1.

Names

*So from the soil Yahweh God fashioned all the wild
beasts and all the birds of Heaven. These he brought
to the man to see what he would call them; each
one was to bear the name the man would give it. The
man gave names to all the cattle, all the birds of
heaven and all the wild beasts.*
      —Genesis 2:19–20

Though the author of Genesis was no philosopher of language, he
surely encouraged that breed of philosophers by the importance
he attached to names. Just how much importance can be seen if
we compare the above text to one that comes a little before it.
There are, in fact, two accounts of creation in Genesis, and the
two texts come from these different accounts. The first has God
say: "Let us make man in our own image, in the likeness of our-
selves, and let them be masters of the fish of the sea, the birds of
heaven, the cattle, all the wild beasts and all the reptiles that crawl
upon the earth." The second account, cited above, does not explic-
itly say that man is made in the image of his Creator, for the
likeness is implicit in man's ability to name. And his very naming
of the animals marks his dominion over them.
   Genesis does not say what sorts of names Adam gave the animals,
but presumably they were specific names, like *dog, cow,* and *eagle.*
The creation story itself, however, makes use of generic names in
telling us what Adam did; it says that he named the "cattle," the
"birds," and the "wild beasts." In chapter three we find the last
explicit reference to Adam's naming: "he named his wife 'Eve'."
In our attempts to describe children's name learning we shall be

very much concerned with these three sorts of names: proper names, like *Eve,* specific names, like *eagle,* and generic ones, like *bird.* Of course there are many species of eagle of which *eagle* is the generic name. We shall not be much concerned with the niceties of taxonomy, however—anymore than were the young children whose vocabularies we shall be studying. To describe these vocabularies we shall need to talk about three types of names, and I believe that the use of the terms *proper, specific,* and *generic* will cause the reader little inconvenience.

There is a difficulty about what to call these three sorts of words. The Jerusalem translation of the Bible calls them all *names;* though some writers would reserve that word for proper names, like *Eve.* I prefer to avoid *noun,* because nouns are specified with regard to the syntactic structure of a sentence. To call a word a noun suggests the role it plays in grammar, and since young children do not speak in anything recognizable as sentences, I will at this stage sidestep the issue of what parts of speech their words belong to. To call them simply *words* would be too imprecise. Logicians use *term;* but while this has the attraction of established usage, it has the disadvantage of being at once too technical and too comprehensive. *Term* is too technical in that it embraces purely logical expressions, such as general symbols for functions and variables; it is too comprehensive in that it embraces such complex structures as *father of Mary.* Besides, *term* seems to lack some of the force that *name* has of denoting objects, or drawing attention to and designating them. For this reason I will press *name* into extended service. There is nothing in principle against doing so, though we should note that frequently common nouns are not used as names. In *Mary is a girl, girl* does not name anything, whereas *Mary* names Mary. The point will come up again; for the moment just accept that common nouns are not always names: proper names always are. By way of comfort for the uneasy, my decision to call proper and common nouns by the single word *name* has the backing of Plato in *The Sophist;* of Aristotle in the *De interpretatione,* though he later changed his views; and of such redoubtable modern logicians as Geach (1962, 1972) and Kripke (1972).

Technical details aside, however, what are we to make of the Bible's reverence for naming? Is it merely a residue of primitive awe at the first attempts at systematic classification? Whatever the risk of being thought primitive, those of us who have spent years in studying how children learn names are more inclined than most

to take the texts at face value. In order to name things intelligently the child must know a lot about them, and in addition he must know their names. The power of so naming presupposes the power of distinguishing among objects, recognizing them when encountered again, and assigning them to their classes. To call something a *dog*, with normal understanding, is to claim true of it those characteristics that mark it a dog. How anyone learns to do that has puzzled men from Plato to our own day. In addition, being able, intelligently, to call a creature a *doggie* often implies in some measure the ability to deal with it. The child who knows what dogs are knows that they bark, run, eat, and sometimes bite. He knows what to expect of them. Similarly, when he knows what chairs are, he knows that they do none of the things a dog does, but you can usually sit on one without fear that it will collapse.

