1978

Bindra, Dalbir - How adaptive behavior is produced: a perceptual - motivational alternative to response - reinforcement in The Behavioral and Brain Sciences (1978), 1, 41-91

Abstract: (P.41) The sway that the response - reinforcement framework (Spencer, Thorndike, Hull, Skinner) has held on the behavioral sciences for nearly a hundred years is finally ending. The strength of this framework lay in providing concepts and methods for studying the effects of hedonic (reinforcing) stimuli on the repetition of specified responses acquired in instrumental training situations of various kinds. Its weakness lay in the invalidity of its central assumptions, stimulus - response association and response - reinforcement, which could not deal with motor - equivalence and flexibility (or "intelligence") in behavior. -- (Bindra emphasizes in his work the role of hedonic (~~reinforcing~~ incentive) stimuli as motivational rather than reinforcing. -

Bible:

Be fruitful and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.—

(Genesis, I : 28)

Found in: John Bartlett, Familiar Quotations, fiftieth and 125th anniversary edition.—, revised and enlarged, Little, Brown and company, Boston, Toronto. — 1980 (1855)

" " 1976 H

Bixenstine, Edwin - The Value-Fact Antithesis in Behavioral Science -

J. Humanistic Psychology, Vol. 16, # 2, Spring 1976. H

Remark by Sperry: "A valuable and pertinent article."

Task: Look for "Realism vs. Idealism". -

Doubt has grown in recent years as regards the value neutrality of applied psychology because those working with troubled human beings invariably wrestle with questions of right and wrong conduct. Goodwin Watson (1958) has observed that "An amoral therapy is a contradiction in terms (p.575)". And Szazs (1961) has gone past mere doubt to the bold assertion that "mental illness" reduces to nothing other than people caught up in ethical and moral dilemmas. P.36 - Values and value judgments impregnate the whole science enterprise. While others might refer to this position as phenomenal or even humanist, I prefer to dub it realist in nature. ...positivism reduces psychology, the science of humans, to the study of the mechanics of behavior. P.37 On the Development of Realism. Galileo...established the persuasive power of the empirical method over other truth-finding processes. Intuition, reasoning, authority, and revelation would never again rule our minds. Now...science is celebrated among the laity while among scientists there are widening fissures of puzzlement. ...ascribed to new physics of Planck and Einstein which has bred Heisenberg's principle of uncertainty. The guiding theme of 19th century scientific thought - that in principle given knowledge of each atom, every future (or past) event could be determined - has proven to be a fiction. Rapprochement. - The principle of uncertainty, however, was not needed to dethrone

atomic determinism for it was fictional in any case. Bridgman (1959) has estimated that it would take the atomistically inclined neurobiologist 10^{14} lifetimes merely to mention each atom of the human brain. Nor would (P.38) there be space to accomodate the machinery needed to make such hypothetical observations. This scientific perspective created science in the image of God rather than of human being. Science became an institution above and apart from human frailty, not subject to human limitations. P.40 Synthesis. Madsen (1971) has observed that we are in the "beginning stages" of synthesis, a "new metascience," in which the main thesis is the view that science is an integral part of human culture. ...Polanyi's Personal Knowledge is another way of referencing what I herin call realism. P.41 - My thesis is that every human response is ~~xxxxxxxxx~~ evaluative, that this condition is irreducible, and that all we accomplish in attempting to limit the evaluational in our response is to distort our own subjective awareness. ...The "basic sense data" of science does not reside in raw, immediate experience...but in experience as transformed and evolved in symbols. P.45 Glass (1965) has said, "Somehow there has crept into our writings about the nature and methods of science a dictum that science is objective while the humanistic studies are subjective, that science stands outside the nature of man. Waht a profound mistake (P.81)!" Facts are not in opposition to values, nor are we able to dismiss the human observer as a constant. In the final analysis, all nature is human nature, all science by humans is a study of humans. We are not merely in nature, we are of nature - nature is in us. P.46 Bronowski (1958) "...there ware many sciences... where this insistence on a causal system did have admirable results. But there have been others where the results have been disastrous. Look for example on economics. It ha:

P.51 - Knowledge based on the fact quadrant is old and well established. It is comfortably exact and issues from a science able to claim purity of method. But it is unimaginative and risk-free. Science limited to fact is content to chart the minute details of an area which some bold explorer has since abandoned for livelier sport. All in all, an exclusively factual science is a pompous, picayune bore. It enables a legion of researchers to grind out methodically pure vignettes from yet another slightly shifted vantage in order to place them in journals already similarly burdened. Such an approach proves more useful in amassing a record of publications than in furthering knowledge. (Storer, 1963; Weiss, 1962). - Obligation and Morality. - ...objectivity and verification do not rest on value neutrality, but rest instead on interpersonal consensuality and intrapersonal redundancy in values. I have not, however, dealt with the puzzling question of obligation. To value an event positively (or negatively) implies some action compatible with this evaluation. Many find the distinction of what is and what ought to be irreconcilable. - P.52 - Ethical systems should not contest with or exclude fact values. They do, however, embrace the wider domain of values. -- Living in company with others is impossible unless allowance is made for nonconsensuality. When we differ, but must carry on nonetheless, we resort to a favorite human invention - the contract (Pratt & Tooley, 1964). So important is the contract in realizing human values that it is often confused with value. Contract formation is a valued human enterprise, preferred to the anarchy which reigns in its absence. But the need for contracts arises because people respond to event with different values. -- If the world were factual, if we had high redundancy and cosensuality in all things, there would be much less need of contracts (no need if people

