog itself from the set denoted by S_o. The third and fourth lines state that no two kinds in S_o may share a realization, resulting in S_o being a set of distinct kinds. As this disjunction condition is rather lengthy, we will be abbreviating it as *Dis'*, and treat it as a relation that holds between the free variable S_o, and the CN operated on by the word *kind*. In abbreviated form, *kind of dog* would be symbolized as follows.

$$(25)\quad \lambda x^k[S_o(x^k) \,\&\, \underline{\text{Dis}}'(S_o)(\underline{\text{Dog}}')]$$

We will see another application of this condition shortly.

Another issue raised by this look at prenominal *kind* is that there are a few quantifiers/determiners which behave a bit strangely with respect to this construction. Most of these elements may occur as specifiers of this construction in all contexts.

(26) a. {Every / Any / Each / One / This / That / Some / ...} kind of mouse attacks cats.

b. {All / Many / Lots of / Several / Most / These / ...} kinds of mice attack cats.

All those listed in (26) appear to be quite natural to me. However, the following in (27) are strange in some way.

(27) a. ?*A* kind of mouse attacks cats.

b. ?*The* kind of mouse attacks cats.

In addition, it is not clear whether or not *sm* may occur here naturally.

(28) ?Sm kinds of mice attack cats.

We also find this same sort of distribution to hold with simple CN's as well. Neither (29a) nor (29b) are interpreted as meaning 'kind of mouse'.

(29) a. *A mouse is quite common.

b. The mouse is very quick. (wrong reading)

This prohibition against the articles is not total, however. *A* may appear naturally if it is in predicate nominal position. This is in accord with our treatment of predicate nominals, where *a* there is not to be identified semantically with the indefinite article.

(30) The shrew is not a kind of mouse.

And if an adjective or a relative clause modifies the noun, the sentences become quite acceptable.

(31) a. A kind of beaver *that lives in Siberia* is fast disappearing.

b. The kind of beaver *that I was speaking of* is now extinct.

This, too, holds with simple CN's. I find (32) entirely acceptable.

(32) a. A beaver that lives in Siberia is fast disappearing.

b. The beaver that I was just speaking of is now extinct.

I believe the case of the definite article has a rather straightforward sort of explanation. It does not seem at all plausible, as Jackendoff (to appear) points out, to think of this as a case that could be readily handled by positing a determiner source for the restrictive relative clause, and have the *kind* CN's subcategorized for a *Det S* sequence. Instead, this distribution falls out of the semantics of the definite article itself, in concert with the disjunction condition. We will treat the definite article as asserting the uniqueness of some entity. Let us first look at what would be the full translation of an NP such as *the kind of mouse*.

(33) *The kind of mouse*

the $\lambda Q \lambda P^{\vee} P(\iota x^{i}[^{\vee}Q(x^{i})])$

mouse $\underline{\text{mouse}}'$

kind $\lambda Q \lambda x^{k}[S_{o}(x^{k}) \ \& \ \underline{\text{Dis}}'(S_{o})(Q)(x^{k})]$

Full translation, with disjunction condition fully spelled out:

$$\lambda P^{\vee} P(x^{i}[S_{o}(x^{i}) \ \& \ [\forall z^{o} \exists y^{k}[\Box[\underline{\text{mouse}}'(z^{o}) \leftrightarrow S_{o}(y^{k}) \ \&$$
$$R(z^{o},y^{k})]] \ \& \ \sim\Box\sim \exists w^{o}[\underline{\text{mouse}}'(w^{o}) \ \& \ \sim R'(w^{o},x^{i})]$$
$$\& \sim \exists w^{o} \exists x^{k} \exists y^{k}[x^{k} \neq y^{k} \ \& \ S_{o}(y^{k}) \ \& \ S_{o}(x^{k}) \ \&$$
$$R'(w^{o},x^{k}) \ \& \ R'(w^{o},y^{k})])$$

This denotes the property set of that unique entity such that (a) that entity is a member of S_{o} (b) there are possibly some mice that do not realize that unique entity (c) S_{o} is a subset of all the possible kinds of mice (d) all members of S_{o} are disjoint kinds (e) necessarily, everything that realizes the kind mice also realizes a kind in S_{o} and vice versa. As matters turn out here, we have to choose a set S_{o} that has one member. Suppose we choose a set S with two members that fulfill the requirements. Then there would be no unique x^{i} member of S_{o}, as the only requirement is that S_{o} contain disjoined subordinate kinds. Given this interpretation, the only way to find a unique x^{i} in S_{o} is to let S_{o} be a one-member set. But if S_{o} is a one member set, all realizations of the member of S_{o} must necessarily be identical with the set of mice, and if something is a mouse, it must realize the member of S_{o}. Thus, the unique member of S_{o} would have to be the same as the kind mice itself. But this conflicts with the requirement that the kinds in S_{o} be subordinate kinds. Thus, we arrive at a contradiction, as the sole member of S_{o} must and must not be identical with the kind mice.

Let us contrast this result with what happens when we have a restrictive modifier present, as in (34).

(34) The kind of mouse that roars.

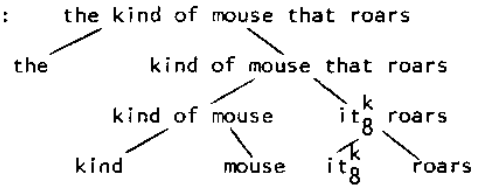
Note here that the relative clause must be interpreted as modifying the CN *kind of mouse*, and not just the CN *mouse*. If we illustrate with an adjective instead, the position of the adjective eliminates the ambiguity, and we find contrasts such as (35).

(35) a. The migratory kind of penguin.

b. *The kind of migratory penguin.

Below is illustrated the translation of (34) with respect to the syntax presented.

(36) Syntax:



Reduced translation:

$$\lambda P^{\vee}P(\iota x^{i}[[S_{o}(x^{i}) \;\&\; \underline{Dis}'(S_{o})(\underline{mouse}')(x^{i})] \;\&\; G(\hat{}\underline{roar}')(x^{i})])$$

Now the only requirement on what S_o may contain is that it be a set of subordinate kinds of mice that are disjoined, only one of which roars. Suppose we choose a disjoined set of kinds of mice, such as mice that roar and mice that don't roar. Every mouse is a realization of one or the other of these kinds, and these two kinds are subordinate to mice. In this set, there is a unique kind, mice that roar, which do characteristically roar.

We might instead choose another set of kinds of mice, which contains a single kind that roars. Suppose Pomeranian mice roared, and all other mice did not. So if there is a set S_o containing Pomeranian mice along with a number of other disjoint kinds that do not roar, the NP *the kind of mouse that roars* could denote it as well. While there may not be any unique kind of mouse that roars from among all the possible kinds, there may be a unique kind with respect to a given disjoint subset of those kinds. Thus, the kind of mouse that roars might have more than one possible denotation. This is in accord with our intuitions, I believe.

The restrictive modifier, then, allows us to pick out a unique subordinate kind from a set that we could not pick out in the absence of the restrictive modifier. If no restrictive modifier is present, we are forced to pick out a non-subordinate kind, which we are not allowed to do. We do not find the same sort of pattern with the remainder of the quantifiers and determiners as they do not require uniqueness of the kind.

A similar account cannot be given for the facts concerning the interaction between the indefinite article and restrictive modifiers, and I do not know what to say about it except to note the problem.

3. *Such*

3.0 Introductory remarks. The English word *such* represents an extremely interesting and recalcitrant phenomenon from both a historical and a synchronic point of view. This is due in part to the fact that it appears to participate in more than one sort of construction, and in part is due to the fact that the usage of this word appears to be in the process of change, leaving many 'fossils' behind that appear in present-day English.

Such in many cases is ambiguous between a meaning that speaks of quantity, and another that speaks of quality or of characteristics. A sentence of the following sort is clearly ambiguous.

(37) Such intelligent farmers should be treated with the utmost of respect.

One reading might be paraphrased by *farmers that are so intelligent...*, and it indicates something about the EXTENT of the farmers' intelligence. The other reading might be paraphrased as *intelligent farmers of that kind...*, and means that intelligent farmers with such-and-such characteristic(s) should be so treated. In this particular case, the readings appear to be distinguishable on the basis of stress. On the extent reading, the word *such* bears fairly low stress, and the stress contour appears to be 4-2-1; on the 'kind' reading, *such* bears secondary stress which is about equivalent to that of the adjective, and the contour appears to be about 2-2-1 (this is in the absence of any constrastive or focusing stress, of course).

Another means of distinguishing the extent reading of *such* from the 'kind' reading (we will, following Bolinger (1972), henceforth refer to this reading as the IDENTIFIER reading) is that the extent reading may govern a result clause introduced by the complementizer *that* from which no NP has been removed. The following is not ambiguous.

(38) Such intelligent farmers attended the convention that everyone was duly impressed.

The identifier reading, on the other hand, may govern a clause introduced by *as* from which an NP must be removed; also, *as* followed by a simple NP is another possible option.

(39) Such intelligent farmers as {Bill / we met ___ yesterday} are to be treated with respect.

(39) is no longer ambiguous between extent and identifier *such*.

Matters are not quite so simple, however, as in some cases the extent *such* may also govern an *as* clause. This is because the adjectival determiner *as* may govern an associated *as* clause, and, as dis-

cussed in Bresnan (1973), *so* may alternate with *as* in polarity contexts. Then, under certain conditions, *so* may be turned into *such* (the conditions will be discussed shortly). In effect, then, we find some cases of the word *such* derived from *as*, via *so*. We find paradigms of the sort in (40).

(40) a. Bill is not *as* smart a linguist *as we thought he was*.

b. Bill is not *so* smart a linguist *as we thought he was*.

c. Bill is not *such* a smart linguist *as we thought he was*.

If the conditioning factor *not* is removed, we find that *so* governing an *as* clause is no longer possible, and likewise for *such*. This pattern is to be anticipated if we derive *such* from an underlying *as* in this case.

(41) a. Bill is *as* smart a linguist *as we thought he was*.

b. *Bill is *so* smart a linguist *as we thought he was*.

c. *Bill is *such* a smart linguist *as we thought he was*.

When *such* appears before a CN bearing no adjective, it may remain ambiguous if the CN represents something of an epithet. A couple of examples mentioned by Bresnan serve to illustrate.

(42) a. Bill is such a fool.

b. Bill is sucn a next-door neighbor.

(42a) is ambiguous between the extent and identifier readings, while (42b) strongly favors only the identifier reading. This is because it seems one can be a fool to a certain extent, but one either is or is not a next-door neighbor, and there appears to be no extent involved in this case. This corresponds to the fact that *he is more of a fool than you* is not odd in a way that *he is more of a next-door neighbor than you* is.

The above is intended to illustrate the differences between the extent *such* and the identifier *such*. We will assume, following Bresnan (1973) that the extent *such* is derived from an underlying *so*; the identifier *such* will not be treated in this way (though Bresnan suggests perhaps we should) but it will be derived from a simple underlying *such*. It is only with this identifier use of the word that we will be concerned in the main from now on.

3.1 Syntax. Identifier *such* (henceforth simply 'such') in Modern English appears as part of an NP in the modificational system of head nouns. It appears that in earlier times *such* could easily be used as a substantive, requiring no necessary presence of a head noun.

At least in my dialect, however, the substantive use has all but disappeared. All of the following are quite strange.

(43) a. *Such should be treated with the utmost of respect.

b. *I've never given this to such before.

There are some examples cited in the literature, though, which may sound a bit archaic but seem very acceptable. (italics mine)

(44) a. "...to call for more facts and experiments, if *such* are possible." (Jespersen)

b. "They have been friends to us, and *such* we want to be to them." (Curme)

(45) a. "His love for Mary, if *such* it may be termed..."

b. "He took taxis, whenever any *such* were available." (Jespersen)

(46) "...for of *such* is the Kingdom of Heaven."

This substantive use of *such* also appears to have been capable of taking an associated *as* clause. (Examples are from Jespersen)

(47) a. "It is not fit for *such* as we to live with the rulers."

b. "What's a torn foot to *such* as me?"

c. "...laught at *such* as we."

It should be pointed out that there is another use of *such* which should be momentarily distinguished from the above, where it appears as a seeming pro-form for an NP meaning something like *that way*. This appears to be restricted to precopular position, and I am in serious doubt as to the productivity of this use of *such* in current speech.

(48) a. Such is life.

b. Such, then, were the conditions under which he took power. (Jespersen)

These uses of *such*, then, are excluded from this analysis.

Historically, it appears as if *such* is derived form a portmanteau of the word for *so* (or *as*) which was *swā*, and the morph for 'like', which was *līçe*, the Old English being *swelch* or *swilch*. In Gothic, the word for *such* is a transparent juxtaposition of these two elements. As *like* is perhaps best regarded as an adjective, and *so* an adjectival

determiner, we might then think of *such* as being a word that behaves as if it were a phrase comprehending an adjectival head with a determiner (which we will refer to as an Adjective Phrase (AP), as opposed to simple adjectives, though the simple adjectives as well might appear syntactically under the node AP). I believe that this hypothesis is borne out by an examination of the syntactic similarities between synchronic instances of AP's and the word *such*.

We regard as adjectival determiners, following Bresnan (1973) and Selkirk (1970), words like *so*, *too*, *as*, *how*, *this*, *that*, *enough*, and the comparative and superlative morphemes *-er* and *-est* (which in all cases show up as bound morphemes). Thus we find examples of the following sort.

(49) a. *Bigger* men (*er* + big men) than Steve are hard to find.

b. Henrietta is *so smart*.

c. Henrietta is {too / that / this / as} smart.

d. Bill is the *biggest* fool (*-est* + big fool)

e. *How smart* is Hank?

f. He is *smart enough* (*enough* + smart)

It is precisely this class of determiners that may also show up as determiners of the quantifiers as well (e.g. *too many*, *how much*, etc.)

One restriction that is placed on these AP's is that they must appear outside all other modifiers of the head noun, and can never occur on the 'inside'.

(50) a. He is an old enough boxer (for us to consider).

b. *He is a fat old enough boxer (for us to consider).

(51) a. He is a sicker fat boxer than I had remembered.

b. *He is a fat sicker boxer than I had remembered.

We find a similar restriction to be placed on *such*.[3]

(52) a. They are such {famous / glorious} victories.

b. *They are {glorious / famous} such victories.

And we find that *such* cannot appear in an NP that already contains another AP, just as we cannot 'stack' AP's.

(53) a. *They are quicker such rabbits.

b. *They are such quicker rabbits.

c. *They are fat enough sicker boxers.

d. *They are sicker fat enough boxers.

It is further noted that when *a* is the determiner of the NP, *such*, like some of the other AP's, must appear on the outside of it. We therefore find distinctions like:

(54) a. One such man/ *such one man

b. *A such man/ such a man

Likewise, we find that the AP's may appear in this pre-article position as well.

(55) a. Bill is {that tall / too big / so boring / as smart} a linguist.

b. How smart a linguist is Bill?

And finally, as has been noted, both *such* and the AP determiners may govern the presence of an associated clause (with the exceptions of *this*, *that* and *how*).

(56) a. Bill is *too* tall a player *for* us *to* have on the team.

b. Smarter men *than* we have see today do exist.

c. Bill is *as* nice *as* Julie is.

d. Harriet is small *enough for* Ozzie *to* hide her under the couch.

e. Hal is *so* cool that nothing bothers him except exams.

f. This is the biggest mistake *that* you have ever made.

g. *Such* people *as* we have seen today should be locked away.

This makes *such* appear to be very much like an AP, and so let us assume

that it is to be analyzed as an AP. We will now look a little closer at its distributional properties in order to obtain a clearer picture of how *such* fits into the overall system.

We will begin by positing a PS rule which generates only one AP per NP, on the 'outside' of all the other modifiers. While such a rule may be unnecessary in the long run (and multiple occurrences of AP's in a sentence being ruled out by some complexity factor), it will serve to ensure that only one AP per NP appears, and that it does not appear in the scope of other modifiers. We will consider the AP to be semantically like a simple adjective, and CN' to be semantically just like a CN. The Phrase Structure rules of relevance are then:

$$NP \rightarrow \left\{ \begin{matrix} (Det) \\ Q \end{matrix} \right\} CN'$$

$$CN' \rightarrow (AP)\ CN$$

We will consider *such* to be a basic expression of category AP for the time being. This rules out the possibility of having adverbial modifiers with *such* as may occur with other AP's.

(57) a. *almost* as smart/ **almost* such

b. *just a bit* too quick/ **just a bit* such

However, this lack of modification may follow from treating *such* as having (semantically) a part of its meaning *so*, which also rejects modification.

(58) a. *He is just a bit so tall (that everyone looks up to him)

b. *Marvin is nearly so well-trained.

The *so* that arises from *as* in polarity contexts is amenable to such modification, however.

(59) Bill isn't *nearly* so well-trained (as we first imagined).

One matter worthy of note concerning the distributional characteristics of *such* is illustrated in the following paradigm.

(60)

Many	such men	One such man
Several		Every such man
All		Any such man
Some		Each such man
Twenty		Some such man

Most	such men	*A such man/ such a man
Any		
...		

Apparently *such* may appear between any quantifier and any CN with the sole exception of the indefinite article *a*. In the case of *a*, the hole in the paradigm seems readily filled by the construction *such a...* , which is impossible with any other quantifier (**such all men*, etc.). We will therefore posit a rule of grammar which inverts the sequence *a such* to read *such a*.

Such a Inversion

X	a(n)	such	Y
1	2	3	4
1	3+2	∅	4

(which constituent is actually moved is not an issue I have investigated at this point). It should be pointed out that this rule has a certain amount of independent motivation in that it accounts for more than just the paradigm exhibited above. In some cases, extent *so* becomes *such*, and is inverted by this rule as well. It is proposed then that the derivation for an NP like *such a tall lion* on the extent reading would proceed as illustrated in (61).

(61) a. a so tall lion (underlying)

b. a such tall lion (*such* derived from *so*)

c. such a tall lion (*such a* inversion)

This leaves one problem to be accounted for. We must specify exactly when it is that *so* may be turned into *such*.

In Bresnan (1973) it is hypothesized that *so* → *such* applies just when *so* is followed by an NP, thus accounting for:

(62) a. such [intelligent men]

*so [intelligent men]$_{NP}$

b. such [an intelligent man]

*so [an intelligent man]

However, this is not the constituent structure I would care to assign to these, for both syntactic and semantic reasons, and so I here offer

another version of so → such. It is based on the observations exhibited in the following paradigm.

(63) a. He is so/*such intelligent

b. They are two *so/such intelligent men

c. So/*such intelligent a woman teaches at Dartmouth that...

d. He is such an intelligent worker (from: a so intelligent worker)

Such appears just when the extent *so* is followed by an adjective that is followed by a CN. Thus the rule:

So → Such/ ___ Adj CN

One will note that the definites are lacking in the paradigms presented. This is because they are unacceptable with *such*, for a reason that is unclear at this time.

(64) {*The, *These, *Those, *Carol's} such men

This is a fact that we will not attempt to deal with in our analysis. We will, however, assume that there is some mechanism that can account for (64) which is consistent with the syntax and semantics presented here.

In its ability to intervene between quantifier and CN, *such* is in a fairly small class among the AP's. This sort of erratic distribution is to be anticipated when one is dealing with an extremely small and limited class of words (Jackendoff (to appear) points this out repeatedly, and it has been illustrated to me by Barbara Partee with respect to the Engish modals). The sentences of (65) are acceptable, and those of (66) are not.

(65) a. many *such* lilacs

b. many *larger* ships/several *more intelligent* mules

c. three *big enough* horses

d. all such *(so) smart* birds

(66) a. *many too starry nights

b. *several as beautiful lilacs

c. *any {this, that} smart mule

(66) d. *one how smart mule

The difference between these two classes appears to be that those that are not acceptable have the adjectival determiner prior to the adjective, while those that are acceptable have the determiner element (a) absent in the case of *such* (b) encliticized onto the adjective or a quantifier in the case of the comparative -er (c) permuted around the adjective in the case of *enough*.

Selkirk (1976) has argued that we need a surface filter that rules out NP-medial AP's that begin with a determiner element. This rule might be written as follows:

At surface structure, rule out any sequence: Spec[$_{AP}$Det Adj]CN

As support for this filter, Selkirk notes that some determiners increase greatly in acceptability if there is a modifier preceding the determiner. She cites the following sorts of examples.

(67) a. Her *slightly too overdressed* admirer made his way across the room.

b. A *quite nearly as likely* answer was provided when Smith raised his hand and shouted 'George Washington, in 1492!'

Compare the above with (68), where the predeterminer modifiers are absent.

(68) a. *Her *too overdressed* lover made his way...

b.??An *as unlikely* answer was provided when ...

If indeed an AP were generated between the quantifier of the NP and CN, the filter would not rule out (67), but it would rule out (68). While the judgments here regarding (67) appear to vary a good deal from speaker to speaker (as observed by me on a wholly informal basis), I agree fairly well with Selkirk's judgments and will adopt her filter here as a part of the mechanism of the grammar. I do, however, wish to make one slight modification in how it is stated, and this concerns the case where there is a null determiner in the NP. We would also like to rule out sentences like the following.

(69) a. *They are too beautiful flowers.

b. *They are {that, this} pretty dancers.

c. *They are as clear days.

d. *How clear days were they?

Those sequences that appeared capable of appearing between Q and CN remain acceptable.

(70) a. They are prettier/more beautiful flowers.

b. They are pretty enough pictures.

c. They are such linguists (identifier reading)

The filter is then re-stated to accomodate the possibility of the null determiner: Mark as ungrammatical in surface structure any sequence of the form:

$$X_{CN}[_{AP}[\text{Det } X]\ CN]\ Y \qquad \text{(Selkirk's filter)}$$

In treating *such* as not being a determiner, this filter does not rule out cases of identifier *such* appearing between quantifier and CN.[5]

Such appears to differ from the other AP's in that it apparently cannot appear postnominally. All of (71) are quite acceptable, but those of (68) clearly are not.