Imagine how you would feel if you were sick and went to see the doctor, and the doctor was unable to say what was wrong with you. In Ireland sick people sometimes bewail the doctor's inability "to put a name" on their complaint. It is most disturbing; it signifies to the patient that the doctor has failed to make sense of his symptoms and, consequently, does not know how to treat him. The patient is obviously justified in regarding disease naming as something far beyond linguistic expertise.

Ideal Science of Name Learning

Before embarking on the search for a theory of name learning, it is wise to ask what a good one would be like if we found it. Obviously it should have three major components. It should state what names are and how they function in the language that is being learned; it should specify those properties of mind that are relevant to name learning, those that enable a child to learn names; and it should explain how a child with the specified properties learns names. Let us look briefly at each component, for in doing so we not only shall have a preliminary look at the problems, but also shall outline the scope of the book. Since it is a preliminary look, however, the language will be less precise than it needs to be later.

A. NAMES

The sorts of names we have discussed are distinguished by their semantic functions. Proper names are the paradigm examples of words that refer. They reach out, as it were, to objects and designate them for comment. It is less clear that common nouns also

refer, though an interesting case can be made that they do. What common nouns certainly do is describe. If I say *Tom is a cat, Tom* refers to a particular creature; *cat* describes him. Descriptions can be either true or false of the object to which they are ascribed.

Do proper names also describe? At first they might appear only to refer, not to describe. Yet if a proper name is to be applied on different occasions and if it is to perform its task of referring, a single proper name must refer to the same object on all occasions on which it is used. (For the moment forget that there can be several men called John Smith.) What is needed to ensure such constancy? To forestall later discussion, it seems that the name must be associated with a principle of identity, and that is best supplied by some such common noun as *cat. Tom* will continue to perform its function properly if it continually picks out *the same cat.* It seems, then, that proper names tacitly involve certain sorts of common nouns and, thus, certain sorts of descriptions.

If this is right, common and proper nouns can refer and describe. Nevertheless the two sorts of word are semantically distinct. We shall have to explore how they differ.

Specific and generic nouns also differ, mainly in the range of objects to which they can be suitably applied. While all roses are flowers, not all flowers are roses. At the same time a single object can be a flower and a rose. The child has to cope with all this. The family pet may be called *Spot, the dog,* and *the animal.* What sense is the child to make of this proliferation of names used of a single creature? What are the implications for theories of reference and meaning that all three types of word can be employed of a single creature?

Personal pronouns are another sort of word which can be used to refer. Their reference is not so stable as that of proper names. Whom they refer to depends on the speaker, the person being addressed, and what the speaker is talking about on a particular occasion. There can be little doubt that the pronouns refer, and a good case can be made that they also bear meaning. The child must master all this, while distinguishing the semantic force of pronouns from that of proper names and from that of common names.

All the foregoing comes, broadly, under the rubric of semantics. There are also linguistic aspects of name learning. Each name consists in speech sounds. Each language has its own set of speech sounds. The child, if he is to perceive names correctly, must learn to identify patterns of such sounds, and learn, too, what modifica-

tions of sounds the language permits. In addition, he must learn to articulate those sounds in recognizable form.

Names belong in grammatical categories, as do all the words of the language. Grammatical categories vary from language to language. The child must learn what ones his language employs and which words belong in which categories. This is a great problem that has not received a fair share of attention in the literature on child language, and in particular in the literature on name learning. Yet the learning of grammatical categories is the fundamental issue in the learning of syntax; since syntactic rules are defined over the grammatical categories.

A subset of common names have plural as well as singular forms. The same subset can also take *a* as well as *the*. This grammatical variation is accompanied for the most part by semantic variation that is not too complicated. Since the grammatical variation may provide the child with useful clues to the subcategories of names, I have included chapters on number and the definite article. I admit, however, that the decision to include those topics and exclude others is to a great extent arbitrary. My choice was to some extent motivated by the availability of interesting empirical work.