(P.46 (Bronowski) ...never recovered from the fatal reasonableness of Adam Smith's Wealth of Nations. Look at psychology. In psychology, the word cause has been translated as motive or compulsion, and the word effect has been translated as behavior. And the mechanical systems which have been built on this are really no improvement on the old theory of humours. (61). " ... Bronowski (1958) is too harsh. (In a brief sequel to Science and Human Values, Bronowski (1965) makes clear a deep reservation that humans can ever be a subject of scientific study. We may obtain a poetic kind of knowledge, but not a scientific kind of knowledge of people. "An account of an observation in science ...is intended to take the place of the experience: within some agreed tolerance, the account...is the experience...But we cannot observe men and give an account of that as we observe nature. The poem and the drama is not the experience except as we identify ourselves with it, and know what it feels like to have it. What distinguishes literature is that it cannot be understood unless we understand what it is like to be human (pp.77-78). (Bixenstine thinks there is no knowledge free of these human qualities P.47 - Every observation is an interaction, a complementation between observer and event. If we alter our conception of reality, if we discover hidden within older perceptions new and different ones more satisfying to us, this does not destroy the assumption that some universe is real. P.50 -- Science has merely formulated the common denominator of all persuasion - "Show me". One can show another only as one is able to communicate about an event and as it recurs. Persuasion regarding events of little or no consensuality is stymied for lack of language. The innovator, the prophet, the person of vision is constantly frustrated in communicating with those lacking his or her perceptions.

were also reasonable.). In Walden Two Skinner (1948) created a totally factual world and argued that in such a world there would be no need for contracts, laws, or moral suasions. Skinner did not dehumanize humans, as some claim, so much as place them in improbable circumstances. We do not have a totally factual world and never will. - Contracts are our way of bringing consensus where it did not previously exist. They are not contrary to fact, rather they start with fact and proceed to embrace a wider scope of experience. They enable persons of different values to live, if not in the same world, at least in permissive proximity. P.53 Operationally speaking, what we ought to do is to observe our contracts. Obligation attends the fulfillment of a pledge. As we make pledges not only with others but with ourselves, it is clear that both ethics, as a set of observances entered into by a number, and morality, as a personal code, carry obligatory meanings.,--.... But what ought we pledge or contract to do (you may ask). ....We do not evaluate in obligation to nature. We evaluate as an expression of nature. There is no external guide to point the way. Like it or not, we are the only measure of good, and the contracts we make in realizing our values are purely of our own creation. -- Conclusion: - We insist we are free to choose and object to the mechanical, stimulus-controlled version of humans so common to psychology. But, London objects, this opposition is but the lingering conceit of an exalted- human-centered conception of the universe from which all other conceits, through Copernicus, Darwin, and Freud, have been stripped. - "What is really means when we say that man is a machine is that his behavior is lawful and limited. This is true of

everything in the world as well, and its implications (P.54) for understanding man are not new or special; but they are not always appreciated (P.185)." ..... "The humanists only valid basis of resistance to the machine model is psychological;..." ---London's "humanist" is a straw man. Fiegl (1959) some time ago pointed out to psychology that the concept of will and that of determinism were far from antithetic. Rather, the only sensibl definition of will was self-determinism. If I am free it is insofar as I am in my self a force which sets limits and determines events. - P.55 ...there is no nonideological system - Science - positioned outside of us against which to cast our dimensions. There is only an ideological system called science through which we struggle to cope with our multidimensional valuative experiences. - - Realism, the position taken in this article, brings a needed corrective to the superhuman,avaluative view of science we have traditionally touted. The realist sees sciense as a special culture with its own conventions, as no less steeped in values than any other human enterprise, and as no more exact or real than those value judgements permit. Science has been a very tense pursuit in some quarters. Realism invites us to relax, to be both human and scientist. We cannot avoid symbolism, ritual, metaphysics, and ethic in our science because we cannot be other than fully alive and fully human in all we do. Realism also encourages a great appreciation in science of the artistic, the wildly imaginative and feelingful. Great scientific innovators have always been people of aethetic refinement, of musical and artistic talent. For them the "frontiers of science" have not been some distant, uncharted place, but the wealth of inner experience, of rich unmapped mental stuff that infused their lives. (End.)

Very Good.

1976

Bixenstine, Edwin - The Value-Fact Antithesis in Behavioral Science

Journal of Humanistic Psychology, Vol. 16, #2, Spring 76

(abstract)
P. 35 - While values emerge ever more prominently for consideration in the reflective, scientific literature of our time, a stubborn cleavage remains in our construing of values and facts. P. 36 Fact = special class or species of value (against efforts to keep "morals" + "metaphysics" out of science - during therapy!) --

Look for "Realism vs. Idealism" —

Footnote:

P. 55 - "Science, London holds, is outside and above our ideological flounderings. It remains a superhuman institution spoken to earlier." "No ideology inheres in scientific work, and man must always borrow wisdom from some moral creeds to guide its use." (Quoting London). -- London (1969) starts with a positivist, superhuman view of Science and therefore concludes that our sense of self and will are mere epiphenomena. ......But what if science is ideologically loaded? - (Bixenstine). --P.37 The 19th century saw a growing confidence among scientists that the universe was atomistic, orderly, causal and therefore would ultimately be revealed to science,....

P.38 -"The positivists claim that modern scientific method is the only reliable method of acquiring knowledge. Since it gives us no knowledge as to the values we ought to seek, there can be no such knowledge. And, to carry on logically to the bitter end, if no knowledge of values is possible it becomes nonsense to say there are values." (Hall, 1956, P.4)

That values are real and have some relationship with science despite positivist objections are propositions now widely heralded.

But if we have attempted rapprochement by subordinating value to science as a form of facts (a la Dewey) or by composing a new "moral science" (a la Hall and Hartman), we have also sought rapprochement by subordinating science to value. - A variant suggest that the scientist embraces values in the very practice of science as, for example, avoidance of prejudice, freedom of inquiry, and honesty of reporting. Values act like a catalytic agent which permits, but does not participate in, a vigorous scientific process. Again, value and fact are brought into closer relationship, but that relationship clearly maintains the fact-value distinction.