(71) a. Every man {this / that / so / too / as / more} intelligent...

b. Every man intelligent enough

c. *Every man such

In this respect, *such* appears to pattern as a simple adjective, most of which cannot appear postnominally, **Every tall man*, etc. But the notion that we treat *such* as a simple adjective, rather than an AP, is not able to account for this lack of postnominal occurrence. There are cases where simple adjectives may appear NP-finally, when the head N has been incorporated into the determiner, as with *something*, *anyone*, *somebody*, etc. Here, too, *such* is also unacceptable.

(72) Someone {*famous* / *tall* / *obnoxious*} just walked into the room.

(73) *Someone *such* just walked into the room.

What is responsible for the inability of *such* to appear postnominally rather has to do with its semantics (as was pointed out to me by Barbara Partee). We begin with the preliminary observation that *such* (in Modern Engish) cannot appear in predicate position, though all the other AP's may.

(74) a. George is {tall enough / that smart / too crafty / etc.}

b. *George is such.

Instead, *such* may only appear in attributive position. In this respect, *such* patterns like a group of adjectives isolated in Siegel (1976) which are of syntactic category CN/CN. These may not appear either in predcate position or after *anyone*, *someone*, etc. A few examples are listed.

(75) a. The *main* reason

b. *Something *main*

c. *The reason is *main*.

(76) a. Several *crack* troops

b. *Somebody *crack*

c. *The troops are *crack*.

(77) a. A *prize* specimen

b. *Anything *prize*

c. *This specimen is *prize*.

Though many of this class may not take extent determiners, I find that some such as *prize* may. When these occur with an adjectival determiner, these may neither appear in predicate position nor in postnominal position. Another example is *rightful*.

(78) a. Several [more prize] specimens (than those)

b. ?Several prize enough specimens

(79) a. *Several specimens more prize

b. *Several specimens prize enough

(80) a. *Those butterflies are more prize.

b. *Those butterflies are prize enough.

(81) a. Two [more rightful] owners (than he)

b. Two rightful enough owners

(82) a. *Two owners more rightful.

b. *Two owners rightful enough.

(83) a. *Those owners are more rightful.

b. *Those owners are rightful enough.

What will be suggested here is that the case of the postnominal AP's is to be derived from reduced relative clauses, and thus from predicate position. Since *such*, like the sort of CN/CN adjectives exhibited here, cannot appear in predicate position, it cannot appear postnominally either.

This discussion should give the reader an idea how it is that *such* fits into the picture with respect to the syntax of AP's. Naturally, a good deal of syntax regarding AP's has been left untouched here, some of which may be readily gleaned from Bresnan (1973) and Selkirk (1970) and Selkirk (1976). In particular, the role of the quantifiers *much* and *many* has been totally ignored here, the rule of Enough-Permutation (Bresnan and Jackendoff (to appear)) has been left undiscussed, and there remain certain difficulties in a proper account of constructions surrounding the use of the indefinite article (such as *too mean a bridgeplayer*, or *any friendlier a doorman*). These problems will remain for the time being.

3.2 Semantics of *such*. At the level of preliminary observation, it appears that *such* functions in the semantics as a pro-modifier of CN's. (Postal (1969) has made the claim that *such* functions as a pro-relative clause). It does in fact appear to be able to 'stand in place of' virtually any sort of CN modifier, be it adjective, PP, relative clause, or participle.

(84) a. *Old* ladies.....*such* ladies

b. People *owning dogs* .....*such* people

c. Cats *without tails* .....*such* cats

d. People *who eat fish*.....*such* people

It appears that *such* can refer back to the italicized expression if it appears later in the discourse.

These examples may lead one to posit a simple replacement transformation, which has the effect of replacing an aforementioned modifier by the word *such*. However, there are a number of reasons for rejecting this sort of approach. One matter that must be contended with is that *such* appears to be able to refer back to discontinuous constituents (at least on the surface).

(85) a. *old* ladies *who mend shoes* ....*such* ladies should be paid more

b. *Handsome young* priests *with little or no talent*.... *such* priests should be required to attend church weekly

Even in underlying structure, it would not be easy to motivate a structure where the underlined constituents form a syntactic unit that could be replaced by *such* (much less a PRENOMINAL syntactic unit).

A second reason for rejecting a simple replacement transformation is that *such*, like the definite pronouns, does not require a linguistically realized antecedent. Pragmatic control is as possible with *such* as with *he*.

(86) (Professor to colleague upon encountering a student gnawing at the base of a lamp post:)

'Do you have many *such* students in your class, too?'

Third, it appears that *such* can stand for sequences of words that do not appear to be modifiers, such as whole NP's. The following cases are taken from Jespersen (1927).

(87) a. "*Honest money lenders?* There are no *such* people."

b. "...with *politicians*, *journalists*, and other *such* important personages."

And in (88) are a couple of other examples I have observed,

(88) a. *Rats*, *bats*, *mice* and most other *such* small animals...

b. Though *the wheel* and *the lever* were known to the ancient Babylonians, *such* devices were unknown to the inhabitants of the North American continent.

It is difficult in these cases to think of a straightforward replacement for *such* which has the form of a CN modifier. For these reasons, we will henceforth treat *such* in an interpretive fashion, much in the same way we would want to treat definite pronouns in discourse (see Cooper (1976)).

However we treat *such*, though, it appears that thinking of it simply as a pro-modifier misses the point, for it cannot stand for just any modifier of a CN. One class of modifiers that *such* cannot seem to stand for are those adjectives such as *alleged*, *future* and *false*, which fail to pick out a subset of the CN modified (that is, an *alleged* murderer is not necessarily a murderer, but a *spiteful* murderer is).

(89) a. *False* prophets.....??*such* prophets are to be avoided.

b. *Future* teachers.....??*such* teachers deserve more pay.

c. *Alleged* criminals....??*such* criminals are sad.

We note that this inability of *such* to refer back to these modifiers has nothing to do with the fact that these modifiers cannot be derived from relative clauses. None of the following can be derived from relatives, either, but *such* appears much more natural with them.

(90) a. *Tax* lawyers.....*such* lawyers are of benefit to few

b. *Veteran* salespersons.....few *such* salespersons are paid enough

c. *Corn-growing* farmers.....*Such* farmers should grow more hay

It is not the fact that modifiers like *tax* and *veteran* pick out subsets of the CN modified per se that qualifies them as possible antecedents for *such*, for the modifiers illustrated below also pick out subsets, but *such* cannot refer to them, either.

(91) a. People *in the next room*...??*such* people (are obnoxious)

b. Elephants *that are standing there*...??*such* elephants

c. Men *that Jan fired this morning*...??*such* men

This is the class of modifiers discussed in Chapter 5 that give rise to bare plurals that do not appear to refer to kinds of things. If we use an example of a locative PP that we noted COULD be interpreted as defining the natural habitat of a species, we find that *such* there becomes far more acceptable. Recall that (92) could be interpreted as referring to simply a set of alligators that happened to be in a certain place, or as a "race" of alligators in some way.

(92) Alligators in the New York sewer system.

If we refer back to this modifier with *such* we find that we do arrive at a felicitous interpretation if we regard the antecedent NP as referring to a kind of alligator, and not simply a group in a certain place.

(93) Alligators *in the New York sewer system*...*such* alligators survive by eating rodents and organic debris.

We also noted that there was a difference in interpretation between the NP's of (94), the former apparently referring to a kind of stamp, but the latter seems merely to refer to a certain set of quarters.

(94) a. Stamps that Monaco issued during the war

b. Quarters that I gave to bums yesterday

We find here, too, that a conversational continuation of *such quarters...* is considerably stranger than continuing *such stamps....*

What unifies this set of observations is that the modifiers apparently referred back to by *such* must be modifiers that delineate a KIND of the nominal modified. For example, the PP *in the next room* is not very easily construed as a modifier that picks out a KIND of person, nor is *false* in *false prophet* a modifier that picks out some KIND of prophet. This latter observation follows from the characterization of *kind of prophet* being a CN that denotes a set of kind-level individuals, necessarily all of whose realizations are prophets. But it is clearly untrue that false prophets are in all cases also prophets. This is in contrast to a modifier like *old*, where old ladies are necessarily also ladies, and may be referred to by using the expression *such ladies*.

Let us now propose a means of representing all these observations about the possible antecedents of *such* in terms of what sort of translation we might wish to give it. In order to do this, though, we must go about the business of repairing some assumptions we have been making about what *such* refers back to. One of our observations was that *such* may refer back to an NP itself, as in *Honest money-lenders? There are no such people.* Here, *such* is not referring back to just the modifier *honest*, but rather to the whole NP *honest money-lenders*. We note that all honest money-lenders are also people -- they are a kind of people.

It seems to be a valid generalization about *such* when it refers back to a whole NP that the NP referred to must be a sub-kind of the kind that corresponds to the CN *such* appears prior to. Thus:

(95) *mammals*.....*such* animals

**animals*.....*such* mammals (animals are not a kind of mammal)

dachsunds.....*such* dogs

**dogs*.....*such* dachshunds (dogs are not a kind of dachshund)

typewriters.....*such* inventions

**inventions*.....*such* typewriters (inventions are not a kind of typewriter)

This same sort of pattern holds when the antecedent NP contains a modifier as well.

(96) *vicious dachshunds.....such* dogs

*?*vicious dogs.....such* dachshunds

electric typewriters....such inventions

*?*electric inventions.....such* typewriters

The way we will be treating *such* here is as an anaphoric element that refers to a kind of thing in all cases. Thus, in referring to nice pets as *such pets*, we should italicize the whole NP, and not simply the adjective *nice*.

(97) *nice pets.....such* pets are sought after by many

And, to recapitulate another example, the italicization is better considered to be as follows.

(98) *handsome young priests with little or no talent....such* priests

The translation of *such* is an expression of category CN'/CN containing a free variable that ranges over kinds, with the qualification that the free-kind variable has to be interpreted as a kind subordinate to the one that corresponds to the CN that *such* modifies. With this sole qualification, the context of use (the assignment of values to variables) will assign any possible denotation to the free variable. The translation of *such* is proposed to be:

(99) $\lambda Q \lambda x^{o}[[\forall z^{o}\Box[R'(z^{o},x^{k}) \rightarrow {}^{\vee}Q(z^{o})] \,\&\, R'(x^{o},x^{k})] \,\&$

$\sim\Box\sim \exists y^{o}[{}^{\vee}Q(y^{o}) \,\&\, \sim R'(y^{o},x^{k})]]$

In this expression, Q is the variable that will receive the value of the CN *such* modifies, x^{k} is the free kind-level variable, and the whole CN derived by applying this to a CN is the set of objects that realize whatever kind is assigned to x^{k}, just as long as all objects that realize x^{k} are a subset of x whatever value is assigned to Q. (We henceforth drop the final conjunct ensuring the kind is subordinate).

Below is illustrated the CN *such bird*.

(100) $\lambda x^{o}[\forall z^{o}\Box[R'(z^{o},x^{k}) \rightarrow \underline{\underline{bird}}'(z^{o})] \,\&\, R'(x^{o},x^{k})]$

The translation (reduced) of *every such bird* would then be as follows.

(101) $\lambda P[\forall y[\forall z^{o}\Box[R'(z^{o},x^{k}) \rightarrow \underline{\underline{bird}}'(z^{o})] \,\&\, R(y,x^{k})] \rightarrow$

${}^{\vee}P(y)]$

The example below is the NP *such a bird* (from **a such bird)*

(102) $\lambda P \exists y[{}^{\vee}P(y) \,\&\, \forall z^{o}\Box[R'(z^{o},x^{k}) \rightarrow \underline{\underline{bird}}'(z^{o})] \,\&$

$R(y,x^{k})]$

In these examples and others, the value assigned to x^{k} might be ducks, baltimore orioles, birds that migrate only once a century, birds that eat meat, small birds, or carnivorous sparrows that live on mountaintops, and thus we can refer to each with the locution *such birds*. What could not possibly be assigned as a value of x^{k} is any kind that does not have all its realizations as birds. Thus, the kind fake eagles (as opposed to bald eagles) cannot be referred to as *such birds* since fake eagles can be made out of anything, and they are not necesarily even birds. Likewise for rubber ducks and toy pheasants.

We noted previously that the following relationship did not appear able to hold.

(103) *false prophets...??such* prophets are not popular

This is due to the fact that false prophets are not also prophets. But, as normally used, all false prophets are *people*. Indeed, the following appears to be entirely reasonable.

(104) *false prophets.....*the world would be better off without *such* people.

We will not ever obtain a reading of *such*, though, which may refer back to an NP that does not denote a kind, as with *people in the next room* or *parts to this machine*.

Although all the examples we have been considering have quite naturally specifiable linguistic antecedents, it is not at all necessary. We are allowing *such* to have any denotation at all, even ones that cannot be related directly to another expression of English. Let us reconsider example (44b).

(105) "...with politicians, journalists, and other *such* important personages."

It takes an act of imagination here to come up with some English expression for *such*, though upon encountering the sentence we have a pretty good feel for what is meant. That is the other persons that are of the same kind of important person as journalists and politicians, though the exact specification of this particular kind is left very much up in the air.

Another nice illustration of this property of *such* was pointed out to me by Robin Cooper. Consider (106).

(106) I met an old-style structural linguist the other day. *Such* people are becoming rarer in other academic fields as well, I'm told.

Here, *such* does not transparently have as an antecedent the kind old-style structural linguists, but rather refers to the kind of person that an old-style structural linguist is. Some may think of *such* as referring to those last few defenders of a theory that is correct but no one pays any attention to, or it can be interpreted in a more neutral or derogatory way. However, we must point out that the discourse of (106) is perfectly interpretable even though there is no straightforward English expression that this is related to. So we see that the anaphor of *such* is apparently assigned not on any linguistic basis, but instead on the basis of our knowledge of the world and our use of language in that world. There are some cases like the above that arise with respect to definite pronouns as well. Terry Parsons noted the example of (107).

(107) You take two wings, put them together on a broom-stick, and *it* will never fly.

In this case there is no straightforward linguistic antecedent for *it*, but in this context it is perfectly interpretable as having an antecedent 'mentioned' in the sentence.

In sum, the treatment of *such* as simply being a pro-modifier, though initially plausible, does not adequately capture the nature of the anaphoric reference of this word. If we instead think of *such* as being a pro-kind that modifies a CN, it appears that a good deal can be gained in terms of accounting for the behavior of this construction in English. Insofar as this analysis of *such* is correct, and insofar as it depends crucially on the distinction between kinds and objects made in this study, we see that the study of *such* grants further credence to the study of the role of kinds in the semantics of a natural language.

3.3 The *such as* relative. The *such-as* relative would have to be classified as being among those fairly obscure constructions of English which are little used in every-day speech. As a result, many of the intuitions surrounding this construction are uncertain. However, enough is clear that its analysis can be proposed here with a certain amount of confidence, though I have found cross-speaker intuitions to be somewhat varied. I therefore beg the reader's indulgence in tolerating some of the judgments made here.

There are two forms of the *such-as* relative that will be considered. In the first case, what follows *as* is of sentential form. This is illustrated below.

(108) Such women as *we met yesterday* are a credit to society.

In the other case, what follows *as* is simply an NP. In this respect the *such-as* relative is similar to the complements of comparatives and the other AP constructions, where the complement may consist of either simply an NP or something of sentential form.

(109) Such women as *Frieda* should be paid more handsomely.

We will first be concentrating our attention on the such-as relative that has as its complement something of sentential form.

Though this relative is given a good deal of attention in Jespersen and a lesser amount in Curme (1931), and is copiously illustrated in Ryden (1966), the only transformational grammarian to my knowledge that has looked at this construction is Bresnan (1975).

Syntactically, this relative requires the deletion of an NP just like a restrictive relative clause. Failure to delete an NP results in anomaly.

(110) a. Such people as we were talking to ___ are strange.

b. The people that we were talking to ___ are strange.

(111) a. *Such people as Bill ate some ice cream are strange.

b. *The people that Bill ate some ice cream are strange.

However, the *such-as* relative may delete elements in environments that the normal restrictive relative may not, such as the logical subject of there-inserted sentences or predicate nominals.

(112) a. Such women as there were ___ at the party ...

b. *Some woman that there was ___ at the party...

c. Such people as John believes those murderers are ___...

d. *People that John believes those murderers are___...

These NP locations are characteristic of indefinite NP's, and it appears that treating the deleted element of a restrictive relative as being a definite NP of some sort is the most desirable analysis (see Carlson (to appear) and references cited). But if this is so, we would not wish

to grant the underlying form of the deleted NP in the *such-as* relative a definite status, but rather treat it as an indefinite.

I believe that there is a certain amount of evidence that the deleted NP in the *such-as* relative is interpreted as being a kind-denoting expression. Let us look at the interpretation granted the relative in (113).

(113) Such emperors as ___ ruled Wallachia for 275 years...

Here, there is no claim being made about any particular emperor ruling Wallachia for this length of time, but it seems only that some KIND of emperor ruled. The relative in (114) has the same sort of semantic characteristics as (113).

(114) *This kind of emperor* ruled Wallachia for 275 years.

Oppose the interpretation of (113) to that of (115), a restrictive relative.

(115) Three emperors that ruled Wallachia for 275 years.

There are other examples of the deleted NP in the *such-as* relative behaving as if it had differentiated scope like the above.

(116) a. Such accidents as ___ occurred twice yesterday near the state line.

b. Such animals as ___ were everywhere I looked.

c. Such freighters as ___ were often sunk by the Germans.

Compare with the restrictive relatives of (117).

(117) a. Accidents that happened twice yesterday.

b. Animals that were everywhere I looked.

c. Freighters that were often sunk by the Germans.

In (116), it need not be the same accident that occured twice, not the same animal in every location, nor the same freighter that was often sunk. Rather, it seems that it must be the same KIND of accident occurring twice, the same KIND of animal everywhere, or the same KIND of freighter often sunk. This is not so in (117) which has only the former interpretation.

It is also noted that we can in the *such-as* relative obtain narrow scope readings for the deleted NP. In (118), it need not be the case that everyone bought the same cars, though it must be in (119).

(118) Such cars as everyone bought ___ yesterday are dangerous.

(119) Cars that everyone bought ___ yesterday are dangerous.

One would therefore anticipate that the kind-level predicates would be acceptable in the *such-as* relative. However, this does not appear to be borne out by the facts. The following are decidedly not wholly acceptable.

(120) a. ?Such animals as ___ are very common/rare/widespread.

b. ?Such reptiles as ___ are extinct.

c. ?Such tires as ___ are in short supply.

These facts, however, do not contradict the proposed analysis where the deleted NP denotes a kind, for there are some other oddities of the *such-as* relative from which the judgments of (120) follow. If the predicate of the sentence is one that ranges over individuals (has a 'generic' interpretation), the sentences are likewise strange. I find the sentences of (121) to be strange by comparison to those of (122), which contain only stage-level predicates.

(121) a. ?Such people as ___ are intelligent.

b. ?Such people as ___ find life exciting.

c. ?Such people as ___ go to track meets.

(122) a. Such people as ___ are running past the door.

b. Such people as ___ are asleep over there.

c. Such people as ___ are in Joan's latest class.

I believe that we can characterize these facts, in a loose fashion, by noting that the function of the *such-as* relative seems to be one of EXEMPLIFYING the kind, where a specific group can be picked out and pointed to. In the sentences of (122), we see that we can there infer that there is a specific group of individuals referred to in some way; this is not the case in (121), nor is it at all the case in (120).

I do not know how to state this sort of condition in the grammar, and I will assume it to be an extragrammatical process that accounts for this. This is somewhat bolstered by the fact that some cases of predicates that do not pick out particular groups do not sound too bad. Lisa Selkirk suggested the following example.

(123) Such people as ___ are inclined towards verbosity will not be considered for the position.

In (124) are a couple of other examples that have been noted in the literature.

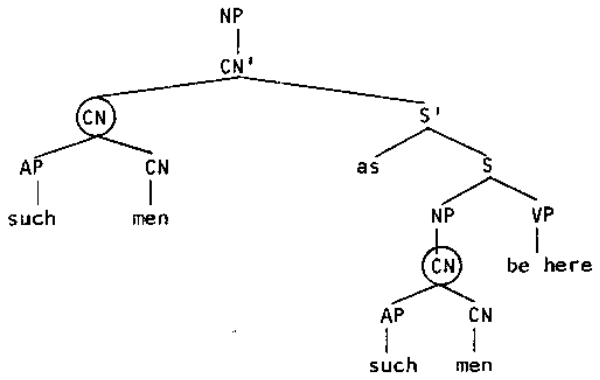
(124) a. (Curme) "Such pastimes as ___ are pleasant"

b. (Ryden) "...chose suche a personne as ___ is playne and honeste."

We will therefore assume that treating the deleted NP of the *such-as* relative will not also force us to accept the sentences of (120), their being ruled out by some process that also accounts for the oddness of (121).

In what follows we will be proposing a syntax and semantics for the *such-as* relative. The complexity of the translations and the matter of the power of the syntactic rules used here will not be of immediate concern; our aim is to posit a system that obtains the correct results. What we will be doing is to syntactically generate the *as* clause in postnominal position where it appears on the surface, rather than representing it as a constituent of the AP itself. We are not following up on suggestions made in Selkirk (1970) and Bresnan (1973) regarding the source of complements governed by a constituent of the AP (as with comparatives, equative *as* clauses, and so forth). In order to account for the properties observed of the deleted constituent in the *such-as* relative, it will be proposed that it consists of an NP of the form *such CN*. The proposed syntax, then, would assign the following underlying structure to an NP like *such men as are here.*

Figure 2



It is a requirement of the syntax that the circled CN nodes match, as these relatives do not appear to allow the process of Subdeletion (Bresnan, 1975) as we find in comparatives and similar constructions.

(125) *Such men as we were talking to ___ women (walked on the ship).