B. RELEVANT PROPERTIES OF MIND

What does the child bring to the task of name learning that is useful? That obviously depends on what names are and how they function. The foregoing remarks do not really answer those questions; they merely reveal the scope of the question. Before we can be at all specific about what the child brings to the task, we need fairly explicit theories of reference and of how the language does the work of referring. We also need a fairly explicit theory of meaning for names. In addition we need a theory of phonology and theories of the other grammatical aspects of names that we choose to tackle.

The grammatical aspects of names and their functioning will cause us fewer problems than the semantic ones. Nevertheless we cannot expect more than a sketch of what each involves and of what the child brings to the learning of each. This book will serve its purpose if it provides a sketch that has some chance of being right. Further progress must wait upon theoretical advances and on empirical observation.

The same can be said of the semantic aspects, but here the position is worse. There is little problem in picking out the nouns

in an English sentence; there is little in specifying which sounds contrast with which at the phonological level for a particular dialect of English. There is great difficulty in deciding which words refer. And there is enormous difficulty in specifying what reference and meaning are. Still nothing is to be gained by fighting shy of the difficult problems. What I have done is proposed the very best theories of reference and meaning that I could, fully aware how uncertain the ground is on which they are constructed. In connection with each I propose a psychology indicating what the child would need to bring to the task of learning, if the theory of reference is correct. If anyone can improve on the theories, he will, in doing so, have means for improving the psychology. Equally, if anyone can improve on the psychology, he will have means for improving the semantic theories. For there must be a match between the two.

Because of the complexity of the issues, the unfamiliarity to many psychologists of some of the analysis and the controversial nature of the conclusions, I have placed the theoretical chapters on reference and meaning towards the end of the book, as chapters 11 and 12. While some of the issues in the earlier chapters have not been so closely discussed in the psychological literature before, the type of evidence and argument will be familiar to psychologists.

C. LEARNING

How does the child learn names? A satisfactory answer presupposes answers to the questions raised in sections *a* and *b*. For the question is, how does a child as described in *b* learn names as described in *a*?

So sketchy have our answers been that there is little to gain at this point from a direct attack on learning. Let us adopt an indirect one. Some psychologists may consider that psychological learning theory, in principle, provides an answer. It is not, however, the answer given in this book. Indeed there is scarcely any discussion of that theory elsewhere in the book, and courtesy demands an explanation. Besides, in looking at learning theoretic approaches, we will deepen our understanding of the issues already raised.

First, some remarks about animals and language. It does not help our understanding of children to be told that a dog can learn simple commands, such as *bring the ball*. It could be that he senses the master's intention or, as conditioning theory would have it, that he has a gratifying series of associations between hearing the

sound, bringing the ball, the master's throwing it, and the excitement of the chase. Unfortunately we do not know what the command conveys to the dog; and naturally all attempts to explain how the dog interprets depend on what his interpretation is. The same is true of the remarkable work done by Gardner and Gardner (1971), Premack (1976), and others in teaching chimpanzees various sign languages. If chimpanzees can learn names for things, they pose us the same problem as children. How do any of them do it?

The most common approaches to the meaning of a word in psychology come one way or another under the heading of associations. Associations are a theoretical construct of great simplicity: an association is a relation between two psychological events, A and B, such that when an event of type A occurs, an event of type B tends to occur also. A and B can be a sensation and a memory, e.g., A can be the sensation of a knife and B the memory of a fork. More to the point, A can be the auditory sensation of a name and B the visual perception of an object, e.g., the name *knife* and the object, knife, respectively. There surely is something of value in this approach, because if children did not simultaneously experience objects and their names, they could hardly learn their mother tongue.