P(40)"The 19th century science model has imparted vitality to science by reducing vitality in the scientist."

Mind waves

1987

Blakemore, Colin and Greenfield, Susan (Ed.) (Thoughts on Intelligence, Identity and Consciousness) - Oxford: Basil Blackwell. —

Collection of 32 Papers on the Mind-Brain relation, including contributions by Donald Mackay, John Searle, Sir John Eccles, etc. — János Szentágothai, etc. —

Chapter Headings: Pt. 1: Persons & What makes an individual?
Pt 2: Animals: How do they think, and do they have minds?
Pt. 3: Machines: Could they have minds?
Pt. 4: Ideas: How brains could have minds, and why.
Pt. 5: Problems: What is mind?

— — —

Preface: Behaviourism ground to a halt, partly even the humble laboratory rat posed too resourceful, too thought-ful, too rich in insight to be treated as if it were a mindless machine. — The psychology of behaviour has recently returned to its 19th-century roots in the current fashion for 'cognitive' explanations of the actions of animals, as well as people. Brain researchers of all sorts have been forced to take seriously mentalistic explanations of behaviour

and most of them see perception, intention, thought and will to be legitimate subjects of interest for the rapidly-growing subject of neuroscience. Indeed the nature of consciousness may come to be seen as the central problem of research on the brain. — // Philosophy has had longer to think about thought, but is no closer to a generally agreed solution to the mind-brain problem: The dualism of Descartes .... etc. etc.. (Private discussion led to the invitation of scientists + philosophers to Oxford - 2 terms of mind debates with students at Oxford. — Basil Blackwell suggested publication of contributions. — (~~??~~ Comments: no summary, but something about the author heading each paper.) [before each part.]
(Book has pictures too) [(Entire set-up doesn't look very scientific).—

Sperry on split brain quoted by MacKay — on Philosophy by MacKay

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XXX

P.228 — Supervenience: the doctrine of the supervenience of the mental on the physical is the doctrine that there can be no mental differences without corresponding physical diff. — -- this view is a consequence of the thesis that mental phenomena are caused by + realized in the brain —— supervenience of the mental is simply a special case of the general principle (of) the supervenience of macro-properties on micro-properties. — — (by Searle)

Sp. not mentioned.

Blakemore, C+G. Mindwaves

Sperry – Split Brain:
Jeffrey Gray 1968

Sperry, Philosophy:
Jacob Szentágothai
Jeffrey Gray (?) 1968

– (Numbers in the text referring to notes are used.) –

Reference to Sperry in Mackay's ~~paper~~ mentions his article (his 1966 paper in) "Brain and Conscious Experience (p. 304), Eccles, Ed. treats his split-brain work and the existence of "two free wills in one cranial vault,"3 which was interpreted by the popular press that each ~~of the~~ beneficiary of the operation was now in reality 'two persons'. That interpretation seems exaggerated to Mackay – and he explains why.

Reference to Sperry in Szentágothai's ~~paper~~ article mentions "A modified concept ~~#~~ of consciousness" (1969). In his chapter on emergence, Szentágothai explains that "in the past two decades the concepts of "emergence" and "emergent" have been introduced (or more correctly re-introduced, since the concept has an earlier history) by Roger Sperry, and incorporated into the framework of an explicitly formulated theory by Mario

Bunge. —

Reference to Sperry by Jeffrey Gray's article mentions "Hemisphere deconnection and unity in conscious awareness." He says (p. 467) "This implies that conscious experience is somehow a property of biological cells, or perhaps of nerve cells only. We might then have access only to certain 'macroscopic' aspects of conscious experience which arise when a lot of neurons come together, each neuron having its own 'microscopic' consciousness. (If this sounds absurd consider whether the half of the brain that can't talk after a split brain operation in man does or does not have conscious experience, alongside the conscious experiences of the half of the brain which can talk to you – see Donald MacKay's chapter in this volume.) — —

Preface to Chapter 1, 2½ pages, (Humans share 98% of their genes with great apes, 50% with fruit flies!) — — Successful structures + function were discovered, preserved + refined through natural selection. — — the genes obviously play an enormous part in building the brain. — animal + human brains have much in common. — (2 = 2½ pages) (3 = 2½ p.) Pt. 4: At the time of its conception by René Descartes in the 17th century, dualism was a liberating force because it freed every natural phenomenon except mind (or soul) from the constraints of religious dogma. The blossoming of science and medicine in the following 100 years was partly due to this liberation of the material world. Moreover, it also invaded modern biology because it encouraged the idea that the body + organs of man are essentially

P. 259, cont. – similar to those of animals. But man's soul can control his animal instincts. – Eccles claims that thinking produces neural activity in the cortex. – – Weiskrantz: tells of patients who can make sensory discriminations + learn things but who, because of their brain damage, are unaware of their abilities. – unconscious of their perceptions or memories, they act as if a monitor in the brain had been disconnected – the "monitor of consciousness. The evolutionary ~~funct~~ advantage of this monitoring function is that it permits reflection, consideration, the comparison of events separated in space or time; in short, it allows thought." // Szentágothai: Even tiny grafts of 15–50 randomly scattered neuronal cells are able to organise themselves into functional circuits (according to his research) ∴ the 50 billion nerve cells with 10^{13}–10^{14} connections in the brain alone are able to create the "self" without any need to postulate non-material forces. But one problem remains: "how can mind, if created from the operation of the brain, act back by 'downward causation' on the system that made it – – (Conclusion: What is mind? Can't

(yet) be answered. — Last 2 ~~chapters~~ points quite interesting. —

P. 335 Szentágothai: "it might suffice to remove from accepting the idea of 'downward causation' that we have the choice and are responsible ... animals are equal to their nature and live in happy ignorance of good and evil. The parable of 'Paradise Lost' is indeed the ultimate and terrifying truth — the beauty and greatness of being human."