In order to accomplish the task of making the system work correctly, one minor modification is required concerning the translation and syntactic form of *such*. We will henceforth treat *such* as we would other pronouns, having a numerical subscript on the word that is identical to the numerical subscript on the free variable in its translation. The translation of $such_4$ will have in it a free variable of the form x_4^k, and likewise for $such_{131}$, $such_{99}$, and so on.

The *such-as* relative will be formed in one step, though it is a bit more complicated than the restrictive relative in the form of the rule required. What the syntactic rule will do is to concatenate a CN' that begins with *such* with a clause and adds the word *as*. The *as* clause must have an NP in it of the form *such CN* where this CN is identical to the CN of the head, and the embedded NP is then removed when the concatenation occurs. The syntactic rule would be the following.

S27. If $\alpha \in P_{CN}$, and α is of the form $[(\$)such_n[\beta]_{CN}]$, and if $\phi \in P_t$, then $F_{25,n,m}(\alpha,\phi) \in P_{CN'}$, where $F_{25,n,m}(\alpha,\phi) = [\alpha[as\ \phi']_t]_{CN'}$, where ϕ' is gotten from ϕ by removing the first occurrence of $[\$such_m[\beta]_{CN}]$ in ϕ.

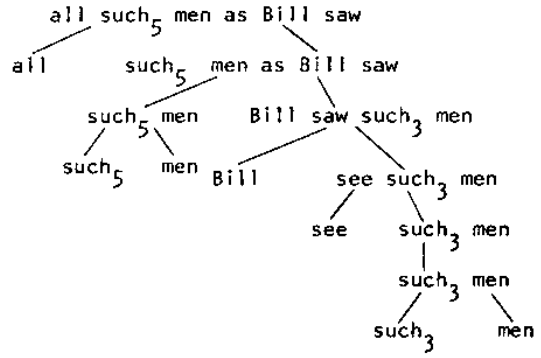
What this rule will do is take a CN' like *such men*, and a clause like *Bill saw such men* and derive a CN' of the form *such men as Bill saw.*

Semantically, $F_{25,n,m}$ gives us a derived phrase of type $\langle e^o, t\rangle$. It creates a predicate out of the *as*-clause which has as argument the free variable in the matrix occurrence of *such*. Formally,

T27. $F_{25,n,m}(\alpha,\phi)$ translates as $\lambda x_n^o[\alpha'(x^o)\ \&\ \lambda x_m^k\phi'(x_n^k)]$

Let us illustrate with a concrete example how the system works. The example illustrated is: *All such men as Bill saw.* The translation of *Bill saw* here is abbreviated as SB'.

Syntax:



Semantics:

Translation of head CN': *such$_5$ men*

$$\lambda x^{o}[\forall z^{o}\Box[R'(z^{o},x^{k}_{5}) \rightarrow \underline{man}'(z^{o})] \;\&\; R'(x^{o},x^{k}_{5})]$$

Approximate translation of *as*-clause: *(as) Bill saw such$_3$ men*:

$$SB(\iota y^{k}\,\Box\forall w^{o}[R'(w^{o},y^{k}) \leftrightarrow [\forall z^{o}\Box[R'(z^{o},x^{k}_{3}) \rightarrow \underline{man}'(z^{o})] \;\&\; R'(w^{o},x^{k}_{3})])$$

Translation of the expression resulting from rule $F_{25,5,3}$:

$$\lambda x^{o}[[\lambda y^{o}[\forall z^{o}\Box R'(z^{o},x^{k}_{5}) \rightarrow \underline{man}'(z^{o}) \;\&\; R'(y^{o},x^{k}_{5})](x^{o}) \;\&\; \lambda x^{k}_{3}[SB(\iota y^{k}\,\Box\forall w^{o}[R'(w^{o},y^{k}) \leftrightarrow \forall z^{o}\,\Box[R'(z^{o},x^{k}_{3}) \rightarrow \underline{man}'(z^{o}) \;\&\; R'(w^{o},x^{k}_{3})]])](x^{k}_{5})]$$

This can be boiled down a BIT further to:

$$\lambda x^{o}[[\forall z^{o}\Box R(z^{o},x^{k}_{5}) \rightarrow \underline{man}'(z^{o}) \;\&\; R'(x^{o},x^{k}_{5})] \;\&\; [SB\ (\iota y^{k}\,\Box\forall w^{o}[R'(w^{o},y^{k}) \leftrightarrow \forall z^{o}\Box R(z^{o},x^{k}_{5}) \rightarrow \underline{man}'(z^{o}) \;\&\; R'(w^{o},x^{k}_{5})])]]$$

Finally, the NP *All such men as Bill saw* has the following translation:

$$\lambda P\forall v^{o}[[\forall z^{o}\Box[R(z^{o};x^{k}_{5}) \rightarrow \underline{man}'(z^{o})] \;\&\; R'(v^{o},x^{k}_{5})] \;\&\; SB\ (\iota y^{k}\,\Box\forall w^{o}[R'(w^{o},y^{k}) \leftrightarrow \forall z^{o}\Box[[R(z^{o},x^{k}_{5}) \rightarrow \underline{man}'(z^{o})] \;\&\; R'(w^{o},x^{k}_{5})]] \rightarrow {}^{\vee}P(v^{o}])]$$

It would not be an understatement to note the complexity of the resulting formula, so we will in words here try to describe what the translation of the NP *all such men as Bill saw* says. The NP is of course a set of properties, in this case, properties of objects. It is the property set associated with any object that is a realization of a kind, represented by the free variable x^{k}_{5}. The context of use will assign a kind as the value of x^{k}_{5}, but subject to certain restrictions, which most of the rest of the formula is about. First of all, all object-level realizations of x^{k}_{5} must be men, and thus x^{k}_{5} must be some kind of man; but the possible interpretation of x^{k}_{5} is subject to yet another restriction. There is some kind of thing that Bill saw, y^{k}, and y^{k} has to denote a kind all of whose realizations are men (y^{k} too, is a kind of man) and anything that is a realization of y^{k} is also a realization of x^{k}_{5}, and vice versa. So, y^{k} and x^{k}_{5} are the same kind, since they have all the same realizations. And since Bill saw y^{k}, he also had to have seen x^{k}_{5}. So, x^{k}_{5} can only be assigned a value from the domain of kinds such that it is (a) some kind of man and (b) a kind of man that Bill saw. This seems intuitively very much in accord with what the NP *all such men as Bill saw* means.

The case where the complement to *such* is *as* followed by a simple NP will be handled in a slightly more straightforward manner. We will interpret an NP like *such men as Bill* as being men that are of the same KIND as Bill. The syntax and semantics are given below.

S28. If $\alpha \in P_{CN'}$ and α is of the form $[such_{n}\beta]$ and if $\delta \in P_{NP}$, then $F_{26,n}(\alpha,\delta) \in P_{CN'}$ where $F_{26,n}(\alpha,\delta) = [\alpha[as\ \delta]]_{CN'}$

Semantics: If α translates into α', δ into δ', then $F_{26,n}(\alpha,\delta)$ translates as $\lambda x^{o}[\alpha'(x^{o}) \;\&\; \lambda y^{k}\delta'(\hat{}\lambda z^{o}[R(z^{o},y^{k})])(x^{k})$

Example: all such$_4$ men as Bill:

(as) Bill: $\lambda P^{\vee}P(b)$

such men: as above

Translation: $\lambda P\forall w^{o}[[\forall z^{o}\Box[R'(z^{o},x^{k}_{4}) \rightarrow \underline{man}'(z^{o})] \;\&\; [R'(w^{o},x^{k}_{4})] \;\&\; R'(b,x^{k}_{4})] \rightarrow {}^{\vee}P(w^{o})]$

This is the set of properties associated with all objects that are realizations of x_4^k, x_4^k being some kind of man, and Bill being a realization of that kind.

Even in the case of this simple NP construction, it appears that the notion of exemplification is quite crucial for acceptability. We thus find the following array.

(126) Such men as { Bill / those men / my friends / ?several of my friends / ?all my friends / *some people / *lots of Africans / *everybody }

It seems the less easy it is to take the NP as picking out some particular person or set of persons that the speaker could have in mind as examples, the less acceptable the NP.

This will conclude the treatment proposed for *such-as* relatives here. A couple of the aspects of the syntax and semantics proposed above bear some comment, though. One of the characteristics of the *such-as* relative, along with all others that have a putative determiner source, is that they cannot 'stack' as can restrictive relatives in most dialects.

(127) a. Men who eat liver who rise early live long.

b. *Such women as are in this class as Bill talked to yesterday, are nice.

The syntax of the analysis offered here prevents this 'stacking' from occurring, as any attempt to tack on another *as*-relative would fail to meet the structural description of the rule that is responsible for putting together the clause and the CN' that begins with *such*.

Another aspect of this analysis is that it does not represent the clause as a constituent of the prenominal AP in underlying structure, thus preventing us from having to posit a local extraposition transformation that places prenominal clauses at the end of the NP. Of course it may yet be that a prenominal source for clauses of this type is to be required, and I know of no convincing arguments against the existence of such rules. But at least we here have a semantics which does not depend on a syntactic relation obtaining between just the word *such* and a clause introduced by *as*.

3.4 Closing observations and postnominal *such-as* relatives. The syntax and semantics above failed to account for the case of the postnominal *such-as* relative.

(128) Men such as Bill saw ___ yesterday should be avoided.

To my knowledge, every postnominal *such-as* relative can be paraphrased almost exactly by an NP that has the *such* appearing prenominally, and vice-versa. (129) means the same as (128).

(129) *Such* men *as* Bill saw ___ yesterday should be avoided.

The only exception to this I know of is that the postnominal *such-as* construction may also function as an appositive relative clause, which the prenominal *such* construction cannot.

(130) Lots of linguists, such as Bloomfield, Sapir, Whorf, and Daniel Jones, used to work late at night.

(131) *Such linguists, as Bloomfield, Sapir, Whorf, and Jones...

At the present time I do not know how to state the relationship between the prenominal and the post-nominal constructions. As observed earlier, *such* cannot appear postnominally alone, but if it appears with a complement it is acceptable.

(132) a. *Several men such.

b. Several men { such as Fred and Bill / such as we were just talking to... }

The postnominal *such-as* construction cannot be derived from a reduced relative clause as was posited for the appearances of other postnominal AP's.

(133) a. *Those men are such as we were talking to ___ yesterday.

b. *Several men who are such as we were talking to ___

c. Several men such as we were talking to ___ yesterday...

(134) a. *Three men who were such as Fred and Tom...

b. Three men such as Fred and Tom...

So there must be some other source for this construction beyond a simple case of relative clause reduction.

A good deal about *such* remains unresolved, both in terms of its syntax and its semantics. We have here focused on how it is that the

semantics of *such* requires reference to kinds of things, and we have shown a line of thought based on our analysis of the bare plural which can account for many of the semantic properties of this word.

FOOTNOTES TO CHAPTER 6

[1]However, many find the following entirely possible.

i. What did you buy three kinds of ___?

I agree with this judgment, but it is not accounted for here.

[2]This of course leaves us with the question of why it is that NP's like *the woman* are well-formed without a restrictive modifier. I am making the presumption that the definite article is subject to contextual limitation, and that *the woman* refers to that unique entity in the domain of discourse that is a woman. When reference is made to kinds of things, however, there is the requirement in the disjunction condition that whatever kinds are referred to collectively 'cover' the class denoted by the modified nominal. Even if there is a unique kind that can be isolated by the context, it will fail the criteria set forth by the disjunction condition. Thus, the conflict, and the anomaly of *the kind of ant*. This assumes that the disjunction condition is not applied to object-level NP's, which seems reasonable to me at first sight. But Edwin Williams points out that the disjunction condition should rule out the following sentence:

ii. There is only one kind of ant.

I take it that this means only one kind is in existence currently, and that (ii) does not eliminate the possibility of other kinds of ants emerging in the future, for example.

[3]The only exception to this ever encountered by me is the NP *future such events*, which I find clearly acceptable. The analysis proposed here does not account for this.

[4]Modern German, for example, lacks this rule, and the word corresponding to *such* may appear between the noun and the indefinite article.

[5]This leaves us in need of an account of why it is that the extent use of *such* is acceptable in bare plurals, but not when an overt determiner is present.

i. They are such big lions/*too big lions

ii. *Many such big lions/*many too big lions walked in (extent reading)

The only account I can imagine at this time, one which lacks current independent motivation, is that in place of a rule that inverts *such* and *a*, we admit the presence of a null determiner, and formulate the inversion rule so that it instead permutes *such* with *a* and ∅. Thus, *such big lions* on the extent reading would have the following derivation if this is correct.

iii. ∅ so big lions (underlying form)
∅ such big lions (*so* to *such*)
such ∅ big lions (*such*-∅ inversion)

The original statement of Selkirk's filter will rule out NP's like *too big lions* because it would then be of the form [∅ too big lions], as opposed to the form of *such big lions* as illustrated above. This is the only evidence I know of at this time the points towards the existence of a null determiner in English, though perhaps an alternative explanation might be found without using ∅.

APPENDIX TO CHAPTER VI

The Second Fragment

We will here present a syntax of a fragment of English, the rules for translating the English into the intensional logic, and a set of relevant meaning postulates. The syntax and interpretation of the intensional logic remain as presented in the appendix to Chapter 4, and are not reintroduced at this point.

Syntax of English

Let e and t be two fixed objects that are distinct from one another, and neither is an ordered pair or triple. The set of categories of English CAT is that smallest set such that (a) e and t are in that set (b) whenever A and B are in that set, A/B, A//B, A///B, A////B, and A/////B are in that set. The new syntactic categories CN' and IV' are of the same category semantically as CN and IV.

Basic Categories. The set of basic phrases of the categories of English B_A is defined as follows:

B_{CN} = {[dog]$_N$, [cat]$_N$, [man]$_N$, [woman]$_N$, [mammal]$_N$, [sailor]$_N$, [fish]$_N$, [house]$_N$}

B_{IV} = {[run]$_V$, [walk]$_V$, [sleep]$_V$, [bark]$_V$, [available]$_{Adj}$, [drunk]$_{Adj}$, [intelligent]$_{Adj}$, [widespread]$_{Adj}$, [common]$_{Adj}$, [popular]$_{Adj}$, [everywhere]$_{pp}$, [here]$_{pp}$}

$B_{T/CN'}$ = {an$_1$, the, \$[all]$_Q$, \$[many]$_Q$, [some]$_Q$, [every]$_Q$}

B_T = {[Bill]$_N$, [Mary]$_N$, [Rover]$_N$, [Amherst]$_N$, him$_n^\gamma$, \$them$_n^\gamma$}
(where n is a natural number, and $\gamma \in$ {o, k, in})

B_{TV} = {[see$_1$]$_V$, [hate]$_V$, [hit]$_V$, [find]$_V$, [fear]$_V$, [look for]$_V$ [in$_1$]$_P$, [near$_1$]$_P$}

$B_{TV/IV}$ = {[see$_2$]$_V$}

$B_{t/t}$ = {[necessarily]$_{Adv}$, [will$_1$]$_V$, not, [can$_1$], [do]$_V$, [do]$_V$}
+pres +pres +pres -pres

$B_{IV/IV} = \{[\text{slowly}]_{Adv}, [\text{rapidly}]_{Adv}\}$

$B_{IV/t} = \{[\text{believe}]_V, [\text{expect}_1]_V\}$

$B_{IV/INF} = \{[\text{try}]_V, [\text{expect}_2]_V\}$

$B_{IV'/IV} = \{[\text{be}_2]_V, [\underset{+pres}{\text{will}_2}]_V, [\underset{+pres}{\text{can}_2}]_V, [\underset{+pres}{\text{can}_3}]_V\}$

$B_{IV//IV} = \{\text{-ing}\}$

$B_{IV///IV} = \{[\text{be}_3]_V\}$

$B_{IV'/IV'} = \{[\text{often}]_{Adv}, [\text{always}]_{Adv}\}$

$B_{IV/IV\ /\ T} = \{[\text{in}_2]_P, [\text{near}_2]_P\}$

$B_A = \Lambda$ if A is not one of the categories listed above.

Syntax. By P_A is meant the set of phrases of CAT A. This set is defined as follows. Again, outermost brackets are omitted in the specifications of form, and parentheses around variables in these specifications of form indicate optional presence. At the end of the syntactic rules is a brief description of the function of each.

S1. $B_A \subseteq P_A$ for every category A; the proper brackets are assigned. Thus, if $\alpha \in B_A$, by this rule $[\alpha]_A \in P_A$.

S2. If $\alpha \in P_{CN}$ and α iotf $[\beta]_N$, then $F_1(\alpha) \in P_{CN}$, where $F_1(\alpha) = [\$\alpha]_{CN}$

S3. If $\alpha \in P_{CN}$, then $F_2(\alpha) \in P_{CN'}$ where $F_2(\alpha) = [\alpha]_{CN'}$

S4. If $\alpha \in P_{T/CN'}$ and α iotf $\$\beta$, and if $\delta \in P_{CN'}$ and δ iotf $\$\gamma$, then $F_3(\alpha,\delta) \in P_T$ where $F_3(\alpha,\delta) = [\$\alpha\delta]_T$; if α and δ are not of the form specified, then $F_3(\alpha,\delta) = [\alpha\delta]_T$

S5. If $\alpha \in P_{CN}$ and α iotf $\$\beta$, and if $\phi \in P_t$, then $F_{4,n,\gamma}(\alpha,\phi) \in P_{CN}$, where $F_{4,n,\gamma}(\alpha,\phi) = [\$\alpha[\text{that } \phi']_t]_{CN}$, where ϕ' is gotten from ϕ by removing the first occurrence of $\$\text{they}_n^\gamma$ or $\$\text{them}_n^\gamma$ and changing all subsequent occurrences to *they* or *them* respectively. If α is not of the form $\$\beta$, then $F_{4,n,\gamma}(\alpha,\phi) = [\alpha[\text{that } \phi']_t]_{CN}$, where ϕ' is gotten from ϕ by removing the first occurrence of he_n^γ or him_n^γ and changing all subsequent occurrences to *he* or *him* respectively.

S6. If $\alpha \in P_{CN'}$ and α iotf $\$\beta$, then $F_5(\alpha) \in P_T$, where $F_5(\alpha) = [\$\alpha]_T$

S7. If $\alpha \in P_{CN/CN}$ and $\beta \in P_{CN}$, then $F_6(\alpha,\beta) \in P_{CN}$, where $F_6(\alpha,\beta) = [\$\alpha\beta]_T$ if β iotf $\$\delta$, and $= [\alpha\beta]_T$ if β is not of the form $\$\delta$

S8. If $\alpha \in P_{CN'}$, then $F_7(\alpha) \in P_{IV}$, where $F_7(\alpha) = [\alpha]_{IV}$ if α iotf $\$\beta$, and $= [\text{an } \alpha]_{IV}$ if α is not of the form $\$\beta$

S9. If $\alpha \in P_{IV}$, then $F_8(\alpha) \in P_{IV'}$, where $F_8(\alpha) = [\alpha]_{IV'}$

S10. If $\alpha \in P_{IV/IV}$ and $\beta \in P_{IV}$ and β iotf $[\delta]_V(\gamma)$, then $F_9(\alpha,\beta) \in P_{IV}$, where $F_9(\alpha,\beta) = [\beta\alpha]_{IV}$

S11. If $\alpha \in P_{IV//IV}$ and $\beta \in P_{IV}$ and β iotf $[\delta]_V(\gamma)$, then $F_{10}(\alpha,\beta) \in P_{IV}$, where $F_{10}(\alpha,\beta) = [[[\delta]_V\alpha]_{Adj}(\gamma)]_{IV}$

S12. If $\alpha \in P_{IV///IV}$ and $\beta \in P_{IV}$, then $F_{11}(\alpha,\beta) \in P_{IV}$, where $F_{11}(\alpha,\beta) = [\alpha\beta]_{IV}$

S13. If $\alpha \in P_{IV'/IV}$ and $\beta \in P_{IV}$ and β is not of the form $[\delta]_V(\gamma)$, then $F_{12}(\alpha,\beta) \in P_{IV'}$, where $F_{12}(\alpha,\beta) = [\alpha\beta]_{IV'}$

S14. If $\alpha \in P_{IV'/IV'}$ and $\beta \in P_{IV'}$, then $F_{13}(\alpha,\beta) \in P_{IV'}$, where $F_{13}(\alpha,\beta) = [\alpha\beta]_{IV'}$

S15. If $\alpha \in P_{IV/t}$ and $\phi \in P_t$, then $F_{14}(\alpha,\phi) \in P_{IV}$, where $F_{14}(\alpha,\phi) = [\alpha\phi]_{IV}$

S16. If $\alpha \in P_{TV/IV}$ and $\beta \in P_{IV}$, then $F_{15}(\alpha,\beta) \in P_{TV}$, where $F_{15}(\alpha,\beta) = [\alpha\beta]_{TV}$

S17. If $\alpha \in P_{TV}$ and $\beta \in P_T$, then $F_{16}(\alpha,\beta) \in P_{IV}$, where $F_{16}(\alpha,\beta) = [\alpha\beta]_{IV}$ unless α iotf $[\delta]_V[\gamma]_{IV}$, then $F_{16}(\alpha,\beta) = [[\delta]_V\beta[\gamma]_{IV}]_{IV}$

S18. If $\phi \in P_t$ and ϕ iotf $[he_n]$ to $[\alpha]_{IV'}$, then $F_{17,n,\gamma}(\phi) \in P_{INF}$, where $F_{17,n,\gamma}(\phi) = [to[\alpha]_{IV'}]_{INF}$

S19. If $\alpha \in P_{IV/INF}$ and $\beta \in P_{INF}$, then $F_{14}(\alpha,\beta) \in P_{IV}$

S20. If $\alpha \in P_{IV/IV\ /\ T}$ and $\beta \in P_T$, then $F_{18}(\alpha,\beta) \in P_{IV/IV'}$ where $F_{18}(\alpha,\beta) = [\alpha\beta]_{IV/IV}$

S21. If $\alpha \in P_{IV}$ and α iotf $[\beta]_V(\delta)$, then $F_{19}(\alpha) \in P_{IV'}$, where $F_{19}(\alpha) = [\alpha]_{IV'}$

