Reinforcement Psychology and the Market Environment

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REINFORCEMENT PSYCHOLOGY AND THE MARKET ENVIRONMENT

by

Richard P. Eastman

A Thesis Submitted to the Faculty of The Graduate College in partial fulfillment of the Degree of Master of Arts

Western Michigan University Kalamazoo, Michigan April 1979
A functional analysis of behavior requires a monopoly of controlling variables. Where contingency-control is mutual, i.e., where there is mutual shaping of shaping, functional analysis of contingency control is impossible. Weingarten and Mechner's notion of 'dependent-contingency' analysis restores some sense here, but not enough to salvage grandiose schemes for monopolistically controlled experimental cultures.

Utopian behaviorists do not realize the scope of functions performed by markets in the human environment. Prediction and control of a dependent-variable culture requires prior elimination of entrepreneurship, (black) markets, and the far-reaching division of labor that is provided only by market coordination. Under such a system, aversive control is inevitable and the high standards of living and capacity for large populations in an industrial order must be foregone.

Skinner, a heterogeneous mixture of scientific and socialist repertoires, has a theory of cultural control that generates conclusions opposite from those of this, nevertheless quasi-Skinnerian, analysis.
I wish to thank my parents, Charles and Vi Eastman, and my wife, Lynett Stimson Eastman, for their encouragement and faith in me which have sustained me during this undertaking. To them this thesis owes much more than any few words of mine can convey. I am indebted to Linda Parrott for her detailed, exacting, and enlightening comments and suggestions; and, even where I disagreed with him, to Dale Brethower for his prompt and careful criticism. One other must be mentioned with special appreciation for his advice, as generously given as it has been received. John Michael has been a continuous source of inspiration and insight, a critical audience of one, without whose sterling example of tireless dedication, high intellectual standards, and liberal scientific attitude this work, humble as it is, might not have been written. Whatever the defects of its thesis may still be, and however much I may have fallen short of appreciating the full force of some of their criticisms, or of making appropriate corrections, I am sure that this is a much better work than it would have been without the generous help of these three. I am also grateful to the Ludwig von Mises library at Hillsdale College and to the Upjohn Library of Kalamazoo College for books that would have otherwise been unknown to me and for a genuinely scholarly atmosphere in which to write. Finally, I am indebted to the Michigan taxpayer, that 'Forgotten Man' and often reluctant accomplice in the perpetration of state education, for whatever other assistance Western Michigan University or its faculty may have accorded me. Of course, responsibility for these pages, such as they are, is mine alone.

Richard P. Eastman

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This thesis was begun at Western Michigan University in 1974. It is the evolution of an idea I had three years earlier at Lake Forest College while taking George Weiner's undergraduate course in microeconomic theory. The idea concerned the problem of price determination in a market of two sellers, the famous 'duopoly' situation of nineteenth-century French economist Augustine Cournot. It appeared to me that the issue of price determination could best be resolved—at least in its "contingency-shaped" rather than its "rule-governed" component\footnote{I presuppose the reader's more-than-passing familiarity with Skinner's system which includes a philosophy of science and a theory of knowledge as well as a science of behavior. I have throughout reserved a strictly Skinnerian usage for the following terms: deprivation, aversive stimulation, contingency of reinforcement, discriminative stimulus, operant behavior, positive and negative reinforcement, generalization, discrimination, abstraction, schedule of reinforcement, operant extinction, punishment, escape, avoidance, verbal contingencies, rule-governed behavior, respondent conditioning, and emotional predispositions and responses. Well over a hundred expositions of these concepts are currently available in published form. On the other hand, no initial knowledge of economics systems or theories is called for beyond that usually associated with even a moderately sound liberal-arts education.}—by a behavior-laboratory experiment. (B. F. Skinner had recently won me over completely.) Later, at Western Michigan, my 'solution' entailed the construction of a synthetic birdseed-and-keypeck economy of five individually chambered but electronically interconnected pigeons: two competitor price-setting "seller birds" and three price-selecting "buyer birds."

Five chambers, five food dispensers, 16 peck keys, and panel
arrays with a total of 72 stimulus lights were all assembled from scratch and paid for by my father—who happens to be a seller (of car polish)—and myself. The electro-mechanical equipment (it took up half a wall) required scouring the department for every available piece of jetsam. And jetsam was everywhere. Thousands of dollars of tax-paid 'Great Society' equipment had been tossed into dust-catching heaps to make room for more advanced computer systems. Much of this salvage had to be overhauled and supplemented with whatever parts C. F. Eastman was able to find in California. I hired assistants at three dollars an hour (good money in those days, which I earned as an all-night janitor at an Osco Drug store.) They helped me solder over a thousand electrical connections.

Building this 'market mechanism' placed me under the special control of the technological and scientific problems involved in generating and then monitoring interreinforcement, problems some of which I could not then even begin to guess were insoluble. It became increasingly distressing to find that by appealing to the contingency-of-reinforcement-and-probability-of-response paradigm I could interpret synthetic-market pricing phenomena, but could not, either experimentally or conceptually, functionally analyse them in those terms. This problem persisted no matter how simple or elegant the experimental situation.¹

After a year and a half of full-time effort (I was working to be

¹A detailed treatment of these problems occurring in an (actually completed) experiment with similar analytical shortcomings can be found in the discussion of Boren, 1966, p. 24, below.
in full operation by the two hundredth anniversary of Adam Smith's *Wealth of Nations*, with my buyer birds, in independent training sessions, now showing 'rational' price discrimination and with the wiring of the remaining chambers near completion, I saw that I could go no further.

The analytical barrier before which I had been stopped was the delimiting boundary between psychology and economics. "One science is distinguished from another neither by theory nor by data. Different types of experimental control over the various subject matters provide the defining characteristics."\(^1\) In my synthetic-market designs, isolated chambers notwithstanding, controlling contingency variables were running loose. Antecedent stimuli, behavior, and consequences could not be isolated or made discriminable. Pricing appeared to be under the control of its own past tense. With each new wrinkle it became more evident that markets are not simply instances of 'complex cases,' but rather basic and distinct behavior-controlling relationships. I had not ceded independent-variable control to the incidental histories of five pigeons; I ceded it to a market of such histories.

A second rude awakening came when I found that I could not interest Skinnerian faculty either in my technique for generating market pricing or in its resulting conceptual difficulties. (That one New-Class don refused even casual discussion of my work with me and

that the department-sponsored Behaviorist's for Social Action labeled me a fascist were only two points of a larger pattern of resistance.

I could not but agree with Sidman that:

"...psychologists differ with respect to the phenomena they consider important. Their evaluation, therefore, of a new behavioral control technique will be colored by the importance they attribute to the phenomenon over which the improved control is demonstrated."

To those the set the fashion at Western's psychology department, the idea of order in market control was clearly outre. It was unreasonable for me, considering this, to assume that a technique for finding that order would be taken any more seriously.

Frozen out, I shelved my experiment and began looking for something else to do. Still, a residue of interest had escaped abulia. I began to write a theoretical analysis of operant behavior in markets and, incidentally, a critique of the science and Weltanschauung of anti-market behaviorists.

Then Jack Michael agreed to chair a theoretical thesis of mine, prospectus unseen.

I immediately took on a full-time position as a gas station attendant for Clark Oil, a job which has enabled me to spend the last few years (from 64.9 to 78.8 cents per gallon) independently reconsidering the prevailing science of human behavior which does not account for market activity, but which, nonetheless, is offered by growing numbers of our university products as a guide for redesigning or abolishing our profusely market-propagated culture. This required power-

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1loc. cit., p. 16

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ful and anomalous method. Borrowing heavily from Neo-Classical and Austrian School economists and from quasi-behavioristic exchange-theory sociologists, I have elaborated a supplementary science of market cultures, a benevolent mutation of Skinner's reductionistic sociology.

Perhaps working in this kind of vacuum has not been without advantages. Placed thus, far outside, one finds that the centrifugal force of reinforcement from new knowledge of one's subject matter becomes sufficient to overcome the gravitation of a fortress intellectual community. And even for a very ordinary investigator, that can lead to something.
PART ONE

Monopolistic Contingency Analysis

The Nature of the Problem

No subject has been more faithfully explored by behaviorists than the effect of pre-specified contingencies upon the operant emissions of single organisms. Yet, even the most ovine adherents to this estimable strategy suspect that contingencies must additionally be investigated as effects, for only when its practitioners aver that controllers too are controlled does a functional analysis of behavior yield reinforcing properties of consistency and completeness.

According to current analysis, arranging contingencies of behavior reinforcement and, by that, altering response probabilities, topographies and strengths, is itself behavior that is shaped and maintained by such contingencies. It makes no difference whether the subject of control is the controller himself or a second organism. The controlling relation occurs when exogenously supplied contingencies, verbal and nonverbal, contribute to the topography and strength of the first instance. Resulting operations of the controlled upon the environment of the controller may then take over the maintenance of subsequent controlling responses. These responses may be differentially reinforced as the controller makes contact with the changing requirements of control, requirements presented by the instruments of control, the
state of the subject, and, of primary concern in this thesis, the extraneous contingencies which compete in generating prepotent responses. These other contingencies with which the contingency arrangements of the controller contend exist whenever deficiences in resource, appliance or repertoire precludes a monopoly of relevant controlling variables.

The introduction of multiple controlling agencies presents difficulties in a functional analysis of control. How does one analyse control when the partial controller's missing variables are subject to control by other organisms, i.e., other partial controllers, and, at the same time, each partial controller's control-contributing manipulations are reinforced and punished in widely dissimilar ways by different features of their common subject's repertoire? How, even in the laboratory, does one discriminate independent and dependent variables when attempting to predict the behavior of a partial controller under the control of both 1) features of the subject's repertoire, and 2) variable manipulations of control-sharing rivals who, in turn, are under the control of a) incompatable features of the same subject's repertoire and b) variable manipulations of the first partial controller?

Presumably, principles gleaned analysing behavior as a function of contingencies still operate in multi-organism relations where contingency arrangements mutually control contingency arrangements. Such relations, although complex, present no analytical anomalies and require no new explanatory processes. Nonetheless, it is questionable whether familiarity with the body of
single organism research, even when supported by the computer and systems analysis, can trace and differentiate component contingency-behavior functions from larger interactive relations. Such multi-controller relations may not be reducible to specifiable behavior-free independent variables and single organism behavior, or, if reducible, the relations may have no counterpart in the mechanical or algorithmic contingencies we can devise (short of one day uncovering and synthesizing the very organic processes that permit operant responding). In either event, future analysis of contingency-governed behavior would require two distinct methods, each with its appropriate class of controlling variables: the original Skinnerian or 'monopolistic' contingency analysis with behavior-free independent variables, and the catallactic\(^1\) or 'multiple-controller' analysis of concern here. The distinction would be based upon the inherent accessibility of subject matter and not upon the level of analysis or the physical properties of variables.

If, however, contrary to the present thesis and in accordance with the tacit assumptions of contemporary analysis, catallactic relations can, in fact, be broken down into discrete subject be-

\(^1\)The term 'catallactics' was first used by economist Whately in 1831 to mean 'the science of exchanges' and more recently by Austrian School economist Ludwig Edler von Mises in his Human Action: A Treatise on Economics, 3rd revised ed., (Chicago: Henry Regnery Co., 1963) p. 3. It is derived from the Greek verb katallattein, 'to barter', 'to exchange' or "to admit to the community." F. A. von Hayek, Studies in Philosophy, Politics and Economics, (Chicago: The University of Chicago Press, 1967) p. 164 Present modified usage is proposed for inclusion in the technical terminology of behavior analysis.
haviors and behavior-free controlling variables, analytical bifurcation may still be the logical course of investigation since the process of identifying appropriate 'pure' independent variables will unavoidably entail big, and up-to-now unforeseen strategic costs. To search for uncontaminated or pure relations within a complex interactive process is to direct attention away from controlling relations as they actually exist and to divert it instead toward 'model selection skills' made necessary for selecting just those behavior-free-independent-variable relations that best account for the observed interaction. This removal from the phenomenon studied would necessarily entail a retreat to 'theory testing' since every theoretical reduction of catallactic relations into constituent pure relations, i.e., the inferred 'atoms' comprising actual catallactic relations, would have to be validated empirically. Pure operants, the discovery of which marked a major advance in the science of behavior, would then, ironically, serve the function of an other-dimensional explanatory entity, the same kind of weak device which radical behaviorists have, so far, asiduously avoided. Inevitably, an analysis of catallactic relations will appeal to either 1) incorporation of behavior-free independent variables where they do not actually exist and must be conceptually 'fitted', or 2) direct inspection of subject matter 'in one piece' which will require a (possibly futile) search for effective research methods. If the former proves to be so weak and uninteresting that its practice is extinguished (as has happened with work initiated by Homans) or if the latter is unsuccessful, then the experimental analysis of behavior will remain
what it is today: a science of the monopolists, by the monopolists and for the monopolists.

**Catallactic relations and the analysis of control by contingencies**

The notion of a new kind of contingency relation which is in-penetrable to contemporary analysis is bound to appear spurious to behaviorists with long histories replete with reinforcement of extremely plausible *a posteriori* accounts of daily life. The following example should sharpen their discrimination (one way or another):

A grain company installs a vending machine which dispenses sacks of grain of given size and quality according to a schedule determined by, perhaps, a faulty coin mechanism. A behaviorist with a known grain-buying history and motivated by known reinforcer-establishing operations comes to buy pigeon grain with money from his limited research fund. From these events we may assume that, barring extraneous factors, our behaviorist's long-term performance on the machine operandum is accountable to contemporary analysis, and is even immediately predictable, in general terms, provided direct inspection of the coin apparatus identifies the schedule in maintenance as one similar to those already studied elsewhere. Perhaps, it will resemble a familiar conjunctive of various ratio schedules. At any rate, the contingencies within the relevant controlling environment are givens not subject to endogenous modification. (Our behaviorist does not tamper with the workings of other peoples vending machines.) The relation remains non-catallactic. Even when, one year later, a rival company
installs a second machine three feet away which dispenses sacks containing a different quantity and quality of grain according to a somewhat different schedule, monopolistic analysis remains appropriate since the behaviorist in our example cannot reinforce or punish mechanically arranged contingencies. The new two-machine situation will, of course, require consideration of additional factors appropriate to concurrent schedules, such as the 'matching' phenomenon, but, disregarding the initial placement of the second machine by some human competitor, neither machine is being reprogrammed as a function of the moves of the other. The relevant independent variables remain devoid of contingency-shaped features. Next in our example, the two vending machines are each connected to a computer in the respective home office. Each is programmed to compete with the other's contingencies according to a once-and-for-all pricing formula derived, perhaps, from game-theoretic 'maxi-min' strategies, micro-economic 'reaction curve' analysis or even some predetermined 'systems' approach to behavior modification. Whatever the pre-programmed strategies of these 'smart' vending machines, the resulting combinative concurrent schedule can be calculated in advance and described in terms of some equilibrium or cyclical pattern of co-ordinate probabilities. Despite its greater complexity, this subject-environment relation is also non-catallactic since the programs-generated adjustment of schedules is not behavioral and, therefore, not contingency shaped. Prediction remains 'in the cards' (in this case IBM cards) of contemporary analysis. After a second year (during which we have still not located the elusive catallactic relation)
the machine from the first company is replaced by a human sales representative authorized to make deals. He arranges contingencies designed to undercut (i.e. gain prepotency from) those of the rival vending machine and supplies verbal contingencies pointing out the extra reinforcing consequences of buying grain from the first company. Whether the introduction of the dealer is enough to initiate a catallactic relation depends, further, upon the variables of which his deal-making is a function. Is it as a function of the changing 'counter offers' of the behaviorist that the dealer emits contingency manipulations of different topography, duration, intensity or rate; or, contrarily, is he attending only to the deals arranged by his computerized rival from company number two? If the former, then we must inquire further into whether the behaviorist's actions are merely discriminative with the rest of the contingency being supplied extraneously, as when the home office supplies reinforcement contingent upon following a rule-governing sales strategy which, in the language of business, 'anticipates every contingency'? Where the dealer attends only to the machine or is under the purely discriminative control of the behaviorist, the substitution of a dealer for a machine presents no new problem to contemporary analysis beyond those imposed by sloppy design. If, however, the behaviorist is arranging verbal contingencies (e.g. If you come down a dollar, I'll buy ten sacks right now.) that actually reinforce or punish the offers of the dealer (i.e. the dealer is, pre-scientifically speaking, 'bargaining in good faith') and vice versa then the relation is catallactic and, it may be seen, outside the range of
It is important to note that it is the addition of mutual contingency shaping of contingency shaping and not the absence of rule government that is essential to catallactic relations. As long as the former is included the latter may also be present. If an organism arranges contingencies which generate rules or determine the selection of rules governing his controller, the relation remains catallactic.

Where the problem occurs

To learn just where monopolistic analysis falls short one must step back to where one can see the whole system. The radical behaviorist interprets the organism as a locus of dependent variables within the universe of physics. This locus moves relative to itself and relative to whatever is near it. This motion when either released, elicited or emitted is the behavior of an organism. Emitted behavior characteristically operates upon the environment. For analytical convenience it is arbitrarily delimited into operationally defined classes of discrete emitted responses. The basic dependent variable in a science of emitted behavior is the probability that a response of a given class will be emitted under given circumstances. This probability is frequently defined operationally as rate of response, response per opportunity or inter-response time. Among the many independent variables known to effect these measurements of probability are the familiar ontogenetic contingencies of operant selection. In a given state of organism and environment the emission of a unit of operant behav—
ior is followed by some rearrangement of enironing stimuli. Repeated occurrence of this contingent rearrangement according to some schedule may or may not alter the probability of further operant emissions under similar circumstances. Given a dependent variable, an obvious task for a science of emitted behavior is to contrive a wide variety of response-contingent transitions from one enironing stimulus arrangement to another and see what happens. The first contingencies analyzed were one-for-one transitions scheduled trial-by-trial. Intermittent contingency maintenance in real time was later introduced by Skinner when he added clocks and counters, at first separately and later in combinations of increasing complexity. Recently 'on line' computers have accelerated the pace if not the quality of this research. Despite the scale and variety of present work, contingencies investigated can all still be specified in terms of clocks, counters, responses and stimulus events, regardless of whether the medium of maintenance involves microcircuits or rule-governed 'consequating' by a researcher or behavior modifier. A catalog of known contingencies indexed by clock-and-counter settings and describing corresponding response-rate patternings would easily fill a small library. Of course, a science of behavior, to be of service in the business of living, must not only catalog the condition-bridging contingencies and their characteristically generated response probabilities; it must (at least in theory) also be

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able to identify contingencies in maintenance at a given time and place in the world.¹ Since the entire scientific enterprise can be described as individuals coming under the control of contingencies maintained in the physical universe, the job of identifying contingencies is a burden that radical behaviorists can appropriately share with other disciplines. The astronomer can best describe the probable frequency of meteors that will reinforce stargazing on a particular night. A mathematician can quickly tell a behaviorist whether continued operation of a long division problem will result in reinforcing completion of a rational answer or infinite extinction by an irrational number. The semi-sciences of statistics and actuarial work can calculate the probability that when a salesman rings a doorbell in a given neighborhood he will be reinforced or punished by the appearance of a person of a given age or income bracket. To our great relief, the description of many such contingency-maintaining mechanisms or processes are reasonably placed beyond the academic boundaries and concern of a science of emitted behavior and need not clutter our journals.

