

Having accommodated Gibson, Neisser now faces problems that Gibson appears unable to handle, such as assimilation of information, conceptual relativity, and deep-structure ambiguity. This is evident in the denial of the occurrence of assimilation (p. 66), the hard line stance that the environment provides an "absolute" specification that disambiguates perceptions (p. 45), and the concluding comment that "in the long run such encounters [between cognition and reality] must move us closer to the truth" (p. 194). What Neisser apparently meant to say is that ambiguity is always relative to a conceptual framework, and that sufficient information pickup within that framework can resolve ambiguity. But, following Gibson, the environment is taken to be the only possible, and ultimate, framework. This naive realism must deny the conceptual relativity of truth and the impossibility of measuring verisimilitude, points well known to philosophers and methodologists. Further, such a claim denies deep structural ambiguity, which results when one entity is different "things" (meanings, etc.) because it fits alternative frameworks equally. Chomsky's arguments and one's personal experience suffice to make that point. One need look no farther than the revolutionary reconceptualizations characteristic of science to see that every revolutionary has been an assimilator. Einstein was not just more skilled in looking than Newton; the conceptual essence of his revolution was to assimilate Newton's observations to a new theoretical framework.

The treatments of attention and consciousness are so vague as to merit no discussion. Neisser's goal is apparently only to argue against information sniping conceptions, because no positive account (beyond the lines quoted above) is put forward.

What of the arguments against control by conditioning? Here there is nothing wrong with Neisser's utilization of Gibson, but the argument from infinite environmental variability is only one of many rebuttals to radical behaviorism. Chomsky's arguments in favor of creativity in language and action acknowledge the same thing within the organism and its responses that Gibsonian argu-

ments put in the stimulus. An adequate psychology must deal equally with the stimulus, organism, and response, and not bury the problems of any one in the others. Were Neisser not committed to stimulus factors, he could have utilized many other arguments (and had a more adequate conception of cognition).

IN sum, the New Testament takes a giant step backward, committing itself to analysis of stimulation and its pro-

cessing in a self-less manner, with no linkage to or integration with action (behavior remains a "consequence" of cognition in chapter 9, rather than an aspect of it). If this is all there is to cognitive psychology, it seems likely that it is merely another passing fancy rushing toward obscurity. Fortunately there are alternatives, to both Neisser and the information processors, which incorporate the tenable aspects of Gibson: one need look no farther than the Weimer and Palermo and Shaw and Bransford volumes for examples.

Inspiration and Perspiration: Genius at Work on Cognition

John R. Anderson

Language, Memory, and Thought. Hillsdale, N.J.: Erlbaum, 1976. Pp. xiii + 546. \$19.95.

Reviewed by WAYNE A. WICKELGREN

John R. Anderson is Professor of Psychology at Yale University. A PhD of Stanford University, he was a Junior Fellow of the University of Michigan's Society of Fellows. Anderson has research interests in memory, acquisition of cognitive skills, language comprehension, and computer simulation. He is coauthor with Gordon H. Bower of Human Associative Memory.

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THIS is an important book, filled with interesting new ideas and experiments and clean, concise, insightful summaries of related work. The focus of the book is on semantic memory—the most rapidly advancing area of psychology at the present time. Semantic memory is primarily concerned with the representation and processing in the mind of (syntactically) complex ideas,

such as the propositions communicated by sentences, paragraphs, episodes, and the like. Semantic memory research differs from neoChomskian psycholinguistics in placing a greater emphasis on semantics and integrating semantic memory with verbal learning and information-processing research on memory. John Anderson's theoretical vision is particularly broad and clear in this regard, so that the contents of the book fully justify its title. In addition, Anderson combines relevant knowledge in cognitive psychology, linguistics, artificial intelligence, and logic. Indeed, one of the most significant functions of the semantic memory area is as a "foreign language" translation device to communicate related knowledge among these different fields. John Anderson is often (but not always) adept at such translation, and the book is well worth reading to become more familiar with important theoretical questions, concepts, and systems in all four of these fields. In particular, there are numerous applications of concepts and principles from logic and automata theory, which few psychologists (myself included) have suffi-