— — — (I like Szentágothai!!!)

→ before that (P. 334) ~~this interpretation~~ Mind functions — might then also be considered as emergent from brain functions — might have a downward causal effect on brain functions. (13 ← Szentágothai and then on downward causation). In other words, conscious ideas and thoughts might interfere with the activity of neuron networks resulting from self-organization, without getting into conflict with accepted (legitimate) laws of nature. The possibility of 'downward causation' from mental functions on the very same brain functions from which they emerge (by 'bottom up' causation) within the accepted laws of nature, is an attractive solution to the mind-brain problem.

... with make questions about human don't necessarily come into conflict with mind brain.

mind brain - relation: they're parallel,

1976

Blanchard, B. and B. F. Skinner - "Debate on Mind" - in Theories in Contemporary Psychology - Melvin H. Marx and Felix E Goodson, (ed.) MacMillan Publ. Co. Inc. New York, 1976. - (P. 205)

Preface to book: It is tempting to construe the remarkable changes that have been occurring in our discipline during the past decade as a major revolution. (etc. - Photocopy =)

P. 205 - Blanchard: - If there are in fact conscious events distinct from bodily events, a method that disregards them and confines itself to the body cannot be adequate to the study of mind. -
P. 206 - Are we then to dismiss distinctively conscious events altogether? - Watson says Yes, on the ground that he could find no such events in his test tubes. Skinner (1953) "... to resort to nonphysical events" is to offer a "fictional explanation"; the belief in a mind or consciousness inducible to any form of bodily change seems to him an anachronism, a last lingering survivor of primitive animism. // I believe this view is radically mistaken. (1) There is such a thing as consciousness, inducible to physical change (2) its denial, instead of according with modern science, is in conflict with it; (3) to reject the efficacy of consciousness makes nonsense of practical life. (Blanchard, 1939). - Cogito ergo sum. - (you establish the fact of conscious use in the very fact of doubting it.) Even a delusion is a

matter of consciousness. – Watson: Toothache = change in dental nerve. (But experience of pain is evidently not the same as a movement.) Their identification is a confusion. – (Physical event = movement of matter → direction or velocity. (P. 207) (Not applicable to pain). – Pain: dull or ex-cruciating (not applicable to movement.) – Behaviorist accepts pain killer at dentist to avert ... What? It is not the physical change that makes it objectionable - but the excruciating pain, which is as different from the physical change that conditions it as are any two things in the world. – P. 208 – Watson denied the existence of images. – P. 210 – Behaviorism leaves a vacuum at the heart of our moral and practical life. – ... hollow men in a wasteland. – "Consciousness, however frail and evanescent, is the seat of all goods and evils, of all values of all kinds, and they would go out with it like a candle. –

Excellent (All 8 Blanchard - pages photocopied.)

Skinner (P. 212) Mental events are reducible to physical change. – Behaviorism: The world is made only of one kind of stuff. – The world "within our skin" not diff. – If (P. 213) we speak of reinforcement of an action instead of its purposefulness, its easier to predict it. and control it. – "So-called cognitive functions of consciousness ...." – If pigeon pecks disks for food because it has been reinforced for doing so, it adds nothing to say that it pecks because it knows it will get food. – P. 214 "If the mentalist insists that we have still left out "seeing" itself, we must ask him what he means. –

Block, N. and Fodor, J.A. - What Psychological States are not. 1980
In Readings in Philosophy and Psychology, (2.Vol.) Harvard University Press
Vol. 1, Pp. 237-250.

P. 238 "...the Darwinian doctrine of convergence applies to the phylogeny ~~and~~ of psychology as well as of the phylogeny of morphology and of behavior. It is well known that superficial morphological similarities between organisms may represent no more than parallel evolutionary solutions of the same environmental problem: In particular that they may be the expression of quite different types of physiological structure. The analogous point about behavioral similarities across species has been widely recognized in the ethological literature: organisms of widely different phylogeny and morphology may nevertheless come to exhibit superficial behavioral similarities in response to convergent environmental pressures. The present point is that the same considerations may well apply to the phylogeny of the psychology of organisms. Psychological similarities across species may often reflect convergent environmental selection rather than underlying physiological similarities. For example, we have no particular reason to suppose that the physiology of pain in man must have much in common with the physiology of pain in phylogenetically remote species. But there are organisms whose ~~physiology~~ psychology is homologous to our own but whose psysiology is quite different, such organisms may provide counterexamples to the psychophysical correlations physicalism requires. (Qu. How do we know anything about the psychology of remote species?)

Block, Ned. Troubles with Functionalism. 1980
In Readings in Philosophy and Psychology, Vol.I, Ed. Ned Block. (First published 1978). Pp. 268-305. - - The functionalist view of the nature of the mind is widely accepted. Like behaviorism and physicalism, functionalism seeks to answer the question "What are mental states?" I shall be concerned with identity thesis formulations of functionalism. They say, for example, that pain is a functional state, just as identity ~~theory~~ thesis formulations say that pain is a physical state. ...the troubles ascribed by functionalism to behaviorism and physicalism infect functionalism as well. - ...Characterization of functionalism: each type of mental state is a state consisting of a disposition to act in certain ways and to have certain mental states, given certain sensory inputs and certain mental states.

Nothing on downward causation - boring - dry.

Block, Ned (Ed.) Readings in Philosophy of Psychology 1980 +1981 (1983)

(2 Volumes). Harvard University Press.