¹The division of the world into amenable (contingency-known) design and unamenable (contingency-unknown) accident does not obviate this issue of science. The absurd consequence of this dodge has merely been the proposal by aberrant radical political behaviorists to destroy through revolution or subversion all contingencies or all controlling human relations which they cannot monopolize. Rather than using the controllable conditions of the laboratory to isolate and explore unknown contingency mechanisms operating in the human economy, they would remake the world into a centrally-controlled setting thereby eliminating everything not conforming to their current and lamentably limited state of analysis.
However, not all of the environmental contingencies at large in the world have their origins in non-behavioral or statistical realms. Some contingencies controlling behavior originate within the behaviorist's bailiwick and must necessarily be accounted for there. Of these, a multitude are rule governed. Accounting for rule-governed contingency maintenance is easy. We may simply point to the reinforcer-establishing operations, the reinforcers, and the discriminative text books, instructions, maxims, experimental designs, descriptions of contingencies and/or sales strategies involved. However, just as the world's contingencies cannot all be mapped and interpreted for us by other disciplines, so, too, those behaviorally arranged contingencies encompassed by a science of behavior cannot all be accounted for in terms of rule-governed stimuli. Much contingency maintenance is contingency shaped and imperfectly, or not at all, correlated with a set of discriminative rules. In fact, every rule-governing stimulus has its origins, however remote, in prior episodes of contingency shaping. Still analysis is not problematic if the contingencies controlling a shaper's shaping can be traced back 'across the border' to another discipline. A man's behavior may be contingency-shaped by another man whose own shaping is, in turn, shaped by yet another man and so on until the shaping by the first man in the sequence is found to be controlled by contingencies originating in the field of mechanics, medicine, agricultural science or some other non-behavioral science. Tracing this logical extension back into history would be difficult only insofar as familiar data would have to be reconstructed. But what if there is no 'first
contingency' originating in another area of science? What if the chain of control loops around within the domain of the behavioral variables producing mutual shaping of shaping?

In such a case, a contingency is no longer an identifiable parameter. Partitive analysis of such reciprocally determining performance encounters the ineluctable problem of solving a single equation with two or more unknowns. However, unlike the mathematical problem where associative, distributive and other properties are originally ascribed to the subject matter, permitting manipulations from which a locus of solutions can be confidently derived, the behavioral processes within catallactic relations cannot be experimentally modified without at once destroying the relation of interest. Attempts to 'plot a solution' against experimentally insinuated 'substitutions' which override or obstruct a partial controller's contingency-governed contingency manipulations can only serve to create a new catallactic relation with one less agent. When all partial controllers save one are systematically regulated in this way, allowing finally, for parametric study of the remaining behavior, we find that the relation we are left with is monopolistic rather than catallactic, as would be the case when a grain buyer finds the town's last 'flexible' dealer replaced by a vending machine.

Why catallactically generated contingencies cannot be specified

Unlike the subject matter of appropriate monopolistic analysis, the contingencies generated in catallactic relations are not discriminable by direct inspection of design, apparatus or program
and they cannot be replaced by a known set of clock-and-counter equivalents. Experimental replacement of part of an unknown with an arbitrary known only works when what is replaced is purely an independent variable and not also an inextricable component of the dependent variable.

Only observation after the fact, i.e., history, yields such specific data as, for example, that in environment \( x \), at time \( t \), partial controller One arranged contingency \( c \) for partial controller Two, whereupon, in \( s \) seconds, partial controller Two transited partial controller One to new environment \( x' \), etc. Only from such data can we identify specific clock and counter settings describing correlated events generated within a catallactic relation. However, these data are necessarily incomplete. Even hindsight fails to reveal more than a glimpse of the contingencies in maintenance throughout any temporal segment of a catallactic relation's cumulative record. A within-relation contingency can only be known to have been in maintenance during those relatively few instances when all of its requirement has actually been met and a mediated stimulus rearrangement observed to follow. A grain dealer may make an offer, but later, in the ensuing seconds of silence, may already have come to emit, under the control of the buyer's latest counter offer, covert maintenance of a new counter counter contingency which may again be modified before it is ever met and the consequence overtly delivered and recorded. The scatter of data points may prove so thin as to be insufficient to control accurate discrimination of generality or replicability among catallactic relations, making both criteria of comparison and,
ultimately, prediction impossible to obtain.

Although covert behavior may be of little theoretical importance as a dependent variable, its presence as an uncontacted contingency in a catallactic relation cannot be ignored. There is a difference between a response which falls short of meeting a partial controller's contingency and a response which is emitted in the absence of any contingency. The difference is in the possibility that with just slightly varied amplitude in the behavioral 'noise', the contingency may be met at a point where in previous replications it has fallen short. Such an event could precipitate a chain reaction of radical deviations in all subsequent contingencies and counter contingencies as the relation unfolds. Of course the effects of any deviation will be more far-reaching than in monopolistic experiments since each partial controller's movement is never without its own effects in catallactic relations where looping, i.e. mutual, contingency control generates ever widening ramifications.

It will be asked why an experiment cannot be designed in which the contingencies maintained by the partial controller are always overt. Partial controllers can be placed in environments where some contingency is always in maintenance and controlling responses merely select schedule-setting values. For example, a pigeon may select a schedule for another, yoked, pigeon by pecking one of several keys, thereby illuminating that key, changing schedules in the other pigeons's chamber and darkening the previously lit key which had activated the previously operating schedule. Or, a grain dealer may be required to continuously point
somewhere along a scale of prices on the wall, whichever number he is pointing to at a given instant being the current price offered to his prospective buyer. Prices offered would then present an unbroken record. Yet, even this strategy does not yield identification of within-relation contingencies.

Let us see why not.

Suppose two partial controllers, one selling grain for money and the other buying grain with money, each bargain exclusively by pointing respective index fingers at numbers drawn along a horizontal scale on the wall. The scale is graduated in dollars per kilo or kilos per dollar. At the outset, it is safe to predict that each partial controller will first point at a ratio on one end of the scale opposite the other's pointing finger. After an interval (of extinction?) one or the other will shift his finger slightly towards the center of the scale. From this moment on, each move by one towards or away from the other reinforces or punishes the latter's differential responding, until, eventually, two fingers meet at the same point. Here an instantaneous 'market price' is established. Grain and money exchange hands and the next sack of grain or dollar bill goes up for sale. This is a catallactic relation. The market price, which may differ from episode to episode, may be, but is not necessarily, mutually reinforcing. It may be aversive, as when a partial controller moves his finger over to his high cost side, having in this way previously lured 'his pigeon' to his own side, but, this time, fails to avert an unprecedented and immediate closure by the other. We may obtain a record of such haggling by placing a slowly unwinding roll of pa-
per across the price scale and connecting a pen to the tip of each partial controller's pointing finger. A market transaction would then be indicated at ratios where the two performance lines meet. With such an arrangement we see at once that each line is a record of both an ongoing performance and, when correlated with the record of the other partial controller's performance, a continuous stream of consequences and antecedent stimuli. We also recognize that each excursion of the finger pens may be registering either superstitious responding or noise, as well as behavior under the (catallactic) control of the other's movements. Putting both facts together, we discover that regardless of their source of strength, all finger excursions function impartially as both antecedent and consequence in relation to the other's behavior. In monopolistic analysis, noise and superstitious responding are merely emitted, recorded as relevant history and otherwise done with. In catallactic relations no discriminated movement can be expected to have merely transitory or minor effects since contingency features are also changed with circular effects which continue indefinitely. This confounding characteristic of the continuous price-scale procedure poses fundamental problems to researchers seeking experimental replicability among relations.

A second arresting feature of this price scale relation between partial controllers is that neither performance line presents obvious partition boundaries for isolating coherent units of analysis. The inter-transaction interval, i.e., the dual performance record between each finger interception, lacks the unambiguous status of, for example, the inter-reinforcement interval or inter-
shock interval of monopolistic analysis. How do we delimit a segment of ongoing performance as a discrete stimulus confronting the partial controller? Do we synoptically treat the entire length of the preceding performance as one long schedule or can smaller units be found enabling us to confront a more manageable succession of discrete and short-lived schedules? If the former, must we then, following the economist, compute derivatives from data to deal effectively with rates and accelerations as important discriminative properties? Alternately, if performances are to be dealt with as shorter localized contingency components, must we attend to the absolute positions of fingers on the scale or to relative positions; absolute movements or relative movements?

Finally, how shall we evaluate a method which yields from just two co-varying performances an organized and complete set of stimuli, behaviors and consequences for each partial controller? (One hears the structuralist laughing up his sleeve.)

We are attempting to discover whether a continuous price-scale procedure affords discovery of specific contingency relations within catallactic relations. So far, we have mentioned two technical difficulties: one, concerning the indiscriminability of relationally determined stimulus effects against other inevitable effects of extraneous or incidental origin, and the second, involving the practical separation of discrete stimulus events or the effective organization of data. It would be rash not to allow for the eventual resolution of these problems. However, assuming, optimistically, that satisfactory answers will be supplied, a third difficulty, more formidable and fundamental remains.
By now, it should be evident that the central problem in analysing partial control behavior is identifying and accounting for replicable intra-relational contingencies. Certainly, this corresponds in importance to the monopolistic researcher's familiar and now almost automatic task of determining the effects of known and deliberate contingencies upon behavior. We define a contingency as the differential consequences of emitting and not emitting a particular response upon a given occasion. In a catal-lactic relation, such as our price-scale arrangement, the consequences which follow each response are indicated in the cumulative record. What is not indicated are the consequences of not responding or of emitting a response with just slightly different spatio-temporal relations. No matter how they are collected and correlated, the partial controllers' 'haggle' data supply no clue as to the way in which the seller's subsequent offers would have been modified had the buyer countered differently in a particular instance.

Such contingency information, missing here, is, in monopolistic analysis, always available to be described fully in 'state notation'. This schematic device, fast becoming the standard idiom for representation of the monopolistic independent variable, exhaustively maps all of a monopolistic procedure's possible environing states and, for each of these, all of the various clock, counter, probability generator and yoke-triggered events which transfer the subject to other states. In all, it is an expedient that is useful in both experimental and conceptual analysis. However, when drawn up on the basis of all available price-scale rel-
ation data, such diagrams would have to omit all operative transfer criteria or 'transition arrows' except those along that 'particularized' course actually traced by the two hagglers. Since states are defined not only by currently environing stimuli, but also by the various time and behavior requirements for state transition, we are faced with the problem of correctly locating the organism in one of many possible topographically identical, but functionally different states. If we identify states by the set of all transition arrows leading from each, and if our methods permit the discrimination of but one arrow for each state, i.e., that requirement actually met in empirical replication, we see that our hopes for nomothetic generality are in big trouble. Nor are we cheered when we consider that even the simple price-scale procedure, with its sequential stimulus continuity and looping control features, allows for an astronomical number of obtainable states; in fact, a state diagram surpassing in its complexity the layout of all possible chess situations from the opening moves to every imaginable checkmate, stalemate and draw. A finite number, to be sure, but certainly one large enough to dampen the prospects of those who would construct a complete diagram 'space' through the formalistic application of statistical analysis and static game theory to sufficiently huge samples of replications. Which is just as well, for these armamentaria would be misapplied and unavailing here anyway. A partial controller may indeed find himself in a repeat situation, either with respect to recurring finger positions along a price scale, or, in chess, with respect to a previously encountered deployment of pieces, but it is also true
that in both cases, when endeavoring to predict state-transitioning contingencies, the effect of an intervening history of conditioning must also be considered. Have those whom the other partial controller has been up against moved defensively or offensively, conservatively or recklessly, straightforwardly or with bluffing? Whatever the additional history, it will have its effect. If a partial controller has, in the past, responded to move A with move B and to move C with D, the fact that he again responds to move A with B does not imply that he would have again responded to move C with D. A current environmental state may have any of a number of different sets of transition arrows, each set positioning the organism in a different sector of the conceptual diagram of all possible situations and transitions. Without knowing which transition requirements are obtaining at a particular moment, the actual pathway of a partial controller through the scheme of all possibilities can never be drawn. There appears to be no way of escaping the possibility that observed similarities among replications may be merely topographical, the 'accidental' outcomes of wholly dissimilar systems of controlling relations. In other words, relational comparison is out of reach.

It will be countered that among experienced chess players, i.e., those who have had long contact with the contingencies of the game, certain mid-game and final-game outcomes are readily replicable. Here, it must be pointed out that it is only the final moves, where an inescapable resolution is known to inhere and the catallactic element of mutual shaping is absent, that replicable solving of the essentially monopolistic 'chess problem'
is reliably predictable.

Catallactic Relations as a Function of "Independent Contingencies"

The contribution of Weingarten and Mechner

In the preceding section of this thesis it was established that one sure way to destroy a catallactic relation of interest is to attempt parametric analysis of a partial controller's behavior by substituting monopolistic arrangements for the control-contributions of other partial controllers. Yet, the scientist's assumption of an orderly universe suggests the possibility that even this 'destructive' process embodies a lawfulness around which a new or ancillary functional analysis may be evolved. What have been construed as disruptions may thus be reinterpreted as transitions from one distinct catallactic relation to another. Each relation then stands as one value of a new dependent variable that is functionally related to a particular extra-relational arrangement. The entire catallactic relation is thus an analytical unit controlled by circumscribing non-catallactically determined variables.

For example, the exchange rate between grain and dollars (i.e. the price of grain) generated within the catallactic relation of our previous 'price scale' example (pp. 15-16 above) is such a dependent variable or outcome. It is a function of such non-catallactic 'facilities of exchange' as the concrete price scale itself, the so-much-full grain bin, the buyer's wallet or check book and pen, as well as the various other instrumentalities...
(or capital\textsuperscript{1}) such as the parking lot, cash register, grain sacks, commercial scales, scoop, etc., along with their costs of operation. Together, these factors constitute the current non-behaviorally maintained contingencies governing the transfer of grain or dollars from one partial controller to another. (Of course, the present analysis is not intended to denigrate the relevance of prior conditioning, especially the role of the reinforcing verbal community, who provide the partial controllers with haggling and exchange repertoires at initial strengths.)

From the time it was first 'hatched' by Weingarten and Mech
ner,\textsuperscript{2} the general principle of this interpretation has been left dormant by a basic-research community bent on the pursuit of ever-higher-resolution and finer-grain 'readouts' from their single-organism experiments. Perhaps indifference to the article has stemmed from a lack of laboratory-generated interest in problems of mutual reinforcement exchange. Certainly, the 'right questions' are not forthcoming from research concerning inter-response

\textsuperscript{1}Capital are operandina, 'conditioned reinforcers', called by some, 'frozen labor', the completed 'precurrent' construction of manipulanda 'of value' in the chain of behaviors leading to a final consumption good. (Cf. Skinner's treatment: "Conditioned reinforcers are often the product of natural contingencies. Usually, food and water are received only after the organism has engaged in 'precurrent' behavior--after it has operated upon the environment to create the opportunity for eating and drinking. The stimuli created by this precurrent behavior, therefore, become reinforcing." \textit{Science and Human Behavior}, (New York: The Macmillan Company, 1953) p.76)

times, adjunctive behaviors, conditioned suppression, and other such 'micro' topics—important as they may be. Nor has curiosity been piqued by the, seemingly obvious, implications of the semi-economic 'matching law' or the recent and interesting attempts¹ at analysing 'consumption patterns', i.e., the demand schedules² of albino rats for root beer and Tom Collins mix, as a function of monopolistically arranged, and, therefore, non-catallactically determined 'budgets' and prices. It may be that the leap has not been taken because we lack the sufficient repertoire of market economics on which to land. At any rate, whatever selective factors peculiar to this stage of the evolving science are responsible for the failure to utilize Weingarten and Mechner's original analytical device, it is nonetheless evident, as we shall see, that no investigation of the nature and operation of catallactic relations can proceed without it.³

The innovative strategy of Weingarten and Mechner identifies as its basic dependent variable the behaviorally arranged contin-

¹John H. Kagel et al., "Experimental Studies of Consumer Demand Behavior Using Laboratory Animals," Economic Inquiry XIII (March, 1975) pp. 22-38

²A microeconomic term, loosely applied by Kagel

³One by-product of the present truncated corpus (and of the Skinnerians' self-imposed separation from traditional social psychology) has been to leave the field clear for 'scientific socialism' and its candid assertion that any exchange analysis found incompatible with the dialectical interpretation of historical class conflict is unscientific and must be spurious. Wholesale acceptance of this line by radical political behaviorists then contributes further to this research restriction and low yield.

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gencies within what we have been calling catallactic relations. Such variables they call 'dependent contingencies' (but, as we have seen, they have coequal status as behaviors). They are to be analysed as a function of 'independent contingencies', i.e., the monopolistic contingencies which specify and delimit modes of interaction, and, in an experimental analysis, are systematically arranged according to a particular research design.