Associations between auditory and visual events were B. F. Skinner's (1957) main theoretical device to explain the learning of names. The word *association* does not figure prominently in Skinner's book, but since his treatment depends crucially on a reinforced connection between visual stimuli and a verbal operant (response), the connection is an association. One problem for the approach is to explain how the child sets up the appropriate equivalence classes. That is, how does he know that several different sounds are all tokens of, say, the word *dog*? The differences among the tokens are likely to be every bit as marked as those between the objects that are called dogs. Chapter six below deals with the variations in sound. The other arm of the same problem is how does he know which objects are appropriately called *dog*? That is the problem which Plato spent his whole life pondering (see White, 1976), and there is as yet no solution. It follows that difficulty in solving it does not distinguish Skinner's theory from any other. Notice that in Skinner's account *meaning* plays no part outside of an association. Perhaps it is best to regard his work as strictly a theory of how the child learns something, rather than a theory of what he learns. Even

then he has a problem accounting for how the child learns names
for imaginary creatures like Hobbits and leprechauns, such abstract
entities as the number seven, and indeed such theoretical constructs
as electricity and heat.

Traditional accounts of language make great play with the word
meaning and it was surely the absence of the word in other accounts
that prompted Osgood (1953, pp. 695 ff.) to propose an associa-
tionist theory that allowed for "mediating processes" between
words and overt responses. Together with him can be placed phi-
losophers like Morris (1946) and Stevenson (1944) who saw mean-
ing as a "disposition to respond."

The basic idea in these approaches is that what a person learns is
an association between a word and a response. However, words do
not always elicit observable responses, so an observable response is
frequently replaced by an internal, unobservable one. A child, for
example, may feel some excitement at seeing a dog and attempt to
grab him. In the course of time he may associate just the excite-
ment with the word *dog*. The excitement, then, is the meaning
even if no further reponse ensues. That is Osgood's theory, and it
is close enough to a response disposition to be coupled with it.

The attraction of the position is its ability to explain the fact
that words often have an emotional feel to them. *Christmas* may
still evoke a warm familial glow in some breasts, in others a feeling
of exhaustion and snappy humor. Associations seem admirably
suited to handle such phenomena. However, Osgood's theory has
the same problems as Skinner's in explaining how the learner sets
up the equivalences across variations in speech sound on the one
hand and objects on the other. It also has problems explaining
how a word like *triangle* can have a meaning, even if we experi-
ence no feeling or disposition to respond in connection with it.
Finally, *Christmas* does not mean any such thing as warm familial
glow; it means a certain Christian feast, even for persons who are
not Christians.

There is very little chance of either of these theories being an
adequate foundation on which to construct a theory of meaning.
We may ask, however, if associationism is a viable approach to
reference. The answer is no, for two principle reasons. It does not
give an adequate explanation of the principle of identity, the
principle that attaches a name to the same object over time and
over local movement. The associations envisaged are between
perceptual experience and a name. It would be natural for associ-
ationists to appeal to memory and recognition as the foundation

for the principle. But while memory and recognition play a part in the application of the principle, they are not the heart of the matter. For my friend, John Smith, is the same person, even if the ravages of time since I last saw him prevent me from recognizing him. It is the identity that stands when all prods to memory and recognition fail that escapes the associationist.

The second inadequacy of associationism is its assumption that the essence of a proper name is its one-to-one relation with an object. If that were right, there should be no distinguishing a proper name from any other expression that is used exclusively of one individual. Now, often when I meet my son I say, *Hello, handsome!* (which must be short for some such expressions as *Hello! You handsome boy*) and, as far as I am aware, I say it to no one else. Yet it is not his name. It follows that a one-to-one relation between an expression and an individual is not all there is to reference. I am not sure that this is an inescapable argument against all possible associationist approaches to reference, but it is certainly an inauspicious start, and I prefer to look elsewhere for a satisfactory theory.

Associationism meets great difficulties in attempting to deal with names as nouns. As far as I know, no such attempt has been made since the early 1960s. The reason is that nouns are not marked as such in the sensory array. There is, then, nothing that an associationist would recognize in a child's experience that might become associated with a proper name to mark it a noun. This looks like an insuperable difficulty.

