used in visual display. Perhaps the most sophisticated correlations of all are the ones that have been made in the past ten years between the environments and social systems of various species of African canids, antelopes, and primates. It is not a criticism of all this work but rather a prediction of its logical sequel to say that what is still lacking is a theory that will lend both generality and precision to the stated relationships. This theory will almost certainly be built out of the machinery of population genetics and population ecology, the processes of which form the black box connecting the input of environmental pressures and the output of programmed social responses. Most ethologists, including the authors of *Non-verbal Communication*, do not yet seem to have grasped the enormous potential of this connection. Another curious hiatus is the lack of attempts to conduct formal phylogenetic analysis. Although phylogenetic reconstruction is a central procedure in much of ethology, and some ethologists are in fact just phylogenists using behavioral characters, the reconstruction is typically of an intuitive, 19th-century nature. Reference is seldom made to the modern field of phylogenetic systematics. Perhaps useful applications are still out of reach, but it nevertheless seems curious that so little attention has been paid to such a potentially fundamental discipline.

Far more worrisome to me, however, is the fact that ethologists, and particularly human ethologists, have not yet learned the methods of multiple working hypotheses and strong inference. Typically they still use what might be called the advocacy method of developing science. Author X proposes a hypothesis to account for a certain phenomenon, selecting and arranging his evidence in the most persuasive manner possible. Author Y then rebuts X in part or in whole, raising a second hypothesis and arguing his case with equal conviction. Verbal skill now becomes a significant factor. Perhaps at this stage author Z appears as an *amicus curiae*, siding with one or the other or concluding that both have a piece of the truth that can be patched together to form a third hypothesis—and so forth seriatim through many journals and over years of time. Often the advocacy method, which is displayed in egregious form in *Non-verbal Communication*, muddles through to the answer. But at its worst it leads to "schools" of thought that encapsulate logic for a full generation. There is no question that the superior method of multiple working hypotheses, together with strong inference based on precise models, can be used in even so complex a subject as sociobiology. A good recent example is M. L. Cody's study of the behavior of mixed finch flocks (*Theoretical Population Biology* **2**(2), 142–58 [1971]).

While reading *Non-verbal Communication* I kept having stray thoughts about whether the humanities and social sciences should become branches of biology. Perhaps this will really happen, but the humanists and social scientists involved in the Royal Society project are in no immediate danger of succumbing to the language and thoughts of biology. Edmund Leach has written a lucid essay on the influence of culture on communication, rich with allusions to linguistics and psychoanalytic imagery, but not perceptibly influenced by biology. The same is true of chapters by E. C. Grant on mental illness, Jonathan Miller on drama, and E. H. Gombrich on Western art, each of which would grace the pages of *Daedalus*. Nevertheless, it is notable that such a colloquium was arranged in the first place, and *Non-verbal Communication* is an admirable attempt to systematize what surely must be one of the most important of all emerging scholarly fields. Its failings are those of any exploratory expedition, its chief virtue the promise of important discoveries soon to come.

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Rules and Rituals of Everyday Life

Relations in Public. Microstudies of the Public Order. ERVING GOFFMAN. Basic Books, New York, 1971. xx, 396 pp. $7.95.

Erving Goffman is well known for his seven previous books, in which he has written about the "presentation of self," the implicit rules of social behavior, how people become mental patients, and other aspects of social interaction in real-life settings. It is generally agreed that these books offer profound and original insights into the nature of social behavior, and that they are superbly written. On the other hand Goffman does not provide or make much use of experimental or quantitative empirical data (though he does use detailed descriptive materials), and he stands apart from those social scientists who do experiments and test hypotheses.

In this book Goffman develops his previous ideas by analyzing the detailed rules and rituals of certain sequences of social behavior. He suggests the rules governing human territorial behavior, greetings and farewells, and apologies and explanations following an offense, and describes how criminals and saboteurs maintain normal appearances and how mental patients fail to do so. This book introduces a number of new topics, but more important it also introduces some new ideas, or rather extends some of the author's earlier ideas. Social rules are portrayed as intricate, interlocking sequences, which make social systems workable if the different participants play their parts properly. The sequences are like language in that they have rules of sequence, which people follow without awareness. Certain linguistic analogies are noted, such as the "embedding" of greetings when a greeting itself includes a greeting and a farewell. Emphasis is also placed on various rituals—a greeting is an "access ritual," making the transition to a condition of increased access; it is an interaction sequence which is generally understood and which accomplishes a changed state. Once a farewell has been made it is impossible to repeat it, for example if a visitor has to return to collect a forgotten object.

Goffman's research method is still the same—perceptive observation in a wide variety of specific field situations, together with citation of rather offbeat descriptive studies, for example of saboteurs, gangsters, and spies. His method is to take a limited act of social behavior, such as holding hands or passing another person on the pavement, and to observe carefully how it is done, by whom, what the rules are, and what the subvarieties are. He then postulates concepts which make the act intelligible, and links it to related behavior. Like other sociologists Goffman is concerned with the meaning of events to those involved; however, he does not interview people (as cognitive psychologists and ethnomethodologists do) but infers meaning from what they do.