Boren, 1966

Boren's monkey interreinforcement procedure\(^1\) may be reclassified as an early experiment in this category. During one phase of his investigation, two macaque monkeys, Si and Al, were placed in adjacent chambers, wherein 32 bar presses in one produced a pellet next door and activated within the pellet-receiving chamber an identical lever so that 32 presses there delivered a reciprocating pellet to the first chamber. These apparatus parameters were Boren's independent contingencies. They were present and operative whether Si and Al were in their chambers or not. However, to obtain any responding at all, Boren had to develop his independent contingencies through successive stages; not including the prior monopolistic 'delayed reinforcement training' which was also required.\(^2\) These earlier stages included continuous interreinforce-

\(^1\)Johen J. Boren, "An Experimental Social Relation Between Two Monkeys," *Journal of the Experimental Analysis of Behavior* IX (November, 1966) pp. 691-700

\(^2\)loc. cit., pp. 692-93
ment schedules, alternating red and white stimulus lights, and five seconds of 'time out' for responding out of turn, i.e., during the red light.\textsuperscript{1} The result was high, steady states of responding, resembling the short, fixed-ratio-schedule runs found in monopolistic analysis. "A stable social relation" had been achieved.\textsuperscript{2}

After a convincingly long steady-state performance under these independent contingencies, the alternation requirement (i.e. the fixed exchange rate of one pellet for one pellet, 32 responses) was lifted and replaced with the "free responding procedure."\textsuperscript{3} Now, no matter where Al was in his own lever sequence, 32 presses by Si gave Al a pellet, and \textit{vice versa}. With 32 responses no longer required in a chamber before a pellet could be delivered to that chamber, the rates of behavior exchange were now wholly dependent contingencies.

To monitor this dyadic catallaxy, two cumulative recorders were used, each with a pen held steady while a clock mechanism pushed the graph paper along beneath it, marking the time axis. Both clocks kept the same paper speeds, allowing easier temporal correlation of performances. When a monkey pressed his lever, the respective recording pen then jumped a small fraction of an inch; perpendicular to the movement of the paper, along the response

\textsuperscript{1}ibid.
\textsuperscript{2}loc. cit., p. 699
\textsuperscript{3}loc. cit., p. 695
axis. After 540 responses, i.e., the width of the paper, both pens then reset to the zero-response position. Rate of response for each monkey thus equaled the slope of the record in each segment between resets. To indicate pellet deliveries, a relay activated by the thirty-second response of the other monkey, momentarily tugged the receiving monkey's pen leaving a small hatch mark on his ongoing record.

Since we are especially interested in the experimenter's behavior with respect to his experiment it is necessary to quote extensively from his account of the results.

"Both monkeys maintained relatively high rates the first two sessions (84-85) under the free responding procedure. By session 86, however, Al's rate had dropped very low... At the beginning of this session (as during the entire first session) both monkeys responded rapidly (sometimes simultaneously) so that they received a similar number of pellets. At the end of the session, however, an important change took place. At approximately the fourth reset of the recorder... Al stopped responding and Si continued. The result was that Al received a number of reinforcements for sitting and not responding. The seed of social instability had been sown.

"This pattern continued through session 86 and most of session 87 and accounts for the low rate shown for Al and the high rate shown for Si... Si did most of the responding while Al did most of the eating. By the sixth excursion of the pen... Si had made more than 3000 lever presses but had received only two reinforcements from Al. A short time later (before the seventh excursion) Si began to pause for long periods—a behavioral consequence which probably resulted from the large amount of responding and the small amount of reinforcement. A second consequence of Si's pausing was that the reinforcement frequency for Al dropped. At this point Al's rate increased sharply while Si sat and received a number of pellets. While the reasons for the sharp change in Al's behavior is not definitely known, Al's extensive past history with the alternation procedure was probably involved. With that procedure, the reinforcement frequency was increased by responding, since after one monkey emitted a run of responses, it usually received a pellet back from the
other monkey.  

Why did Al's responding suddenly drop off? Boren's examination of the data within sessions 84-87 does not tell us. No reference is made to intra-relational schedule control as we now understand it. Appeal is made to an earlier set of independent contingencies (i.e. the alternation procedure), but this explanation amounts to no more than a description of those contingencies. The account of both monkeys' responding after Al's sudden transition is similarly structural (i.e. topographical, not demonstrating functional relationships): "... Al stopped responding and Si continued. The result was that Al received a number of pellets ... for not responding." And finally, "This pattern continued ... and accounts for the low rate shown for Al and the high rate shown for Si."

In giving this account of this phenomenon Boren includes actual pictures of cumulative records from the relevant sessions. He claims that this data "was particularly important because it permitted an understanding of how the social interaction developed." A source of ambiguity is the word how (rather than why), a word which applies equally to both structural and functional accounts. The fact is that Boren's analysis is structural when he is attending to endogenous events and functional when controlling relations are sought elsewhere. After Si emitted 3000 lever presses and re-

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1loc. cit., p. 695
2loc. cit., p. 699
ceived only two pellets he began to pause. Boren attributes this "behavioral consequence" to aggregate molar events, to "the large amount of responding and the small amount of reinforcement." Although this conclusion is plausible it is not a discrimination of correlations demonstrated within the experiment itself. The experimenter completely overlooks consideration of the minutiae of moment-by-moment catallactic control, although nothing in his data enjoins dismissal of these local features of mutual contingency shaping. Even within the canons of standard monopolistic analysis, the effects of differential reinforcement of low rates, reinforcement of other behavior, discrimination and the completely novel effects of untested reinforcement schedules are not to be lightly discounted.

The account continues:

"Although Si had been the high responder before session 88, Al became the higher responder afterwards. . . Al's rate increased gradually and reached a maximum on session 97. Since Al received only a small portion of the 140 pellets allotted to each daily session, the increased responding may have been due in part to increased food deprivation. However, the results with the other two monkeys (and later work with these monkeys) where deprivation was held constant indicated that increased deprivation was not the essential variable for this type of result. . . Al's overall high rate was formed of runs of 32 responses followed by brief pauses. The termination of the run and the initiation of the pause coincided with the click of Si's pellet dispenser and the delivery of the pellet. Si's pattern was usually the same. This performance pattern indicates that each monkey was influenced by the delivery of food to the other.

"After session 97, Al's response rate decreased steadily, an effect which would seem to follow from the low rate of reinforcement. From session 97-101 Al made more than 4000 responses per session but received an average of only five pellets. At the same time Si's rate remained at its usual low level. The probable reason is not hard to find. Si was receiving an average of
135 pellets per session, the bulk of which were delivered when he was not responding. Thus Si was frequently reinforced for not responding.  

Boren has little difficulty explaining maintenance of Al's low response rate in sessions 87 and 88. This, as well as Si's own paucity of reciprocation during sessions 88 through 101, is predictable as a consequence of reinforcement of other behavior, i.e., behavior emitted in lieu of lever pressing. Boren is here generalizing from behavior principles discovered in monopolistic studies concerning unsignaled transitions from contingent to non-contingent reinforcement and from high-frequency to low-frequency reinforcement. His statements are thus (not necessarily incorrect) interpretations of the data in terms of already familiar contingencies, not a description of the discovery or isolation of contingencies currently obtaining.

Not so easily accounted for is the difference between the pattern of Si's rate changes (lasting two sessions) as a function of Al's sloughing off and, later, Al's much more persistent performance as a function of Si's rate drop (88-101), a slowdown which lasted until danger to Al's life forced a change in experimental design. As problematical as Al's continuity-breaking slowdown in session 87, is that monkey's return to the lever after session 88. Here, Boren was only able to offer negative analysis, discounting the relevance of an increase in Al's level of deprivation. This

1loc. cit., pp. 695-6
was accomplished through systematic variation of food intake, a monopolistic technique which did not directly interfere with the catallactic contingency features of the experiment. We may note here Boren's use of the deductive method to discover a functional relationship between the click of Si's pellet dispenser and the end of a run. Recall that any direct experimental manipulation of pellet deliveries, i.e., the empirical method, would have transformed the independent contingencies; doing violence to the catallactic relation. The experimenter yields to the analytical barrier presented by catallactic contingencies without discovering its general principle.

We may compare the present interpretation with Boren's own assessment of his achievement.

"This study has described: (1) a technique for studying a social relation between two animals, including a training procedure; (2) an alternation procedure for maintaining a stable social relation; and (3) the finding that the social relation will not be reliably maintained by a free responding procedure."

It is clear from (2) and (3) that Boren is treating the dependent contingencies generated under the free responding procedure as the same social relation that is generated under the alternation procedure. This interpretation is at variance with our present understanding of the functional relationship between different independent contingencies and catallactic relations. Nevertheless, Boren's assumption could still be valid were he able to demonstrate that he was able to vary his independent-variable procedures from

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1 *loc. cit.*, p. 699
alternation to free responding ceteris parabus, i.e., without altering the fundamental dependent-contingency relationships. This was not done. The experiment thus falls into the same category as switching players from checkers to chess contingencies and then discovering that 'jumping' will no longer be maintained. We find it useful to discriminate between not jumping in checkers and not playing checkers, between not responding under a given procedure and not responding when the procedure is withdrawn. Boren clearly views maintenance of a social relation, rather than the relation itself, to be the variable controlled by his procedure. Independent variables, such as schedules of reinforcement, control behavior. Boren, of course, appreciates this fact. Independent contingencies (e.g. Boren's various interreinforcement procedures) also control behavior, but not without the attendant contribution of dependent contingencies, the schedules of which are indiscriminable and vary as an unknown function of those same independent contingencies. Boren approaches, but misses, the distinction:

"As in the natural environment, the subject of the present experiment and the basic situation (rather than the experimenter) exercised control over the critical variables. On the other hand, the laboratory contributed (1) the special environment of the chamber, levers, pellet dispensers, etc. which set some of the conditions of the experiment; (2) the experimental analysis of the social interaction; (3) the past history of training which established the interreinforcement repertoire; and (4) the objective recording of the social behavior. The recording was particularly important because it permitted an understanding of how the social interaction developed."1

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1 Ibid.
As he sees it, Boren has observed the dependent contingencies maintained by two monkeys and has extracted basic monopolistic reinforcement relationships relevant to the behavior of each:

"The above analysis of the social interaction emphasizes the reinforcement contingencies of the individual member of the social pair. The approach is to explain how the relevant variables affect the individual participant. In this way the interaction can be accounted for by established principles of individual behavior without requiring special "social" formulations. From this point of view the major problem of analysis seems to be the complexity of the social interaction due to the inconsistency, the intermittency, and the number of controlling variables programmed by one organism for another."¹

The experimenter ¹ has not emphasized what he claims to have emphasized, the contingencies affecting individual monkeys; and ² has not explained what he claims to have explained, how the inter-reinforcement variables control individual participants. His experiment gets us no closer to the specification of contingencies than would careful recording of exchanges in a real-world situation. This is not to say that Boren's data is worthless or that his procedures are not an important development in an analysis of catallactic relations. In retrospect it appears to have been the right experiment, conducted for defective reasons and evaluated according to inapplicable criteria of, perhaps, the wrong science.

Despite its interpretive shortcomings the experiment does fulfill some of the task set by Weingarten and Mechner, viz., deter-

¹loc. cit., pp. 699-700
²op. cit., p. 449
mining "what, if any, dependent contingencies various types of independent contingencies produce." Boren has satisfied the "if any" part of this objective. As for "what" has been generated, in the final analysis, the cumulative records which Boren offers are not decipherable into the three-part-contingency elements called for.

We require a new formulation of the problem of interreinforcement in order to avoid wasted effort plumbing the depths of what Boren calls "inconsistency, intermittency, and the number of controlling variables programmed by one organism for another," but which we have since come to recognize as a pervasive barrier to the contingency analysis of catallactic relations.

The Dependent Variable of Catallactic Analysis

According to Weingarten and Mechner, social interaction invariably involves organisms responding to "complex and changing contingencies." However, they aver, present ignorance prevents us from generating the dynamic complexity which interests us, "except by actually introducing the second subject." Apparently it is not appreciated that even after proceeding in this way, contingencies will continue to be unspecified. In expounding their discovery of "the specific contingencies which function as independent variables of social interaction," the authors completely neglect analysis

\[\text{loc. cit., p. 458}\]
\[\text{ibid.}\]
\[\text{ibid.}\]
made necessary by the notion of dependent contingencies. The unique status of the experimental variable and its importance as a new monopolistic 'handle' are given preeminence, as though it were understood that the dependent contingencies would remain our old familiar friends, the reinforcement schedules of monopolistic analysis. Accepting their monograph at face value, one expects that a proper Weingartenian-Mechnerian reanalysis of, say, Boren 1966, would reveal such detailed contingency information as, for example, that between his 16th and 40th pellet in session 100, Si maintained an alternative mixed variable-interval multiple fixed-ratio schedule with differential reinforcement of low rates.

Although the prospects of obtaining such information have already been dealt with earlier in this thesis, it will nevertheless be convenient to continually remind the reader of that analysis by substituting our neologism, catallactic relation, for Weingarten and Mechner's misleading coinage, dependent contingency.

The problem of formulating a suitable measure of the dependent variable of catallactic analysis is not insurmountable. Binary criteria of maintenance versus non-maintenance or control versus non-control have been proposed. Hake and Vukelish, for example, recommend evaluating cooperation procedures (of which Boren, 1966, is one of their examples) on the basis of "demonstration of control." ¹ Cooperative behavior must be shown to be controlled by

"(a) the reinforcer resulting from the cooperation procedure, and
(b) the specified procedural relation between reinforcers."¹ A
procedure which defines a set of independent contingencies will
either be found to sustain interaction in this way or it will not.

Although such criteria are attractive insofar as they supple­
ment Skinner's concept of survival versus non-survival of cultural
practices, they unfortunately have the disadvantage of not leading
us to inquire further after specific dimensions along which catal­
lactic relations, apart from their survival, can be measured.

Exchange does more than just happen or not happen. For exam­
ple, it may be currently in my repertoire, albeit at a low initial
probability, to manipulate variables over which I have special con­
trol, in order to rearrange some stranger's environment according
to his instructions. Likewise, if sufficiently motivated, that
that same stranger can employ his distinctive control advantages
to rearrange features of my own situation according to my specific­
ations. Given a set of independent contingencies including 1) an
otherwise unobtrusive agency which effectively prevents any re­
course to force, threat, theft or fraud; 2) bargaining appliances,
such as measuring instruments and the 'price scale' of our earlier
example; and 3) appropriate initiation, bargaining, and exchange
repertoires; it is then left to a science of catallactic relations
to inquire after the terms of the exchange that the stranger and I
will settle upon.

The dependent variable we seek is a rate of exchange. Each
environmental rearrangement which a partial controller can effect
is susceptible to quantitative measurement and qualitative (i.e. chemical or taxonomical) specification. The exchange of environmental rearrangements or behaviors can thus always be expressed in ratios, e.g., two loaves of bread and a jug of wine for one book of verse and a song. A science of catallactic relations is a science of exchange ratios rather than response rates.

In Boren, 1966, we failed to learn the contingency conditions (i.e. the schedules of reinforcement) under which observed response rates were taking place. The only unambiguous outcome (besides maintenance or non-maintenance) was the quantitative relation between the two cumulative performances. This is a rate of exchange.

It is an important characteristic of such exchange rates, that unlike the response rates of monopolistic analysis, they tell us nothing about the strength or intensity of the behavior in question. A man may trade the opportunity of saving the lives of one hundred strangers for the chance to save a good friend, a ratio of one hundred to one, but this same ratio obtains when a marble is traded for a hundred baseball cards. In either case, the transaction may be slow and weak or quick and intense. Exchange ratios tell us the relative ordering of response probabilities and environmental arrangements for two (or more) partial controllers with given histories, when under 1) given independent contingency conditions, 2) given states of deprivation, and 3) given levels of aversive stimulation. Presumably, transactions are broken off when what each does or offers to do for the other no longer controls what is being done or what is asked to be done in return, and when haggling aimed at modifying the going or offered terms becomes too
punishing or is extinguished. At this juncture, more exchange cannot reinforce one without punishing the other. For this reason it is perhaps more useful to interpret the cessation of such transactions as an equilibrium, the point where the ratio of exchange equals zero; rather than as an instance of non-maintenance, non-survival or weakness of a relation or practice within a procedure.

The Pitfalls of Artificial Classificatory Schemes

Efforts to provide a classification of independent contingencies in current radical-behaviorist literature have been vitiated by a high frequency of artificial distinctions and fictions. Examples are supplied in two monographs by Hake and Vukelich. Both begin with the same paragraph:

"The essential aspects of a (any) cooperation procedure are (1) that the reinforcers of both individuals are at least in part dependent upon the responses of the other individual, and (2) that the procedure allows such responses, designated as cooperative responses to result in an equitable division of responses and reinforcers."

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1 Mentalisms are not the only explanatory fictions in the sciences of human action. Analysis of the shortcomings of all such fictions originates not with Skinner, but with early-nineteenth-century economist Jeremy Bentham, who insisted that such everyday supposititious expressions as, for example, community need to be redefined in terms of what is real and perceptable. Cf. C. K. Ogden Bentham's Theory of Fictions (New Jersey: Littlefield, Adams and Co., 1959) and Nicholas Capaldi, Mill, Bentham and the Utilitarian School (New York: Monarch Press, 1965) p. 13

A definition of cooperation procedures which requires that the responses of each individual allow an equitable division of responses and reinforcers introduces an obviously ideological category of dubious analytical value. It is perhaps indicative of the homogeneity of political orientation among Skinnerians that this strange notion has not been challenged in our journals. No rationale is offered by the authors, even though their resulting classificatory scheme leads to absurd distinctions because of it. For example, if in an alternation procedure rat A presses a lever that delivers equal quantities of water to himself and rat B, whereupon rat B may then press his own lever delivering equal amounts of food to both himself and rat A, i.e., reciprocal yoking, the procedure qualifies as cooperation. But if I pay skillful you five dollars to do what would cost clumsy me six dollars and twice as much time to do myself, that, according to Hake and Vukelich, is not cooperation. Thus the very process which allows a far-reaching division of labor within a market economy or smaller group is denied the label 'cooperation.' Compounding this damage to reasoned analysis is its subsequently propounded complement which defines competition as obtaining wherever "reinforcers are unequally distributed."¹

¹op. cit., p. 334
ination procedure "the subjects are typically tested in full view of one another, and are either told about the social relationship or presumably learn it." In nonsocial procedures the subjects do not learn about the dependence of reinforcement upon the behavior of others:

"The rationale is that the main factors controlling nonsocial behavior are the laws of conditioning for individual subjects, rather than the complex variables introduced by social interaction."^2

The authors are apparently unaware that their defining principle is completely intuitive. The adjectives social and nonsocial add no more to our understanding of cooperation than they add to the words modified in such oxymoronic terms as social justice, social democracy or social services, where what is actually supplied is a convenient ambiguity. For example, we may well ask whether or not we are in contact with a genuine social relation when a subject either 1) is told that his invisible opponent is really a "smart" computer, or 2) faces a machine with changeable features resembling at one moment a smile and at another a frown or evidences changing 'body-language' configurations or human-sounding sighs and groans, or 3) is told that there may be a second subject, or 4) believes in an anthropomorphic god who deals out fate as would a human controller, or 5) is told that his visible human opponent is merely making counter moves according to computer instructions or a pre-determined formula, etc.