Contains among others, articles by Putnam, H., Skinner, B.F., Chomsky, N., Davidson, D., Fodor, J.A., Block N., Armstrong, D.M., Kim, J., - all in the first volume - and Kosslyn,S.M., Pylyshyn, Z.W., and some authors from the first volume - in the second volume. All those mentioned are discussed in Sperry's Consciousness Revolution paper.

No references to Sperry in any of the articles in Vol. I.

Vol.II Ref. to Sperry by Chomsky in "On Cognitive Capacity" P.322 (Notes) "For more on these matters, see the chapters by R.W.Sperry, A.M. Liberman, H.-L.Teuber, and B.Milner in Schmitt and Worden (1974) - That's Note 7. - It refers to the sentence of Gregory that "the speed with which babies come to associate the properties of objects and go on to learn how to predict hidden properties and future events would be impossible unless some of the structure of the world would be inherited--somehow innately built into the nervous system." - Chomsky objects to this view in his note. ..."It is not clear why one should expect to find an evolutionary explanation of the sort that Gregory suggests. (To little, known - ref. to dominance in language of left hemisphere.) ---

(No further ref. to Sperry in Vol II.)

Preface (to both volumes): ...lines of research in many areas of philosophy and psychology have tended to converge on the same clusters of issues. ...A host of crucial issues do

Paradigm Shift. —

Block, Ned, Ed. - Imagery - MIT Press, Cambridge 1981

Block, Ned - Introduction: - After 50 years of neglect during the big days of behaviorism, mental imagery is once again a topic of research in psychology. — — one of hottest topics in cognitive science. — Even a journal entirely devoted to it.
Chapter 6 - Mental images can be scanned! -

Kosslyn, St. M., Pinker, S., Smith, E. E & Shwartz, St. P. —
Mental imagery + mental representation → intimate relationship. —

1988

Boden, Margaret A. Computer Models of Mind
New York: Cambridge University Press. –

Question: Is cognitive science based on a functionalist, mentalist paradigm like mentalism in general? – Do they retain a micro-determinist position or are some of them emergentist macro – micro-proponents? -- What is the dominant paradigm of cognitive science?

Preface: This book shows how computer models have been used, and might be used, to help us formulate psychological theories about the mind. Introduction: Computational psychology --- Early computer models characterized mental activity as purely mechanical. -- even purposive behavior (Wiener). – Only after development of digital computer, detailed theoretical ~~representations~~ of hypotheses of mental representations. – (v. Neumann, Turing, etc.). - (McCulloch + Pitts) --> Equated on-off-states of computer with all-or-none properties of neurons conduction. very influential (~~Hebb~~). – Working models of mind-like functions attempted. -- Early work collected in "Computers + Thought" by Feigenbaum + Feldman, 1963. – Also: Plans + Structure of Behavior by Miller, Galanter, + Pribram (1960). - Criticized S-R behaviorism for ignoring mental processes. - Thought that mental

processes more accessible + like computer programs. — Hierarchical structure with many levels (~nothing) = actual controlling mechanisms in the brain. — // P.5 concepts drawn* from computer science play some central theoretical role in the computational psychologist's claims about what the mind is and how it functions. 3 characteristic ways of theorizing. — 1) Functionalist approach to the mind, (# drawn) in which mental states are abstractly defined in terms of their causal role (with respect to other mental states and observable behaviour. Functionalism is a philosophy of the late 20th century in which the mind is conceived of in terms of the computational properties of universal Turing machine. Every psychological phenomenon (capable of scientific explanation) is assumed to be generated by some effective procedure, some precisely specifiable set of instructions defining the succession of mental states within the mind. // 2.) Computational psychologists conceive of the mind as a representational system, and see psychology as the study of various computational processes whereby mental representations are constructed, interpreted, and transformed. 3) = Neuroscience = ~~[illegible]~~ broadly computational. // Photocopy p. 5 !!! ... might be in asking what sorts of logical operations or functional relationships ... enables it to embody the mind in neural networks. What the brain does that enables it to embody the mind is the main question, not what it is in itself as a physical system — as relevant!!! — Parallel processing (p. 7) — ! — Some — even neuropsychology as relevant!!! — — Dis agreement — others concentrate on it — build computers after brain insights!!

1988

Boden, M. Computer Models of Mind

use of computational models f. higher mental processes. Wide divergence of views! — Some argue that meaning cannot be explained through computer models — many non-computational psychologists (+ others) agree. — Even if we decide that computer approach is not suited f. brain study — Popper's argument — Science advances not only through conjectures but also through refutations. — But that's misleading negative. Some gains have been made for psychology by attempts to consider the mind as a computational machine. —

P. 264 (Conclusion) — it is taken for granted that a computational psychology must be mechanistic; either denying any role at all to mental processes or describing them in a way which is fundamentally inappropriate. The first of these alternatives clearly misses the mark; unlike behaviourists — computational psychologists believe that theories about internal processes are entirely permissible. Mentalistic concepts like representation, inference and intentionality pervade computational theorizing. — The second alternative —

Bohm, D. Quantum Theory 1951

P. 626: As we go from the ~~classical-to-the-quant~~ small scale to the large scale level, new (classical) properties then appear which cannot be deduced from the quantum description ... (manifesting themselves) in the appearance of definite objects and events, which cannot exist at the quantum level. // Large-scale and small-scale properties are not independent, but are actually in the closest inter-relationship. ...this interdependence is reciprocal... P. 627: Thus, large-scale and small-scale properties are both needed to describe complementary aspects of a more fundamental indivisible unit, namely, the system as a whole. p. 628 ... the nature of what can exist at the nuclear level depends to some extent on the macroscopic environment. Heading of this chapter: "Relationship between quantum and classical concepts."(That's the chapter from which I just quoted.) (Should be photocopied too.)//..p. 24. the electron absorbs energy only in quanta. -- The simplest interpretation of this phenomena is that light consists of particles ... When the beam is so intense that it seems to be continuous, it must in some way be equivalent of what is described as a light wave in classical physics. ... P.31 Photons. .. (P. 23 Photoelectric effect) .. P. ## 33 Compton effect. -- (P.30 Correspondence principle. - P. 31 Particle properties of light.) P. 264 The classical limit of Quantum theory.