One way of looking at Goffman's work is to see it as like the rich clinical

observations of Freud, as a source of hypotheses for experimentalists to test. Some of the earlier ideas have indeed been tested in this way, the theory of embarrassment for example, and some of the new ones here could be. Some of this material may lead to research in another way, for instance by suggesting the different forms that territoriality may take. Other hypotheses are virtually untestable—the idea that there is a need for public order, or that self-presentation is usually deceptive. Goffman does not seem to be trying, however, to build up a body of empirical laws and verified hypotheses; he seems to be elaborating a conceptual scheme which will enable us to understand everyday social behavior.

The ideas presented here are of fundamental importance, but I find it difficult to understand precisely what the author's theoretical position is. He stresses the diversity of behavior in different settings, as if the rules for each setting are the result of historical trial and error in different cultural groups. At other points he suggests empirical laws which could apply to all situations. He stresses the similarity with animal behavior, suggesting now that the capacity for these different kinds of social performance is innate. He uses ideas from linguistics, suggesting that there is a kind of grammar of nonlinguistic behavior, though the elements and the rules are not spelled out. This leaves open a host of basic problems. On the more specific topics of rules and rule-breaking with which the book is concerned, what exactly is the difference between basic interaction rules and social conventions, between rules that when broken lead to the breaker's being regarded as mad, criminal, amusing, an innovator, or just as a deviate? And does all social behavior fit this model, which seems most appropriate for rather stereotyped rituals?

What is the importance of studying such apparently trivial behavior as hand-holding? In the first place it provides us with a clearer understanding of the extremely important matter of interpersonal relations, and how they are managed, signaled, and negotiated. Second, it has practical application in the analysis of the behavior of mental patients. Goffman's earlier book *Asylums* was influential in the reform of these institutions—so that his account there has ceased to be correct. In the last chapter of the present book he presents a most illuminating analysis of the social behavior of manic patients as people who have what are taken to be the wrong definitions of themselves, who break rules of access and territoriality, in an attempt to create a certain pattern of social relationships. Goffman can explain why this upsets other people who are dependent on the normal system of rules and relationships, but he does not explain how patients develop this particular style, and it is not very clear what the implications are for treatment.

It is a little disappointing not to find in this book more convergence between Goffman's idiosyncratic approach and the enormous body of experimental and allied material in this area. In his citations Goffman still prefers comic books and offbeat memoirs to solid empirical data. For example he makes no reference to social psychological experiments on deviance or to experimental work on nonverbal communication, both of which are highly relevant to the main themes of this book. Perhaps the real problem is that there are still fundamental differences of approach between those who regard human social behavior as a kind of language, as an extension of animal social behavior, or as a branch of experimental psychology, and those who see it as an intricate social system requiring the collaboration of the actors in ritualized interaction sequences.

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A Paradigm Shift in Psychology

Mental Imagery. ALAN RICHARDSON. Springer, New York, 1969. xii, 180 pp. $6.75.

Imagery. Current Cognitive Approaches. SYDNEY JOELSON SEGAL, Ed. Academic Press, New York, 1971. xiv, 138 pp., illus. $7.50.

Imagery and Verbal Processes. ALLAN PAIVIO. Holt, Rinehart and Winston, New York, 1971. xii, 596 pp., illus. $13.

At one time, psychology was the study of the contents of the mind. Among the most interesting items available to introspection were (and are) *images*, that is, phenomena very like actual sensations and perceptions which occur in the absence of adequate stimuli. It seemed important to determine how many different kinds of imagery there were; to categorize people in terms of the frequency and vividness of their images in various sense modalities (vision, hearing, and so on); and to discover the introspective differences between images and perceptions. In addition, there was a good deal of interest in the functions of imagery and its role in the higher mental processes.

Unfortunately, it turned out that the methods of introspective psychology were not up to the task set for them, and none of these questions has ever received a satisfactory answer. The inconclusive experiments and conceptual confusion which characterized the early work on imagery helped to assure the success of behaviorism, at least in America. Introspective psychology disappeared, and the study of imagery vanished with it. For about 30 arid years respectable psychologists considered it almost indecent to speak of mental processes. When they had to deal with problem solving and other complex activities they took refuge in "covert verbal responses"—words supposedly spoken by the subject to himself, which were connected by bonds of *association*. The only kind of memory studied was verbal memory; thinking was nothing but "verbal mediation"; both were simple examples of associative processes.

In the last ten years this situation has changed remarkably. The behavioristic taboos have been broken, and the mind suddenly seems worth studying after all. Ideas and images are once again discussed in respectable journals. What contemporary cognitive (or "information-processing") psychologists mean by "the mind," however, is very different from what their predecessors meant. The definition is no longer in terms of conscious, introspectively given phenomena. Instead, it is in terms of a flow of information in the organism. Theoretical terms like "storage," "retrieval," "recoding," and "selection," now in common use, do not refer to elements of consciousness but to hypothetical stages of activity or processing. Because of this paradigm shift, contemporary