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1 *loc. cit.*, p. 338
2 *loc. cit.*, p. 337
It may be that all such fictions as cooperation, altruism, communal responses, social emergents, and even society and social science are pre-scientific terms requiring not operational redefinition so much as removal from the lexicon of a non-normative science of behavior. All are but poor shorthand terms for unanalyzed monopolistic-contingency and independent-contingency effects. They elicit strong emotions and unquestionably invite undisciplined political noise which can only interfere with current research and scientific discourse and which actually make rational analysis of the potentially harmful activities of behavioral scientists that much more clumsy and confusing; more so, in fact, than do the mentalistic fictions of old.

The problems associated with the specification of the independent variable in catallactic analysis cannot be circumvented by contriving an arbitrary taxonomy of fictitious dimensions. The sterile strategy which classifies procedures according to an artificial system of, for example, degrees of equality, socialness, sharing, etc., and then empirically explores its combinations according to the criterion of maintenance versus non-maintenance,

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3Ibid.
must give way to a science of independent contingencies as such and to their control of catallactic relations as measured in rates of exchange.

**Terminological Considerations**

It is the goal of scientific practice to evolve a verbal repertoire which controls the most effective action possible with respect to a given subject matter. (It matters little whether one views the control as logical necessity or as the product of a specialized community which arranges verbal contingencies under the narrow control of contingencies maintained by their particular subject matter.) The selection of the terms *catallactic relation, catallaxy, partial controller,* and *independent contingency* is, in this sense, not arbitrary. Alternatives, such as *capitalism* and *market economy* have been passed over because of their frequent confounding with historical 'mixed' or interventionist economies of the current non-communist world. The term, *perfect competition,* is rejected because of its long-standing association with certain hypothetical constructions of logic and mathematics. *Free market* and *free enterprise,* although the preferred terms of this student, are permanently excluded from any behavioristic formulation. Too many otherwise competent graduate students and professors fail to discriminate between Skinner's notions of 'uncaused behavior' and 'autonomous man' on one hand, and those views of such liberal savants as John Stuart Mill and Herbert Spencer. These latter have inquired into "not the so-called 'liberty of will,' so unfortunate-
ly opposed to the misnamed doctrine of philosophical necessity; but
civil, or social liberty; the nature and limits of the power which
"can be legitimately exercised by society over the individual," es-
entially the interest of those who seek to elucidate the nonobvi-
ous effects, throughout a catallaxy, of different types of legal
(independent-contingency) frameworks.

Notwithstanding the inadequacy of many analytical terms of
economic theory, there are a large number of commercial and banus-
iac words, such as borrow, build, buy, contract, cost, interest,
money, produce, profit, and sell, which exercise remarkably precise
semantic control, perhaps owing to several centuries of selection
by the requirements of profitable trade. It is also significant
that of all such basic terms, only one, property, is ambiguous and
not readily translated into a non-controversial behavioral defini-
tion. This may be because property is a practice from which the
other behaviors follow, a given the effects of which are taken for
granted. Property is not an outcome of catallactic action. Its
practice is a requirement for such action. It is a practice which
endogenously establishes the independent contingencies which sup-
port and control a culture's catallactic relations. The cultural
practices which shape the complex behaviors known as 'respect for
private property' and 'business ethics' as well as the rule-govern-
ed police power which through the maintenance of punishing contin-
gencies protects property (however it is defined) from 'infringe-
ment' together fulfill a function similar to that served by Boren's
segregating chambers¹, which, through physical restraint, permitted Si and Al, two otherwise Neanderthal types, to peacefully trade to mutual advantage. (The fact that some of Boren’s procedures failed to sustain interreinforcement merely suggests that not all property practices are equally conducive to exchange.) At any rate, because they are put there by variously motivated men, rather than by nature or divine providence, the restrictions imposed by the practice of property and the partial control such practice gives to others over us, rarely meet with unanimous consent. The practice of property is a product of cultural evolution. The attempt to monopolistically control the catallaxy through the scientifically guided modifications of property practices is a cultural mutation which will always have the support of less effective partial controllers and ‘closet monopolists’. Such a mutation, however, if it can survive at all, will only do so with the help of some kind of catallactic analysis.

The Present Status of Catallactic Analysis

It will be asked how the concept of catallactic relations differs from that suggested by the famous cartoon of the white rat who boasts that he has his experimenter trained to supply food at the press of a lever. Have not catallactic relations already been acknowledged in Skinner’s accounts of “counter control”², the state-

¹Boren, op. cit., p. 692

ment "the subject is always right", his characterization of labor-
actory research as coming under the control of contingencies main-
tained by subject and apparatus and the contingency selection pro-
cess implied in the notion of survival of reinforcement practices?

First of all, it is doubtful, even in long-term studies with
frequent design changes, whether the performance of a rat or pigeon
actually comes under control of the effects its own performance has
had upon the researcher's experimental-design modifications. If
they exist, such relations have not found their way into current
journals. Even in human experiments we do not hear of subjects
emitting modified data as a function of consequential design re-
visions that are more comfortable or remunerative from the sub-
ject's point of view. Such 'extraneous' factors, if discovered,
would tend to be ignored, thrown out or fudged rather than foot-
noted. Admittedly, various chimp verbal experiments contain ele-
ments of mutual contingency shaping between subject and researcher,
but the episodes are rarely planned and have never been more than
anecdotally described. Furthermore, no token system has ever been
designed to study catallactic 'market' relations. On the contrary,
animal laboratories, mental hospitals, detention homes, parent-
child settings and prisons have maintained only monopolizing 'com-
mand economies'. Whenever catallactic 'black markets' have sprung


2 *id.*, *Contingencies of Reinforcement: A Theoretical Analysis*,
(New York: Meredith Corporation, 1969) chap. 4

3 loc. cit., p. 46
up, they have universally been treated as aversive and contaminating extraneous variables; never as lawful contingency-control phenomena of interest in themselves.

In an appendix to *Verbal Behavior*\(^1\) Skinner reminds readers that his foregoing analysis was not a functional analysis of the verbal community. One may expand the point by adding that *Science and Human Behavior*\(^2\) and *Schedules of Reinforcement*\(^3\) were not functional analyses of the general reinforcing community. In Skinner's analysis, community or cultural contingencies are taken as 'givens' or else offered as 'plug-ins'. The above mentioned books are manuals for effective monopolistic control (a fact which soi-disant radical political behaviorists have not been lax in spotting).

When a functional analysis of behavior uses reinforcer-establishing operations, contingencies and stimulus states as variables, it is following the strong suit of science. However, there is the evolving interpretation, based, in part, on the persistent pattern of gaps left by advancing monopolistic analysis, that a complete and consistent system of study of the reinforcing practices of verbal communities, economic communities, entire cultures or the man in the street requires analysis of catallactic relations. Such analysis can only proceed without the now-strongly-favored behav-


\(^2\)op. cit.

\(^3\)id., *Schedules of Reinforcement*, (New York: Appleton-Century-Crofts, 1957)
ior-free independent variable. It will treat relations among organisms, rather than the behavior of isolated organisms, as its subject matter, and, following this, will require a new dependent variable (akin to 'relative exchange rate' or 'price level' in economics) in place of those measures of single-organism response probability appropriate to monopolistic research. Without such further analysis, no prediction, regulation or interpretation of non-totalitarian culture and its reinforcement practices shall be forthcoming.

The epistemological problems posed by contingencies generated within catallactic relations, although new to psychology, should not be unfamiliar to students of other fields in which selection processes figure prominently.

Human biography and those branches of history dealing with the contributions of individual behavior rather than aggregate variables such as class, race, ethnicity, civilization, etc.; as well as those natural sciences seeking to construct accounts of the selection of species, innate (released) behaviors, susceptibility to reinforcement, etc., are all alike in that the selecting contingencies responsible for the natural or historical structures are inaccessible. Either no one was there to record them, or, for various reasons, the contingencies, like catallactic contingencies, are not usefully recordable. Biography and history do not pass down the relevant reinforcement history responsible for Caesar crossing the Rubicon. No one was taking that data. However, neither can history reveal the immediate consequences of staying north
of the Rubicon. This for additional reasons. Similarly, in natural selection, we may only venture more-or-less educated guesses about the precise nature of the contingencies responsible for present-day phenotypes. We may never know the extinction-bringing consequences of being trilobites or tyrannosauri, but, with greater certainty, neither will we ever learn what minimal mutations might have kept these venerable organizations in business. Just as the would-be effects of a hypothetical deviation, small and momentary, from the actual performance within our catallactic price-scale relation can never be known, neither can we ever learn the effect of a hypothetical 'sport' within a given Mesozoic or modern ecology.

In medicine, the objective is to catalog all known diseases and disfunctions and to locate at least one cure for each. After a cure is obtained, research may continue until a cheaper cure is found or until prevention is possible. Similarly, a behavior therapist or kindergarten teacher, when monopolistically controlling behavior, needs merely one affordable (and ethically admissible) procedure that will generate the target performance. When predicting the behavior of partial controllers within catallactic relations, however, finding one or a few 'sufficient' controlling relations in operation is not enough. All actual or potential relations must be discovered, weighed and taken into account. As we have already seen, any experiments or model which would reliably predict the course and outcome of a catallactic relation on the basis of generalization (i.e. principles) derived from prior replications requires duplication of all relevant features to a degree of tolerance which we can still neither determine nor achieve.
This required exhaustiveness is, of course, in stark contrast to the mere 'satisficing' measures sought in applied behavior analysis.

This, then, is the problem of catallactic analysis; a problem which our science of behavior, our behaviorism and our behavioral utopianism faces everywhere and confronts nowhere. It is the problem of the "invisible hand" which since its first clear formulation at the hands of the classical economists, viz., Hume, Smith, Malthus, Ricardo, etc., has persistently remained beyond the pale of monopolistic analysis. The general market or catallaxy\(^1\) is the product of many categories of behavior: respondent and operant, conditioned and unconditioned, verbal and nonverbal, rule-governed and contingency-shaped, as well as scientific and prescientific, yet, it itself is not the product of human design.\(^2\) Rather, as the result of an unplanned behavioral evolution, it encompasses and integrates the designs and plans of all of its individual partial controllers.

When it was first discovered it was already in operation, and now, after two hundred years, Adam Smith's original account (apart from its naïve ethology) still remains in the central tradition of scientific economic analysis:

"In almost every other race of animals each individual,

\(^1\)Hayek, op. cit., p. 164

\(^2\)loc. cit., chap. vi
when it is grown up to maturity, is entirely independent, and in its natural state has occasion for the assistance of no other living creature. But man has almost constant occasion for the help of his brethren, and it is in vain for him to expect it from their benevolence only. He will be more likely to prevail if he can interest their self-love in his favor and shew them that it is for their own advantage to do for him what he requires of them. Whoever offers to another a bargain of any kind proposes to do this. Give to me that which I want, and you shall have this which you want, is the meaning of every such offer; and it is in this manner that we obtain from one another the far greater part of those good offices which we stand in need of. It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages. Nobody but a beggar chuses to depend chiefly upon the benevolence of his fellow citizens."

"As every individual, therefore, endeavours as much as he can both to employ his capital in the support of domestic industry, and so to direct that industry that its produce may be of the greatest value; every individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for society that it was no part of it. By pursuing his own interest he frequently promotes that of society more effectively than when he really intends to promote it. I have never known much good done by those who affected to trade for the public good. It is an affectation, indeed, not very common among merchants, and very few words need be employed in dissuading them from it." 

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2loc. cit., Book IV, chap. ii

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Adam Smith's notions are strikingly reflected in Skinnerian apostate, Richard Herrnstein's response to Noam Chomsky's defense of the monopolistically administered and radically egalitarian collectivist state.

"Does anyone doubt that the differential rewards granted in society function like the potential difference in an electrical circuit—as a kind of labor pump? By attaching different outcomes for different jobs, or for jobs done well or poorly, society directs the flow of labor one way or another—as, for example, out of vaudeville and into radio and motion pictures, which had captured its audience and the attendant multiple rewards. As a more timely example, consider the diminishing ranks of applicants for graduate schools and the lengthening queue for law and medical schools, precisely in tune with the shifting demands of society at large. Or remember that when the rewards for manufacturing spats disappeared, so did spats manufacturers. The inherent rewards of making spats, such as they were, could not have changed, but the extrinsic ones evaporated, and so did the industry. Now this is not to suggest that society always distributes its rewards sensibly, humanely, or even attractively; merely that the distribution expresses something like a social consensus, which then gets converted into human effort. Sometimes, because of extraneous perturbations, or short-term influences, the consensus may be faulty... But, all is not lost, for there is glory (if not money) waiting for the fellow who sets the public straight..."

Here, Herrnstein is addressing Chomsky's notion, intraverbally linked to the literature of such 19th-century social theorists as Proudhon, Marx, and Bakunin, that catallactic relations among partial controllers are merely unfortunate historical aberrations and not the lawful or natural consequence of man's hereditary endowment in combination with a limited and

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1Richard Herrnstein, "Whatever Happened to Vaudeville? A Reply to Professor Chomsky." *Cognition. I* (1973) no. 2
changing environment (i.e. the early 19th-century liberal' view that, when coercion is forcibly proscribed, catallactic relations are naturally selected by the reinforcing benefits of the consequent division of labor).

There is, today, a common thread in all socialist tracts to urge the elimination, or 'nationalization' of every individual's ability to produce and distribute reinforcement to others according to his own arranged partial-controlling contingencies. These authors assume that with the eradication of the individual's control of 'means' generating 'goods and services' for others, there will be left, within the residual environment, sufficient influence to shape a collection of wholly altruistic human beings. (When we consider the warmly solicitous regard of the approaching panhandler or the sycophantism of the 'communal person' towards the one in charge of 'access' to the cooperative's car, typewriter or phonograph, we begin to see their point.) Whatever one makes of this, it cannot be escaped that man can only live as either a monopolistic controller, a partial controller, or, less fortunately, a monopolistically controlled non-controller of others or an anchorite under the control of the roots and berries of the forest. There are no other openings.

Since the discovery of the market, economists have been seeking means to reliably predict the buying, selling, consumption and investment behaviors of individuals in the catallactic economy; a type of prediction which, when accurate, selects through bestowal of increased bidding power (i.e. more dollars
or more 'grain') the successful entrepreneur of the moment and his capital-supplying backer.

No fact of our era has been more obvious than the failure of economic science to establish exact and effective predictive practices. Entrepreneurship remains synomous with risk-taking and the economist today is more frequently a ward of the state than a captain of industry. So dismal have been the results that maintenance of the original objective among academic economists is all but extinguished. It is not an unfair generalization to say that the new self-set task of economic analysis is the development of models from which the effects of the state's monopolistic manipulations of police power (i.e. the arraying of positive sanctions and punishing contingencies) can be predicted and planned. These models are invariably based upon arbitrary statistical aggregations supposed to represent segments of the catallactic economy as if each segment were an integrated unit. In view of our preceding discussion of the problems of partitive analysis of catallactic relations, we may suspect that it is the convenience and prestige of monopolistic analysis and the meritricious attractions of political 'decision making', more than a record of predictive successes which sustains these efforts. Even those rare economists who present themselves as critics of 'conventional wisdom' merely fashion their alternatives after earlier American 'institutionalist' literature or the practices of contemporary main-stream sociology and cultural anthropology, all three of which deal exclusively with merely structural accounts of behavioral and institutional topographies.
and ignore entirely the all-important controlling relations.

Of all prominent schools of twentieth-century social thought it appears that only the modern heirs to Marx's dialectical materialism, a variety of post-Hegelian German historicism, can be credited with attempting to interpret society as an ongoing system which subsumes all of the monopolistic machinations of its members into one universal and determinate process. (The methodological underpinnings of this general orientation may now be cursorily touched upon. However, a thorough examination of the specific kinds of functional relations—of which the Marxians claim special knowledge—must await the further elaboration of the concept of the catallaxy which follows in the second part of this thesis.) Unfortunately, as science and as theories of behavior, history's various Marxisms (including 'Chomskyism' and the so-called 'conflict theories' of radical sociology) are wholly incompatable with the practices and generated principles of contemporary behavior analysis. This point is quickly made by a sampling of inimical features: dialectical relations among material opposites, e.g., Engels' statement that a butterfly "is the negation of a caterpillar"¹ versus functional relations among variables; loosely defined catch-all variables, e.g., economic classes, class interests, class consciousness, the material productive forces of a stage of history versus variables that can be oper-

¹Friedrich Engels, cited, along with many of his similar statements, by Ludwig von Mises in his Theory and History, (New Haven: Yale University Press, 1957) p. 105
ationally defined exclusively in the measurement units of physical science; a Ricardian 'labor theory of value' (from which the specious concepts of 'surplus value' and 'exploitation' are derived) versus the Pavlo-Skinnerian 'reinforcement theory' which takes account of such events as deprivation operations, contiguous presentation of neutral events with reinforcement, operant 'chaining', etc.; and 'alienation' as something which stems from non-ownership (by one's class) of the means of production versus alienation as behavior resulting from defective contingencies of reinforcement.