More recent work on child language does not use the word *association,* but the general notion of an associative link is, I believe, implicit in the theories. These links are no longer between words and objects or between words and covert responses, but between words and semantic markers (sometimes called "semantic features") and also among the semantic markers themselves.

Eve Clark (1973, 1974, 1977) argues that associated with each common name like *dog* is a set of semantic markers. These constitute the word's meaning. In addition, those that have been abstracted from the sensory array serve as "conditions of application" (Clark, 1977, p. 151) for the word: i.e., they serve in sensory tests of category membership. For example, the markers that go with *dog* might include fourleggedness, a certain posture, a head of a certain shape, and so forth. It is possible, in the psychological tradition, to see the relation between such markers and objects

as an association. Hearing the word elicits the markers. And it is possible to see the relations among the markers as associations. They are associated because they have been experienced together.

Katherine Nelson (1974, 1977) constructs a theory in which sensory attributes seem to play a less central role. She denies that initially children analyze objects into sensory components that serve to classify the objects. Instead, they treat objects as wholes and classify them by the functions they serve. However, the contrast with Clark's theory is less than one might imagine. Nelson believes that subsequently children do establish semantic markers that have been abstracted from the sensory array. And Clark does allow semantic features that are based on functions and characteristic activities. The difference between the two theories, then, is mainly one of emphasis.

An important question about a semantic feature that represents a function is, how does the mind form it? Does it abstract the function feature itself on the basis of sensory attributes of an action? If the answer is affirmative, the theory is empiricist; if it is negative, the theory is not.

Vygotsky (1962) has a theory that can be taken as a variant of those just discussed. The essential modification is slight because he retains all the central concepts that we have seen. He relaxes the rule that an object must show some definite set of features or functions in order to fall under the concept. It is enough to pass some subset of tests or even just one of them.

An even more interesting modification in the same spirit is proposed by Bowerman (1978a). Besides sensory features and functions, she claims that similarities in "subjective experience" can sometimes be the basis for using certain words. She instances the use of *heavy* by her two children, for whom the clue seemed to be "physical effort expended on an object." However, like Vygotsky she claimed that certain words were used of objects that satisfied only some subset of the feature tests. In Bowerman (1978b) she gives this example taken from her daughter Eva's speech over the period of 15 to 23 months of age. Eva first learned the name for the moon; then she went on to call by the same name a half grapefruit, a lemon section, the circular chrome dial on the dishwasher, a shiny leaf, a ball of spinach, a crescent-shaped piece of paper, a hangnail, and so on. A truly remarkable list, but by no means unique! It is a matter for surmise whether Eva thought all those objects were moons, so that *moon* could be used of them in the same sense, or whether she used the word metaphorically of

them all except the "real" moon. Just for the record, my son, Kieran, at that age frequently used the words *like a*. For example he sometimes described the wheeling searchlights on top of Montreal's Place Ville Marie as "like a helicopter." This strengthens the feeling that many such expressions as those of Eva Bowerman are really metaphorical.

Eva's use of *moon* is a good example of what Bowerman (1978b) calls the organization of a word meaning around a basic object or prototype. She is appealing to the work of Eleanor Rosch (1977) and her associates, who have studied "typicality" in adults. The idea is that adults can easily and consistently rank a set of objects for typicality under some descriptor. Take *bird:* they agree that a robin is a more typical bird than a chicken, and a chicken more typical than a penguin. Rosch argues that in learning the meaning of many words, we establish a basic object for the category which we represent either in the form of an image or of a sensory feature list. This works, Rosch claims, only for categories of which people can easily form images, like robin and bird; it does not work for animal. It is easy to see how Eva Bowerman's use of *moon* can be interpreted in that framework. Some of the objects she called *moon* were shiny like the moon, others were shaped like the moon in one of its phases.