S22. If $\alpha \in P_{IV}$, then $F_{20}(\alpha) \in P_{IV'}$, where $F_{20}(\alpha) = [\alpha]_{IV'}$

S23. If $\alpha \in P_{IV}$ and α iotf $[\beta]_V(\delta)$, then $F_{21}(\alpha) \in P_{IV'}$, where $F_{21}(\alpha) = [\alpha]_{IV'}$

S24. If $\phi \in P_t$ and ϕ iotf $[he_n]_T$ to $[[\alpha]_{IV}]_{IV'}$, then $F_{22,n,\gamma}(\phi) \in P_{IV}$, where $F_{22,n,\gamma}(\phi) = [\alpha]_{IV}$

S25. If $\alpha \in P_{CN'/CN}$ and $\beta \in P_{CN}$, then $F_{23}(\alpha,\beta) \in P_{CN'}$, where $F_{23}(\alpha,\beta) = [\$\alpha\beta]$ if β iotf $\$\delta$, and $[\alpha\beta]_{CN'}$ if β is not of the form $\$\delta$

S26. If $\alpha \in P_{CN'}$ and α is not of the form $\$\beta$, then $F_{24}(\alpha) \in P_T$, where $F_{24}(\alpha) = [an_2\alpha]_T$

S27. If $\alpha \in P_{CN'}$ and α iotf ($)such$_n$[$\beta$]$_{CN}$, and if $\phi \in P_t$, then $F_{25,n,m}(\alpha,\phi) = [\alpha[as\ \phi']_t]_{CN'}$, where ϕ' is gotten from ϕ by removing the first occurrence of $[(\$)such_m\delta]_T$ in ϕ, where $\delta = [\beta]_{CN}$

S28. If $\alpha \in P_{CN'}$ and α iotf ($)such$_n$[$\beta$]$_{CN}$, and if $\delta \in P_T$, then $F_{26,n}(\alpha,\delta) \in P_{CN'}$, where $F_{26,n}(\alpha,\delta) = [\alpha[as\ \delta]]_{CN'}$

S29. If $\alpha \in P_T$ and $\beta \in P_{IV'}$, then $F_{27}(\alpha,\beta) \in P_t$, where $F_{27}(\alpha,\beta) = [\alpha\ to\ \beta]_t$ unless β is not of the form $([\delta]_{Adv})[[\gamma]_V(n)]$, in which case $F_{27}(\alpha,\beta) = [\alpha to[[be_1]_V\beta]_{IV'}]_t$

S30. If $\alpha \in P_{t/t}$ and α iotf $[\beta]_V$, and if $\phi \in P_t$ and ϕ iotf δ to γ, then $F_{28}(\alpha,\phi) \in P_t$, where $F_{28}(\alpha,\phi) = [\delta\ \alpha\ \gamma]_t$; if α is not of the form $[\beta]_V$, then ϕ need not be of the form specified, and $F_{28}(\alpha,\phi) = [\alpha\phi]_t$

S31. If $\phi, \psi \in P_t$, then $F_{29}(\phi,\psi) \in P_t$, where $F_{29}(\phi,\psi) = [\phi\ and\ \psi]_t$

S32. If $\alpha, \beta \in P_{IV'}$, then $F_{30}(\alpha,\beta) \in P_{IV'}$, where $F_{30}(\alpha,\beta) = [\alpha\ and\ \beta]_{IV'}$

S33. If $\alpha, \beta \in P_T$, then $F_{31}(\alpha,\beta) \in P_T$, where $F_{31}(\alpha,\beta) = [\$\alpha\ and\ \beta]_T$

S34. If $\phi, \psi \in P_t$, then $F_{32}(\phi,\psi) \in P_t$, where $F_{32}(\phi,\psi) = [\phi\ or\ \psi]_t$

S35. If $\alpha, \beta \in P_{IV'}$, then $F_{33}(\alpha,\beta) \in P_{IV'}$, where $F_{33}(\alpha,\beta) = [\alpha\ or\ \beta]_{IV'}$

S36. If $\alpha, \beta \in P_T$, then $F_{34}(\alpha,\beta) \in P_T$, where $F_{34}(\alpha,\beta) = [\alpha\ or\ \beta]$

S37. If $\alpha \in P_T$ and α is not of the form him_n^γ, $\$them_n^\gamma$, or $an_2\beta$ and if $\phi \in P_t$, then $F_{35,n,\gamma}(\alpha,\phi) \in P_t$, where $F_{35,n,\gamma}(\alpha,\phi) = \phi'$, where ϕ' is gotten from $\phi(a)$ if α iotf $\$\beta$, by removing the first occurrence of $\$they_n^\gamma$ or $\$them_n^\gamma$ and replacing it with α, and

changing all subsequent occurrences to *they* or *them* respectively, (b) if α is not of the form \$$\beta$, by removing the first occurrence of him_n^γ or he_n^γ in ϕ and replacing it with α, and changing all subsequent occurrences to *him* or *he*, respectively.

S38. If $\phi \in P_t$ and ϕ iotf $[\alpha]_T$ to $[(\beta)[[\delta]_V[\begin{Bmatrix} him_n^\gamma \\ \$them_n^\gamma \end{Bmatrix}]_T(\gamma)_{IV}]$,

then $F_{36}(\phi) \in P_t$ where $F_{36}(\phi) = [[\begin{matrix} him_n \\ \$them_n \end{matrix}]_T$ to $[(\beta)[[\delta]_V en]_{Adj}(\gamma)]_{IV}[by[\alpha]_T]]_{IV'}]_t$

To serve as an aid to the reader, the following characterize the effect of each rule in turn.

S1. Basic category rule

S2. Attachment of plurality, no semantic effect

S3. Automatically takes any CN to CN', no semantic effect

S4. Introduction of quantifiers

S5. Relative clause rule

S6. Bare plural rule

S7. CN/CN adjectives, and the word *kind*

S8. Introduction of predicate nominals

S9. Automatically takes any IV to an IV', no semantic effect

S10. Introduction of VP adverbs

S11. Progressive aspect

S12. Active *be*, be_3

S13. Introduction of be_2

S14. Adverbs of quantification

S15. Verbs taking sentential complements

S16. Introduction of see_2 (as in *see them drunk*)

S17. Verb-object rule

S18. Creation of infinitives

S19. Verbs taking infinitival complements

S20. Preposition-object rule

S21. Introduction of G

S22. Introduction of G'

S23. Semantic effect of be_2 for verbal IV phrases

S24. Derived VP rule

S25. Introduction of *such*

S26. Indefinite singular generic *a* rule

S27. Creation of *such-as* relatives

S28. Creation of *such-as* nominals

S29. Subject-predicate rule

S30. Introduction of tense, modals, sentence adverbs

S31. Sentence conjunction

S32. VP conjunction

S33. NP conjunction

S34. Sentence disjunction

S35. VP disjunction

S36. NP disjunction

S37. Quantifying in (at sentence level only here, the derived VP rule makes IV scope quantification unnecessary)

S38. Passive rule

Transformations

All transformations, with the exception of There-Insertion, are obligatory. All apply on the t (S) cycles.

MODAL RAISING

X	to	[Y	[V ±pres	Z]]	W
1	2	3	4	5	6
1	4	3	Ø	5	6

SUBJECT CASE MARKING

X	$\begin{Bmatrix} \$them_n \\ him_n \end{Bmatrix}$	V ±pres	Y
1	2	3	4
1	$\begin{Bmatrix} \$they_n \\ he_n \end{Bmatrix}$	3	4

SUBJECT-VERB AGREEMENT

X	$[\$ Y]_T$	$\begin{bmatrix} V \\ \pm pres \end{bmatrix}$	Z
1	2	3	4
1	2	$\begin{bmatrix} 3 \\ +plu \end{bmatrix}$	4

NEGATIVE PLACEMENT

not	T	[V, ±pres]	Y
1	2	3	4
Ø	2	3+2	4

AFFIX-HOPPING

X	[do]$_V$ αpres (+plu)	(Adv)	V	Y
1	2	3	4	5
1	Ø	3	[4, αpres, (+plu)]	5

OF INSERTION

X	[N	CN]$_{CN}$	Y
1	2	3	4
1	2+*of*	3	4

SUCH-AN INVERSION

X	an	such	Y
1	2	3	4
1	3+2	Ø	4

ADJECTIVE SHIFT

X	CN	[that	to	[{be$_1$, be$_2$}]$_V$	Adj]	Y
1	2	3	4	5	6	7
1	6+2	Ø	Ø	Ø	Ø	7

THERE INSERTION

X	T	to	[be$_2$]$_V$	Y
1	2	3	4	5
1	[there]$_T$	3	4+2	5

CDN: $2 \neq he_n^Y$ or $\$they_n^Y$

RAISING

X	{expect, believe}	[T	to	IV']	Y
1	2	3	4	5	6
1	2+3	Ø	4	5	6

Surface Structure Operations

(a) Mark as ungrammatical any sentence containing the structure $[T \text{ to } X]_t$, or the structure $[\text{that}[\text{to } X]_t]_t$

(b) Replace all elements bearing features with the appropriate forms.

(c) Replace all nouns occurring in the structure $[\$[N]_{CN}]_{CN}$ with the plural form of that noun, and erase all instances of $.

(d) Erase all remaining subscripts and superscripts on pronouns.

Translation

We use a mapping f from the categories of Engish to the types of intensional logic. f is a function with CAT as its domain such that:

$f(t) = t$

$f(IV) = f(IV') = f(CN) = f(CN') = \langle e,t\rangle$

Whenever A, B ε CAT, then $f(A/B) = \ldots = f(A/////B) = \langle\langle s, f(B)\rangle, f(A)\rangle$

Let c be a mapping from the members of B_A to the categories of the sorted intensional logic. If a ε B_A, A ε CAT, then c(a) ε $Cat_{f(A)}$ in the sorted logic. It assigns the categories as follows:

1. $c(man) = c(woman) = c(dog) = c(cat) = c(mammal) = c(sailor) = c(fish) = c(house) = c(intelligent) = \langle e^o, t\rangle$
2. $c(run) = c(walk) = c(bark) = c(sleep) = c(drunk) = c(available) = c(here) = \langle e^s, t\rangle$
3. $c(everywhere) = c(popular) = \langle e^i, t\rangle$
4. $c(common) = c(widespread) = \langle e^k, t\rangle$
5. $c(an_1) = c(the) = c(all) = c(every) = c(many) = c(all) = \langle\langle s, \langle e^i, t\rangle\rangle, \langle\langle s, \langle e^i, t\rangle\rangle, t\rangle\rangle$

6. $c(\text{Bill}) = c(\text{Mary}) = c(\text{Rover}) = c(\text{Amherst}) = \langle\langle s, \langle e^o, t\rangle\rangle, t\rangle$

7. $c(\text{him}_n^\gamma) = c(\$\text{them}_n^\gamma) = \langle\langle s, \langle e^\gamma, t\rangle\rangle, t\rangle$

8. $c(\text{see}_1) = c(\text{hit}) = c(\text{find}) = c(\text{look for}) = c(\text{in}_1) = c(\text{near}_1) = \langle\langle s,\langle\langle s,\langle e^i, t\rangle\rangle, t\rangle\rangle\langle e^s, t\rangle\rangle$

9. $c(\text{fear}) = c(\text{hate}) = \langle\langle s,\langle\langle s,\langle e^i, t\rangle\rangle, t\rangle\rangle\langle e^o, t\rangle\rangle$

10. $c(\text{see}_2) = \langle\langle s,\langle e^s, t\rangle\rangle,\langle\langle s,\langle s,\langle e^i, t\rangle\rangle, t\rangle,\langle e^s, t\rangle\rangle\rangle$

11. $c(\text{will}_1) = c(\text{can}_1) = c(\text{not}) = c(\text{necessarily}) = c(\text{do}_{+\text{pres}}) = c(\text{do}_{-\text{pres}}) = \langle\langle s, t\rangle, t\rangle$

12. $c(\text{slowly}) = c(\text{rapidly}) = c(\text{-ing}) = \langle\langle s,\langle e^s, t\rangle\rangle,\langle e^s, t\rangle\rangle$

13. $c(\text{believe}) = \langle\langle s, t\rangle, \langle e^o, t\rangle\rangle$

14. $c(\text{expect}_1) = \langle\langle s, t\rangle,\langle e^s, t\rangle\rangle$

15. $c(\text{try}) = c(\text{expect}_2) = \langle\langle s, \langle e^i, t\rangle\rangle,\langle e^s, t\rangle\rangle$

16. $c(\text{be}_2) = \langle\langle s, \langle e^s, t\rangle\rangle,\langle e^i, t\rangle\rangle$

17. $c(\text{can}_2) = c(\text{will}_2) = \langle\langle s,\langle e^s, t\rangle\rangle,\langle e^o, t\rangle\rangle$

18. $c(\text{often}) = c(\text{always}) = c(\text{can}_3) = c(\text{kind}) = \langle\langle s,\langle e^o, t\rangle\rangle,\langle e^k, t\rangle\rangle$

19. $c(\text{good}) = c(\text{beautiful}) = \langle\langle s, \langle e^i, t\rangle\rangle,\langle e^i, t\rangle\rangle$

20. $c(\text{such}) = \langle\langle s, \langle e^o, t\rangle\rangle,\langle e^o, t\rangle\rangle$

21. $c(\text{in}_2) = c(\text{near}_2) = \langle\langle s,\langle\langle s,\langle e^i, t\rangle\rangle, t\rangle\rangle,\langle\langle s,\langle e^s, t\rangle\rangle,\langle e^s, t\rangle\rangle\rangle$

22. $c(\text{be}_3) = \langle\langle s,\langle e^o, t\rangle\rangle, \langle e^s, t\rangle\rangle$

The actual translations are carried out by a biunique function g from B_A to expressions of the intensional logic. Most lexical items translate as complex expressions. We presume a stock of constants of the logic, among them being the following, their STypes also being given. m, b, r, a are distinct constants of type e^o.

Place' is of type $\langle e^o, t\rangle$; *at'* is of type $\langle e^o, \langle e^s, t\rangle\rangle$; see^+ hit^+, $find^+$, in^+, $near^+$ are of type $\langle e^s,\langle e^s, t\rangle\rangle$; $fear^+$ and $hate^+$ are of type $\langle e^i, \langle e^o, t\rangle\rangle$; $in^{+'}$ and $near^{+'}$ are of type $\langle e^s,\langle\langle s, \langle e^s, t\rangle\rangle,\langle e^s, t\rangle\rangle\rangle$. We further introduce the realization and the generalization relations, R of type $\langle e^i,\langle e^s, t\rangle\rangle$, $R'\langle e^k,\langle e^o, t\rangle\rangle$, and G of type $\langle\langle s,\langle e^s, t\rangle\rangle,\langle e^i, t\rangle\rangle$ and $G'\langle\langle s,\langle e^o, t\rangle\rangle,\langle e^k, t\rangle\rangle$.

Translation Rules

T1. a. *Bill*, *Mary*, *Rover*, *Amherst* translate as $\lambda P^\vee P(\alpha)$, where α = b,m,r,a respectively.

b. him_n^γ and $\$\text{them}_n^\gamma$ translate as $\lambda P^\vee P(x_n^\gamma)$ unless n is a multiple of 42, in which case they translate as $\lambda P[\exists x^i[\forall y[{}^\vee S_n(z)](y) \leftrightarrow x=y] \,\&\, {}^\vee P(x)]$

c. an_1, *some* translate as $\lambda Q\lambda P \exists x^i[{}^\vee Q(x^i) \,\&\, {}^\vee P(x^i)]$
the translates as $\lambda Q\lambda P^\vee P(\iota x^i[{}^\vee Q(x)])$
all, *every* translate as $\lambda Q\lambda P\forall x^i[{}^\vee Q(x) \rightarrow {}^\vee P(x)]$
many translates as $\lambda Q\lambda P$ Many $x^i[{}^\vee Q(x) \,\&\, {}^\vee P(x)]$

d. $find$, hit, see_1, in_1, $near_1$ translate as $\lambda P\lambda z^{s\vee} P(\hat{x}^i \exists y^s[R(y,x) \,\&\, \delta(z,y)])$, where δ = $find^+$ hit^+, see^+, in^+, and $near^+$ respectively.

e. $fear$, $hate$ translate as $\lambda P\lambda x^{o\vee} P(\hat{y}^i[\delta(x,y)])$, where $\delta = fear^+$ and $hate^+$ respectively.

f. see_2 translates as $\lambda Q\lambda P\lambda x^{s\vee} P(\hat{z}^i \exists y^s[R(y,z) \,\&\, {}^\vee Q(y) \,\&\, see^+(x,y)])$

g. *necessarily* translates as $\lambda p[\Box^\vee p]$
not translates as $\lambda p[\sim^\vee p]$
$will_1$ translates as $\lambda p[W^\vee p]$
do [-pres] translates as $\lambda p[H^\vee p]$
do [+pres] translates as $\lambda p[Pres^\vee p]$

T1. h. *be*$_2$ translates as $\lambda Q \lambda x^{i} \exists y^{s}[R(y,x) \,\&\, {}^{\vee}Q(y)]$

i. *often* translates as $\lambda P \lambda x^{k}[\text{Many } y^{o}[R'(y,x) \,\&\, {}^{\vee}P(y)]]$

always translates as $\lambda P \lambda x^{k}[\forall y^{o}[R(y,x) \rightarrow {}^{\vee}P(y)]]$

j. *kind* translates as $\lambda Q \lambda x^{k}[S_o(x) \,\&\, \underline{\underline{Dis}}'(S_o)(Q)]$
(where $\underline{\underline{Dis}}'$ is the disjunction condition)

k. *such*$_n$ translates as $\lambda Q[\lambda x^{o}[\forall z^{o}\Box[R'(z, x_n^{k}) \rightarrow {}^{\vee}Q(z)] \,\&\, R'(x^{o}, x_n^{k})] \,\&\, \sim\Box\sim\exists w^{o}[{}^{\vee}Q(w) \,\&\, \sim R'(w^{o}, x_n^{k})]]$

l. *everywhere* translates as $\lambda x^{i} \forall z^{o}[\text{Place}'(z) \rightarrow \exists y^{s}[R(y,x) \,\&\, at'(y,z)]]$

m. *in*$_2$ and *near*$_2$ translate as $\lambda P \lambda Q[{}^{\vee}P(\hat{x}\exists z^{s}[R(z,x) \,\&\, \delta(z)(Q)])]$ where δ is *in*$^{+\prime}$ or *near*$^{+\prime}$, respectively

n. We assume a lexical rule that maps object-level nouns that are members of B_{CN} to kind-level nouns that are also members of $B_{CN'}$. Let us posit a function k which is of type $\langle\langle e^{o}, t\rangle, \langle e^{k}, t\rangle\rangle$. The rule is as follows:

If $\alpha \in B_{CN}$, then $k(\alpha) \in B_{CN'}$

If α translates as α', then $k(\alpha)$ translates as $\lambda x^{k}[S_o(x) \,\&\, Dis'(S_o)(\alpha')]$. Conditions: For every x^{k} in S_o there must be a member of B_{CN} such that (a) $\Box[\forall x^{o}[T'(x) \rightarrow \alpha'(x)]]$ where T' is the translation of T

(b) $\forall x^{o}\Box[T'(x) \leftrightarrow R'(x^{o}, x^{k})]$

o. Any expression of B_A not translated above is in the domain of g such that if α is in its domain, α translates as $g(\alpha)$.