From these few dissimilarities it is evident that while 'scientific socialism' does treat behavior within historical economies as a unitary, dynamic and lawful subject matter, it nonetheless, unquestionably and undefensibly fails to establish for its method, function and variables any objective criteria of validity, reliability or generality; criteria easily reached by the standard practices of radical behaviorism, methodological behaviorism and many of the less rigorous statistical psychologies. Marx's Capital simply does not pass muster before the modern research standards set by Sidman's Tactics of Scientific Research.¹

Yet, to dismiss communism merely on the basis of its faulty empirical logic is to ignore its increasing acceptance and advo-

cation among young behavior modifiers and radical behaviorists. The tendency is clearly evidenced by the well-attended Marxist societies and demonstrations and by the widespread pamphleteering and poster exhortations within our 'stronghold' state graduate programs and professional conventions. There is also in many departments a surge towards 'progressive social action' (i.e. the use of 'Marxist-Leninist, Maoist analysis' to direct localized applications of behavior modification and to limit its use in support of 'the system'.) Perhaps what we are witnessing is the prognosticable effect of politically sensitive student-acceptance criteria coupled with the tellingly effective teaching methods of a loose-knit corps of zealous fellow travelers, with, in the heights, a waffling B. F. Skinner. A more substratal and less incriminatory explanation appeals to the failure of all species of monopolistic analysis to proficiently interpret the problems, both real and apparent, of deprivation and aversive control within the 'mixed' economy. Seeking to retain science, our 'strong suit', which many behaviorists erroneously identify exclusively with the practices and instrumentaria of monopolistic analysis, a growing minority immediately move to eject the world's poorly understood catallaxy of partial controllers and aim to engineer, in its place, a dependent-variable culture operated according to our facile laboratory research paradigm. These impatient tutelaries of mankind are desirous of realizing, in their lifetimes, a universal polity of behaviorally designed 'small is beautiful' collectives. Understandable, they are attracted to communism's promise of quick and salutary overthrows. With this
expeditious alternative they need not wait for the slow Grey Em­
inence of cultural evolution, the always-tentative selection and
dissemination of practices within the market system. They are not
aware that what they are rejecting is the scientific conception of
catallactically controlled man and his place in nature.

The two-tiered Marxist Behaviorism, or 'Skinnerianism in a
hurry' is the great hoax of modern psychology. It has no more
claim to the mantle of Minerva than would an Augustinian Behavior­
ism, a John Birch Behaviorism or a Vegetarian Behaviorism, or than
has had a Marxist genetics. Our concern here is simply to show
that this particular 'materialist philosophy' does not offer a co­
herent account, either rational or empirical, of behavior within
catallactic relations. (As for their analysis of the macro per­
formance of catallactic economies, see Part Three below.)¹

¹To those who will criticize polemical digression from a
purely theoretical disquisition upon catallactic control, I apol­
ogize for having offended their taste, but I point out that I am
commenting upon recent modifications obvious within the relevant
scientific community. It is a new kind of 'flight from basic re­
search', with powerful aims and interests of its own which will
undoubtedly effect that community's critical behavior with re­
spect to the present thesis. In the marketplace of ideas one can­
not help moving according to the competition.
PART TWO

Interpreting the Catallaxy

The Partial Controller Within the Catallaxy

_Homo oeconomicus_ is, as Skinner has pointed out, an explanatory fiction "endowed with just the behavior needed to account for the overall facts of the larger group."¹ These facts are the historical data of interest to economists, i.e., the levels of prices, wages, inventories, sales, etc. from the most recent measures to the earliest considered relevant and accurate. The behavior (motivation? objectives?) that sufficiently accounts for these facts is usually conceived by economic theorists as utility maximization, growth maximization, long and short-run profit maximization, and so on. However, this picture of man, deduced exclusively from financial and government indices, is not enough to illuminate even the broad aggregate concerns of economists. Skinner's remarks on this topic are not without relevance:

"Some attention to the individual transaction is often required when generalization at the level of the group prove invalid. We have already noted the special conditions which affect economic value... Economists frequently explain the failure to predict a particular consequence from a broad generalization by appealing to special conditions of this sort. Although the supply of money and goods may suggest inflation, for example, some condition, not otherwise related to the supply of money or goods, may generate undue caution on the part of a

¹_Science and Human Behavior, op. cit., p. 399_
large number of buyers. If a science of economics were to take all such extraeconomic variables into account, it would become a complete science of human behavior."¹

Skinner may be venturing outside his recognized area of competency, however his views are by no means alien to the best qualified thinking on the subject. Milton Friedman, in his Nobel Lecture on inflation and unemployment², also claims that we can no longer rely on generalizations at the level of the group which exclude consideration of the way in which specific variables make contact with individuals. The relationship between aggregate measures of inflation and unemployment were once thought to be a permanent inverse relation which came to be called the 'downward-sloping Phillips Curve'. This last statistically controlled generalization played a key role in Free-World economic policies for almost two decades. In the present era of 'stagflation,' however, this macro 'law' is continually being violated as inflation and unemployment rise together. According to Friedman,³ stagflation cannot be accounted for without attending to exactly how an increase in the supply of money first makes contact with the individual partial controllers. When the money supply is increased, producers, in direct and easily discriminated contact with their own individual sales receipts, first conclude that there has been an increase in the demand for their own products. Each thinks that the rising revenue from sales results from a change in con-

¹ibid.
³id., Price Theory, (Chicago: Adline, 1976) chap. 11

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sumer behavior with respect to his product only. He has received the usual market signal that his product is now a more powerful reinforcer commanding a larger portion in exchange against all other goods and services that it did before. In response to this stimulus control, each producer moves to meet the perceived new market conditions with more hiring, greater output, orders for new plant and equipment, etc. This action is based on what economists call imperfect knowledge, the illusion of increased real wealth (as opposed to increased 'paper' or nominal wealth, i.e., more certificates entitling one to a 'slice of the economic pie,' but smaller slices since the size of the pie has not grown with the issue of certificates laying equal claim to it.) Only later does the producer come into contact with indications that all other producers (i.e. his suppliers and competitors) have been responding in the same way, i.e., that the paper-money demands for all products have gone up together while the relative exchange rates among these items (except for paper money) are little changed. Having eventually come under the control of these remote changes outside his sales departments, the producer readjusts his behavior to all relevant exchange-rate data by cutting back on hiring and inventories, and discontinuing what are now seen as mal-investments. These investments were planned to supply a buying public who, when they first discriminated a higher number on their pay-checks, interpreted the event as a jump in their own real wealth, and at once began purchasing less urgent shopping items which before they would have passed over. Only later is it discovered that the sellers' 'pointing index fingers' on the various 'price
scales'—see Part One, above—are no longer responding to dollar offers as before. Price tags are now higher. Paychecks, for those still receiving them during the producers' readjustment, are now considered niggard, especially in contrast to the preceding magnification of their apparent purchasing power. Yielding to the political heat this generates, the monetary authority then acts to bolster paychecks. The cycle is repeated, but with a difference. The producers and consumers are now less likely to be tricked into buying more goods and services simply on the basis of another inflationary 'jump' of the same magnitude. In order to 'stimulate' the economy the government must now engineer higher rates of inflation, and soon accelerations of the rate of inflation.

We may speak of homo economicus 'adjusting his expectations' and of this 'anticipated inflation rates', etc. or we may speak of the changing catallactic relations among partial controllers as their behavior is brought under the control of changing independent contingencies, i.e., the monopolistically manipulated money supply, government spending and taxation etc. Either way the present point is made. Economic theory cannot ignore events at the level of the psychology of the individual; perhaps, ultimately, the only level of economic lawfulness.

The present notion of the partial controller fits the emerging behavioristic interpretation of human action, and, in fact, extends that interpretation to cover behavior not under the direct control of either the natural environment or a monopolistic controller. Thus we recognize the catallaxy which includes both the dependent contingency arrangements of the partial controllers and
the independent contingencies of which they are a function, as well as all other factors pertaining to individual behavior which have been discovered by monopolistic behavior analysis.

The Approach of Fourraker and Siegal

An experimental science which seeks to predict the ratios in which environmental rearrangements are exchanged has been approached in many fields. One may refer to various learning experiments with game situations, the various quantity-adjuster oligopoly experiments, prisoner's dilemma games, conflict experiments, price-bidding experiments, and the n-person game experiments of mathematicians.¹ A common denominator of all of the (sometimes catallactically controlled) dependent variables in these experiments is that they are inevitably functions of independent contingencies designed specifically to approximate the conditions postulated in theoretical models. These conditions may be classified as either 1) game-theoretical decision spaces or 2) economic markets containing a small number of buyers and/or sellers with different cost and market-demand conditions obtaining at various combinations of price and quantity offered. The work of Fourraker and Siegal furnishes important examples of the later, characteristic features of which may be briefly sketched:²


Randomly selected subjects were segregated and placed in paired cubicles. One subject of the pair was designated as the seller and the other as the buyer. Each was given a profit table with a 'profit matrix' showing profit levels for each possible combination of price and output. The subjects, during earlier instruction, had been told that they could pocket whatever profits—dollars and cents—they generated. The profit matrices were derived from hypothetical cost and revenue functions of an imaginary 'bilateral-monopoly' market situation. (The profit-determining terms by which the sellers previously acquired the products they sell and on which the buyers will subsequently resell the products they buy, are thus simply givens imbedded in the matrix data.)

Negotiations began when the price-setting seller wrote his bid on a piece of paper and handed it to a research assistant who then handed it to the buyer. The buyer, presumably acting under the control of the seller's offer and the profit table, then selected a quantity to be bought. The experiment was designed so that selection of the highest of sixteen prices and the highest of eighteen quantities yielded most money to the seller, while the lowest price and highest quantity maximized the profit of the buyer. Behavioral outcomes were evaluated against two hypothetico-deductive predictions; individual profit maximization (the Bowley's...)

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solution), and joint maximization (the Pareto optimum\textsuperscript{1}). In the former, the theoretical seller (a set of mathematical assumptions) selects the price bringing himself to the highest minimum profit, given the range of the buyer's possible reactions; and the buyer sets the quantity which maximizes his profits, given the seller's price. The final price and quantity supply the coordinates of a solution (the Bowley point) which has logical properties in common with the saddle point of a two-person conflict game. In contrast, the joint maximization solution, arrived at through protracted bidding and counterbidding, grants greater profits to one or both interactants. Given the two alternatives, it was the Fouraker and Siegal hypothesis that different combinations of (independent contingency) conditions each had a different likelihood of conforming to either the Pareto or Bowley solutions. Three parameters were systematically varied: 1) the matrix cells: either showing to each the profits of both or to each only his own, 2) the form of contract: either one-shot episodes or repeat bidding which allows for the accumulated effects of new reinforcement history, and 3) the position of the 'equal split' of profit payoffs: either at the Bowley point or the Pareto-optimality position. The experimental result was that when the interactants had no indications of the other's profits and when profits were split equal at the Bowley price, or when interaction was limited to a one-shot

\textsuperscript{1}Pareto Optimality: Any situation where no one can acquire further advantage without withdrawing some benefits that another already has. From: Vilfredo Pareto, \textit{Manual d'Economie Politique}, (Paris: M. Giard, 1909)
episode; the Bowley model reliably supplied accurate predictions. "However, by manipulating the experimental conditions (amount of information, form of bidding, and the location of the equal profit contract) we could induce the Pareto solution." In some experiments this solution required the interactants to alternate trial-by-trial between the twin peaks of a bimodal profit distribution curve.

In a second series of experiments conducted by the same team of investigators two sellers, rather than a buyer and a seller, confronted each other. The market they competed to supply was again a given, based this time on hypothetical demand functions, i.e., the predicted behavior of suppositious 'buyers'—in reality, arbitrary parametric substitutions for actual partial controllers. It has already been established that such measures should not be interpreted as simulations of catallactically controlled behavior. These manifestations of theory function exclusively as the independent contingencies of a two-subject interaction and not as reliable surrogates for mass markets. It was the objective of

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1 Fouraker and Siegal, op. cit., p. 204

2 loc. cit., pp. 89-199

3 The behavioral assumptions of a downward-sloping demand curve are based both on statistical analysis of aggregate market data, and, more generally, on appeals to the law of demand which states that the lower the price of something, the more of it people will buy. This law, in turn, is based upon 1) the principle of diminishing marginal utility, i.e., the more something is consumed per unit of time, the less will be the utility from additional units relative to the utility to be derived from additional quantities of other goods, services, and/or leisure,
Fouraker and Siegal merely to discover how their flesh-and-blood sellers would divide their stationary-state pseudo-market between themselves and at what offered prices. Two variations of this two-seller situation were tried. Each variation was based on a particular model and associated with a different derived outcome. In the first variation, both sellers were quantity adjusters with prices being automatically determined for each price by the demand function. Each seller was given a profit matrix indicating, at the intersection of columns labeled "Quantity produced by me," and rows labeled "Quantity produced by my competition," their own profits at each quantity combination, and also, in some experiments, the profits of their rivals. The experimental result was that rival quantity adjusters, when lacking each other's profit data, tended to set quantities corresponding to the competitive (i.e. relatively high-quantity, relatively low-price) solution predicted by quantity-adjuster duopoly theory, whereas with complete profit information, there obtained a much greater diversity of outcomes. When the exogenous promise of an eight-dollar bonus to the highest-profiting sellers was introduced, the range of outcomes was once again narrowed to the high quantity and low-price

and therefore the smaller the price one will pay for another unit; 2) the fact that owing to people's differing incomes, as the price declines, more can afford the item; 3) the fact that as price declines, even weak reinforcers will be purchased; and 4) the fact that individuals tend to switch to the lowest-price instruments appropriate to their aims. It is important to note that actual contingency control by partial controllers plays no part in this, the neo-classical theory of demand; learned behavior is assumed to be constant.
In the series of experiments with price adjusters (where market quantity was an automatic function of the sellers' combinative pricing policies) it was found that, where information about one's rival's profit structure was lacking, subjects tended to undercut each other's price to a point well below joint-profit maximization, and when information was complete, contract diversity increased with non-maximizing (immediately costly) 'signals' often leading to more Paretian relationships, or what is referred to in the language of antitrust power politics as successful tacit collusion.

In evaluating the significance of this type of experiment we best begin by examining the disclaimers and prescriptions of the researchers themselves:

"... we are employing student decision makers in a radically simplified situation; economic conflict (sic) in the real world generally takes place among gargantuan organizations with varying historical backgrounds and current postures. The entrepreneur in a real situation may be concerned about the financial structure of the organization or about public opinion as reflected in the actions of, for example, the Justice Department; he may be worried about potential competitors or product obsolescence. Indeed, the list of possible critical variables is without end. Thus it is dangerous to go blithely from a study such as this to prediction or policy formation in business. However, this gap results more from the shortcomings of the theory than it does from innate deficiencies of the experimental method. Most economic theory presupposes individual actors with relatively simple objectives; if these assumptions lead to grievously incorrect conclusions, we must construct better economic models."1

1loc. cit., p. 206
In any case we cannot cope directly with the complexity of the actual phenomenon: There seem to be too many facts and relationships for a brain, even a mechanical one, to treat in an orderly fashion. Abstraction and model building are necessary to reduce the problem to manageable proportions. The experimental method can contribute to the process of identifying critical variables and the nature of their roles in conflict situations.\(^1\)

I leave it to the reader to ponder the usefulness of a method which "can contribute to the process of identifying critical variables" in a field in which "the list of "the list of possible critical variables is without end."\(^2\) Our present concern is with whether or not this method has isolated any critical variables at all.

The method of Fouraker and Siegal involves the relationships between three realms: 1) a discriminated segment of the real world, 2) a conceptual (hypothetico-deductive) model of that segment of the real world, and 3) an experiment which takes as its independent variables monopolistically arranged laboratory conditions which meet the specifications of the nonbehavioral (independent contingency) assumptions of the model and adopts as its dependent variable such apposite catallactic outcome measures as price level or relative exchange rate. An economic model invariably makes both behavioral and independent-contingency assumptions. By construct-

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\(^1\) loc. cit., p. 207

\(^2\) A critical variable is one which exerts such powerful control over a subject matter that no reliable prediction is possible without taking it into account.
ing within the laboratory a set of independent contingencies which faithfully incarnate a model's market-structure postulates, we then have two outcomes, one experimental and the other deductive, which are suitable for comparison. (This is provided, of course, that commensurable units of measure are found for both; numbers qualified with dollar signs and actual greenbacks and coins meet this compatibility requirement.

We are analysing a method which involves the contributions of two disciplines. First, the economic theorist, confronted with the concatenation of real-world phenomena, abstracts from it a scheme of semi-permanent functionally related systems or statements. The precision of the contingencies that establish such abstractions is always open to question. Not only his subject matter, but also the literatures of his culture and the practices of his intellectual community set up contingencies which narrow the control exercised by the real world so that there emerges a manageably small number of statements about functional relations (e.g. when piecework rates are raised, output per manhour increased; when ceteris paribus, the amount of money tokens is increased, each token comes to control a smaller fraction of the total goods and services, and consequently, controls less labor.) These statements are then selected from and intraverbally manipulated in accordance with rules of logic (or 'wish fulfillment,' in the case of those who, to paraphrase Alois Schumpeter, avoid errors of reason by escaping reason altogether.)