Bohm, David Quantum Theory 1951

Englewood Cliffs, N.J. - Prentice Hall

Question asked: Does Bohm express views of holism in this early work, or is he here a reductionist?

Preface: Central aim of this book: To provide a formulation of the quantum theory at a relatively elementary level. Brief summary of most important conceptual changes: 1. the classical concept of a continuous and precisely determined trajectory is fundamentally altered by the introduction of a description of motion in terms of a series of indivisible transitions. 2. The rigid determinism of classical theory is replaced by the concept of causality as an approximate and statistical trend. 3. The classical assumption that elementary particles have an "intrinsic"nature which can never change is replaced by the assumption that they can act either like waves or like particles depending on how they are treated by the surrounding environment. -- breakdown of assumption that world can correctly be analyzed into distinct parts, each having a separa existence, but working together according to exact causal laws to form a whole. Instead, quantum concepts imply that the world acts more like a single indivisible unit, in which even the "intrinsic" nature of each part (wave or particle) depends to some degree on its relationship to its surroundings. It is only at the microscopic (or quantum) level, however, that the indivisible unity of the various parts of the world produces significant effects, so that at the macroscopic (or classical) level, the parts act, to a very high degree of approximation, as if they did have a completely separate existence.

Down-ward causation implied?

Proton explained 2.

Part I shows how the quantum theory can be developed in a natural way, starting from the previously existing classical theory and going step by step through the experimental facts and theoretical lines of reasoning which led to replacement of the classical theory by the quantum theory. (Photocopy of Preface for Sp.)

p.624: ...classical concepts cannot be regarded as limiting forms of quantum concepts, but must instead be combined with quantum concepts in such a way that, in a complete description, each complements the other. -- classical view: The behavior of a system as a whole can be regarded as the result of the interaction of all its parts. Quantum view: indivisible unity of all interacting systems ("intrinsic" properties of a system (e.g. wave or particle) are brought out only in interactions with other systems.) therefore, exact causal laws meaningless. p.625 in connection with the wave function, classical and quantum theories meet. (with the interpretation of the wave function) -- It is only at the classical level that definite results for an experiment can be obtained, in the form of distinct events which are associated in a one-to-one correspondence with the various possible values of the physical quantities that is being measured. // This means that without an appeal to the classical level, quantum theory would have no meaning. We conclude then that quantum theory presupposes the classical level and the general correctness of classical concepts in describing this level; it does not deduce classical concepts as limiting cases of quantum concepts.

P.626: the correspondence principle is simply a consistency condition which requires that when the quantum theory plus its classical interpretation is carried to the limit of high quantum numbers, the simple classical theory will be obtained. ... the large scale behavior of a system is not completely expressible in terms of concepts that are apprpriate at the small scale leve

1975

Bohm, David, (D.J.) and B. J. Hiley - On the intuitive understanding of nonlocality as implied by quantum theory. - Foundations of Physics Vol. 5, #1, 1975 (Received March 29, 74) -

Aim of Reading: Implicate order? - Whole organizing the parts? Downward causation? --

-the essential new quality implied by quantum theory is nonlocality. - a system cannot be analyzed into parts whose basic properties do not depend on the state of the whole system.

Typed notes in "Quotes"

Bohm, David -- 1987

Quantum Implications. (Essays in honor of David Bohm) Edited by Hiley, B.J. & Peat, F. David. London: Routledge &Kegan Paul.

1) General Introduction: The development of David Bohm's ideas from the plasma to the implicate order. Hiley & Peat. P. 1.

2) Hidden Variables and the implicate order. David Bohm. P.33 (This article is an extension and modification of a talk, D. Bohm, Zygon, 20, 111 (1985).

28 other articles. (Might contain good references on Bohm's early work.)

General Introduction: Bohm born in 1917 in Pennsylvania. Father from Austria-Hungary. No physics in family background. Early youth, B. liked to find out how things worked. Re Read science fiction at 8. Later astronomy, universe, science. Father successful busine nessman. Disliked science. No money in it. Young Bohm tried inventing. No chance to sell these. So, he decided to become a theoretical physicist. -- P.2. As he began to study physics seriously, he was repeatedly struck by the interconnectedness of what, at a superficial glance, seemed to be totally unrelated phenomena. ... this characteristic of a rich and highly interconnected substructure became more and more apparent. In Q.M. this interconnectedness was vital, but was minimized in usual presentation. In Bohm's original perception, interconnectedness vague and ill-defined. Took shape gradually, ultimately leading to a very radical & novel way of looking at reality.

Key paper on Implicate Order. 1973

Bohm, David Quantum Theory as an Indication of a New Order in Physics. B. Implicate and Explicate Order in Physical Law. Foundations of Physics, Vol. 3, (#2), Pp. 139-168. (Received, Oct. 27, 1971)

This is the paper for which I was looking so long and so unsuccessfully, the paper in which Bohm publishes for the first time his Implicate Order! (Found it through thorough study of Wholeness + the Implicate Order, 1980 in Fuller Theological Library!!!) --

Abstract: In this paper, we inquire further into the question of the emergence of new orders in physics, first raised in an earlier paper. In this inquiry, we were led to suggest that the quantum theory indicates the need for yet another new order which we call "enfolded" or "implicate". One of the most striking examples of the implicate order is to be seen by considering the function of the hologram, which clearly reveals how a total content (in principle extending over the whole space and time) is "enfolded" into the movement of waves (electromagnetic and other kinds) in any given region. We then come to the notion that the quantum theory indicates that this implicate order is not merely a dependent or fortuitous feature of the content, but rather it should be con-

considered as the independent ground of existence of things, while the ordinary explicate order is what should be considered as dependent. Finally, in the appendix we point out how the implicate order is expressed mathematically in terms of an algebra similar to that of the quantum theory, which is, however, subject to generalizations going beyond the limits of what has meaning in this theory. Various new directions of further research are indicated, which will be explained in later papers. --