T2. If $\alpha \in P_{CN}$ and α translates as α', then $F_1(\alpha)$ translates as α'

T3. If $\alpha \in P_{CN}$ and translates as α', then $F_2(\alpha)$ translates as α'

T4. If $\alpha \in P_{T/CN'}$ and $\beta \in P_{CN'}$ and translate as α' and β' respectively, then $F_3(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T5. If $\alpha \in P_{CN}$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_{4,n,\gamma}(\alpha,\phi)$ translates as $\lambda x_n^{\gamma}[\alpha'(x) \,\&\, \phi']$

T6. If $\alpha \in P_{CN'}$ and translates as α', then $F_5(\alpha)$ translates as $\lambda P {}^{\vee}P(\imath x^{k}\forall z^{o}\Box[R'(z^{o}, x^{k}) \leftrightarrow \alpha'(z^{o})])$

T7. If $\alpha \in P_{CN/CN}$ and $\beta \in P_{CN}$ and translate as α' and β' resp., then $F_6(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T8. If $\alpha \in P_{CN'}$ and translates as α', then $F_7(\alpha)$ translates as α'

T9. If $\alpha \in P_{IV}$ and translates as α', then $F_8(\alpha)$ translates as α'

T10. If $\alpha \in P_{IV/IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_9(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T11. If $\alpha \in P_{IV//IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{10}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T12. If $\alpha \in P_{IV///IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{11}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T13. If $\alpha \in P_{IV'/IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{12}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T14. If $\alpha \in P_{IV'/IV'}$ and $\beta \in P_{IV'}$ and translate as α' and β' resp., then $F_{13}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T15. If $\alpha \in P_{IV/t}$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_{14}(\alpha,\phi)$ translates as $\alpha'(\hat{}\phi')$

T16. If $\alpha \in P_{TV/IV}$ and $\beta \in P_{IV}$ and translate as α' and β' resp., then $F_{15}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T17. If $\alpha \in P_{TV}$ and $\beta \in P_T$ and translate as α' and β' resp., then $F_{16}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T18. If $\phi \in P_t$ and translates as ϕ', then $F_{17,n,\gamma}(\phi)$ translates as $\lambda x_n^{\gamma}[\phi']$

T19. If $\alpha \in P_{IV/INF}$ and $\beta \in P_{INF}$ and translate as α' and β' resp., then $F_{14}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T20. If $\alpha \in P_{IV/IV\ /\ T}$ and $\beta \in P_T$ and translate as α' and β' resp., then $F_{18}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T21. If $\alpha \in P_{IV}$ and translates as α', then $F_{19}(\alpha)$ translates as $G(\hat{}\alpha')$

T22. If $\alpha \in P_{IV}$ and translates as α', then $F_{20}(\alpha)$ translates as $G'(\hat{}\alpha')$

T23. If $\alpha \in P_{IV}$ and translates as α', then $F_{21}(\alpha)$ translates as $\lambda x^i \exists z^s[R(z,x) \ \& \ \alpha'(z)]$

T24. If $\phi \in P_t$ and translates as ϕ', then $F_{22,n,\gamma}(\phi)$ translates as $\lambda x_n^{\gamma}[\phi']$

T25. If $\alpha \in P_{CN'/CN}$ and $\beta \in P_{CN}$ and translate as α' and β' resp., then $F_{23}(\alpha,\beta)$ translates as $\alpha'(\hat{}\beta')$

T26. If $\alpha \in P_{CN'}$ and translates as α', then $F_{24}(\alpha)$ translates as $\lambda P[[G(P)(\iota x^k \Box[\forall z^o[R(z,x) \leftrightarrow \alpha'(z^o)]]] \vee [G'(P)(\iota x^k \Box[\forall z^o[R(z,x) \leftrightarrow \alpha'(z)]]]]$

T27. If $\alpha \in P_{CN'}$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_{25,n,m}(\alpha,\phi)$ translates as $\lambda x^o[\alpha'(x) \ \& \ [\hat{x}_m^k \phi'] \ (x_n^k)]$

T28. If $\alpha \in P_{CN'}$ and $\beta \in P_T$ and translate as α' and β' resp., then $F_{26,n}(\alpha,\beta)$ translates as $\lambda x^o[\alpha'(x) \ \& \ \hat{y}^k \beta'(\hat{z}^o[R'(z,y)])(x_n^k)]$

T29. If $\alpha \in P_T$ and $\beta \in P_{IV'}$ and translate as α' and β' resp., then $F_{27}(\alpha,\beta)$ translate as $\alpha'(\hat{}\beta')$

T30. If $\alpha \in P_{t/t}$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_{28}(\alpha,\phi)$ translates as $\alpha'(\hat{}\phi')$

T31. If $\phi, \psi \in P_t$ and translate as α' and ψ' resp., then $F_{29}(\phi,\psi)$ translates as $\phi' \ \& \ \psi'$

T32. If $\alpha, \beta \in P_{IV'}$ and translate as α' and β' resp., then $F_{30}(\alpha,\beta)$ translates as $\lambda x^i[\alpha'(x) \ \& \ \beta'(x)]$

T33. If $\alpha, \beta \in P_T$ and translate as α' and β' resp., then $F_{31}(\alpha,\beta)$ translates as $\lambda P[\alpha'(P) \ \& \ \beta'(P)]$

T34. If $\phi, \psi \in P_t$ and translate as ϕ' and ψ' resp., then $F_{32}(\phi,\psi)$ translates as $\phi' \vee \psi'$

T35. If $\alpha, \beta \in P_{IV'}$ and translate as α' and β' resp., then $F_{33}(\alpha,\beta)$ translates as $\lambda x^i[\alpha'(x) \vee \beta'(x)]$

T36. If $\alpha, \beta \in P_T$ and translate as α' and β' resp., then $F_{34}(\alpha,\beta)$ translates as $\lambda P[\alpha'(P) \vee \beta'(P)]$

T37. If $\alpha \in P_T$ and $\phi \in P_t$ and translate as α' and ϕ' resp., then $F_{35,n,\gamma}(\alpha,\phi)$ translates as $\alpha'(\hat{x}_n^{\gamma}\phi')$

T38. If $\phi \in P_t$ and translates as ϕ', then $F_{36}(\phi)$ translates as ϕ'

Meaning Postulates

MP1. $\exists u \Box[u = \alpha]$ where α is m,b,r, or a

MP2. $\Box[\alpha(\beta)(u) \rightarrow \beta(u)]$ where α translates *slowly* or *rapidly*

MP3. $\Box$<u>look for</u>$'(P)(u) \leftrightarrow \exists S \ S(\hat{y}^{\vee}P(\hat{z}^i \exists w^s[R(w,z) \ \& \ find^+(y,w)]))$

MP4. $\forall x^o \Box \forall x^s[R(x^s,x^o) \rightarrow \forall y^o[R(x^s,y^o) \leftrightarrow y^o = x^o]]$

MP5. $\Box \forall x^s \exists y^i[R(x,y)]$

MP6. $\forall x^o \forall y^k \Box \forall z^s[R(z,x) \ \& \ R'(x,y) \rightarrow R(z,y)]$

MP7. $\forall y^k \Box \forall x^s[R(x,y) \rightarrow \exists z^o[R'(z,y) \ \& \ R(x,z)]]$

MP8. $\forall x^i \Box[[\exists z^s[R(z,x)]] \rightarrow$ <u>Exist</u>$'(x^i)]$

MP9. $\Box G(P)(u) \rightarrow [H(\exists z^s[R(z,u)]) \rightarrow H(\exists w^s[R(w,u) \ \& \ {}^{\vee}P(w)])]$

MP10. $\Box G'(P)(u) \rightarrow [H(\exists z^{O}[R'(z,u)]) \rightarrow H(\exists w^{O}[R'(w,u) \ \& \ {}^{\vee}P(w)])]$

MP11. $\Box G(\hat{x}[S(x) \ \& \ T(x)])(u) \rightarrow G(\hat{}S)(u) \ \& \ G(\hat{}T)(u)$

MP12. $\Box G'(\hat{x}[S(x) \ \& \ T(x)])(u) \rightarrow G'(\hat{}S)(u) \ \& \ G'(\hat{}T)(u)$

MP13. $\forall x^{O}\Box[\underline{\text{Dog}}'(x) \rightarrow \underline{\text{Mammal}}'(x)]$

MP14. $\Box\alpha(\hat{}\beta)(u) \rightarrow \beta(u)$ where α translates *good* or *beautiful*

MP15. $\forall x^{k}\forall y^{k}\Box[[\forall z^{O}[R'(z,x) \leftrightarrow R'(z,y)]] \leftrightarrow x = y]$

MP16. $\Box Pres({}^{\vee}p) \leftrightarrow {}^{\vee}p$

MP1 states the rigid designation of the names of objects. MP2 ensures that if someone runs slowly, then that person also runs (for example). MP3 states the 'lexical decomposition' of the item *look for*. MP4 states that any stage can be the stage of one unique object. MP5 states that every stage is the stage of some individual. MP6 states the transitivity of the relation between R and R', while MP7 makes sure that all stages of kinds are also stages of some object of that kind (we may not wish to include this if we are dealing with mass terms, but this has yet to be investigated in detail). MP8 states that if some object or kind has a stage, then it can be said to exist. MP9 and MP10 constrain the interpretation of the generalization relations so that the property generalized over must at some past point be the property of a stage of whatever the generalization is attributed to, provided stages have existed of that entity, or of some object that realizes that entity. Thus, if lions roar, and there have been lions, some lion must have roared at some time; however, if unicorns eat grass, it does not follow that there has been some actual unicorn eating grass at some time. MP11 and MP12 state that G and G' have a distributive property. MP13 states that relation to be found between dogs and mammals, dogs being a kind of mammal. MP14 ensures that we can conclude from John being a good sailor, for example, that John is thereby also a sailor. MP15 states that any two kinds with all the same realizations are the same individual. From this it follows that square circles and eight-sided pentagons are the same kind of thing, since they have all the same realizations (namely, none). It is not clear at this time if this is completely desirable, but if we wished to claim that they are different kinds, we might amend MP15 so that it only concerns itself with kinds that do have realizations. MP16 states the vacuousness of the present tense operator. This allows us to treat the present tense syntactically in an unexceptional manner.

CHAPTER VII

FURTHER ISSUES

0. Introduction

This chapter will be devoted to a number of issues raised by the proposed analysis of the English bare plural presented in the previous chapters. For the most part, what is discussed here will remain in a totally unformalized or partially formalized state, and as a result we will only be able to reach partial conclusions. Nonetheless, what is presented here is of interest to any complete analysis of the workings of the bare plural.

This chapter will take up six matters that remain unresolved in the light of previous discussion. We will first in Section 1 look at the matter of coreference with respect to certain adverbial phrases, in particular *when* adverbials, and examine certain phenomena that have not been treated in previous discussion. Next in Section 2 the simple present tense will receive examination. Although in most cases the simple present tense appears to be unambiguously generic (as opposed to the past tense or the future), there has been no attempt here to treat this as a significant fact about generic sentences. Reasons will be given for why it is that the simple present does not appear to be ambiguous in English, reasons which have nothing in particular to do with any syntactic facts. The definite generic (*the dog*) will then be examined in Section 3. In the fourth section, we will be looking at some ambiguities that appear which are not in any obvious way predicted by the analysis presented. These are cases where we appear to be able to obtain either a universal reading for the bare plural, or an existential reading. These cases will be shown to be characterized as a general class, and other facts will be shown to follow for this particular class. The fifth section discusses a possible extension of the analysis of kinds of things proposed here that may be used to account for the semantic behavior of certain definite descriptions, and we will choose the NP *the president* as our working example. Finally, we will turn to a discussion of mass nouns, abstract nouns, gerunds, and infinitives as a means of showing a possibly fertile area of further investigation. The chapter will end with a general conclusion for the whole dissertation.

1. *When* Adverbials and Coreference

Pronouns in clausal adverbials may appear to exhibit object-by-object coreference having as antecedent a bare plural NP. Sentence (1) is such an example.[1]

(1) *Dogs* bark when *they* see a mailman.

In this case, as in all others to be presented, there is a possibility (though in many cases an unlikely one) of interpreting the pronoun in the laziness manner. Thus (1) can be interpreted as possibly meaning that some dogs bark when there is an instance of some dogs seeing a mailman. These readings will be excluded from our consideration for the remainder of this section. The most natural reading of (1) involves the same dog barking and seeing a mailman, and might be paraphrased as *any dog barks when it sees a mailman*. The most straightforward account of this particular sentence would be to derive a predicate of the form [$\hat{x}^{o}$[x barks when x sees a mailman]] by derived VP, and generalize with G' to form a sentence that is interpreted by means of the following rough formula:

(2) $G'(\hat{x}^{o}[x \text{ barks when } x \text{ sees a mailman}])(d)$

This receives a certain amount of plausibility from the observation that adveribals such as *although* or *because* adverbials, which do not appear to be part of the predicate of the sentence (Williams (1975)) and thus could not be part of a derived VP, do not appear to be able to exhibit such coreference.

(3) Dogs bark $\left\{\begin{matrix}\text{although}\\\text{because}\end{matrix}\right\}$ they see a mailman.

I do not find a reading of this sentence which means that any given dog barks although or because that dog sees a mailman.

As a general means of characterizing the coreference possibilities in *when* adverbials, though, this account makes some incorrect predictions. We are treating the pronominalization here as BV pronominalization, but several matters seem to go awry. First of all, if the generalization is correct that BV pronominal forms cannot be epithetic NP's but have to be actual pronouns, these sentences do not uphold that generalization. I find the following to be perfectly interpretable on an object-by-object basis.

(4) a. *Dogs* bark when *the little devils* are at play.

b. *Mailmen* quake when *the poor saps* hear a ticking package.

c. *Robbers* flee when the cops shoot at *the bastards*.

Secondly, backwards pronominalization appears possible here, though it does not appear possible with other cases of BV pronominals.

(5) a. When *they* are not closely observed, *golfers* cheat.

b. When Bertha hails *them*, *taxi drivers* come running.

c. When Max steals *their* bones, *dogs* bite him.

Finally, there are those cases of *when* and *if* adverbials which are atemporal in nature, for which the BV approach gives an unconvincing and totally unlikely reading. Consider the following sentences.

(6) a. Bill hates dogs when they are of a rare breed.

b. Hotels are uneconomical when they have less than 200 rooms.

c. Wolves are intelligent when they have blue eyes.

None of these are convincingly paraphrased with an object-level NP in the antecedent case. All the following are very odd.

(7) a. ?Bill hates any dog when it is of a rare breed.

b. ?All hotels are uneconomical when they have less than 200 rooms.

c. ?Each wolf is intelligent when it has blue eyes.

The sentences of (7) give one the impression that a given hotel sometimes has 200 rooms, and sometimes it does not, or that any given dog is sometimes of a rare breed, or it sometimes is not. One does not receive the same impression about the sentences of (6), where a bare plural NP serves as the antecedent of the pronominal form. If we were to treat the sentences of (6) in the same way as tentatively proposed for sentence (1), we would have as a component of the translation a property of objects which would come out roughly as: $\hat{x}^{o}$[x is intelligent when x has blue eyes], for example (7c). If we quantified in with an object-level NP, such as *Max*, this would reveal that the property is in some manner not particularly well-formed: Max is intelligent when he has blue eyes. So the BV approach, along with the derived VP and generalization, fails to adequately capture the semantics of the sentences of (6).

This particular construction can be generally characterized as requiring that the bare plural in the main clause (or any other NP referring to kinds of things) be in an environment where an object-level NP could appear as well, and the when-clause must also be a property of objects if the pronoun is replaced by a free variable and a lambda-expression produced. The following examples violate these conditions, and thus no individual-by-individual reading emerges.

(8) a. Wolves are *common* when they have blue eyes.

b. Lions are dangerous when they are *widespread*.

c. Dogs *are eating* when they are of a rare breed.

In none of these cases is there the coreference exhibited we are interested in. This is because the sorts of properties attributed to either the bare plural or the pronoun in the subordinate clause do not meet the necessary criteria.

One possible clue to the solution of this puzzle is to note that there is a convincing semantic similarity between these *when*-clauses and relative clauses. This is illustrated by the following pairs of sentences.

(9) Wolves are intelligent *when they have blue eyes.*

Wolves *that have blue eyes* are intelligent.

(10) Plays are boring *when they are over two hours long.*

Plays *that are over two hours long* are boring.

(11) John likes animals *when they are small and fuzzy.*

John likes animals *that are small and fuzzy.*

Temporally-oriented *when* clauses do not exhibit this same sort of parallelism.

(12) a. Bears *when they get up.* ≠

b. Bears *that get up* eat.

And, of course, there are differences in distribution between relative clauses and *when*-clauses.

(13) a. Bears that have sharp teeth are extinct.

b. *Bears are extinct when they have sharp teeth.

We will not here discuss particular sorts of solutions that capture certain of these facts, but not others, as all I know of are wholly inadequate in one way or another. One thread that appears valuable to pursue is that *when* in some sense quantifies over object-level realizations of some NP (it need not be the subject NP) in the main clause. However, this makes the *when* clause appear similar to one of the adverbs of quantification discussed in Chapter 3; but the two may felicitously co-occur, though two adverbs of quantification are normally ruled out in the same clause.

(14) a. Now and then, bears are intelligent.

b. Bears are often intelligent.

c. *Now and then, bears are often intelligent.

d. Bears are {often / usually / never / always} intelligent when they have sharp teeth.

In most cases it appears that a pronoun with an antecedent in the main clause is required for a non-temporal interpretation of the *when*-clause. The following have only temporal senses.

(15) a. Bookshelves are valuable when beans come in cans.

b. Wolves howl when the moon rises.

But this is not quite correct, for in many appropriate cases the definite article in the subordinate clause, which somehow serves to 'connect' the NP it determines with some antecedent in the main clause, allows us to obtain felicitous non-temporal readings.

(16) a. Speeders slow down when *the cops* are Italians.

b. Doctors usually refuse to operate when *the patient* is asthmatic. (Thanks to R. Cooper for this example)

c. Restaurants are unpopular when *the waiters* are sloppy and ill-mannered.

The underscored NP's in (16) do not refer to any particular individuals, but their reference is rather determined by an implicit relationship that holds between the NP and something in the main clause.

It is also possible to construct examples of non-temporal *when*-clauses with two or more bare plural antecedents in the main clause, the pronouns being interpreted in this BV-like manner.

(17) *Dogs* hate *cats* when *they* see *them* every day.

(Meaning, if a dog sees a cat every day, it hates it.)

The nature of the non-temporal *when*-clause remains at this time a mystery, and its restrictions with respect to the bare plural represent a difficult puzzle in terms of how to formally represent these facts. In spite of the fact that this sort of example is the only case I know of at this time which cannot be naturally handled by the sorts

of pronominalization processes posited, there would be no more light shed on this case if we were to admit of a quantifier associated with the bare plural NP.

2. Simple Present Tense

In English for many main verbs, the simple present tense has only a 'generic' sense, while the past tense and the future with the modal *will* are ambiguous between a generic and an event reading.

(18) a. Fido barks. (not ambiguous)

b. Fido barked. (ambiguous)

c. Fido will bark. (ambiguous)

The formal system presented in Chapters 4 and 6, however, treat the simple present as being as ambiguous as either of the other two, and no attempt has been made to accomodate this peculiar behavior of the English simple present. I believe that the facts of (18) are such that they in essence really have little to do with any peculiar syntactic interaction between generic predicates and the present tense and as a result it does not affect my analysis in any substantive way. The fact that a sentence shows up with the main verb in present tense *form* does not automatically exclude an event (or reportative) reading. All the italicized sentences of (19) have natural reportative readings (and in some cases are very naturally interpreted as either reportative or generic).

(19) a. Anyone *who meets Sally* finds her attractive.

b. *Bill smiles* when *Max does something silly*.

c. *The dog next door barks* whenever *our cat is let out*.

d. *Fred eats a bowl of ice cream* {every day / on Sundays / once a month / at the theater}.

(20) a. *The Knicks play the Spurs* this Tuesday.

b. *Our plane lands* at 3:47.

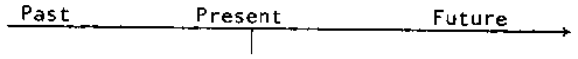
c. First, *you turn the key* and then *a little light goes on*.

So the fact that, on the surface, a given sentence has present tense form does not automatically rule out an event reading.

What is it that differentiates cases like those in (19) and (20) from a case like (18a)? Clearly, the difference is that a reportative reading of (18a) would have to mean that Fido barks at the present time (the time of utterance), whereas the sentences of (19) and (20) do not have to mean that the event referred to by the italicized sentences would have to occur at the present time, but rather that they may occur at some time other than the present. So it is the time that the present tense refers to in a given context that determines whether or not the simple present may be used in a reportative sense. For some reason, the case where the present tense refers to the present time only disallows the event reading. This indicates that there is something special about the present time in English.

If we draw a simple time line, with present, past, and future graphically represented, I believe that we can illustrate what this peculiarity consists of.

Figure 1



Here, the past is represented as a stretch of time, as is the future. But the present time is not represented as a stretch of time, but rather as being the dividing line between past and future. That is, the present is a point in time, while the past and future are not.

In Bennett and Partee (1972), it is argued that the time reference of sentences such as (21) is not a point of time, but is rather a stretch of time.

(21) Veronica built a house.

If one asks when Veronica built the house, the answer will invariably give a period of time that includes at least the period from beginning to completion (e.g. last year). One cannot give as the answer the time at which the las nail was driven, or any other particular point of time.

We might sum up this observation by saying that ALL EVENTS CONSUME TIME. Events are only true with respect to stretches of time, and cannot be true with respect to points of time. This is quite plausibly so with a sentence like (21) which involves the notion of building something (a beginning and a completion), but this is not so evidently with cases that do not appear to involve such processes.

(22) a. Martha sits on the porch.

b. Bill runs.

c. Fido lies completely motionless.

In these cases, it is much more easily imagined that the 'event' spoken of here do not consume time, and could be true of an instant. But I do not believe this is true. Let us illustrate with a crude sort of analogy, one that should not be taken entirely seriously. Suppose that (22c) could be true of an instant of time; we will represent this with a photograph of Fido lying motionless. But how, from just looking at this instantaneous representation of the event spoken of in (22c), could we tell if Fido is in fact lying motionless? Could the photograph have not been taken as Fido was in the process of rolling over, or when Fido was at vigorous play? There are any number of possibilities here. Now in order to tell if Fido is in fact lying motionless, we must examine not only a single point in time, but a stretch in time in which Fido does not move. Wittgenstein (1971) makes a similar observation about a picture of a man walking up a hill. Of course, in visual representations there are conventional ways of representing time in the static picture (such as the 'streak lines' of objects in motion found in cartoons), and there are conventional ways of interpreting what is going on in a given picture, but these represent inferences drawn from the representation concerning surrounding stretches of time and are not directly represented.

Since all events do involve stretches of time, if this line of reasoning is sound, if one attempts to say that a given event -- be it building a house or lying motionless on the lawn -- is true with respect to a POINT of time, something strange should happen. I believe that what in fact happens is that the reading of a sentence which attempts to make such a statement is ruled out. This, then, is why it is that (18a) is not associated with a reading that speaks of an event. Now in the cases of (19) and (20), and (18b) and (18c), the time reference of the present tense is not the present moment, but past or future or both. Since the past and future are stretches of time, unlike the present, there is the opportunity for the sentence to refer to a stretch of time. Thus, these sentences are acceptable on the event reading.

The reader has no doubt noticed the 'announcer' use of the present tense, where presently occurring events are reported in the simple present (as discussed in Bennett (1974) and in Goldsmith and Woisetschlaeger (1976)).

(23) Jones tosses the ball over to Smith. Smith tags out the runner and fires the ball to the plate. The catcher drops the ball! The run scores, and Boston goes ahead 5-4!

This reportative use of the present tense requires a highly-constrained sort of context, though how to characterize this set of contexts in a general way is not at all clear. Nonetheless, there is some special assumption being made in the use of such examples as (23) about the way the present tense is being used. I will here suggest only that the

usual notion that the present time represents a point of time is here suspended in some pragmatically-determined way, and under these circumstances the present time is taken as being a stretch of time. See Goldsmith and Woisetschlaeger (1976) for some interesting observations concerning this use of the present tense.