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The result is an economic model. Some models are so simple that no claim is ever made for their descriptive accuracy (e.g., the neo-Walrasian general equilibrium theory). Others are claimed to have captured all of the essentials (e.g., Marx's dialectical theory of history). What distinguishes them is the claim by proponents of the latter group that their schema are somehow under the exclusive stimulus control of their subject matter\(^1\) with nothing but logical organization added. Actually, nothing could be further from the truth. The fashioning of every so-called descriptive model is distorted by reinforcing and punishing consequences that have been meted out by various social, intellectual and economic communities according to circumstances. However, contrary to the teachings of scientific socialism, the fact that distortions are a necessary concomitant of community control in no way discredits any analysis. Those who condemn bourgeois psychology and economics solely on account of their 'ruling-class interests,' and attribute to their own analysis the one true logic because of their identification with the final social class of history, fail to see that even an absolutely objective reference frame is to be valued over its antithesis only insofar as it can be demonstrated to afford greater effectiveness in achieving objectives. A theoretical economist or contingency analyst comes to know a real-world culture (or catal-laxy) in the sense that he acquires behavior which satisfies the

\(^1\)In the language of Skinner's analysis of verbal behavior, it is claimed that the model is a pure tact.
contingencies it maintains. But control of the model-builder's behavior with respect to his subject matter, and apart from his logical manipulations and mathematical calculations, is limited to variables which lie in his immediate environment. His actual contact with the catallaxy is restricted to books, journals, lectures, discussions with his (similarly restricted) colleagues, government and business statistics, engineering data, newspapers, radio, interviews, questionnaires; and his own first-hand experience with the buying and selling of goods, labor, savings accounts and investments, and finally, to the extent that they touch him directly, the contingencies arranged by political institutions (e.g. form 1040, speeding tickets, OSHA inspections, etc.). These are the things which his knowledge is about. We may behavioristically define economics as the science which investigates discrepancies among different responses of economic model builders. At any rate, owing to the disparate control exercised by various distinctive provinces of community reinforcement, we have no trouble discriminating among contributions of the Manchester (laissez-faire), Chicago (monetarist), Keynesian and Marxist schools of economics and their various sets of analytical practices.

In the second phase of this model-based experimental method, the experimental researcher, who is also not free from the contingencies of ideological communities and literatures, selects from among the theorist's models those most compatible with his current repertoire and instrumental means. Fouraker and Siegal, for example, selected market models which stimulated price and quantity problems confronting corporate managers in competition with a few
big firms; the very situations one would expect to be most of interest to the sponsoring Harvard Graduate School of Business Administration, a main feeder of oligopolistic enterprises. Furthermore, the models which were selected involved only two or three relevant interactants operating along clear-cut and easily quantifiable dimensions and under the control of reinforcees unambiguous power—prime criteria for experimental managability.

From this brief excursion into the sociology of economic knowledge several important conclusions may be drawn. First, the independent-contingency features of the model-based experiment bare no natural, automatic or point-to-point relation to the actual independent contingencies of the system the model is supposed to depict. Second, since the degree of correspondence between the theorist's independent contingencies and the independent contingencies of the real world is unknown, the catallactic relations generated under the control of the experimental conditions bare an unknown relation to the behavior generated by the real-world catallaxy. We may say that the trans-dimensional method lacks validity in its construction, since it cannot be demonstrated that the experiment's outcome measures are not related to theoretically irrelevant variables introduced during either 1) abstraction of functiona relationships from real-world phenomena, 2) model construction from relation statements, or 3) model selection and the design of the chosen model's experimental manifestation. For this reason, comparison of theoretical results with model deductions sheds no light upon the model's real-world descriptiveness or generality. Even when an experiment vares out a model completely, all that is proven
is that the theorist's behavioral predictions agree with the subject's performance when the latter is placed under the control of contingencies meeting the theorist's non-behavioral assumptions. The power of empirical functional analysis simply cannot be brought to bare when the independent variable is given the status of an operationalized manifestation of a distorted conception of an actual market or economy. This conclusion is further strengthened when we consider that a model's constant conditions, which are the basis for design of the experimental independent contingencies, are themselves merely convenient simplifications which assume constant the catallactically controlled behavior of all other partial controllers, (e.g. in the bilateral monopoly situation, those who sell to the seller and those who buy from the buyer; in the duopoly case, the two sellers' buyers.)

As we have seen this general method is useful for investigating the minimal partial-controller feedback conditions (features of the independent contingencies) necessary before collusive price and output adjusting can occur. The method is only misapplied when the model-based experiments are employed as accurate microcosms providing valid tests of the basal model's predictive, diagnostic and interpretive power. (Of course, the latter formed no part of the intention of Fouraker and Siegal.) We may conclude that in its appropriate application this method is irrelevant to the present thesis. In its inappropriate application its validity rests on the accurate discrimination and abstract representation of all relevant real-world independent contingencies. Sources of distortion have
been suggested so far. However, a definite barrier to such knowledge, a barrier having to do with the nature of the world outside the laboratory, is yet to be considered.

Homans and Blau

When the client leaves the clinical psychologist at the portals of the real world, he is entering an environment which inescapably includes the catallaxy. The standard applied-behavior-analysis interpretation of the real world as a series of divisible monopolistic settings is simply inappropriate. All non-coercive human interaction involves exchanges the terms of many of which are determined in episodes of mutual contingency shaping of contingency shaping.

This thesis has, for the sakes of brevity and clearness, been limited to treating only exchanges of what are most narrowly interpreted as economic goods, viz., grain, bread, tools, money, etc. This has been misleading. As George C. Homans¹ and Peter Blau² have meticulously established, we are constantly exchanging favors, gifts, respect, approval, loyalty, status recognition, legitimation, advice, association, and obligations. Such exchanges go on often without prior open agreement as to the terms of the exchange. (Although, the rates of exchange do exist and can be measured.) Suddenly the picture is greatly complicated, although nothing that

has been previously presented here need be changed.

Although both Homans and Blau credit Skinner with providing the basis of their analysis, it is not generally realized that neither Homans nor Blau conform to the Skinnerian strategy of monopolistic contingency analysis. Neither has sought means to discover the specific schedules of reinforcement which will emerge in given exchange situations. They have predicted the principle. They have not predicted either specific response rates or specific contingency values. They have shown how general patterns of exchange, but not definite magnitudes or ratios of exchange, are a function of group differentiation, bureaucratic hierarchy, and other independent-contingency orderings of individuals with respect to each other and their environments.

While Homans and Blau have each ignored the fact and implications of the loss of resolving power in the transition from monopolistic to catallactic analysis, they have nonetheless provided us with the only two attempts at a behavioristic treatment of the full range of human exchange.

It is worth noting, in passing, that the analyses of the exchange theorists present a complement, if not an alternative, to Skinner's account of dignity. According to Skinner,\(^1\) dignity is approval or social reinforcement reserved for persons whose valuable behavior is emitted for unknown or seemingly weak reasons.

However, the exchange theorists show that the man who grants dignity in so doing also diminishes himself. Thus loss of stature (i.e. the granting of dignity) is traded for unaccountable benefits from another. We see then that behavior attributing dignity may have its catallactically determined price. We may further cynically suspect that even obviously motivated behaviors, if scarce enough and valuable enough, can command the giving of dignity when no other partial-control variables are available.

**Number of Controllers as an Independent Variable**

Weingarten and Mechner have stressed the importance of the number of interacting agents in behavioral research.

"It is even possible that dyads, triads, tetrads, and larger groups constitute different levels of analysis and will come to be regarded as separate major provinces of behavioral science... Psychologists have till now largely confined their attention to one of these levels: the monad... the reductionist fallacy of insisting that dyads must receive attention before triads, and triads before tetrads will have to be avoided."¹

It is an important discovery of economics that under certain circumstances the introduction of additional partial controllers ceases to be a determinant of exchange rates or prices. With less than a nod to the elegance and careful qualification of the classical theory of the firm, we may satisfy our present purpose by using an admittedly oversimple, but not always wholly unrealistic,

¹Kenneth Weingarten and Francis Mechner, *op. cit.*, p. 458
model to suggest the nature of these limiting circumstances.

When the products sold by partial controllers are homogeneous, i.e., of the same grade or utility, and when the sellers are unable to differentiate their products by brand-name advertising or extra services, we may then safely assume that competition will occur only along the single dimension of price. Furthermore, when all of the producers face the same cost conditions, e.g., the soil of island on which we may suppose they live is uniformly productive, and transportation costs are identical, each producing place being equidistant from the marketplace at the center of the island, we may then conclude that number of sellers will control price in the following way. If there is one seller only, he will be able to adjust his price so as to maximize his profits from each buyer, i.e., what he gets in exchange minus what he would give to get his original production back again. If a second seller enters the market we may assume that he will initiate a price war and then make efforts to collude in price fixing which will somehow divide the market. The same may hold true after the introduction of the next few sellers. However, at some point, as the number of sellers increases, all sellers will become price takers rather than price setters. If one sets one's price above that asked by one's competitors one will sell nothing. If one attempts to undercut the competition price, one's revenue per unit will cover less than one's minimum cost per unit, resulting in a punishing loss of partial control. Finally, if one attempts to persuade all of one's competitors to raise their prices together, either by market signaling (i.e. contingency shaping; price leadership) or outright verbal
agreement, one will find that at the moment of truth no one, including perhaps oneself, will have gone along. A competitor's verbal assent to price fixing is easy to obtain, but since there is no enforcement power, there being no private means to coerce compliance or pay partial controllers not to produce, most will end up selling the products he had agreed to hold back, even at the consequently lower but still profitable prices the buyers are ever ready to pay. The critical number of sellers beyond which collusion must break down to the competitive price undoubtedly depends upon the independent contingencies, i.e., the modes of communication and the proximity of the interactants. Once the critical number of partial controllers is reached for a particular set of independent contingencies, partial controllers cease being partial controllers, or by another interpretation, become partial controllers locked into one powerful equilibrium price outcome, an outcome wherein all but one price-setting response is always punished.

Obviously this equilibrium model of a generalized catallaxy is static and incomplete. No mention has been made of the buyers or what it is with which the buyers buy. More than that, the model is based upon structural independent-contingency assumptions which rarely apply to human experience. Conditions and costs of production and delivery are never uniform and unchanging. The products of human action are most frequently heterogeneous and differentiated by combinations of brand name, reputation, advertising, and supplemental services such as warranties, installment, maintenance, efficiency, and the courtesy, attractiveness and status stimuli of the sales personnel. The economist views this multiformity as so
many disequilibrating 'market imperfections' which confound the pristine models with new dimensions for catallactic competition. New partial controllers affect the baseline exchange rates through their competitive, retaliatory and signaling adjustments of the control medium provided in the independent contingencies. There can be no simple combination of parameters, such as number of sellers or concentration of partial control, discoverable through factor analysis, which can side-step precise specification of the independent contingencies. Additional partial controllers must not only be counted and 'weighted', they must also be located within the concatenation of manipulanda and consequences and all conditional and temporal independent-contingency relations. To predict exchange rates we must know more than, for example, that $S_i$ and $A_1$ formed a bilateral monopoly.

We have here suggested conditions under which the number of partial controllers by itself determines exchange rate outcomes. These conditions correspond to the economists' model of perfect competition. We have further suggested that where there is heterogeneity of product and differentiation of partial-control variables, then the number of partial controllers, apart from other independent-contingency considerations, will have little or no predictive power. As Edward Chamberlin has asserted:

"In all fields where individual products have even the slightest element of uniqueness, competition bears but faint resemblance to the pure competition of a highly organized market for a homogeneous product."

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The Concatenated Catallaxy

Exchange rates of goods and services fluctuate as a function of worldwide independent—contingency unknowns. Weather affects crop production as well as energy requirements, rates of depreciation for equipment and inventories, and the costs and speed of transportation. Plagues, blights and earthquakes 'reprogram' independent contingencies in incalculable ways. Discoveries and inventions, i.e., newly established control by natural contingencies, insofar as capital accumulation exists to employ them, constantly alter the composition and distribution of partial control within the catallaxy.

This concept is not new. One hundred years ago, English economist William Stanley Jevons set forth the theory that trade cycles are a function of sunspot activity— an idea now semirevived. Early in the present century, Swedish social theorist Rudolf Kjellén interpreted social and political action to be a function of national geography. The state, according to Kjellén, operates as a vast superindividual organism vying with other states for control of the geographical resources necessary for spatial expansion and survival. Land area, rivers, soil, mountains, outlets to the sea, and


\[2\] Rudolf Kjellén, *Der Staat als Lebensform*, (Leipzig: S. Hirzel, 1917)
the general ecological endowment of the land were considered among the macro-environmental independent variables appropriate to this quasi-Darwinian science of agglomerate behavior. There is no need to add anything to what has already been said about the indispensability of individually locating each partial controller among divers monopolistic contingencies and independent contingencies of the concatenated environment—the job of a micro-environmental analysis. Prediction of exchange rates, i.e., the foretelling of relative flows of products and behaviors, although not the same as prediction of the solitary individual's response rate or response intensity, nonetheless requires reference to environmental contingencies equally as detailed and at the same level of specificity as that required for monopolistic prediction. Like Kjellén's geopolitics, catallactic analysis emphasizes pre-behavioral independent contingencies, but unlike the older discipline, catallactic analysis is wholly social-reductionistic.

We may contrast yet another weakness of Kjellén's orientation, which has been a source of appeal to more than one of this century's nationalist totalitarians, viz., the artificial partitioning, in analysis, of the natural unit of the catallaxy along the political boundaries of the nation state. The range of human exchange is effected by the coercive practices establishing national frontiers, but it need not be isolated or transformed by them. While legal control often terminates at the political frontier, the concept of a national economy being similarly bounded is both historically and theoretically unsupportable.

In order to see why this may be so, and so that we may better
grasp the range and workings of the catallaxy, we may resort to an imaginary chain of events that is suggestive of contemporary accounts of a part of recent history:

A change in the penetration of radiant energy from the sun, caused by the steady accumulation of released by-products of human economic activity changing the sun-screening properties of the atmosphere, causes shifts in ocean currents which affect the temperatures, precipitation and sunshine over large tracts of the Eurasian continent. The modified weather alters the (non-catallactic) contingent relation between seed planting and size of harvest yield throughout central and western Russia. A smaller than usual yield (Soviet agricultural is generally inefficient) affects catallactic relations wherein those manipulating the distribution of grain exert partial contingency control over those partial controllers manipulating the distribution of all other goods and services (i.e. rubles, larger apartments, better positions on automobile waiting lists, party membership, flexibility in the application of bureaucratic regulation, praise, submission, feigned affection, minding one's own business, foreign currency, and so on ad infinitum.)

By established economic reasoning, a less plentiful supply of grain means that less of it can enter exchanges for other kinds of reinforcing events. However, in our imaginary story nothing has lessened the reinforcing potential of grain. The activities of those who do not produce grain must be punished by either a diminished rate of incoming units of grain products or by the sacrifice of more possessions than was earlier necessary to sustain accustomed grain-product consumption. In general, transactions involv-
ing grain in exchange for non-food-related products will end in less of the former controlling more of the later. This change comes about regardless of official plan or policy. The effects are transnational, transystemic and indifferent to ideology. They result from the (to the Russians) exogenous change in independent contingencies. State controls, foreign policy, and 'the black market problem' all are modified by a catallactic process involving 1) partial controllers who manipulate the distribution of now-scarcer grain and make it contingent upon others' behavior, and 2) the others, who similarly manipulate everything else. International political advantages, such as trading concessions, withdrawal of warships from certain oceans, and even concessions in ideological posture, enter the scales as partial control measures controlling those who control grain. As the process is worked out by individuals moved by the catallactic invisible hand, people in those countries exchanging grain for whatever the Russians are providing in return soon discover effects on their own domestic grain transactions. Some (e.g. farmers and the caviar importers) are now in a better position owing to the infusion of Russian material and concessions. Other (e.g. bakers and people who eat a lot of bread) are worse off. Somewhere in the Midwest, a clinical psychologist records weekly changes in a breakfast-cereal executive's self-evaluation, security in his job, overall stress, family relations, and ability to continue paying off his sessions. It is not known by either this clinician or his client that all of these behavioral measures have to do with the fact that the client is a partial controller, linked through the catallaxy to partial controllers in
Russia and to the independent contingencies operating beyond the stratosphere.

Admittedly, the foregoing construction of events is far too fanciful and theory-controlled to withstand historical scrutiny of any of its particulars. However, its intended purpose, viz., merely to establish a principle, has been met. We see how, contrary to Kjellén's views, the catallaxy, as a unit of analysis, may extend beyond either a nation's politics, its laws, or its economic policies and plans.

The "Mainspring and Regulator" of the Market Culture

Wilhelm Röpke, a market economist whose noninterventionist policy recommendations are largely credited with twenty years of post-World-War-Two German prosperity, identifies what we have been calling catallactic relations among partial controllers as both the "mainspring and regulator" of the market culture.¹ They are the mainspring in the sense that the contingencies they arrange reinforce. They are the regulator in that they adjust to select new contingencies as a function of previous reinforcement effectiveness. The positioning of everyone's index finger along all of the various price scales determines, for example, whether the partial controlling farmer will cultivate his north forty or allow them to lie fallow. The latter outcome means that the time and resources which would have gone into the north forty are now more profitably spent on chickens, new dairy equipment, leisure, or the savings ac-

¹Wilhelm Röpke, The Humane Economy, (Chicago: Henry Regnery co., 1950) p. 695
count (in which case the local banker can lend the money to a man who will employ it to open a much-demanded hardware store.) Of course, today's prices are not necessarily tomorrow's prices, and it may turn out that forty acres of wheat would have controlled the greatest return after all. In this sense the farmer too is a risk-taking entrepreneur. Röpke points out that the usual defense of the market system emphasizes only the mainspring, the exclusive use of positive reinforcement. Overlooked is the market's "unrivaled solution" to the problem of "a continual harmonious ordering and guidance of the economic process." As it turns out, it is the latter advantage that is more cogent in the unending dialog between advocates of freedom, i.e., property and competitive trade, and the advocates of etatostic technology, i.e., the planned monopolistic collective.

"Competition as a stimulant is simply a psychological technique that is as applicable in a collectivist economy as in a market economy or, indeed, in any group, be it school or regiment or any other. We may even note that as far as the effects of competition on human destinies are concerned, it may in collectivist systems, be hardened in a way that is unknown and impossible in the market economy. But the other function of competition, which is at least equally important for its economic effectiveness, the function of selection in the area of material means of production meets with the greatest obstacles in collectivist systems. In relation to people, the carrot and the stick are ruthlessly applied, but it is quite another question whether in collectivist systems competition can accomplish so uncompromising, undeviating, and continual a selection of products and firms as takes place in the market economy.

