

ologists—including those persons
control the funds that support the
each—expect psychology to say in-
ing and surprising things about the
ings of human action. At its best,
ology (like poetry) should consist
ids on the inarticulate, efforts to
ess the ineffable, clarification of the
ate. In these efforts, qualitative
ods are indispensable.

The editor of and principal contribu-
to *Conceptual Encounter* understands
importance of qualitative methods
well. Working in the tradition of
Lewin and Fritz Heider, de Rivera
trying to move what Lewin called
conceptual analysis" from the private
the public domain. In this way the
lytic process, at least in principle,
comes available to public inspection:
investigators can follow the same
cedures, ask the same questions, and
perhaps replicate the results.

According to de Rivera, "*Conceptual
Encounter* . . . asks how we can describe
the meaning of an experience—the or-
ganization of a person's experience at a
moment, the person's way of being-
in-the-world—the various choices that
present him as a creative participant in
experience" (p. 22). This quote captures
the flavor of both the enterprise and the
book. The book's seven chapters, written
by de Rivera and some associates, are
studies in how to do conceptual
analysis. All of the chapters are well
written, and two are very interesting
indeed. For example, de Rivera's chapter
concerning comes to a set of conclusions
similar to those reached by Averill
(1980) in his fascinating but very differ-
ent analysis of emotional processes.

There are, of course, some shortcom-
ings in the methodological initiative and
in the book. As de Rivera points out,
the success of his methodology ulti-
mately depends on the talent of the
investigator. Of course, this is always
true, but some research strategies are
more researcher dependent than others.
This dependency results in significant
variability in the quality of the chapters;
de Rivera is quite interesting, but some
of his students are less so. Moreover,
insisting on a rigorous and objective
analysis on subjective materials requires
special conceptual tools. Passages such as
the following suggest that some of the
conclusions need sharpening: "Chein defines
himself as: *that which is at the origin
of perceived space-time* (origin, of course
is understood in the mathematical

and not in the historical or genetic
sense); or, if you will, the *self is the
hereness in the thereness*" (p. 98).

Finally, there are two main issues
involved in evaluating the book: (a) Is
the methodology new and original? and
(b) Is the book interesting? The answer
to the first question is no: The kind of
phenomenological analysis de Rivera
proposes dates back at least to Titchener.
The answer to the second question is
yes: The book is full of intriguing insights
and perceptions. The psychology of the
future badly needs initiatives of this
sort.

Reference

- Averill, J. R. (1980). A constructivist view
of emotion. In R. Plutchik & H.
Kellerman (Eds.), *Emotion: Theory,
research, and experience* (pp. 57-81).
New York: Academic Press.

How to Invent Ideas

G. S. Altshuller (translated by
Anthony Williams)
**Creativity as an Exact Science: The
Theory of the Solution of Inventive
Problems. Studies in Cybernetics,
Vol. 5**
New York: Gordon & Breach, 1984.
330 pp. \$54.00

Review by

Wayne A. Wickelgren

G. S. Altshuller, a resident of the Soviet
Union, is author of *The Foundations of
Invention and Algorithms of Invention*.
Wayne A. Wickelgren is professor of
*psychology at the University of Ore-
gon. He is author of How to Solve
Problems.*

How might one measure the degree of
hardening of a polymer mass when mak-
ing items out of polymers, if it is impos-
sible to measure directly by feel? Alt-
shuller describes methods to create ideas
for inventions that solve problems like
this one. The term *exact science* in the
title suggested to me that Altshuller's
book might describe some precise and
elegantly simple mathematical theory of
creative thinking. It does not. Nor does
the book describe a complex, but pre-
cise, computer algorithm for creative
thinking in any domain, though Altshul-
ler does use the word *algorithm* to de-
scribe his methods for creative problem

solution. Rather, the book describes
many inventive problems and methods
of creating ideas to solve them. These
methods serve as instructions (in natural
language) on how to invent faster and
better.

Do the methods work? I don't know.
Neither Altshuller nor I have any sys-
tematic experimental evidence to sup-
port the proposition that if you learn
and use these methods you will create
better (physical) inventions faster. How-
ever, I am sufficiently impressed with
the ideas in the book to believe that this
is likely. Increases in inventive skill would
doubtless depend on how much time and
effort you put into mastering Altshuller's
concepts and principles and applying
them to problems, including the seventy
problems described in the book. Of
course, if you want to be a successful
inventor, you should also know physics,
chemistry, engineering, or whatever
other fields of study are relevant to the
areas in which you wish to invent.

Altshuller got his ideas for analyzing
the process of invention by studying
patent descriptions from around the
world. From a set of around 1.5 million
patents awarded over a five-year period,
he somehow selected those 40,000 pat-
ents representing the more ingenious
ideas. This is a staggeringly large data
base! I assume he did not give equal
attention to each of the 40,000 patents
selected for further analysis. There is
little statistical or quantitative analysis
of these patents, nor is there any state-
ment of rigorous methods for examining
this data base. Altshuller generated his
ideas simply by reading the patent de-
scriptions. Someone else reading the
same patent descriptions would doubtless
have developed somewhat different ideas.