If all this is in essence correct, it must follow that generic statements, such as *Fido barks* are the sorts of statements that can be true at an instant, and do not 'consume time'. Intuitively this makes a certain amount of sense. When we attribute the property of being a barker to Fido, we are speaking of the general characterization of Fido in terms of no particular time whatsoever. There is, as many have observed, an omnitemporal or atemporal character about generic sentences in that they do not speak of any particular time at all (if one thinks of these as speaking of events in some way). What I am saying here is that they may be true at an instant since they describe (in Goldsmith and Woisetschlaeger's terms) the structure of the universe, and not what is transpiring in a given period of time, although the basis for such statements has some relationship to things that do occur in many cases. Being a linguist, or being one who smokes does not consume time, though actually smoking, or actually carrying out the duties (or privileges) that a linguist must fulfill do consume time.

This line of thought might be taken even one step further. As we are representing event readings of sentences as attributing to some individual(s) the property of having a STAGE of which a given predicate is true or false, we might consider that it is not so much the events that consume time, as the stages themselves. That is, every stage of an individual is associated uniquely with some stretch of time, and never with a point of time. So any predicate that applies to stages has to apply to entities that are associated with stretches of time; if there is no stretch of time available for reference, there is no stage available. If, on the other hand, we are attributing a property directly to an individual and not to one of the stages, we are not in this fragment presented here associating with the individual itself anything whatsoever of a temporal nature; the result is that individuals are available with respect to either stretches of time or points of time. It makes no difference.

This leaves us with a problem of accounting for the cases of present tense sentences which do make reference to stages, such as PP's, progressives, and adjectives.

(24) a. John is lying motionless on the lawn.

b. Fred is ill.

c. The frictionless puck is in motion now.

I do not know what to say about these exactly. It seems that to claim that these sentences may be true at an instant would be wholly defeat-

ing the general line of thought pursued here. One thing that does tie all these together is that they contain instances of be_2, so there may be something about be_2 which 'overcomes' the restriction on the present tense that it makes reference only to a point in time in the absence of adverbials or appropriate contextual cues. A reasonable first guess would be that be_2 takes a given point or stretch of time and claims that the stages of which the following predicate is true are stages that INCLUDE the reference of the tense marker in their associated temporal intervals. It seems that something of this nature is going on in sentences like (25a) as opposed to (25b).

(25) a. Carol was running through the park when she saw a mugger.

b. Carol ran through the park when she saw a mugger.

In (25a), it is asserted that the activity of Carol's running through the park was in progress at the time she saw a mugger (included the time she saw the mugger). (25b), where be_2 is absent, implies that Carol's running through the park was a result of her seeing a mugger, and clearly refers to a state of affairs where seeing a mugger occurs before the run through the park.

It is in light of this particular line of reasoning that no attempt is made here to make any syntactic or semantic provisions regarding the apparent correspondence between generic usage of a sentence and the simple present tense. The present tense is no more or no less 'generic' than any other in its interpretation. It is that the present tense in English is not regarded as a stretch of time which makes a reportative interpretation of the simple present in most contexts impossible.

3. The Definite Generic *The* N.

In English, there are typically considered to be at least three sorts of 'generic' NP's. Two of these have already received attention: the bare plural and the *a* generic. There remains for discussion the definite generic exemplified below.

(26) a. *The beaver* has a flat tail.

b. *The refrigerator* did not come into existence until 1927.

c. *The owl* is reportedly not very wise after all.

Jespersen (1927) characterizes the definite generic as denoting the species itself. "Thus plurals denote all members of the species, but

they do not denote the species itself as *the+sg* does." A similar sort of characterization is offered in Lawler (1973) as well as in Vendler (1971).

One of the mysteries surrounding this construction -- one that will remain a mystery here -- is that its productivity is in some ways limited. One simply cannot take any CN at all, place a definite article before it, and come up with a definite generic NP. Heny (1972), for example, notes the following facts. (his 6a, b and c respectively)

(27) a. ?*The tree* gives off carbon dioxide at night.

b. ?*The primate* is larger than *the crustacean*.

c. ?*The ruminant* has cloven hoofs.

I agree with these judgments here, but there are contexts in which these NP's do not sound too bad.

(28) a. No one really understands how *the tree* knows when to shed its leaves in the autumn.

b. *The primate* is our main object of study in this class.

I cannot arrive at a similar context for the NP *the ruminant*.

Likewise (and these appear in all cases to be strange) Heny finds the following sorts of definite generic NP's acceptable.

(29) a. ?*The road* was first built in Finland.

b. ?*The house* has several rooms.

c. ?*The airport* is a busy place.

Heny and Vendler both propose that one of the restrictions on the definite generic is that they cannot name a kind of thing that is 'too general'. Vendler in particular proposes that all cases of definite generics are derived from NP's that contain a deleted head noun which is somehow removed. Thus, *the tiger* is derived from an NP like *the (kind of) animal that is a tiger*. If there is no suitable superior genus that may be thought of as being the head N, we do not find there to be a generic NP derivable. Vendler uses as one example the following.

(30) a. Euclid described *the parabola*.

b. ?Euclid described *the curve*.

In (30a), *the parabola* is to be derived from *the (kind of) curve that is a parabola*. However, in (30b) we have a difficult time imagining a

proper head N to posit: "the___which is a curve". Hence, there is no generic NP *the curve*.

While Vendler's analysis leaves a good deal to be desired in terms of explicitness, there seems to be something correct in what he is saying. However, I do not know what prevents me from obtaining *the house* from *the kind of structure that is a house*, or the *airport* from *the kind of place that is an airport*, so for Vendler's analysis to be taken seriously such matters would have to be settled in some reasonable way.

However the restrictions are to be finally stated on what NP's may be generic with a definite article and which may not, we can here derive the definite generic by the manner alluded to in Chapter 5 by removing the condition that all the kinds that a CN is true of must be subordinate kinds. With this removed, we can derive *the tiger* from a kind-level N *tiger* along with the definite article. This will be the set of properties associated with that unique entity such that all its realizations in every possible world are tigers. The disjunction condition (since there are many entities that fill the bill here) will search for a set of kinds such that all tigers are realizations of that kind and arrive at the unit set consisting of the kind *tigers*. So the definite generic is then treated as simply a special case of NP's that have the form of simple NP's that refer to kinds of things (like *some small animal* or *every reptile*, etc.).

Semantically, there is a great deal of similarity between the definite generic and the bare plural. Indeed, since we are taking both the definite generic and the bare plural as denoting the property set of the same kind of thing, we would anticipate that *the owl* and *owls* would behave entirely in parallel. To a large extent, this seems to be true.

(31) a. The owl has two eyes in the front of its skull.

b. Owls have two eyes in the front of their skull.

(32) a. The owl is common/widespread/fast disappearing/often intelligent.

b. Owls are common/widespread/fast disappearing/often intelligent.

(33) a. Owls are that kind of bird.

b. The owl is that kind of bird.

(34) a. We are learning all about the owl in our botany class.

b. We are learning all about owls in our botany class.

Lawler notes this parallelism, and finds that cases where the definite generic and the bare plural are differentiated are not easy to find. Nonetheless, a few examples are cited which do seem to show a difference.

(35) a. Madrigals must be polyphonic. (root sense of *must*)

b.??The madrigal must be polyphonic.

(36) a. ?The elephant is extremely numerous.

b. Elephants are extremely numerous.

(37) a. Angels play the harp.

b. ?The angel plays the harp.

(I personally do not find any context with *the angel* used generically acceptable; I am quite sure that *numerous* requires a subject plural in form, so that leaves (35a) as Lawler's most convincing example). I feel quite certain that a number of other examples like (35a) could be easily constructed, and there is something very real going on which is not accounted for by the analysis offered.

Lawler (1973) noted a remarkable separation that occurs between the definite generic and the bare plural. Witness the following pairs of sentences.

(38) a. Owls are in that cage.

b. *The owl is in that cage.

(39) a. Bill threw apples at the embassy.

b. *Bill threw the apple at the embassy.

(40) a. Tigers attacked the village and chased the people away.

b.??The tiger attacked the village and chased the people away.

(41) a. Barb spent the day watching geese down by the pond.

b. *Barb spent the day watching the goose down by the pond.

We note that when the definite generic appears in a context in which there is reference made to stages, it is unacceptable. There is no 'indefinite plural' use of the definite generic. We might therefore postulate that the definite generic has all the individual-level properties of the kind minus those properties that are associated with its stages.

We will not attempt to formalize this, though, as it is not correct. There do appear to be many contexts in which stages must be mentioned and in which the definite generic is completely acceptable. These are exemplified in (42).

(42) a. *The horse* came to America with Columbus.

b. *Man* is now on the moon.

c. Explorers first saw *the buffalo* in 1517.

d. Rumors are that *the dinosaur* is still alive on some South Seas Island.

e. If anyone ever finds *the Great Blue Wobat*, they should contact the nearest office of the department of the interior.

In all these cases, the definite generic appears in a context in which only a few of that kind are actually spoken of. (42a), for example, only requires that some horses came over with Columbus, and clearly not that all horses did, or even most.

What is it that differentiates the sentences of (42) from those of (43)? I believe that a satisfactory intuitive account may be given, but how to formalize this account is not at all clear. Let us take (42a) as our prime example. Notice that one cannot also state that the horse (on the generic reading) also arrived in America last week on a Liberian tanker, or that the horse arrived in America in 1662 as well. What is important about (42a) is that this is the first time horses came to America. Prior to Columbus' visits, there were none, a necessary presupposition for the sentence to make any sense at all. Sentence (43) below, where a bare plural is in place of the definite generic, may be taken either as indicating the arrival of some horses in America, or as the first time that this animal ever came to the western hemisphere.

(43) Horses came to America with Columbus.

Similarly, for (42b), it is presupposed that up to the present time, there was never any man on the moon at all, and that whoever is on the moon is the first man to be there. The sentence (44) can either be taken as simply reporting that there are some men on the moon or as reporting a very special event.

(44) People are now on the moon.

In the cases of (43) and (44), it is not the bare plural or the kind-level NP that plays an essential role here. It seems that the sentences of (45) may be taken in these two ways.

(45) a. Philip Morris arrived in America in 1938. (One of many trips, or his first arrival to a new land)

b. Kathy is now on the moon. (she's made it! or, that's where she happens to be at this time)

On the whole, the contexts in which a definite generic may be used where stages are referred to are those contexts which say something momentous or significant about the species as a whole. Trivial sorts of events do not count. Even if there has never been a horse on my doorstep before, (46) is still exceedingly strange.

(46) The horse arrived on my doorstep yesterday.

The event spoken of cannot be a run-of-the-mill every-day event.[2] As another illustration, compare the following sentences.

(47) a. The zoologists are trying to find blue-nosed ground squirrels.

b. The zoologists are trying to find the blue-nosed ground squirrel.

(47b) lends to the search an epic flavor, as if succeeding in finding the blue-nosed ground squirrel is an event of great significance (it is rarely observed, or thought to be extinct). (47a), on the other hand, does not leave us with this feeling of momentousness, even if we know that blue-nosed ground squirrels are exceedingly uncommon and are very rarely observed. Also, if we substitute a very mundane sort of species -- say, the cow -- into (47a), one loses this feeling of awe, and the sentence sounds much worse.

(48) The zoologists are trying to find *the cow*.

We know that cows are observed daily by large numbers of people, so sentence (48) diminishes greatly in significance.

How to state this notion of 'significance' in a formally precise way is not at all clear to me, nor am I sure that it is possible. It does, however, appear to have a good deal of impact on how we interpret the definite generic and how we may use it in our sentences.

Let us sum up the definite generic vis-a-vis the bare plural. We are taking both to be NP's that denote the property set of a kind. The definite generic appears to share most (but not all, apparently) of the individual-level properties of the bare plural that corresponds to it (as *cows* and *the cow*). The definite generic is much more limited in the sorts of NP's it may productively occur in than the bare plural, the latter being virtually unbounded, and the former is subject to such constraints as the species cannot be 'too general' and any number of

other unanalyzed constraints. When the definite generic appears in a context where stages are referred to, then it must be significant in some way; the bare plural need not be.

It was observed in Chapter 3 that the definite generic could appear felicitously in the *so-called* construction, along with only bare plurals and proper names.

(49) The cardinal is so-called because of its color.

The definite generic also passed the other 'tests' that suggested the bare plural serves as a proper name in the grammar. As a result, I believe that we should regard the definite generic, too, as a proper name of a kind. In the light of the fact that it takes the definite article, this makes it seem to be much closer syntactically to proper names, as many proper names have as a part of the name the definite article as well (*The Hague*, *The Mississippi*, *The Bronx*, etc.). Also, in view of the observation that the internal structure of the definite generic is limited in large numbers of ways (all relative clauses, most adjectives, and all AP-phrases, all PP's are disallowed), and the fact that the internal structure of proper names of objects is limited, the parallelism becomes even stronger. Since we are treating bare plurals as proper names here, I do not know how to distinguish bare plurals from definite generics on this score, though the definite generic appears to be more name-like than the bare plural in several respects.

4. Ambiguities

The contention that the English bare plural is to be regarded as a unified syntactic and semantic phenomenon rests on the claim that apparent ambiguities that appear in its interpretation, namely between a 'universal' use of the construction and an existential use, can be attributed to some other aspect of the context in which it appears. Incompatible with this line of inquiry would be a case where the bare plural does appear to be ambiguous, but where there is no independent factor to be found which might determine the ambiguity. Though it would be very difficult to show in any given case that there is no variable factor in the context that we might attribute an ambiguity to, I know of three classes of cases for which these factors are not so evident as we might expect. So while the following are not strictly speaking counterexamples to the theory proposed here, they do exhibit properties which make them prime candidates for future counterexamples.

The first class of examples all have to do with coming into existence or going out of existence. A prime example is found in (48).

(48) On the 28th of June, God created cows.

I believe that there are at least two distinct ways of taking this. Probably the less likely reading is the one that reports what God happened to do on a given day, and that he might have created cows on other days as well. This is opposed to the more likely reading where the effect of the creation was to create a universal form, or an entire species. It does NOT mean that all or most cows were created on the 28th of June. In fact, the two readings would be compatible with the same state of affairs obtaining on the day in question. At the end of the day there were some cows sitting around that were not in existence at the beginning of the day. How we interpret this action, though, gives rise to an ambiguity, whether the creation of these cows represented the creation of a new species, or just some new cows. I believe similar ambiguities may be detected in (49).

(49) a. Those men killed off *buffalos*.

b. The magician brought *doves* into being with a wave of his wand.

c. George the wizard made *cows* disappear.

This ambiguity is not peculiar to the bare plural, for other NP's that make reference to kinds of things exhibit similar behavior.

(50) On June 28th, God created $\left\{\begin{matrix}\text{this kind of animal.}\\ \text{this dog.}\end{matrix}\right\}$

And if we use the definite generic, only the reading appears which indicates the creation of a new species. This is in keeping with the observations made in the previous section, and the facts here are no doubt closely related.

(51) On June 28th, God created the water buffalo.

Not just any verb that indicates leaving or coming into existence exhibits a similar ambiguity. (52) only indicates a state of affairs where some cows or other were killed, and cannot be used to indicate the eradication of an entire species.

(52) The wizard killed cows with a wave of his hand. (event)

This makes it appear as if the ambiguity of (48) depends on some ambiguity concerning the verb *create*, but if this is so we appear to be in the undesirable position of positing two verbs -- $create_1$ and $create_2$. On the other hand, one might consider this as a context in which an ambiguity of the bare plural arises. But then one would have to show why it is that in most other contexts the bare plural is not ambiguous, such as (52). So at this time, we are left with two undesirable choices for handling this phenomenon. To be consistent with the suggested means of accounting for the interpretation of the bare plural, we would have to consider there to be two verbs *create* at this time. I know of no independent evidence for making such a split.

The second class of potential counterexamples all have to do with location in some way, and perhaps thereby existence (see Kimball (1973) for an interesting hypothesis concerning the relationship between possession, existence and location). I believe that the following sentence is two-ways ambiguous. It was suggested to me by Lisa Selkirk.

(53) Golden lilacs grow in northern Italy.

This can either be construed as a claim about the characteristic location of these flowers (and that they grow nowhere else), or else as a statement to the effect that there are some golden lilacs that grow there, and there may be many more elsewhere.

The whole burden of this ambiguity cannot be placed on the verb *grow* here, for if the locative is replaced with something else, the ambiguity disappears. All the following have only a 'universal' reading.

(54) a. Golden lilacs grow quite large.

b. Golden lilacs grow fast.

c. Golden lilacs grow best in hot weather.

We also find that the simple presence of a locative after an intransitive verb in the simple present tense does not give rise to this sort of ambiguity, but to another.

(55) Mice roar in Siberia.

This can be taken as either meaning that Siberian mice roar, or that any mouse that happens to be visiting Siberia roars (and inexplicably does not elsewhere). In neither case does (56) follow, even though mice are a kind of mammal.

(56) Mammals roar in Siberia.

However, in the case of (53), assuming golden lilacs to be a kind of flower, (57) follows on one reading.

(57) Flowers grow in northern Italy.

Another characteristic of (53) is that as the location becomes smaller and smaller, the 'universal' reading of the subject NP is more difficult to obtain. By far the most acceptable reading of (58) is existential.

(58) Golden lilacs grow out behind our tool shed.

One could imagine that this is the only place this species of flowers appears, but the world doesn't seem to normally work that way. It bears emphasis here that this is a pragmatic fact, not one to be directly represented in the semantics.

A few other examples of verbs that seem to work like *grow* in conjunction with a locative are exemplified in (59).

(59) a. Lions live in eastern Africa.

b. Typhoons arise in this part of the Pacific. (Milsark)

c. Intelligent marines stand in from of those tombs.

Again, an ambiguity appears, but there is no obvious source in the context for this ambiguity between existential and universal. There are indications, however, that something about the predicate is rather special in these cases. First of all, it is rarely that we find the indefinite singular *a* to be ambiguous between the generic and existential readings. This is because the existential *a* appears to require a generalized predicate. In the context of (53) I find *a golden lilac* to be ambiguous between these two readings.

(60) A golden lilac grows in northern Italy.

Also we observed that for the most part existential *a* and the definite generic are in complementary distribution. In the context of (53), though, we find both equally felicitous.

(61) {A golden lilac / The golden lilac} grows in northern Italy.

Even with the definite generic, (61) appears to be ambiguous.

A second unusual characteristic of the sort of construction examined here is that There-Insertion may apply. If it does, the universal reading is omitted, leaving an unambiguously existential sentence.

(62) a. There grow golden lilacs in northern Italy.

b. There arise typhoons in this part of the Pacific.

c. There stand intelligent marines outside this tomb.

d. There live lions in eastern Africa.

Also, another possible transformational variant that seems to unambiguously select the existential reading involves inversion of the subject and the PP.

(63) a. In northern Italy grow golden lilacs.

b. In this part of the Pacific arise typhoons.

c. In eastern Africa live lions.

d. In front of those tombs stand intelligent marines.

If we can attribute these facts to the nature of the predicate in some motivated manner, these cases would be less problematic than they might appear at first sight. At present I have no formalism to introduce to show how this might be done. It should be noted that rules that move the subject NP rightward such as the above seem to select only the existential readings. For example, one could regard the following sentences as ambiguous between a reportative reading (an announcer, say), and a generic reading.

(64) The oldest player sits next to the coach.

However, (65) has only the reportative reading, and lacks the generic.

(65) Next to the coach sits the oldest player.

So in these cases perhaps an ambiguous predicate would be a palatable alternative, though this would require a good deal of work to show.

Sometimes location plays a role in cases that do not fall under the above. Barbara Partee suggested the following example to me.

(66) In the Soviet Union, women work in shipyards.

This, too, appears to be ambiguous as to whether some Soviet women perform a certain type of labor, or whether this is a characteristic occupation for those women. One will note once again that examples of this sort may be constructed in which the indefinite article is taken as being universal or existential. (67a) seems only to have a non-generic reading, while (67b) has only the universal reading (or so it seems).

(67) a. A woman works in the stock room at General Mills.

b. A woman works in salt mines.

This sort of phenomenon is closely allied with the third class of ambiguities not dealt with here. These cases involve bare plural NP's in subject position with direct objects that are 'specific' in some way. In particular, the simple present tense appears to allow either a universal or an existential reading.

In general, these cases appear to involve function in some vague way, though I am not certain every such case can be included in this class. As an example, consider the difference between (68a) and (68b).

(68) a. Trains carry freight.

b. Trains carry the coal that comes out of this mine.

(68a) appears to have only a universal sort of reading, whereas (68b) only makes the claim that some trains carry the coal, and it is not a property attributed to 'all' trains. I also believe that (68b) has a very unlikely reading which asserts that any train, roughly, carries the coal, but I have been unable to convince myself that (68a) has a corresponding existential reading. The same set of facts seems to hold for other examples as well.

(69) a. Computers compute things.

b. Computers compute the monthly GNP figures.

(70) a. Secretaries type reports.

b. Secretaries type all the reports that emanate from the Pentagon.

(71) a. Coffee mugs hold any liquid.

b. Coffee mugs hold our precious water supply.

We also note that the indefinite singular generic and the indefinite singular existential likewise may appear in these contexts.

(72) a. A train carries freight. (universal only)

b. A train carries the coal that comes out of this mine. (plausibly existential; implausibly universal)

(73) a. A coffee mug holds any liquid. (universal)

b. A coffee mug holds our precious water supply. (existential)

It is not at all clear how to appropriately represent these facts in the grammar. Even if we make the simplifying assumption that all the sentences of (68)-(73) are semantically ambiguous (but pragmatically not so), it still remains a question as to how we can represent the existential reading with the simple present tense, as in (73b).

One possible clue to this mystery may be provided by an examination of the example (72b). In that example, it need not be the same train that hauls coal all the time, nor in the sentence below need it be the same guard that remains in front of the tomb day and night.

(74) A marine guard stands in front of this tomb day and night.

This suggests that there is something in these sentences which in effect holds scope over the subject of the sentence. As these sentences all appear to require an object NP, one might consider that the direct object is what holds scope. But I do not believe this is so, for even if the object is a pronoun or a proper name, one still obtains the same effect as in (74).