1 loc. cit., p. 696
Unlike the market economy, the collectivist economy is necessarily debarred from such use of competition because no collectivist system can create the necessary preconditions without losing its own identity. This precondition is genuine economic interdependence of firms. Only on this condition is the formation of genuine scarcity prices for capital and consumer goods conceivable, but there can be no independence of firms without private ownership and related freedom of action.

"Thus everything is interlocked: competition as a regulator of the economy presupposes free market prices; free market prices are impossible without genuine independence of economic units, and their independence stands or falls by private ownership and freedom of decision, unimpaired and undisturbed by government planning. No collectivist economy can possibly satisfy the last of these conditions without ceasing to be collectivist, and therefore it cannot enjoy the advantage of the regulatory and guiding functions of competition." 1

1 *loc. cit., p. 96*
PART THREE

The Experimental Culture

Introduction

Skinner's defense of the comprehensive control of men by means of a centrally coordinated perpetual experiment, represents a major portion of his intellectual contribution. Of immediate importance is the fact that his conclusions do not rule out the incorporation of markets within the evolving design. In discussing the significance of the potential size of catallactic relations and the ways in which scientists may interpret, predict and control relations among partial controllers (i.e. through control of laboratory-imposed or coercive-legal independent contingencies) we are naturally led, following Skinner, to expand our area of discourse to cover the experimental community, the planned society and the culture of design.

Since Skinner has virtually ignored the topic of social coordination by the market mechanism, we are left without his guidance in asking: What common scientific and technological problems confront 1) the planner-controller of a monopolistic state who schedules all contingencies of reinforcement, and 2) the mixed-economy technocrat who seeks knowledge of what the catallaxy is doing and the means (utilizing precise coercive interventions) to make it do what he finds important while avoiding too many unpredictable aversive consequences?
The Attractive Culture

In a largely unfounded assault upon Skinner's scientific investigations, Richard Herrnstein has made one significant observation on the feasibility of behaviorally engineered societies, a critical observation which was not mentioned by Skinner in his otherwise sufficient reply. Herrnstein's statement merits rescue from its original straw-man context and a closer examination of its implications.

"If only a few drives (read: phylogenetically established susceptibilities to reinforcement) are involved in human social behavior, then (governmental) controlling agencies can promise to deliver the timely reinforcers. But suppose the list of drives is long, not fully known, and finally, somewhat variable from person to person and from time to time. Then think of the potential for mischief as the controlling agencies unwittingly withhold reinforcers belonging to drives not yet recognized as such or allow unrecognized reinforcers to sabotage their conditioning."

Let us inquire further into the "potential for mischief" Herrnstein is talking about. If the official plan is less reinforcing to its subjects than the catallactic relations controlled by the current independent contingencies, the collective's subjects will openly or secretly operate as partial controllers in violation of the plan. If police power is then applied in order to punish

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1Richard Herrnstein, "The Evolution of Behaviorism," American Psychologist XXXII (December, 1977)


catallactic behavior and the easy communication among subjects
which breeds it, then, as Skinner has often warned, the way of life
will no longer be reinforcing. There will be escape, passive re-
sistance, or sedition. To avoid Skylla and Kharybdis, the control-
ling agents must consistently deliver more to their subjects for
complying with the plan than those subjects can aquire by employ-
ing what partial control is left to them in catallactic relations.
Skinner's dictum, viz., "the subject is always right," must be re-
spected. More than that, however, achieving continuous prepotence
of all behavior stipulated in the collective plan requires finding
and making use of all the things the subject is right about.

Herrnstein has focused on the difficulties associated with
1) discovering individual inherited differences in reinforcement
susceptibility and 2) designing a unified societal plan which in-
corpororates and adjusts to such ideographic diversity. The data
must be at hand which will enable planners to design contingencies
of just the minimum strength necessary for maintaining prepotency
over insubordinate behaviors controlled by the catallaxy or by un-
planned monopolistic contingencies which cater to a subject's pecu-
liar bent, and which select behaviors incompatible with the plan.
The successful plan must be continually revised in order to insure
that reinforcers of the momentarily right kind and quantity will be
brought to bare in making prepotent those behaviors which discover,
produce, and arrange in contingencies that new mix of reinforcers
which changing conditions, i.e., changing requirements for prepot-
ency, will require. Only when this objective has been satisfied
are the planners safe to apply whatever surplus control remains to
the fulfillment of their "larger purpose."

This problem of economically maintaining prepotency in a catallaxy, although not solved, is at least partially addressed by the concept of 'adjusting schedules' of reinforcement. These are schedules which modify their response requirements or reinforcement density as a function of some measure of the strength of the immediately preceding performance. In a set of adjusting-schedule experiments, Ferster and Skinner¹ pegged changes in ratio requirements to the duration of the post-reinforcement pause within the immediately preceding ratio. These pauses were interpreted as an indicator of ratio-performance strain. Thus for each of three birds run individually under this procedure the ratio-schedule setting was said to have been brought under the control of current levels of deprivation, health, and "general reactivity."² During the first 25 seconds of pausing the automatic programming equipment gradually stepped down the ratio requirement. The first keypeck response breaking a pause immediately checked the decline and raised the requirement five responses. With this technique the researchers were able to let the birds establish their own customized ratios which maximally maintained responding without long pauses. The researchers were thus able to reach the birds' performance limits while avoiding the task of specifically attending to levels of deprivation, aversive stimulation, health, and so on,

¹B. F. Skinner, Schedules of Reinforcement, op. cit., pp. 720-1
²Ibid.
or weighing the effect of distracting contingencies.

Such a shortcut to contingency customizing undoubtedly has much to recommend it to the behavioristic technocrat, who, discovering that he cannot effectively banish the catallaxy, seeks to consistently outbid it everywhere.

However, the approach has its problems.

A programmed community which would adjust all schedules to individual susceptibilities must be capable of monitoring non-repetitious, non-mechanical, or non-localized tasks, as well as tasks fulfilled by novel or largely covert responses. The data collection and feedback necessary to cover the tasks of even the most spartan society is an engineering exercise beyond the scope of any known combination of machine and bureaucrat.

Even if instrumentation for ubiquitous labor-monitoring were developed, behavioral problems would remain.

It is an obvious generalization from experimental analysis that any activity attended by aversive stimulation will decrease in rate whenever such a decrease has no appreciable effect on the overall density of other reinforcement. This is because a decrease in aversive activity has the same effect, ceteris parabus, as an increase in positive reinforcement. When the increased reinforcement density of a work slowdown is, according to an adjusting schedule, met with increased reinforcement per response, then it is possible for a worker's tradeoff between work and remuneration to have many solutions. That is, their work-labor mix may settle anywhere along an indifference curve which plots different combinations of work and compensation which, to the worker, are of equal

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reinforcement density.

Ferster and Skinner did not observe this effect, which stands here only as a prediction, because the power of the food reinforcement was so great and the aversiveness of the peck was so little. The birds were food deprived to 80 per cent of their free-feeding weight. Keypeck responses were chosen because "they can be easily executed, and because they can be repeated quickly and over long periods of time without fatigue." Finally, there were no prominent competing contingencies mapping to comparable deprivations, thereby giving the peck an 'opportunity cost.'

Retaining the Monopolistic Approach

Notwithstanding all that has been said so far, monopolistic analysis does enable us to act more effectively in the real world. Where we have experimentally discovered that a particular schedule of reinforcement produces a particular pattern of responding, and where we see a person operating under such a schedule in the real world, we may more confidently predict that one pattern will resemble the other. Furthermore, if controlled observation has shown us that a change from one schedule to another produces a distinct change in patterning, we may, with increased strength, predict that if the same schedule transition occurs in the real world and the effect of other variables are known to be negligible, the patterning of the controlled setting will be approximated.

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1B. F. Skinner, loc. cit., p. 7
Since contingency schedules cannot be identified within the
catallaxy, we instead seek to identify independent contingencies,
i.e., to complete a structural account of what each subject is in-
strumentally capable of doing to all others. It is the primary as-
sumption of catallactic analysis, as an adjunct of monopolistic an-
alysis, that if repertoires, motivating variables, genetics, health
and age—all of which we may tie together under the general rubric
of history—are sufficiently similar, then, to the extent that the
independent contingencies are duplicated, catallactic outcomes,
i.e., exchange rates, will be similar. But the independent con-
tingencies of the world cannot be brought into the laboratory. The
catallaxy or market which controls a resident of say Kalamazoo is
worldwide and its network of independent contingencies is indivis-
ible. There is no segment, say a group, neighborhood, community
or state which can be isolated, functionally analysed and then used
as a predictive model irrespective of the effects of events upon
the larger catallaxy. The pattern of schedules of reinforcement is
repeated again and again over the surface of the earth. There are,
perhaps, trillions of isolatable subsystems in the world maintain
continuous reinforcement, fixed-ratio-two reinforcement, and other
familiar reinforcement schedules. In contradistinction, the inde-
pendent contingencies controlling world economic behavior lock to-
gether all economic agents of the catallaxy, without disclosing any
practical subsystems. Their arrangement is neither uniform nor re-
dundant; real-world independent-contingency features are not amen-
able to statistical generalization or averaging. There are as
varied as the geography, as changeable as the weather, and as irre-
ducible as the ecosystems which contribute to them. Although it is true that we may create catallaxies in the laboratory, the products of these experiments can never stand as reliable simulations of the exchange systems obtaining in the greater human economy. Neither can they yield a 'genetic code' enabling us to extrapolate the organization of the larger phenomenon. Indeed, all such experiments can offer is an inventory of functional relations among independent contingencies and catallactic relations, general principles affording a better interpretation of our economic environment. That is all. Perhaps that is enough.

The Monkey-Island Catallaxy

In an effort to support the above claims—which are offered as useful scientific assumptions and may never be proven—we may resort to the challenge posed by an anomalistic conceptual experiment.

Suppose that an experimental community of monkeys has been rigged in a carefully controlled island environment. The island has been landscaped with several artificial trees which yield fruit by means of servomechanisms operated from a hidden controlroom. Suppose further that at various points on the island there are vending machines with levers or slots and which dispense a variety of food pellets, toys, tokens, and special tools. The tools are necessary for picking (or picking faster) the fruits from the bogus trees. Next, imagine that each monkey is wearing an electric-shock punishment belt around its waist. These too are operated from a control-room console. Now let us introduce several strategically located trading platforms where the fruits, food pellets, toys,
tokens, tools and other loose items (perhaps of the monkeys' own devising) can be placed in either of two clear plastic containers at each end of a swiveling platform and 'exchanged' for whatever are the contents of the container at the other end. Both containers are always in clear view, permitting each user to always see what the other is offering. The trading platform will only swivel, effecting a trade, when both monkeys simultaneously press their 'exchange consent buttons' located at the end stations of the platform. We are free to assume that all monkeys have previously been taught (under monopolistic conditions) to use the trading platforms for exchanging a wide variety of items for a wide variety of reinforcers and to exchange presumably weak reinforcers for stronger reinforcers. (The training of verbal behavior in order to facilitate haggling—possible at least with chimps—is here optional.)

Next, we give each monkey his own color-coded strongbox or cave where he may safely place his acquisitions and which no other monkey may touch without automatically receiving a persuasive jolt from his punishment belt. Finally, we must allow that every square foot of the island is, in the best 1984 tradition, constantly under the watchful eyes of a number of hidden television monitors, enabling the scientists, armed with counters, clocks and clipboards, to keep track of all monkeys at all times.

In considering this imaginary catallactic experiment we see that the scientist can control the field of independent contingencies, but that as long as the exchange platforms are in operation without coercion, it is impossible to control (or even identify) single-subject contingencies for any one type of reinforcer. On
top of the basic environment and its instrumentation, the scientist merely 1) sets the work requirements for extracting goods on the island (e.g. the force and time required to pull fruit from a tree using a certain tool; the number of lever presses or tokens required before a machine will deliver a tool, toy, tidbit, or token), and 2) enforces laws (i.e. aversive monopolistic contingencies) by means of the punishing belts.

In a classical-liberal-commonwealth version of this experiment; theft, intermonkey coercion and conquest are punished. (For experimental ease in differentiating between coercion and trade, nonpunished transfers of goods may be restricted to the trading platforms—thereby, incidentally, limiting the extraneous influence of Romans-type informal status-favor-friendship-authority exchanges.) Under this experimental dispensation monkeys will be able to work with machines or in orchards procuring reinforcers which they may consume, trade or save. They may also acquire tools making it easier (i.e. cheaper; less work) to acquire goods in the future. These too may be used, traded or saved.

Yet the scientist is still manipulating variables. He may, for example, arrange the independent contingencies so that monkey number six has five times the work ratio required to produce apples than has monkey number eleven, but only half of the latter's requirement in producing toys or bananas or tools. It would be one object of such an experiment to determine if such discrepancies affect the division of labor and relative exchange rates among all goods on the island.

Apart form such gross, macro measures as total consumption,
total production, total savings, i.e., the average contents of the
strongboxes over time, and total investment, i.e., total tool pro-
duction over time, we have available to us only two micro measures,
viz., relative exchange rates and the demography of productivity,
i.e., a census of the division of labor. Even so, empirical ques-
tions relative to the operation of this catallaxy may still be an-
swered.

What items would be exchanged and in what ratios? Would one
monkey exchange (or work) for a type of food he does not eat in
order to better deal with another monkey who is controlling some-
thing more palatable? Would a static division of labor be gener-
ated, a division based upon the experimentally induced advantages
of the more effective fruit getters, toy getters and token getters?
Would the token exchange ratios generate semi-fixed price relation-
ships among goods (relationships the consistent application of
which would demonstrate mathematical logic? Would some monkeys
create new products by assembling novel items from odds and ends
scattered throughout the island? If tokens were eliminated would
some other commodity come to serve as a universal medium of ex-
change? Could that medium be experimentally inflated? If so, to
what effect?

One sees that the possibilities for catallactic analysis are
as abundant as they are prohibitively expensive. (Perhaps this
would-be scientific boondoggle could be conducted profitably as a
one-way-glass private commercial exhibit.)

At any rate, we must recognize that whatever its value, there
is nothing in such an experiment that allows us to predict inter-
catallactic generality. We may interpret the workings of the larger world from the workings of the smaller, but that is all. We must always remember that in the catallaxy 'out here' it is Providence and not Homo sapiens who knows and controls all of the relevant independent contingencies taken together.

The Division of Labor

According to Adam Smith, "it is the power of exchanging that gives occasion to the division of labor." The degree of specialization that is possible in any line of production is largely dependent upon the size of the market, i.e., the prices that partial controllers are offering for various quantities of the product to be delivered at various times in the future. Frequent and steady offers to buy over a long period permits the production process to be profitably broken down to distinctive sets of operations, each fully occupying a single individual's attention. This segment of the production process has several advantages. It leads to skill, automaticity, and the elimination of wasted motion as the worker becomes ever more effectively under the control of a special set of contingencies. Short cuts are found and mechanical innovations are discovered by those experienced in what has to be done and in how to do it with least effort. Time and costs are also saved merely insofar as specialized individuals need not pass from one stage of assembly to another. The divisions of labor which together complete the productive process from natural resources to finished product, make simple operations easily discriminable and the possibilities for effective automation that much more obvious.
Finally, the savings made possible by all of the above, i.e., the accumulation of capital, make further large-scale investment in equipment and tools both possible and worthwhile.

We may speak of an individual segment of production, a single division of labor, as a field of partial control. The individual who controls the variables of one stage may effectively haggle with the controllers of other stages for larger shares of the return from the finished product. The more specialized and irreplaceable the individual, the greater is his (or his union representative's) control—ignoring, of course, the element of government-sanctioned coercion, so prevalent in modern labor relations. Presumably a natural limit to the partial control of labor is reached where the wages demanded become so large in proportion to labor productivity as to cancel all of the above-mentioned savings from the division of labor and automation—at which point, for example, it becomes easier or cheaper to arrange to make one's own car or do without than buy one off the assembly line.

Anyone who would question the importance of the catallactic division of labor would do well to contemplate the pencil. Leonard Read\(^1\) has discovered that no one on earth knows how to make one.

> "At my office I phoned the president of the largest pencil company in the world, asking if I might visit his pencil factory. He was very nice and said yes. I spent

\(^1\)Leonard Read, "The Miracle of the Market," in Champions of Freedom; the Ludwig von Mises Lecture Series, (Hillsdale: Hillsdale College Press, 1974) vol. 1

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the whole day at the factory watching the stuff as it came on the loading platform: the graphite, the wetting agents, the lumber, and so on. I watched the extrusion process, indeed I watched the whole thing. The last hour was spent with the chemist. What is that? He would tell me, but as we went down each line of explanation he would finally admit to not knowing."

Milton Friedman appreciates the significance of Read's discovery.

"... Where do you get the wood? Perhaps by cutting down trees in the Pacific Northwest. How do you cut down some trees? You have to have some saws to cut them with. Where do you get the saws? You have to get some steel. Where do you get the steel? You have to have a steel mill. In order to have a steel mill you have to get the iron ore—and you can add the rest.

"What happens when I go down to the store and I put down a quarter and get two of these pencils? I am trading with thousands of people all over the world, people in Washington State who are cutting down trees, people in South America, people over in Malaysia—I'm making a deal with them..."

"Now how is this brought about? Is there a commissar sitting in some central office who is sending out orders to these people in Malaysia, to these people in South America, to the people in Washington? How is it that they are led to cooperate with one another? That's the miracle of the price system because—note—of these thousands of people who have been led to engage in this simple transaction with me, not one of them has been forced to do it.

"Nobody has had a gun to his head. They've all done it. Why? Because each one of them thinks he's better off in this transaction, and somehow or other I've done it because I think I'm better off. Everybody is benefited. There has been no central direction. These people who have cooperated with one another don't speak the same language; they are people of all different religions. They may hate one another in every respect, but this has

1 loc. cit., p. 62
not prevented some kind of wonderful machinery from bringing these various components together into this little pencil."¹

The problem of superseding the catallaxy

A full and current inventory of 1) an individual's behavioral repertoire and 2) the environment-specific response-probability hierarchies according to which different parts of his repertoire are emitted, together describe both his knowledge of the world and his appreciation of the world's instrumental values and means. Reasoning from this assumption about the behavioral nature of man, one is forced to conclude that a coercion-free positive-reinforcement community cannot be monopolistically managed without, for every stage of the coordinating plan, first anticipating and then incorporating or eliminating all avenues by which subjects may employ available means to secure reinforcing consequences. The plan must comprehensively provide for matching, bettering, or obstructing the apportionment dealt by the catallaxy or by stray monopolistic contingencies when these control behavior detrimental to the plan.