It is amusing to contrast Altshuller's
goal of developing a precise algorithm
of creative thinking with his own use of
poorly understood, not methodologically
rigorous human thinking. Of course, I
used precisely the same sort of methods
(albeit on a different and smaller data
base) when I wrote a book on how to
solve problems, which had the goal of
describing methods of solving mathe-
matical problems. When there are as
many logical problem constraints as there
are in physical or mathematical problem
solving, I think it is wise to concentrate
on understanding these constraints first.
Frankly, I have generally been bored
reading psychological studies that de-
velop methods for protocol analysis, sta-

tistical studies that analyze problem-solving data, and experimental studies that investigate what problem-solving methods people use and whether learning some new methods improves problem solving. It is hard to serve too many masters at once and get anything done. So I hope you won't fault Altshuller (or me) for ignoring many of the standard tools of research psychology in favor of logical analysis of problem constraints and possible methods of problem solving. In Altshuller's case at least, the results are interesting.

Although Altshuller frequently refers to "problems" that inventions (creative ideas) solve, his problems are not the closed-system (e.g., mathematical) type usually considered in work on problem solving. Rather, they are more the open-system type (not within some fixed axiom system) usually considered to require creative thinking. Altshuller claims that inventing a solution to a physical problem is analogous to constructing a theory, and I agree. This type of creative thinking probably differs in some ways from the kind of creative thinking involved in solving a math problem or proving a theorem. Of course, many problems have characteristics of both closed- and open-system problems, and the methods used to solve problems of the two types doubtless have much in common.

Altshuller decries those who glorify the mystery and complexity of creative invention or who emphasize getting ideas by random trial and error or by incubation ("wandering with a distracted air" is Altshuller's, or the translator's, term for the latter method). I agree. Analyzing the problems in understanding creative thinking is of great value, but simply observing that we do not yet understand inventive thinking is not. Any claim that we can never understand creativity is surely total nonsense. Trial and error will doubtless always play some role in creative thinking at the frontiers of knowledge, but as Altshuller observes, human beings are continually inventing new methods that reduce to algorithms what previously required creative thinking. The mistake is in using trial and error or incubation when algorithms or good heuristic methods are available. Altshuller does not waste time marveling at creativity; he wants to understand it and find out how to solve inventive problems by heuristic or algorithmic methods that are better than random trial and error.

Altshuller does develop some semi-precise concepts and principles for analyzing inventive problems in the physical science areas of engineering: S(ubstance)-Field analysis, levels of difficulty of problems and inventions, macro versus micro levels of analysis in problems, stages in the development of any type of technology, and of course the collection of instructions to inventors that Altshuller calls the ASIP (Algorithm for the Solution of Inventive Problems). There is some scientific value in this theoretical analysis of creativity, but Altshuller's greatest contribution is probably his how-to-do-it instructions. Altshuller's focus is not on how the human mind works or on creative invention in general, but on how humans might make better inventions faster in the engineering areas covered by his data base of patents.

I highly recommend this book to any would-be inventor. I also recommend it to cognitive psychologists studying creativity; it is a means of getting better acquainted with a vast domain of creative thinking. I cannot say I like the organization of the book, but there are many useful problems, inventions, and ideas in it. ■

A Catalogue of Power

Leonard W. Doob
Personality, Power, and Authority: A View From the Behavioral Sciences. Contributions in Psychology, No. 1
Westport, CT: Greenwood Press, 1983.
226 pp. \$29.95

Review by
David G. Winter

Leonard W. Doob is the Sterling Professor Emeritus of Psychology and senior research scientist at Yale University. He is author of The Pursuit of Peace. ■ David G. Winter is professor of psychology at Wesleyan University. He is author of The Power Motive.

In the author's words, this book is "a fugue-like dissection of power and authority" (p. 131), the mature reflections of a psychologist who has tracked his topics in activities ranging from laboratory studies to Third World nation building. What Leonard Doob thinks

about power and authority is a valuable reading for the social scientists whose interests touch on these topics.

Many features of this book address those interests. Doob's range of power is laudably broad and deep. He discusses social theory and philosophy (including major German writers); reviews pertinent social psychology research (including articles of value in nonmainstream journals); and injects a general view of reality through illustrations of paradigmatic cases from history and literature. Indeed, this very strength of the book sometimes creates a problem: The discussion ranges so broadly that one might wonder whether Doob has not stepped to the frontier of power and authority in a broader domain of social relations, social organization in general, or the arbitrary nature of such relations. This is one of the author's points.

No matter what their historical perspective, or theoretical orientation, scholars interested in power and authority will find much that is useful in the bibliography, perhaps, is itself the price of the book. My own copy is heavily annotated with checkmarks and notes about topics and questions to be pursued.

At the outset, Doob introduces a useful conceptual framework for analyzing things having to do with power. Imagine two concentric circles around the outside circle, with the inner circle that out of an existing background of events, which, after interpretation, lead to actions—both of which are in fact the background of the next cycle. The inner circle represents the parallel perspective of the individual actor: *Personality* and *perception* of events, leading to *behavior*, which, in the next cycle, add to the accumulation of power. The rest of the book elaborates on these terms. About a quarter of the book is devoted to personality, by far the most fully developed area. Distinctions are drawn between motives involving beliefs about power, attitudes toward power, and skills of getting and using power. Overall, this model is sensible, and of great use in what often seems to be a theoretical and empirical quagmire.

For all its usefulness as a conceptual tool, though, the book may disappoint in its substantive message. The