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P. 143. Undivided wholeness - the lens and the hologram. P. 146. Implicate and Explicate Order: --- physical law should refer primarily to an order of undivided wholeness of the content of a description similar to that indicated by the hologram rather than to an order of analysis of such content into separate parts indicated by a lens. - etc. -

We explain a hologram in terms of interference patterns of waves. -

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1980

Bohm, David   Wholeness and the Implicate Order   (U.S. 1983)

Routledge + Kegan Paul, 1980

Introduction: This book is a collection of essays (see Acknowledgments) representing the development of my thinking over the past 20 years. Acknowledgments:
The author and publisher would like to thank the following for permission to reproduce copyright material: The Van Leer Jerusalem Foundation (Chapters 1 and 2 from "Fragmentation and Wholeness", 1976); the editors of the Academy (chapter 3, from The Academy, vol. 19, no. 1, Feb. 1975); Academic Press Ltd (chapter 4, from Quantum Theory Radiation and High Energy Physics, part 3, ed. D. R. Bates, 1962); Plenum Publishing Corporation (chapters 5 and 6 from Foundations of Physics, vol. 1, #4, 1971* pp. 359-81 and vol. 3, #2, 1973*, pp. 139-63).

P. 147 Implicate + explicate order → - - - F Appendix to Chapter 6 on the implicate order. (P. 157)
Chapter 6 - Quantum theory as an indication of a new order in physics,
Part B: Implicate + explicate order in physical law. (P 140) F? // I think this must be the 1973 paper!? // Chapter 7 - The enfolding - unfolding universe + consciousness. (P. 172)
Sub-heading (P. 186): Quantum theory as an implication of a multi-dimensional implicate order. P. 190: Cosmology + the implicate order. P. 193 The implicate order, life and the force of overall necessity. P 196 - Consciousness + the implicate order.

1971

Bohm, D. - Quantum Theory as an Indication of a New Order in Physics
Part A. The Development of New Orders as Shown through the history of Physics,
Foundations of Physics, Vol. 1, #4, 1971 pp. 359 - 381. -

abstract: In this paper we discuss the general significance of order in physics, as a first step toward the developments of new notions of order. We begin with a brief historical discussion of the notions of order underlying ancient Greek views, and then go on to show how these changed in key ways with the rise of classical physics. This leads to a broader view of the significance of order, which helps to indicate what is to be meant by a change of our general notions of order in physics. We then go into relativity and quantum theory, showing how these developments actually did bring in further notions of order, which are however inconsistent and otherwise inadequate in certain ways. Finally, using these inconsistencies and inadequacies as clues and indications for yet a further new concept of order, we make some proposals for novel directions of inquiry (to be discussed in some detail in later papers) which could lead to theories as different from relativity and quantum theory as these are from classical physics. -

" P. 376 --- in the quantum context, one can regard terms like "observed object", "observing instrument", "link electron", "experimental results", etc.,

1970

Bohm, David and Basil J. Hiley - On a New Mode of Description in Physics. - International Journal of Theoretical Physics, 3(3): 171-183

Consciousness Revolution paper

Aim of reading: Is it true that (P. 34) "David Bohm, another physicist, had also inferred a new vision of reality from the new physics, but his reality, the implicate order, differs from Capra's (Bohm 1970). — (implying that only more recently Bohm said that "the whole organizes the parts".) —

Abstract: --- New informal language applicable to the microdomain, which enables such characteristics as superposition and discreteness to be introduced without recourse to the quantum algorithm. — New notions introduced, e.g. (potentiation and assimilation) - avoid sharp separation between 'system of observation' and 'apparatus'. New language very diff from that of classical physics - classical notion appear as a special limiting case. Not based on use of space-time description. Maxwell's equations understood in terms of cohomology on a discrete complex. -- 'organization' of discontinuous hypersurfaces ---- etc. etc. — P172 = In contrast to our present way of using language, which places emphasis on

x separate objects in interaction, we give primary relevance to activity and wholeness in the sense of undivided movement. // Our main reason for emphasizing these notions is that they are implicit in Quantum Theory. For example, the indivisibility of the quantum of action implies a merging of the 'observed system' and the 'observing apparatus' (why?) so that the two are inseparable and, therefore, constitute a whole in which analyses into parts is not relevant. 'This whole flows + merges into the totality of the universe, including the human observer; (???) P. 173 'The 'union' of the 'observing instrument' and the 'observed content' is just as relevant in the classical domain as it is in the context of quantum theory. — we consider as a particular example, the expressions of the laws of classical electrodynamics in terms of adv. — … theory. -- about 'wave hulls'! -- P 176 - Division of world into separate constituents dropped - instead: Holo movement. = unbroken, undivided totality of movement. — P. 183 conclusion: we have introduced a new form of description in which wholeness, activity and discrete ness are given fundamental relevance - etc. - Nothing on implicate order! No concept of continued connection of wholes. — Ref.: Bohm, D. (1968) contemporary physics, vol. II, 439 Trieste Symposium (London). — Cont. → (Card 2)

1970

Bohm, David and B. J. Hiley, new mode of Description in Physics.