NEISSER's Old Testament, *Cognitive Psychology*, an influential attack by a seemingly avant garde cognitive theorist against the evils of behaviorism, religiously inspired researchers to return to interesting problems. *Cognition and Reality* is a New Testament, inspired by a new prophet (Gibson), designed to lead the flock to the New Truth by repudiating false gods of the Old Testament and further vilifying behaviorism. Neisser now has three major goals: to incorporate a Gibsonian, ecologically relevant analysis of the environment into cognitive psychology, effectively repudiating the information processing approach of *Cognitive Psychology*; to argue against the Skinnerian conception of man as subject to predictable control via contingency manipulation; and to reformulate concepts such as attention and consciousness in noninformation "snippeting" fashion. Unfortunately the New Testament is a retrograde document full of confusions and contradictions which raise more problems than solutions. The book is a failure, largely because the sins of the father are vested in the offspring: both books share the same inadequate metatheory of cognition. Thus the changes Neisser makes are either inadequate to the task, or, at best, accomplish only part of what is necessary.

Neisser correctly argues that information processing accounts that begin with meaningless snippets at the receptor surface and, after processing, storage, and other elaboration, eventuate in cognition (or consciousness) are not ecologically relevant. He replaces them with the Gibsonian notion of information pickup *over time*, modified by inclusion of schemata. (But Neisser's incorporation of Gibson into constructive theorizing, the notion of a perceptual cycle, merely replaces "snippeting" by "cycling.") The familiar Gibsonian theme that information pickup over time does not utilize (re)constructive memory, since the meaning of perception is in the affordance structure of events, rounds out Neisser's switch from image optics to ecological optics. The "new look" at at-

tention discloses that it "is nothing but perception: we choose what we will see by anticipating the structural information it will provide" (p. 87). Consciousness is "an aspect of mental activity, not a switching center on the intrapsychic railway" (p. 105). Behavioral control is impossible in the natural environment because of the complexity (infinite variability) of the stimulus.

METATHEORETICAL arguments against sensory theories, too long for this review, are found in my Shaw and Bransford volume chapter. But consider a few problems with some main contentions of *Cognition and Reality*.

Since Woodworth gave us the stimulus-organism-response framework, psychologists have been faced with accounting for creativity and productivity in cognition (and action) by burying an infinite amount of complexity in one of those three terms. Neisser, like the behaviorists, information processors, and Gibson, is a "sensory" theorist who chooses to consider cognition a matter of "stimulus information and its vicissitudes" (1967, p. 4), burying problems in the stimulus. Neisser now resonates (directly) to Gibson because the ecological analysis of stimulation is vastly superior to the snippeting account which assumed that cognizing was a final processing step that performed the miracle of extracting meaning from meaningless Gregorian snippets. But the ecological meaning specified in affordances likewise begs the question at issue: Gibson *postulates* affordances, and the notion is just as much a *deus ex machina* as the information processor's creation of meaning *ex nihilo*. To equate meaning with affordance is to provide no account of it at all.

PUTTING everything in the stimulus ignores the self, the subject who has experience, meaning, performs actions, and so forth. In 1967, Neisser argued against a homunculus conception of selfhood in favor of a programulus; now he substi-

tutes the schema for the latter. But there is not enough content in his conception of schemata (even when tied to cognitive maps) to provide any concept of self-hood at all: the self as a subject of conceptual (cognitive) activity is absent from Neisser's account, as it is in Gibson's and the behaviorist's. This problem recurs throughout the book in different forms, for instance in the ambiguous treatment of "storage." Adopting Gibson's arguments against storing snippets and for modulation of information over time is a legitimate strategy, but Neisser provides not even a hint of how that is to be accomplished. Indeed, "no theory of memory will be offered in this book" (p. 141).