In all varieties of semantic-feature theories there is a strong link between features and tests for category membership. The feeling is strong that meaning provides the means for recognizing members of a category. This aspect of the theories puts one in mind of the early days of logical positivism when Carnap (1932) could write: "the meaning of a word is determined by its criterion of application"; and again (Carnap, 1933): "a sentence says no more than is testable about it." Since those days, logical positivism has faded into philosophy. The reason is a growing doubt that meaning, or any part of it, is abstracted from the sensory array. If it isn't, then meaning does not constitute our means for recognizing category members. The issue is discussed at length in Chapter 12, below, but in the meantime here is an illustration of how doubt invades the logical positivist position.

Imagine a child rummaging through the drawers of a sideboard. In it he might find glasses, decanters, cutlery, place mats, and chopsticks. Let us suppose that he has never seen chopsticks before and doesn't know what they are. He asks his mother what they are and she answers "chopsticks." He now knows their name, and he can distinguish them reliably from everything else, but he does not

know what they are for. He might think, perhaps, that they were for use in some game. On the assumption that what chopsticks are for is the principle key to the meaning of the word *chopstick*, we now have it that the child can recognize chopsticks without knowing the meaning of the word. If this is right, one sees how meaning and recognizing category members might be distinct.

Of course, reputable philosophers, Goodman (1951) among them, have argued against the whole notion of meaning. They claim that no useful account of meaning is possible. They fear that talk of meaning will snare us into a belief in strange entities, the most dreaded among them being universals. Why not be content, they ask, with real dogs and sensory tests for them? Why leave the door open to such vague intentional entities as concepts that are constructs of mind or, worse still, to Platonic ideas that exist independent of minds and of physical objects? Meaning is the wedge that keeps the door open.

If we could throw out meaning, as Goodman does, we would simplify psychology. We would not have to explain how it is learned and how it functions. If we keep it, as I believe we must, our psychology becomes complicated. The most we can hope for is to eliminate some initially attractive but unsound theories and through sketching conditions on a satisfactory theory obtain an idea of what a satisfactory theory would be like. Even that is going to be a demanding task and will lead us to explore the network of relationships between words, meanings, concepts, truth value, and sensory tests for category membership.

Psychology of Cognitive Development

Since we shall be studying what the child masters in learning names for things, and since we shall be attempting to specify what he brings to the task, it will be impossible to resist the temptation to speculate about the nature of cognitive development. The crucial question is whether the structure and logic of the child's mind develops as he acquires information about the world and about language.

By "mental structure" I mean the formal systems that the mind employs. The list would include a propositional calculus, a calculus of classes, a basic number system, and a system for finding out causal explanations of phenomena, together with specifications of what will serve as an explanation. (More precisely, I mean the mental representations of those systems, but for the present ignore such niceties.) A bold claim that all the mental structures available

to an educated adult are innate is simply false. The adult may know calculus, which is a mental system for handling data, whereas a child almost certainly does not. The interesting form of the question just posed is whether the child has, innately, a sufficiently rich number system from which to deduce the theorems of calculus.

Jean Piaget and his followers believe that all mental structures are the result of mental development (see Macnamara, 1976). The doctrine, that there is no such development, has on its side the null hypothesis of most work in developmental psychology.

That hypothesis is precisely that there is no development of mental structure. It is easy to refute the corresponding hypothesis in developmental anatomy. At one stage the embryo has no hands and later it has. It is easy to refute a similar hypothesis in the domain of information. The adult knows things the child does not. To refute the null hypothesis about mental structure in the sense just indicated is far from simple, and so far as I know has never been done. If that is right, sound thinking bids us stand by it.

The more interesting aspect of the problem for us will be to study the extent of the mental structure that the child must have if he is to learn names for things. We will not obtain a definitive answer to the question of mental development, but we will learn that the child must have rather more mental structure than Piagetians suppose. Chapter 13 is largely devoted to reflections on the issue.