P.178 "of course, the distinction between a potentiation and copotentiation is merely a convenient form of description and is not to be taken as implying their separate existence. Indeed, what are taken as copotentiations at one level can be regarded as potentiations at another level. --- Thus, ultimately our approach implies a hierarchy of complexes, though in any given context a limited number of steps in the hierarchy will be adequate. ¶ If we regard the dual of a complex as a functional, we can use the description in terms of cohomology theory for the copotentiations. By using integral weights for the copotentiations and for the relationships between them, we obtain the corresponding cochains & cocycles." (typical Bohm-Hiley phrasing)

P.180 We are thus led to a kind of 'mechanism' very similar to that arising in the context of quantum theory. — P.183 — We put the laws of classical electrodynamics in terms of cohomology theory --- at the same time we showed that the laws were now in a form that is independent of whether or not there is an underlying space-time continuum. —

Bohr, Niels (from "Between Science + Values by Graham.)

Interested in possibility of a unified view of nature.-
From an early date almost uniquely prepared for clarifying and absorbing the revolutionary philosophical implications of quantum physics.-
Bohr believed that Planck's discovery at the beginning of the century of a quantum of action was the starting point of this breakdown of classical physics,--
In Quantum mechanics "there can be no question of causality in the ordinary sense of the word." (P.52) "we find ourselves here on the very path taken by Einstein of adapting our modes of perception borrowed from the sensations to the gradually deepening knowledge of the laws of Nature."
P.53 The very concept of causality was to Bohr a conclusion drawn by more from a limited range of experience, the range familiar to him in the world of ordinary objects, which obeyed the laws of Newtonian Physics.
Bohr emphasized that man's knowledge at any one point of time is thereby conditioned by the range of experience encountered until that time...
There were both scientists and philosophers who were disturbed by the Radicalness of his proposed break with causality and with his use of

1957

Routledge + Kegan Paul Ltd.

Bohm, David - Causality + Chance in Modern Physics

P.1 - Nothing simply surges out of nothing without having antecedents that existed before. Likewise, nothing ever disappears without a trace. - Everything comes from other things + gives rise to other things. - P.2: The many relationships between objects, events, conditions ... Causal laws. -- P.37 The mechanistic philosophy -- most essential aspects of this philosophy -- great diversity of things can be reduced completely + perfectly to nothing more than consequences of the operation of an absolute + finite set of purely quantitative laws determining the behavior of a few kinds of basic entities and variables. --- mere use of quantitative theory does not, itself imply a mechanistic point of view, as long as one admits that such a theory may be incomplete.' -- P.39 Developments away from mechanism in classical physics. - electromagnetic field - kinetic theory of gases - statistical explanations of laws of thermodynamics. - P.49 Relationship between macroscopic + microscopic level, according to the molecular theory. - Statistical regularities can appear at macroscopic level, independent of irregularities at microscopic level. -- P.56 The inadequacies of the conceptual structure of classical physics

[illegible]

and the philosophy of mechanism. – : Concept of levels, quantitative changes that lead to qualitative changes, chance fluctuations that lead to approximate by deterministic laws for the mean behavior of large aggregates. – Mechanism (P.57) admit such changes are without significance because they must follow completely + perfectly from quantitative laws of motion of the fundamental elements that make up the system, whatever these elements may be. – But – atoms aren't really the fundamental units – (electrons, protons, neutrons, etc.) from this first one could already see that, the assumption of the complete reducibility of everything in the whole universe (P.58) to nothing more than the laws governing the motions of the atoms could not be perfectly valid, because the existence of an structure for the atoms presupposes the laws that govern them to be influenced by conditions existing at the large-scale level. Hence, the laws of the macroscopic level and those of the atomic level will actually be subject to mutual and reciprocal relationships. – P. 59 – New developments in modern physics show that... D: (electrons, neutrons protons) ... can be transformed ... into particles

1957

Bohm, D. Causality, chance + modern physics -2-

P. 54 -- collide with each other. In such an environment, conditions at the large-scale level would significantly influence even the kinds of basic particles into which any system has to be analysed. As a result the goal of deducing the laws of the higher level completely and without any approximation from those applying to electrons, protons + neutrons, proves to be unattainable. --- D. P. 66 = All the laws of the various levels + all the diff. general categories of laws such as qualitative + quantitative, determinate + statistical, etc. represent diff. but (P. 67) necessarily interrelated sides of the same process. Each gives an approximate + partial view of reality + treats help correct errors coming from the sole use of the others, and each treats adequately an aspect of the process that is not so well treated or perhaps even missed altogether by the others. -- P. 132 - A point of view that goes beyond mechanism. - P. 133 - Any given set of qualities + properties of matter + categories of laws that are expressed in terms of these qualities + properties is in general applicable only within limited contexts, over limited ranges of conditions and to limited degrees of approximation, these

limits being then subject to better + better determination with the end of scientific research. --- (may lead to) qualitatively new results of enormous significance. --- P.136 ... requirement of continual probing, criticising and testing of every feature of every theory, no matter how fundamental that theory may seem to be. — P.158 Reasons for inadequacy of LaPlacean Determinism. — P.167 With regard to nature as a whole, however, it cannot be said that this continual process of disclosure of errors in our theories is leading us through a series of successive approximations that converges on some fixed + limited goal which constitutes an absolute truth. Far as science progresses we find that the process of uncovering the errors in previous theories continually points toward the existence of more + more new kinds of things, which were not significant in contexts + conditions studied up to a certain point in the development of our researches, but which may be of crucial importance in new contexts and conditions. — P.168 — Thus, any given kind of thing is in principle knowable. — On the other hand, no matter how far even humanity may progress in any specified period of time, however long, it cannot reach or even approach a complete, perfect, and unconditional knowledge of reality as a whole. — P.169 ... the study of any one thing throws light on other things, and thus ultimately leads to the deeper understanding of its own properties. — If we admit that all the above things do naturally colour + influence our knowledge; but we admit also that nevertheless there still exists an absolute, unique, and objective reality. —

(The End.)