Indeed, no theory of anything seems to be presented in this book. By the definition (p. 1) of cognition as the activity of knowing, one would suppose that treatment of the nature of knowledge and its acquisition would be the main topic, but there is no specification of what knowledge is, or how we acquire it. There are many strange and undefended claims, such as that "detachment" (which is undefined) of perceptual schemata from their original cycles "is the basis of all the higher mental processes" (p. 23). What this means is anyone's guess, since Neisser never tells us. He does attempt an account of the "learning" of concrete references: "names of objects . . . become incorporated into the anticipatory schemata by which the objects themselves are perceived" (p. 165). One might ask how this differs from behavioristic conditioning "theory." One answer is that conditioning theory was considerably more precise.

There are numerous data claims for which no evidence is ever cited. Among many: "Only when continuing pick up of new information is delayed or interrupted does imagery make its appearance" (p. 130); "the higher mental processes are primarily social phenomena" (p. 134); "there must be a stage in development when naming things is deeply embedded in the very process of perceiving them" (p. 169). There are also false data claims, such as the contention (p. 138) that abstract entities cannot be used effectively in P-A learning or mnemonic techniques.

good enough theory to have theoretically interesting flaws as well as virtues. There are many creative ideas in this book, not just a slightly different combination (or mere restatement) of old ideas, as is characteristic of so many theories in cognitive psychology. For its new ideas, for its intelligent selection of other people's ideas from a broad range

of fields, for its new experiments and insightful discussion of other empirical research, read this book. However, to make the best use of your time, just skim the parts you find too hard or too tediously detailed. Anderson does a good job of explaining the essence of his ideas in the less technical sections of the book.

to be greatly applauded. First of all it considers the responses of fathers as well as mothers to the birth of their infants. Second, it deals with parental reactions not just to normal full-term infants, but also to premature infants, those with congenital malformations, and even to those infants who die at or shortly after birth. (It is surprising, however, that given their hypothesis of a sensitive period soon after birth, they do not present evidence on bonding to adopted children.) Third, the book presents clinical interviews as case illustrations in a way that supplements existing data, and offers new insights where few data exist.

The Bonding Bind

Marshall H. Klaus and John H. Kennell

Maternal-Infant Bonding: The Impact of Early Separation or Loss on Family Development. St. Louis, Mo.: Mosby, 1976. Pp. xvii + 257. \$8.95.

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SOCIAL scientists desiring change in public policy, whether it concerns the structure of schools, hospital practices, or childcare recommendations, are confronted by two horns of a dilemma. On the one hand, if they wait until all the relevant data are available then policy recommendations are endlessly postponed, and the status quo, often based on outmoded conceptualizations and unsupported by evidence, is maintained. On the other hand, prescriptions made prior to the availability of adequate research data have a certain faddish quality, are subject to frequent revision, and produce cynicism toward the field as recommendations about face. Klaus and Kennell, in confrontation with this dilemma, opt for policy recommendations based on partial evidence. In particular, their thesis is that obstetrical and neonatological practices surrounding childbirth are urgently in need of revision, for the existing situation does not provide an optimal environment for the bonding that must occur between mother and child. Current hospital practices separate neonates from their mothers during the first hours after birth, just at the time when, the authors argue, there is a sensitive period for the mother in forming an attachment to her child.

There are a number of unusual and welcome features in this book that are

THE book contains a theoretical chapter on maternal-infant bonding, a review of the animal literature, and several chapters reporting the programmatic research of the authors and others on humans. It also includes verbatim clinical interviews, clinical recommendations, and practical hints on how to alter existing hospital practices. An innovative feature is the inclusion of critical comments by eight readers inserted into the body of the text. The diversity of the material is at once a strength of the book, but also a limitation, in that it does not have a clearly identified audience as its target. It appeals variously to pediatricians, obstetricians, research psychologists, social workers, and nurses.

Within the same book, the authors present a serious scientific argument based on a review of scholarly research together with "how to" sections, appropriate for practical manuals. In the end, these are uneasy bedfellows, although they demonstrate the full scope of the authors' concern.

The book has a clear proselytizing aim: it advocates change in hospital practices, abolition of the notion that childbirth follows an illness model, and recommends focus on childbirth as an exciting social event with great emotional impact. In the fervor of their missionary zeal, the authors are sometimes selective in the evidence they present, omitting several studies that fail to find a lasting effect of the role of mother-infant contact in the early postpartum hours and days. In other