(75) a. A nurse attends to General Patton.

b. A train hauls it. (it=the coal)

What we have here, then, is a fertile new area of investigation regarding the syntax and semantics (and pragmatics) of 'generic' sentences. No doubt its proper solution would have a great bearing on the analysis of generic sentences proposed in this dissertation, but it is an area that we will not be able to examine here.

One general sort of prediction about all these cases of ambiguity of existential and universal readings for the bare plural is that in all cases if such an ambiguity appears, both the existential *a* and *sm* will be acceptable, as well as the definite generic. If the ambiguity involves a bare plural in subject position, then generic *a* should be acceptable as well resulting in an ambiguity for the indefinite article.

5. The President

In Chapter 3 when discussing the nature of the bare plural, its properties were exhibited in opposition to those of quantified NP's, less the definites (demonstratives, definite article, and possessives). The reason for this is that the definites sporadically satisfy a number of criteria for isolating NP's that make reference to kinds. Kroch (1974) noted, for example, the following fact.

(76) a. *Women in Jane's class are numerous.

b. *The* women in Jane's class are numerous.

In (76a) we have an instance of a bare plural that does not name a kind, and thus the unacceptability with the predicate *numerous*. However, somehow the presence of the definite article makes (76b) acceptable. If *numerous* isolates NP's that refer to kinds of things, then the subject NP of (76b) refers to a kind of thing.

There are other instances of definite NP's behaving very much like bare plurals, all of which seem isolated to the definite article and the possessives, less the demonstratives.

(77) a. $\left\{\begin{array}{l}\text{The guests}\\ \text{*Several guests}\end{array}\right\}$ arrived *for two hours*.

b. The stars are *numerous*.

c. Harry's dog is *usually* a collie or a poodle.

d. The king's real estate holdings are *widespread*.

However, this parallelism does not hold for all cases. The following appears to be anomalous.

(78) *The stars are common/rare.

But these predicates are not ruled out for all cases of the definites. The following has a natural interpretation IF the possessive indicates that Fitzgerald was the author of the books. It is unacceptable if it indicates his ownership of the books.

(79) In Europe, Fitzgerald's books are quite common/rare.

So there appears to be an intricate network of facts here that interact in a way that is presently not understood.

This section will not present solutions to all the problems of the definites. We will, however, attempt to make an informal beginning into these matters by examining the semantics of a single definite singular NP.

Barbara Partee has observed that the following sentence raises problems for current theories of reference.

(80) The president is gaining power.

I believe there are two ways of interpreting the sentence. The more readily representable reading means that Jimmy Carter is gaining power (we henceforth take Jimmy Carter to be the president). The more problematic reading means that over the past 50 years, for example, the post of the presidency has had more power associated with it year after year.

This general sort of ambiguity is extremely prevalent with the NP *the president* (meaning president of the United States). It appears that all the sentences of (81) are ambiguous in a way similar to that of (80).

(81) a. The president fears the people.

b. Sally likes to take photographs of the president.

c. The president has eaten at the Statler Hilton on Saturday nights every week for the past 25 years.

d. The president hates for his bills to be overridden by Congress.

e. Dr. Evans talked about the president yesterday in his lecture on 20th century social problems.

Under some circumstances, however, there appears to be no ambiguity of this sort. In all the cases in (81), if one substitutes *Jimmy Carter* for *the president*, we find that this substitution does not preserve the truth-value of the sentence. However, this substitution of identicals appears to work very well in the case of (82).

(82) a. The president slept late this morning.

b. Bill sat next to the president last night.

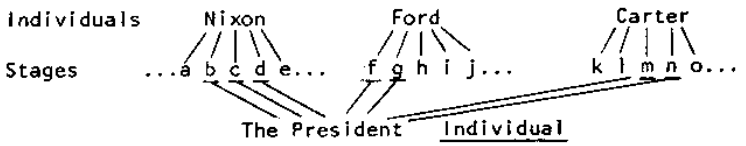
c. The president is on that plane.

d. The president is ill.

e. Maxine, you are looking directly at the president.

We will be suggesting here that the NP be taken to be ambiguous in all cases. One reading of this NP denotes the set of properties that Jimmy Carter has, and is thus identical with Jimmy Carter. That is, this NP denotes the property set of a specific person. The other reading of this NP (similar to the suggestion found in Moravcsik and Gabbay (1973)) denotes a particular entity, all of whose stages are stages of someone who is president of the U.S. Perhaps a diagram to illustrate this would be in order here. Let us take the small letters as being stages of Nixon, Ford, Carter, and the underlined small letters are stages of these people when they were president, and those not underlined are stages prior to election or appointment, or after 'retirement'.

Figure 2



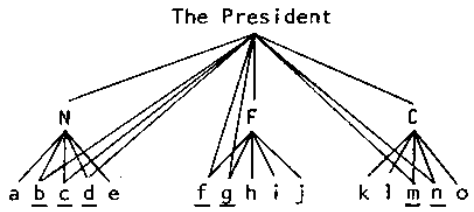
Those stages that are stages of *the president* on the reading we are interested in, then, are just those stages that are stages of individuals during the term of president.[3]

Now let us examine the following sentence.

(83) The president is *often* a Methodist.

Here we have an adverb of quantification, which we represented in Chapter 4 as being a construction that quantifies over object-level realizations of a kind. If this is correct, then it follows that the object-level realizations of the president on the reading illustrated above are those objects who have been president at some time. We are then treating this reading of *the president* as being an entity that is on the kind-level, and not the object-level. As we saw previously that there is utility in the assumption that for every stage there is one and only one object that that stage realizes, treating this reading of the president as a kind avoids our having to give up this assumption (provided the only other alternative is to treat it as an object). So our diagram should be amended to give us the following configuration.

Figure 3



In order to symbolize the differences between the two different meanings associated with the NP *the president*, let us offer the following characterizations. The reading where the president is identical with whoever is the president at the time (e.g. Jimmy Carter) we will formally treat in the Russellian way (that is, the unique entity that is a president). Informally, we will symbolize this translation of *the president* as $\lambda P^{\vee}P(p\text{-}o)$ where p-o is the object-level entity that is the president. Where *the president* denotes the property set of a kind-level entity in the sense we are interested in here, we will symbolize it as $\lambda P^{\vee}P(p\text{-}k)$ (the kind-level entity that is the president). Formally, I have no idea how to derive this latter reading in any principled way.

Treating *the president* as on one reading referring to a kind-level entity leaves us without an account of why it is that the classic kind-level predicates cannot be predicated of this NP.

(83)*?The president is widespread/common/extinct/numerous...

I believe there is a fairly sound intuitive reason for this. All these kind-level predicates seem to presuppose that there can be (not necessarily that there ARE) any number of individuals of the kind they are predicated of in existence at a single time. For example, there may be any number of rabbits or intelligent dogs in existence at the same time. However, the president is not like this at all, since there can only be one president at any given time. In this respect, p-k is like an object, having only one stage associated with it at any given time. However, p-k is not like objects in other respects. In the following sentences, we see p-k patterning more like a kind than an object.

(84) a. The president is often a small individual.

b. The president inhabited the White House continuously for 136 years until Truman moved into Blair house.

c. Five times since the turn of the century, the president has been assassinated by a disgruntled job-seeker.

d. The president makes good decisions when he is from Ohio.

As pointed out before, adverbs of quantification may felicitously apply here in (a); in (b) we see that p-k can exhibit unusual longevity (as *dinosaurs lived in Europe for 400,000,000 years*); in (c) we see that the president may be killed more than once, as may *cats*, and in (d) we see that p-k patterns like a kind with respect to the sort of pronominalization discussed in section 1 of this chapter. We also see that p-k does not require identity of objects in all cases with pronominalization.

(85) My mother met the president in 1942, and my father met *him* in 1953 (but I've never met *him*)

While not all people obtain the reading that my mother might have met Roosevelt, but my father Eisenhower, it is clearly acceptable to many (myself included).

Whether or not the condition placed on p-k that at any given time there is at most one stage associated with it can account for all the differences to be found between *the president* and kinds of the sort we have been examining remains unclear.

If the NP *the president* is in fact ambiguous as to whether it denotes the property set of an individual or a kind, we must account for why it is that in a sentence like (86) the NP is not judged to be ambiguous.

(86) The president is here.

(86) appears to be true if and only if Jimmy Carter is here; there seems to be no reading for the sentences under which this entailment relation does not hold. I believe that we can show, in a informal way, how it is that we can have two different translations for the NP *the president* in (86), yet perceive the sentence as unambiguous. This is because the different translations give rise to equivalent interpretations.

The translations of (86) would be as follows.

(87) a. $\lambda P^{\vee}P(p\text{-}i)(\hat{x}^{i}\ \exists z^{s}[R(z,x)\ \&\ \underline{here}'(z)])$

b. $\lambda P^{\vee}P(p\text{-}k)(\hat{x}^{i}\ \exists z^{s}[R(z,x)\ \&\ \underline{here}'(z)])$

These are equivalent to: $\exists z^{s}[R(z, \begin{Bmatrix} p\text{-}k \\ p\text{-}i \end{Bmatrix})\ \&\ \underline{here}'(z)]$

Let us assume the following.

(a) Jimmy Carter = p-i (henceforth j=p=i)

(b) in all cases, R(p-i, p-k) holds, no matter who p-i refers to.

(c) j, p-k are both rigid designators

It is quite simple to show that (87a) entails (87b) by using the transitivity condition, which states that in all possible worlds, of which there is a stage s which realizes an object o, and o realizes a kind k, then s realizes k as well. In this case, the stage in (87a) realizes the object p-i, and p-i realizes p-k, hence the stage also realizes p-k. So this is one half of the biconditional that we wish to establish between (87a) and (87b). The other half of the biconditional is a bit more difficult to obtain, but intuitively it runs like this. From formula (87b) we know that there is some stage that realizes p-k. From meaning postulate (7) in Chapter 4, we see that in all cases of stages there is some unique object which that stage realizes. So then, there is some unique object whose realization in (87b) was here. We have also informally stipulated that at any given time, if there is some object that realizes p-k, there is one and only one such object. That object has to be p-i. Now p-i and o have to be identical, because if they were not there would have to be some object o which realizes p-k whose stage was here, and o could not be p-i. But this is contrary to our assumptions. Given that p-i = o, we see then that (87a) follows from (87b). So (87a) and (87b) entail each other, and have the same truth-conditions. Since j = p-i at this time, it follows that p-k is here if and only if Jimmy Carter is here. Since the two proposed read-

ings of (86) have equivalent truth-conditions, an ambiguity is not detected. The net result is that in extensional contexts where p-k or p-i have a stage taken of them, they will in all cases have the same truth-conditions.

In intensional contexts where reference is made to stages it will follow that that stage is a stage of p-i iff it is a stage of p-k. The substitution of Jimmy Carter, though, will of course fail for the usual reasons (as p-i is not a rigid designator, but designates Truman at some times, Coolidge at others, etc.).

This leaves those cases where no reference is made to stages at all, as would be the case in the following examples.

(88) a. Bob hates the president.

b. The president eats alone.

c. Bob believes that the president owns the White House.

d. The president owes the American people his honest best effort.

I believe there are two distinct ways of interpreting each of these, though the judgments here are no doubt of a subtle nature. One reading is equivalent to the reading obtained when Jimmy Carter is substituted for the president. The property expressed is then asserted to be the property of the current president. But I believe that there is another reading, which in some vague way attributes the relevant property to all presidents, and not to any particular president. This latter reading entails that the predicate is true of p-i as well. This situation is similar to that of the relationship between (89a) and (89b).

(89) a. Dogs bark.

b. Fido barks.

Provided we know Fido is a dog, we are tempted to infer from (89a) that (89b) holds, though such an inference is of course unwarranted. In like manner, if the president (that is, p-k) owes the people his best efforts, it is tempting to infer that Jimmy Carter owes the people his best efforts as well. Whether or not this entailment should be stated in terms of an entailment that should hold is open to debate. At this time, I am inclined to forego making such a formal statement in the semantics. Consider a sentence like (90).

(90) The president hates to have his bills overriden by Congress.

On the reading where no one president is spoken of (but in some sense all), I do not believe that this requires that all presidents feel this way. If Carter were to not be displeased when his bills were overriden, it would not necessarily falsify (90). There is, however, a very strong inclination to attribute these object-level properties attributed to p-k to p-i as well.

It does not follow, in general, that whatever properties may be attributed to Jimmy Carter may be attributed to p-k as well. Certainly, if Carter wears a sweater, it does not follow (on one reading) that the president wears a sweater (meaning then we expect that behavior out of future presidents as well). Or if Carter is a democrat, it does not follow that p-k is a democrat.

In sum, what is being suggested here is that a certain subclass of definite descriptions ambiguously denote property sets of objects, or property sets of certain kinds. The kinds associated with these definite descriptions would be of a restricted sort by comparison to the class of kinds referred to by bare plurals and other sorts of NP's we have been examining. It seems to be an intuitively promising extension of the analysis proposed for kinds of things, though the details are yet quite unclear and much more investigation is required.

6. Mass Nouns, Abstract Nouns, Gerunds, and Infinitives

6.0 Mass terms. The basic problem with mass terms is that their referents normally do not appear to come 'pre-packaged' as do the referents of count terms. As there is a rich and abundant literature concerned not only with this problem, but with many other aspects of mass terms (see for example, *Synthese* 31, 1975), we will leave undiscussed a good deal concerning these constructions. There is one very crucial point that the analysis offered here for bare plural NP's does have a direct bearing on, however, and it is that if bare plurals have, in most cases, denotations that are the property set of some kind of thing, then surely mass terms are to be analyzed likewise. Unquantified mass nouns, like unquantified bare plurals, behave in a remarkably parallel fashion with respect to the criteria established here. I will mention but a few of these parallelisms below.

Like bare plurals, mass terms have a 'universal' and an 'indefinite plural' (or existential) use, which distribute themselves exactly as the corresponding readings of bare plurals.

(91) $\left\{\begin{matrix}\text{Rain}\\ \text{Hail stones}\end{matrix}\right\}$ fell on the city. (existential)

(92) $\left\{\begin{matrix}\text{Rain}\\ \text{Rain-drops}\end{matrix}\right\} \left\{\begin{matrix}\text{is}\\ \text{are}\end{matrix}\right\}$ wet. (universal)

(93) {Snow / Snow-flakes} fell slowly. (ambiguous)

And the existential sense of the mass terms exhibits the same sorts of semantic characteristics as the existential sense of the bare plurals. In (94a), there is no reading that each person saw the same pieces of furniture, but there is such a reading in (94b) when the mass term is quantified.

(94) a. Everyone saw furniture yesterday.

b. Everyone saw sm furniture yesterday.

In this respect, we observe that the existential use of mass terms when unquantified exhibits narrow scope only with respect to other quantifiers and negation.

It also appears, as we would anticipate, that in opaque contexts we find only opaque readings for these NP's. Compare (95a) with (95b).

(95) a. Bill believes that furniture is in Belle's attic.

b. Bill believes that sm furniture is in Belle's attic.

And we find differentiated scope as well.

(96) a. Water was everywhere.

b. Bill destroyed furniture for 20 minutes.

c. Snow blew around in our basement all last winter.

Here, we find it need not be the same water that was everywhere, nor need Bill have repeatedly destroyed the same pieces of furniture, nor need it have been the same snow in our basement for the whole winter.

As noted previously, pronominal forms do not require identity of individuals either with mass terms. In (97) the same furniture is not being sought by both Mary and Martha.

(97) Mary is looking for furniture, and Martha is looking for it, too.

We may also find a universal reading of a mass term serving as antecedent for an existential reading, and vice-versa.

(98) a. Although Bob dislikes *beer*, Fred served *it* to him last night.

(98) b. Fred served Bob *beer*, although it is not good for one's health.

We also find that many of the kind-level predicates are entirely felicitous with mass terms as well.

(99) Snow is widespread/common/rare/in short supply.

It is also noted that mass terms may co-occur with adverbs of quantification, the quantifying sense of modals, and exhibit the same sort of behavior with *when*-clauses as do bare plurals.

(100) a. Furniture is always heavy.

b. Grass can be nutritious.

c. Lard is tasty when it has been prepared with great care.

Finally, we can overtly classify bare mass terms, as we may bare plurals, as being a kind of thing.

(101) a. Gold is a kind of precious metal.

b. *Sm gold is a kind of precious metal.

Alternatively, we might use a simple CN in predicate position that ranges over kinds. This gives rise to sentences such as (102), which is synonymous with (101).

(102) a. Gold is a precious metal.

b. *Most gold is a precious metal.[4]

So it is apparent that any analysis which fails to account for these overwhelming distributional parallelisms in some principled manner is not adequate (Cartwright (1975a) argues similarly, as well as Carlson (1973)). If it is true that bare plurals refer to kinds of things, then it is surely the case that mass terms do as well. In this respect, the analysis of Cartwright (1975b) appears most promising, where she takes *water* as denoting a kind.

The differences between mass terms and bare plurals are apparent, however. But none of these differences, I feel, would warrant complete cleavage between them. For one thing, certain kind-level predicates do not apply.

(103) *Furniture is numerous/increasing in numbers.

We also find that mass terms have no corresponding a generic, an anticipated result given that any determiner or quantifier that selects

only singular count nouns and not plural ones does not co-occur with mass terms.

(104) *Every men *Every sand (not kind of sand, of course)

*One men *One sand

*Each men *Each sand

*One men *One sand

*A men *A sand

Another difference is that there is no definite generic with any mass term I am aware of. As *the* occurs elsewhere with mass terms, this gap is unexplained. There may be a small amount of evidence that there is a definite generic with mass terms, but the definite article is obligatorily removed. I find (though others do not) that as the object of the verb *invent*, the bare plural yields a strange reading when compared to the definite generic.

(105) Edison invented {??light bulbs / the light bulb}.

While I have no idea how to account for this, I find that mass terms may occur in this context quite naturally, thus apparently patterning like the definite generic and not the bare plural.

(106) The Chinese invented {gunpowder / writing ink / paper}.

As the definite generic appears to have for the most part a subset of the readings of the bare plural, if mass terms have a corresponding definite generic it would no doubt be difficult to spot.

Why would it be that mass terms and plural count nouns pattern so much alike as opposed to singular count nouns? In the end, I can only make one vague suggestion. Perhaps it is that mass nouns and plural count nouns are basically predicates that apply to QUANTITIES of things, whereas singular count nouns do not (only applying to singular objects). Whether or not this suggestion is sensible in the first place, and, if it is, whether or not it plays any role in the ability of plural count nouns and mass terms to function in English as NP's by themselves that denote sets of properties of kinds remains to be investigated.

6.1 Abstract terms. In all previous discussions, we have been treading the more familiar ground of concrete objects. We talk of dogs and mice and cars and books; we do not talk of virtue or pleasure or goodness or intelligence. These latter abstract things

cause all sorts of difficulty for the philosopher and linguist alike, probably for the most part due to our general preoccupation with the concrete. On the basis of the analysis presented here for concrete sorts of things, we might be tempted to regard an NP like *democracy* as denoting an entity that is in the realm of kinds of things. If this is so, it would require a good deal of adjustment concerning how these things relate to objects and stages, though it is perhaps in these terms that the differences between concrete kinds and abstract kinds might be represented. It should be noted that many of these abstract nouns satisfy a number of criteria for kinds that have been mentioned before. Some appear to have an 'indefinite plural' reading as well as a 'universal' reading.

(107) a. Democracy is a form of government. (universal)

b. The Greeks practiced democracy. (existential)

c. There is now democracy in India. (existential)

d. Democracy is nearing extinction. (universal)

Many of the other constructions that have been used to isolate kinds are participated in by these as well.

(108) a. Courage is not very common/widespread.

b. Democracy is often the worst form of government for a people.

c. Intelligence can be evil.

d. Goodness is virtuous when *it* is accompanied by true compassion.

So perhaps treating these as kinds of things would be a reasonable place to start in an investigation of their semantics.

A couple of distributional characteristics of certain classes of abstract nouns may be affected by the discussion that took place in Chapter 6. Moravcsik (1970) classifies mass terms into three basic categories. The first category is called 'abstract count' and includes such terms as *virtue*, *science*, *color* and *objection* (even though the first three are also mass nouns as well in terms of distribution). The second class involves abstract non-count nouns, such as *nonsense*, *vagueness*, *significance* and *precision*. These have no count-noun counterpart. The third class consists of what are called abstract proper names, and include nouns like *three*, *July*, *sincerity* and *courage*. Though I do not feel these classifications are in all cases based on judgments that I share, a completely correct classification system is unknown to me. In any case, let us examine certain of these cases in the light of the analysis of kinds.

The first class includes words that appear to fuction both as mass and count nouns, while the second and third classes do not appear to function likewise.

(109) a. {Much virtue / Much science} {many virtues / many sciences}

b. {Much courage / Much precision} {*many courages / *many precisions}

Some of these words, then, may have both count and non-count alternatives, while others have only non-count forms. I believe we may see why this is so at least for a number of cases.

In Chapter 6 it was noted that the lexical rule which derives nouns that apply to kinds from those that apply to objects (e.g *animal* meaning kind of animal from the basic entry that ranges over objects) would not operate on those nouns that did not have any lexically-entered nouns that were related by being subordinate kinds (or rather, correspond to subordinate kinds). Thus, we can talk about some *bird* being extremely common, meaning some kind of animal, because there are lexically-entered nouns which correspond to kinds of animals (*tiger*, *mouse*, etc.). On the other hand, for most people, it is strange to talk of some oriole as being very common, as it is generally unknown as to whether there are lexically-entered subordinate kinds of orioles.

It seems reasonable that a similar state of affairs holds concerning the relationship between such nouns as *virtue* and *courage*. Notice that we can say the following.

(110) a. Courage is a virtue.

b. Courage is a kind of virtue.

(110a) means the same as (110b). To account for this, it is proposed that abstract nouns as well participate in this lexical rule which derives kind-level count nouns from object-level nouns (much as *wines* may be derived from the mass term *wine*). Thus, the non-count noun *virtue* has a corresponding lexical entry which is a count noun which ranges over lexically entered subordinate *kinds* of virtue (as courage, sincerity, humility, etc.). Likewise, the non-count noun *science* has a count form *sciences* which applies to kinds of science, such as physics, chemistry, psychology, etc.; or the non-count *color* has the form *colors* because there are lexically entered kinds of color (red, blue, brown, etc.). On the other hand, *courage* and *chemistry* (but not *psychology*) do not have count-noun forms associated with them becuase there are no lexically entered subordinate kinds (at least that I can think of, but in the case of *psychology* there are such words as *behaviorism*, *functionalism*, etc.). This is not because there are no kinds of chemistry, or kinds of courage, because we can sensibly say such

things as exemplified in (111).

(111) a. They exhibited the kind of courage characteristic of all devoted hockey players.

b. What kind of chemistry does Maria Evans do in that basement laboratory, anyway?

This account of certain count-non-count alternations among abstract nouns is not intended to cover all cases of such alternations, of course. For example, *animations* appear to be very concrete things (as cartoons), though the abstract noun *animation* seems to be classed as an abstract noun, and concrete animations would not plausibly be considered kinds of animation.

There is, I believe, a bit more evidence that kinds are playing a fairly crucial role even in the class of abstract nouns. It was noted that with the indefinite article (not in predicate nominal position) a kind-reading for an NP is difficult to obtain, if the head noun was unmodified. With some modifier, however, there is a marked increase in acceptability. Thus the difference between (112a) and (112b), which requires a 'kind' reading for a plausible interpretation.

(112) a.??At Seiko, they make a watch.

b. At Seiko, they make a watch that also serves as a juice squeezer and as a tire pump.

Likewise, with abstract nouns, similar distributions are observed for many of those nouns that have alternative count and non-count forms. Examine the sentences below.

(113) a. ?We discussed a virtue at the meeting.

b. We discussed a very unusual virtue at the meeting.

(114) a. ?Sally has a fear.

b. Sally has a fear of small creatures.

(115) a. ?A color emanated from the next room.

b. An eerie color emanated from the next room.

In terms of pronominal reference, too, some of these count noun forms appear to pattern like kinds of things, rather than like objects. For instance, one might consider (though I don't know of anyone who has proposed this in actuality) that a color is to be identified with a set of patches of color. However, the following sentence cannot be used to report a case where Sue and Jill are looking at different patches of color, though both patches are of the same hue.

(116) Sue is looking at one color, and Jill is looking at another color.

Similarly, if Bob walks into the meeting and objects "Your use of force was unjustified," and a few minutes later Hal comes rushing in and proclaims "Your use of force was unjustified," we cannot say (117).

(117) Bob voiced one objection, and then Hal voiced another one.

Even though the ACTS of objecting in (117) are no doubt distinct. In these two cases, we can say the following, though.

(118) a. Sue is looking at one color, and Jill is looking at *it*, too.

b. Bob voiced one objection, and then Hal rushed in and voiced *it* as well.

It is not clear to me how to assimilate abstract nouns into the treatment of kinds given here for concrete sorts of things (or any other system). It does appear, however, that a full treatment of kinds of things in a semantic system would have a good deal to say about the nature of abstract nouns.

6.2 Gerunds and Infinitives. Chomsky (1957) exhibits the following sentence as a classic case of ambiguity in natural language.

(119) Flying airplanes can be dangerous.

The reading of (119) paraphrased by 'airplanes that are flying are dangerous' is readily accounted for by a slight extension of the fragment presented in Chapter 6 (namely, the inclusion of the appropriate lexical items). The other reading, though, is a bit more difficult to account for -- when one flies an airplane, it is often dangerous. The interesting point about this reading of (119) here is that *can* in this context appears to be the quantificational *can* which was represented in Chapter 4 as quantifying over object-level realizations of the subject.

These gerunds also appear to pattern like kinds of things in a number of other ways. For example, certain kind-level predicates seem to felicitously apply.

(120) Getting into trouble is very common/rare/widespread among the youth of today.

(121) Being a linguist is *often* an honor.

(122) Being a musician is an honor *when it* is accompanied with great fame.

In (121) and (122) we see the adverbs of quantification and the peculiar *when*-clauses also may apply.

Are gerunds, then, kinds of things? If so, we find ourselves positing as kinds more and more unlikely-sounding sorts of things, from concrete nouns into abstract nouns into gerunds. But matters become even a little stranger when we observe, as did Bach (to appear), that infinitives, in some cases, behave like kinds of things as well. He observes that the following is quite felicitous. (his (94))

(123) For people to love their children is common.

In addition, it is noted that these infinitives, too (but not all) may participate in other sorts of criterial constructions.

(124) To eat too much salt can be a sign of low birth.

(125) To sass one's parents is forbidden when the grandparents are of Polish extraction.

Unfortunately, I can do little more than note the similarity between kinds and infinitives and gerunds. For some particularly interesting discussion, see Bach (to appear) and Montague (1974).

One may think of treating infinitives as being entities among the realm of kinds of things to really be an unreasonable approach to their proper treatment, a point that I cannot contest at this time with any degree of persuasion. It deserves mention, however, that Thomason (1976) proposes treating propositions as being associated with entities (that is, things of type <e> or some sub-type). If his treatment is correct, it would be a short step indeed from there to infinitives, from infinitives to gerunds, from gerunds to abstract nominals, and from there to concrete NP's that denote property sets of kinds. After all, if in English these things all show up as NP's (which they seem to), in a Montagovian system they would all have to be of the same semantic category as well. The best guess so far is that they denote sets of properties of things of type <e>. Here we have seen that there is at least a good deal of utility -- if not a good deal of intuitive satisfaction -- in treating kinds of things as being of this semantic type.

7. Conclusions

The chief conclusion of this work is that the English bare plural should be treated as a unified syntactic and semantic phenomenon, and that the key to its proper interpretation involves treating it semantically as being the name of a kind of thing. Mass terms should be treated in a similar manner.

How we arrived at this conclusion is of some significance, as the treatment of the bare plural as a name of a kind did not arise

from investigating kinds of things directly. Instead, we began by examining what at first sight appears to be a noun phrase construction that is simply existentially quantified. It was then seen that several problems arose concerning the semantics of this putatively existentially quantified NP which separated this sort of construction from all other quantified NP's. It was also found that there was reason to believe that the existential use of the bare plural was not to be distinguished from the generic, or universal use. But if this is so, we find ourselves at a loss concerning what sort of quantification we should then associate with these NP's, for the generic use seems to demand universal quantification, but the existential use demands existential quantification. We then turned our attention to the generic use, and discovered that there was no consistently specifiable quantifier that could be associated with this use of the bare plural. A proposal was then made that we not attempt to associate a quantifier with the generic use, but instead treat the generic use of the bare plural as being the name of a KIND of thing. Our attention then returned to the existential use of the bare plural to see if there was some way of unifying that construction with the generic use. It was there that the hypothesis was set forth that it is in all cases the sentential context which determines whether or not the bare plural will receive one interpretation or another, and not some inherent ambiguity present in the semantics of the bare plural itself. An ontology was introduced, where the entities were divided into three subtypes -- kinds, objects, and stages -- all related by the realizaion predicates in certain ways. It appeared that certain predicates applied to just certain sub-types, to the exclusion of others, and that the interpretation of the bare plural patterned accordingly. In those cases where the existential interpretation of the bare plural was found, it was posited that as part of the interpretation of the predicate that was an existential claim made about stages of the individual the predicate was ultimately applying to. It was then shown that the problems noted with positing there to be an existential quantifier as part of the semantic interpretation of the bare plural itself could be accounted for in a principled manner under the theory presented, where the initially strange things about the existential use of the bare plural turned out to be the expected. A few more applications of the treatment proposed were then given, including the *see drunk* construction, There-Insertion, adverbs of quantification, and certain interpretations of modals. A fragment of English was then presented.

In the following chapter, extensions of the fragment were proposed, where the treatment accorded kinds of things led to a fruitful account of simple CN's that referred to kinds (as the ambiguous *this animal*), those NP's that have overt occurrences of the word *kind* in them, and it was shown that the English word *such* (on the reading we were concerned with) proved to have as its key the notion of kind. Some shortcomings of the fragment were then presented with respect to the interpretation of pronominal forms, and it was there that the predicate G was introduced. Unlike previous suggestions for treating generics with some verb phrase or sentence-level semantic operation, G does not in any sense function as a quantifier. It is instead a mapping from predicates of one level to those of another. We saw that the use of G could lead us to a number of satisfying results regarding generics, in particular the problem of pronominal coreference, the 'meaning-changing' character of the passive transformation, and it proved to be of great value in representing the semantic properties associated with the indefinite singular generic (*a bird*).

Due to the range of the impact of the proposed analysis of kinds of things proposed here, there remain many areas left unexamined in any detail, some of whose investigations may very well show an incompatibility with the line of analysis pursued here. Of particular interest would be an investigation of what it is about our cognitive make-up that G is supposed to represent, as well as another look at those bare plural NP's that do not seem to function as the proper name of a kind of thing. Other languages, too, were left wholly unexamined, and quite clearly their investigation in this framework would prove to be of tremendous interest and importance. In spite of all the stones left unturned, and all the difficulties that remain, it has, I trust, been shown here that the investigation of the syntax and semantics of natural language is greatly enhanced by attempting a serious analysis of NP's that refer to kinds of things.

FOOTNOTES TO CHAPTER VII

[1]We here concentrate on *when* because of its peculiar semantics. Similar problems are found in adverbial clauses introduced by *if*, *after*, *before*, *unless*, etc.

[2]Terence Parsons notes that use of the definite generic always indicates an academic-sounding register in one's speech, and thus perhaps trivial events spoken of in this way adds to the strangeness of sentences such as (46).

[3]The NP *presidents* denotes a kind, and one reading of the NP *the president*, (the definite generic) denotes that kind as well. This reading of *the president* is distinct from these.

[4]Montague (1970) notes the following pattern.

(i) Water is a liquid.

(ii)??Blue water is a liquid.

I believe these should be analyzed as having the predicate nominal range of KINDS of liquid. Given the analysis of simple CN's proposed in Chapter 6, this would follow.

An oft-discussed sort of sentence wiht regard to mass terms is (iii).

(iii) Gold is a substance.

The assumption is here that the predicate nominal *substance* names a set of things that are substances. However, this, too, might be more gainfully analyzed as saying that gold is a KIND of substance. Note that *substance*, like *liquid* are basically mass terms themselves, functioning as count nouns in (i)-(iii). This indicates that the predicate nominals here do range over kinds, for mass nouns in count form generally have this characteristic.

BIBLIOGRAPHY

Arnauld, Antoine. 1964. *The Art of Thinking*. New York: The Bobbs-Merrill Company.

Bach, Emmon. 1968. Nouns and noun phrases. In Bach and Harms 1968, 91-122.

_____. 1976. An extension of classical transformational grammar. University of Massachusetts at Amherst ditto.

_____. To appear. On *On Raising* and more on raising. *Language* 53:3.

_____ and Robert T. Harms (eds.). 1968. *Universals in Linguistic Theory*. New York: Holt, Rinehart, and Winston.

Bacon, John. 1971. The generic conception of the universal. Scientific Report No. 10. Jerusalem: The Hebrew University of Jerusalem.

_____. 1974. Do generic descriptions denote? *Mind* 82. 331-347.

Bartsch, Renate. 1972. The semantics and syntax of number and numbers. In Kimball 1972, 51-94.

Bennett, Michael. 1974. *Some Extensions of a Montague Fragment of English*. Ph. D. dissertation, University of California at Los Angeles. Distributed by IULC.

_____ and Barbara H. Partee. 1972. Notes on tense and aspect. Distributed by IULC (1978).

Bolinger, Dwight. 1972. *Degree Words*. The Hague: Mouton.

Bresnan, Joan. 1973. Syntax of the comparative clause construction in English. *Linguistic Inquiry* 4.275-344.

_____. 1975. Comparative deletion and constraints on transformations. *Linguistic Analysis* 1.34-77.

Burton-Roberts, Noel. 1976. On the generic indefinite article. *Language* 52.427-448.

Carlson, Greg N. 1973. Superficially unquantified plural count noun phrases in English. Unpublished masters thesis, University of Iowa.

_____. 1977. A unified analysis of the English bare plural. To appear in *Linguistics and Philosophy*.

_____. To appear. Amount relatives. *Language* 53:3.

Cartwright, Helen. 1965. Heraclitus and the bath water. *Philosophical Review* 74. 466-485.

_____. 1975a. Some remarks on mass nouns and plurality. *Synthese* 30. 395-410.

_____. 1975b. Amounts and measures of amount. *Noûs* 9. 143-164.

Chandler, Hugh. 1975. Rigid designation. *Journal of Philosophy* 72:13. 363-368.

Cocchiarella, Nino. 1976. On the logic of natural kinds. *Philosophy of Science* 43.202-222.

Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.

_____. 1965. *Aspects of the Theory of Syntax*. Cambridge: MIT Press.

_____. 1975. Questions of form and interpretation. *Linguistic Analysis* 1.75-109.

Cooper, Robin. 1975. *Montague's Semantic Theory and Transformational Syntax*. Unpublished Ph. D. dissertation, University of Massachusetts at Amherst.

_____. 1976. The interpretation of pronouns. Paper Presented at the Third Groningen Round Table, June, 1976.

_____ and Terrence Parsons. 1976. Generative semantics and interpretive semantics. In Partee 1976, 311-362.

Copi, Irving. 1967. *Symbolic Logic*. New York: MacMillan.

Curme, George. 1931. *Syntax*. New York: Heath and Company.

Cushing, Steven. 1976. *The Formal Semantics of Quantification*. Ph. D. Dissertation, University of California at Los Angeles. Distributed by IULC.

Dahl, Östen. 1971. Nouns as set constants. *Gothenburg Papers in Theoretical Linguistics* 3. Goteborgs Universitet.

_____. 1975. On generics. In Keenan 1975, 99-111.

Davidson, Donald and Gilbert Harman (eds.). 1972. *Semantics of Natural Language*. Dordrecht: Reidel.

Delorme, Evelyn and Ray Dougherty. 1972. Appositive NP constructions. *Foundations of Language* 8.2-29.

Dowty, David. 1972. *Studies in the Logic of Verb Aspect and Time Reference in English*. Ph. D. dissertation, University of Texas at Austin. Published in *Studies in Linguistics* (un-numbered), Austin: University of Texas.

_____. 1975. The stative in the progressive and other essence/accidence contrasts. *Linguistic Inquiry* 6.579-588.

Frege, Gottlob. 1970. *Translations from the Philosophical Writings of Gottlob Frege*. Edited by Peter Geach and Max Black. Oxford: Basil Blackwell.

Goldsmith, John and E. Woisetschlaeger. 1976. The logic of the progressive aspect. Bloomington: IULC.

Gough, James, Jr. 1969. The syntax-based semantics of the English determiners ∅, *a*, *the*. *Papers in Linguistics* 1. 41-48.

Halvorsen, Per-Kristian and Peter Ladusaw. To appear. Montague's universal grammar: an introduction for the linguist. *Texas Linguistic Forum*.

Heny, Frank. 1972. Review of *Meaning and Structure of Language* by Wallace Chafe. *College English* 33.908-929.

Hintikka, K. J. J., J. M. E. Moravcsik and P. Suppes (eds.). 1973. *Approaches to Natural Language: Proceedings of the 1970 Stanford Workshop on Grammar and Semantics*. Dordrecht: Reidel.

Jackendoff, Ray. 1972. *Semantic Interpretation in a Generative Grammar*. Cambridge: MIT Press.

_____. To appear. *Lexicalist Syntax: A Study of Phrase Structure*. Cambridge: MIT Press.

Jespersen, Otto. 1927. *A Modern English Grammar.* Heidelberg: Carl Winter's Universitätbuchhandlung.

Kaplan, David. 1972. Bob and Carol and Ted and Alice. In Hintikka et al. 1973, 490-518.

Keenan, Edward L. 1975. *Formal Semantics of Natural Language.* Cambridge: Cambridge University Press.

Kimball, John P. (ed.) 1972. *Syntax and Semantics*, 2. New York: Seminar Press.

_____. 1973. The grammar of existence. *Papers from the Ninth Regional Meeting of the Chicago Linguistic Society.* Chicago Linguistic Society.

_____. (ed.) 1975. *Syntax and Semantics*, 4. New York: Academic Press.

Kripke, Saul. 1972. Naming and necessity. In Davidson and Harman 1972, 253-355.

Kroch, Anthony S. 1974. *The Semantics of Scope in English.* Ph. D. Dissertation, MIT. Distributed by IULC.

Lakoff, George. 1971. On generative semantics. In Steinberg and Jakobovits 1971, 232-296.

Lakoff, Robin. 1972. The pragmatics of modality. *Papers from the Eighth Regional Meeting of the Chicago Linguistic Society.* Chicago Linguistic Society.

Lawler, John M. 1973. *Studies in English Generics.* University of Michigan Papers in Linguistics, Vol. 1, No. 1.

Lewis, David. 1975. Adverbs of quantification. In Keenan, 1975, 3-15.

Macaulay, Ronald. 1971. *Aspect in Enlgish.* Ph. D. dissertation, University of California at Los Angeles.

Mates, Benson. 1968. Leibniz on possible worlds. In Rootselaar and Staal, 1968.

Miller, George and Philip Johnson-Laird. 1976. *Language and Perception.* Cambridge: Harvard University Press.

Milsark, Gary. 1974. *Existential Sentences in English.* Ph. D. dissertation, MIT. Distributed by IULC.

Montague, Richard. 1970. Reply to Moravcsik. In Hintikka et al. 1973, 289-294.

_____. 1974. *Formal Philosophy. Selected Papers of Richard Montague.* Edited and with an introduction by Richmond H. Thomason. New Haven: Yale University Press.

Moravcsik, J. M. E. 1970. Mass terms in English. In Hintikka et al. 1973, 263-285.

_____. 1970a. Subcategorization and abstract terms. *Foundations of Language* 6.473-487.

_____ and Dov Gabbay. 1973. Sameness and individuation. *Journal of Philosophy* 70.513-526.

Munitz, Milton and P. Unger (eds.). 1974. *Semantics and Philosophy.* New York: NYU Press.

Nunberg, Geoffrey and Chihua Pan. 1975. Inferring quantification in generic sentences. *Papers from the Eleventh Regional Meeting of the Chicago Linguistic Society.* Chicago Linguistic Society.

Parsons, Terence. 1970. An analysis of mass terms and amount terms. *Foundations of Language* 6.363-388.

Partee, Barbara H. 1974. Opacity and scope. In Munitz and Unger 1974, 81-101.

_____. 1975a. Montague grammar and transformational grammar. *Linguistic Inquiry* 6.203-300.

_____. 1975b. John is easy to please. MS.

_____. 1975c. Deletion and variable binding. In Keenan 1975.

_____. 1976a. Some transformational extensions of Montague Grammar. In Partee 1976b, 51-76.

_____ (ed.). 1976b. *Montague Grammar.* New York: Academic Press.

Perlmutter, David. 1970. On the article in English. In Manfred Bierwisch and K. Heidolph (eds.). *Progress in Linguistics.* The Hague: Mouton.

Postal, Paul. 1969. Anaphoric islands. *Papers from the Fifth Regional Meeting of the Chicago Linguistic Society.* Chicago Linguistic Society.

Putnam, Hilary. 1975. *Mind, Language, and Reality. Philosophical Papers*, Vol. 2. Cambridge: Cambridge University Press.

Quine, W. V. O. 1960. *Word and Object.* Cambridge: MIT Press.

Roeper, Tom and Muffy Siegel. To appear. A lexical transformation for verbal compounds. *Linguistic Inquiry.*

Rootselaar, B. van and J. F. Staal (eds.). 1968. *Logic, Methodology, and Philosophy of Science* 3. Amsterdam: North Holland.

Ryden, Mats. 1966. *Relative Constructions in Early Sixteenth Century English.* Uppsala: Almqvist and Wiksells.

Selkirk, Elisabeth O. 1970. On the determiner system of noun phrases and adjective phrases. MIT ditto.

_____. 1976. On prenominal AP's in English. MS.

Siegel, E. A. 1976. *Capturing the Adjective.* Ph. D. dissertation, University of Massachusetts at Amherst.

Smith, Carlota. 1964. Determiners and relative clauses in a generative grammar of English. *Language* 40.37-54.

Steinberg, Danny D. and L. A. Jakobovits (eds.). 1971. *Semantics: An Interdisciplinary Reader in Philosophy, Linguistics, and Psychology.* Cambridge: Cambridge University Press.

Strawson, P. F. 1959. *Individuals.* Garden City, New York: Doubleday.

Stockwell, Robert P., Paul Schachter and B. Partee. 1973. *The Major Syntactic Structures of English.* New York: Holt, Rinehart, and Winston.

Suppes, Patrick. 1957. *Introduction to Logic.* Princeton: D. van Nostrand Company.

Sweet, Henry. 1898. *A New English Grammar.* Oxford: Clarendon Press.

Thomason, Richmond. 1972. A semantic theory of sortal incorrectness. *Journal of Philosophical Logic* 1.209-258.

_____. 1976. On the semantic interpretation of the Thomason 1972 fragment. University of Pittsburgh ditto.

Vendler, Zeno. 1971. Singular terms. In Steinberg and Jakobovits 1971, 115-133.

Waldo, James. 1977. A PTQ semantics for sortal incorrectness. Paper delivered at the SUNY at Albany Conference on Montague grammar and formal philosophy, April.

Williams, Edwin. 1975. Small clauses in English. In Kimball, 1975.

Wittgenstein, Ludwig. 1958. *Philosophical Investigations.* New York: The MacMillan Company.

Zemach, Eddy. 1975. On the adequacy of a type ontology. *Synthese* 31. 509-515.