Ideally, in a monopolistically ordered commonwealth, selected planners place themselves under the control of manipulation-and-feedback contingencies which generate behavior controlling and monitoring all of the society's productive activities. Specific

¹Milton Friedman, "What is America?," The Saturday Evening Post, October, 1978, p. 104
manipulations are differentially reinforced as they, to a greater or lesser extent, direct the labor force to satisfy contingencies yielding evidence to the planners of their continued ability to maintain precise control and feedback. Put more succinctly, changes in the prospects for continued control are what shape and reshape control practices.

Of special importance in such monopolistic economies is the fact that the laborers are not directly reinforced by the productive consequences of their labor. They are prevented from selling or freely consuming what their behavior has engendered. Instead, these natural consequences of their productive activity are diverted by the planners for the arrangement of contingencies elsewhere and are replaced for the laborer with a different set of programmed consequences deemed just sufficient by the planners to get the job done. Only the planners measure the product of the laborer's exertions and adjust contingencies of reinforcement accordingly. Without the ability to trade and, therefore, lacking the relative-scarcity-signalling prices generated in the catallaxy, the laborer is both unable and unfit to ascertain whether the product he produces is in demand or whether it provides for what, from the planners' reference frame, is 'of need.' In this respect the laborer is not unlike the behavior-experiment pigeon that receives grain after pecking a key, but is unaffected by whether or not the keypeck itself has importance to others. We may contrast this situation with that of the partial controller whose only motive for production is the indication that what he produces can reinforce others who supply him with goods and services.
The above comparative reference to the pigeon, although accurate, is too readily misunderstood. Historically, the controversy surrounding Skinner's technocratic socialism has concerned the scientists' ability to sufficiently specify the operational differences between men and pigeons or between 'angels' and apes with respect to contingency control. Enormously less has been written about the problems faced in specifying or predicting the correspondence between the laboratory chamber and the world, i.e., between the several hundred synthetic contingencies arranged in operant-behavior experiments on the one hand, and the independent contingencies generated within the natural environment and the resulting catallactic-contingency relations on the other. Perhaps this lopsidedness in the emphasis of critical analysis is but a measure of market-interventionist predilections shared by both sides of the man-animal and mind-body questions. In any case, the reader must bear in mind that these traditional questions, however they are resolved, are entirely separate from the present subject which is the problem of operationally defining, predicting, and controlling the contingencies of the economic environment.

The 'given' environment

In spite of all those who would deny it, the fact is that even if the psychologistic state could take account of each subject's 1) inherited reinforcement susceptibilities, 2) inherited behaviors and the events which release them, 3) present levels of conditioned-reinforcer effectiveness, and 4) learned ways of attaining both conditioned and unconditioned reinforcement, there would still be left
the basic economic problem faced by all cultures, the problem which
the authors of Walden Two, Small is Beautiful, and Capital and their
epigones have passed by in silence, viz., the problem of taking into
account the changing 'given' environment in which the subjects of
the collectivist state, like the partial controllers of the catal-
archy move and are reinforced.

To ignore this basic environment (which in an exchange society
constitutes the set of all independent contingencies) is to invite
cultural extinction. The continuation of any economic system's ca-
pacity to reinforce its members depends upon learning and making ade-
quate use of facts about what resources (contingencies) can be
quired (satisfied), how, where, when, and—very important—at what
relative costs (a behavioral quantity, expressible only as an ex-
change rate between performances under different contingencies). On-
ly with these facts is it possible to determine which means are most
economically (reinforcingly) employed in attaining given ends. This
point is obscured, but not cancelled, when we recognize that the
targetted end for monopolistic-community planners is always the con-
tinued prepotency of planned behavior; that the ends and means of
the total state are indistinguishable.

The shape of these survival-serving facts follows the dynamic
contours of the basic environment, various parts of which are the
respective provinces of geography, oceanography, meteorology, eco-
logy, demography, technology, physical anthropology, and the history
of economic structural organization, but by far the greatest part of
which can only be characterized as the accidental and transitory
conditions obtaining at unique locations.
F. A. Hayek has been one of a few social theorists who have not underestimated the importance of people's behavioral adjustments to the turbulent particulars of the independent-contingency environment in their extracting from the world (either under a system of catal- lactic relations or centralized planning) a reinforcing way of life.

"The economic problem of society is thus not merely a problem of how to allocate 'given' resources... It is rather a problem of how to secure the best use of resources known to any members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, it is a problem of utilization of knowledge not given to anyone in its totality."¹

"Today it is almost heresy to suggest that scientific knowledge is not the sum of all knowledge. But a little reflection will show that there is beyond question a body of very important but unorganized knowledge which cannot possibly be called scientific in the sense of knowledge of general rules: the knowledge of the particular circumstances of time and place. It is with respect to this that proctically every individual has some advantage over all others, in that he possesses unique information of which beneficial use might be made, but of which use can be made only if the decisions depending upon it are left to him or are made with his active cooperation. We need to remember only how much we have to learn in any occupation after we have completed our theoretical training, how big a part of our working life we spend learning particular jobs and how valuable an asset in all walks of life is knowledge of people, of local conditions and special circumstances. To know of and put to use a machine not fully employed, or somebody's skill which could be better utilized, or be aware of a surplus stock which can be drawn upon during an interruption of supplies is socially quite as useful as the knowledge of better alternative techniques. And the shipper who earns his living from using otherwise empty or half-filled journeys of tramp steamers, or the estate agent whose whole knowledge

is almost exclusively one of temporary opportunities, or the arbitrageur who gains from local differences of commodity prices are all performing eminently useful functions based on special knowledge of circumstances of the fleeting moment not known to others."¹

Hayek is writing about diverse sets of contingencies with which individuals are in unique contact.² In the catallaxy these are the shifting independent contingencies providing individuals with partial control. In the monopolistic collective these are the shifting contingencies of the environment (e.g. the present potential for producing sugar) from which monopolistic controllers, employing their subjects (e.g. growers of sugar cane), extract their continuing means of subject reinforcement (e.g. the disposition of the supply of sugar), while at the same time preventing the producing subjects from diverting their products to contingencies of their individual devising, viz., direct private consumption or exchange—a loss of government control requiring increasingly elaborate detection methods and punishment contingencies.

Revolutionary edicts abolishing the catallaxy do not revoke natural contingencies (e.g. those contingencies which yield sugar cane to those who plant stem cuttings in the right way and under the right tropical conditions). Nor does issuing social directives

¹ loc. cit., p. 124

²Environmental contact is unique for each individual as it is for the three allegorical blind men who each touch one part of an elephant. Each comes to know the elephant (or the contingencies maintained by the elephant) differently. Although we know the same world, none of us knows the world the same.
halt the changing conditions of resources and transportation which make one method of production (e.g. the lime-centrifuge method in the manufacture of cane sugar) cheaper than a rival process at one time but more costly at some other time. Laws of physics, no matter how reactionary from the standpoint of someone's social theory, are beyond repeal. Certain formulae and designs will always remain superior to others in attaining specific ends under particular conditions. Machines and tools may still operate according to the wishes of the state planners, but only as long as there are still materials for building and fixing, and operators who have the skill and motivational history to use and maintain them. Finally, concourse among individuals differentiated by specialized means will still be a necessary feature of any society seeking the benefits obtainable only through an intricate division of labor. It is with this last inevitability that these comes the 'threat' of opportunities for unplanned mutually reinforcing exchanges among subjects.

The state which seeks to gain true experimental control of a culture must not only eradicate the open market; it must also avoid the bureaucratic system of monitoring and managing an extensive division of labor, since such a system affords too many occasions for clandestine partial control. Monopolistic control requires that the state isolate each of its subjects from all unplanned contingencies of reinforcement. Such contingencies are sources of partial control which orient individuals away from the planned direction of the behavior engineers. Partial control always works to supersede the would-be comprehensive plan and to 'corrupt' (through
bribery) the planners and their agents.

Successful isolation requires what only a few of the most ruthless totalitarian regimes in history have attempted, viz., a coercion-encased cloistered society based on minimum-subsistence agriculture and a curtailed division of labor rarely extending beyond small village-farm compounds; self-denial, abstinence, chastity (for the beauty, charm and sexual stimuli of women also afford varying degrees of partial control), political training in self-criticism, and a learned passive acceptance of inevitable punishment. Under such 'pure Maoist' (Cambodian-type\(^1\) or 'ecologically balanced') regimes, those who divert their time and effort from the planned daily work quota in order to privately fashion reinforcers for consumption or exchange, will fail to receive their work-contingent subsistence-maintaining ration for the day and will therefore be too weak (providing, of course, that the schedules are properly fine-tuned) to continue their transgressions—should these 'economic crimes' have been overlooked by the coercive agents.

Such a society is truly non-capitalist in that it proscribes the savings accumulation that would permit new productive ventures or even leisure. Effective experimental control and human equality—the equality of the lowest sustainable level—are its only realizable goals.

Apart from the present government of Cambodia, and increasingly less so, Red China, and increasingly more so, communist control—

\(^1\)Since this was written, the infamous Pol Pot regime of French-university Maoism has been militarily displaced by a Soviet-backed bureaucracy-and-black-market system.
led Vietnam, no country has relentlessly pursued the ideals of economic planning and equality to their necessary economic conclusion. In the intellectual communities of the Free World only a small number of pure Maoists and radical environmentalists openly advocate so extreme a renunciation of the productive contingencies which the world makes available and which over the centuries men have discovered. This is not to say that there are not great phalanxes holding views which, if put into practice, would eventually lead to the same Draconian measures. Many, including our radical political behaviorists, advocate action which has these consequences, but in their case it is a profound ignorance of the fundamental contributions of market economics and its relationship to reinforcement psychology, rather than any sinister motives, which has kept them from apprehending the difference between that which is sought and that which is obtained.

The faith of socialism has always been that its bureaucracies can discover all of the information which would figure in the exchange outcome of interacting partial controllers, i.e., that it could process these facts and incorporate them into a noncatalytic-control plan which would achieve similar results, while at the same time modifying this pseudo-market solution to meet such other goals as fairness (whatever that is), equality, birth control, education (whatever that is), safety (whatever that is), health (whatever that is), as well as generally halting human activity where it may interfere with the propagation of less-successful life forms. Obviously, without these grafted objectives it would be the height
of folly to divert a vast army of bureaucrats from society's potential productive workforce merely to attempt to accomplish by state direction what the catallaxy would have accomplished automatically.

It is a conclusion of nonstatistical market economics that the problem of the dirigible economy is not simply the intelligent allocation of resources. We can do nothing but accept the point made by Hayek and others that even in this dawning computer age there can be no book of data which projects the specifications of the world's independent contingencies for any future time \( t \). The catallaxy is a means of learning, a means of adjusting all of society's members to changing environmental conditions. It attaches a discriminative number or price to each man-serving item in the world. This number indicate the reinforcing power which an item exerts with respect to everyone's current tastes and current knowledge and expectations of relative scarcities. (Note: Naturally, when the medium of exchange is a politically determined supply of government fiduciary paper—rather than a convenient buy scarce commodity such as gold—this coordination becomes distorted.)

There is no centralized data collection, computation, estimation, interpretation, or error involved. The fact that some individuals send contradictory messages or work at cross purposes in no way interferes with its workings. For a socialist commonwealth to succeed it must be able to assume this important function. Its designers must find ways of discovering each individual's uniquely conditioned behavior repertoire as it is constantly adjusting to heterogeneously distributed resources. Only when this is done can the controlling agents reasonably hope to employ systems analysis,
linear programming, and other tools of operations analysis to plan the arrangement of contingencies which move individuals away from their catallactically determined course and towards their prescribed objectives. But even then, care must be taken that their superimposed contingencies do not destroy the special time-place behavioral adaptations of individuals. If this happens there will follow an infinity of maladjustments. Stores will stock items which no longer reinforce the people who produce them and they will not stock enough of those things people have since come to seek. Expensive processes will continue to be used in production long after cheaper processes are discovered. Railroads will be sent to ghost-towns, spaceships will be sent to a sterile moon, and so on and on. To summarize, no planned society can survive without providing for maintenance of the means of utilizing such information as is supplied by catallactic prices, prices which, at present, are our only source of knowledge about the relative importance of all of the ever-new specifics of a turbulent world.

Socialist theory

Those familiar with the Marxian "materialist conception of history" may have already paired several of its elements with homologous elements of the present analytical system. The independent contingencies of a culture are its productive forces (or its means or mode of production). The catallactic relations they control are the social relations of production (or production relations, or, from Marx's earlier writings, the forms of intercourse). The endogenous arrangement of man-made independent contingencies (i.e.
the practice of private property and other aversive-control practices related to man's ability to be reinforced through coercion of others) adds a conditioned and conditioning superstructure to the catallaxy.

The means of production according to Marx include nature and the capital equipment made available by the application of technology by skilled individual's, i.e., the machines, tools, factories, roads, vehicles, formulas, charts, tables, mathematical techniques, engineering principles, etc.—in short, all of the stations and manipulanda of the current divisions of labor and all of the productive repertoires of the various members of society. As we have conceptually demonstrated with the imaginary monkey-island experiment, above, the 'means of production' control, through operant conditioning, all of the productive relations (catallactic relations) of the society (e.g. what each monkey produces and exchanges with each other monkey). They also control a society's politics, laws, education, and other (superstructure) practices—practices, incidentally, which did not obtain on the monkey island because the shock-belt contingencies arranged monopolistically by the hidden scientists took 'the law' out of the monkeys' hands thereby making the otherwise low-probability exchanges prepotent over the 'rule of force.'

The Marxian notion of production relations covers the producing, exchanging, and distributing of goods and services. This includes the way in which labor is recruited, organized, and compensated, and the way in which resources, production techniques and
capital are distributed among alternative ends which can be brought to fruition at alternative times. But there is more to production relations, i.e., more to catallactic relations, than that. In a world in which the catallaxy is imperfectly known, the targeting of means to achieve specific ends at specific times inevitably entails risk. In the language of reinforcement psychology, defective stimulus control generally leads to increased intermittency of reinforcement. As the motivations of a culture's partial controllers are modified through satiation, deprivation, new conditioning, or the completion of sequential segments of behavior chains, the operation of the catallaxy needs to be changed accordingly, i.e., people will be more powerfully reinforced with appropriate adjustments. In like manner, partial controllers will better increase the density of reinforcement within their society if they can adjust their practices to new technological possibilities and resource availabilities. It is the entrepreneur, whose behaviors are selected by profit and loss, who acts to adjust production relations to a changing world. He adjusts inventories, combines factors of production into new products, discontinues certain lines, withholds goods until later times, transfers goods from place to place, switches to different ingredients, and otherwise differentiates his products—all in accordance with his forecasts of discrepancies in the prices offered between one location and another, between one period and another, or between one possible synthesis of existing materials and another. These forecasts are controlled by the discriminative stimuli of the entrepreneur's historically unique location within the concatenation of real-world events,
i.e., by what he has learned to interpret as his reliable 'market indicators.' He may be right in his forecasts. If so, profits will accrue to him which will both reinforce his entrepreneurial technique and enable him to be right the next time in a bigger way. He may be wrong. If wrong, he suffers losses which both punish his methods and insure that he will have less to be wrong with next time. Marx completely missed this 'social-Darwinist' aspect of the catallaxy.

It is difficult to find fault with Marx's assertion that society's superstructural practices are distinct from its production relations and that the superstructure comprises almost every non-exchange control technique employed by the members of society. This category of control encompasses society's customs, folkways, family organization, governmental and legal institutions, formal education, literature and art (i.e. the way the book, theatrical performance or painting controls one, apart from one's buying or selling it) and mass media communications (when these are not designed exclusively to cater to partial-controller demand.) Whether the superstructure, as a set of practices, aims at protecting the individual and his property from coercion, or promoting a welfare-state redistribution of production, or glorifying church or state, or enhancing the power and ease of the superstructure's agents, its relationship to the catallaxy is always parasitic (and only in the first instance symbiotic).

Marx, it is not often realized, understood the impossibility of explaining historical evolution of society's means of production, its production relations, and its superstructure through any
analysis detailing the world-system of economically relevant mutually determining variables to which the patterns of such an evolution must be related. Like Kant before him, and Spencer during his lifetime, and Hayek after him, he knew that any predictive comprehension of this all-embracing totality was beyond the means of either natural science or economics, and much of his writing was directed against those who thought otherwise.

Acceptance of this position posed great difficulties for the young Marx, for he had also accepted Ricardo's (special-case) conclusion that wages tend towards the bare-subsistence level, and brought that same economist's (fallacious) concept of the labor theory of value to its logical conclusion, viz., that those who sell only their labor must be exploited by those who gain through their control of capital or land or who profit from their entrepreneurial behavior. As the self-proclaimed intellectual champion and revolutionary organizer of the working class, Marx was stopped cold insofar as he was unable to find fault with the premises, logic, and major conclusions of the classical economists, conclusions which left room for no course other than liberal non-interventionist policies. To restore hope to the working man in the face of the dismal Malthusian-Ricardian long-run wage analysis, Marx had to develop a new method and a new science which would completely transcend the logic of the science of functional relations.

Towards this end, he placed his writing under the control of the two dominant (and incompatible) philosophies of his current intellectual environment, viz., the idealism of Georg Hegel and the materialism of Ludwig von Feuerbach.
In the system of Hegelian philosophy, reality is a spiritual process that is completely rational, a World-Mind which realizes itself through the workings of its own logic. Our human logic, Hegel avers, is therefore our only approach to understanding reality. What is self-consistent is rational and what is rational is real; all human knowledge is indirectly and incompletely knowledge of the absolute World-Mind. Hegel's technique for comprehending absolute reality is the logical method which proceeds from an initial thesis or statement to a contradiction of that statement, and then to a new statement which resolves the contradiction and carries the sense of the correct features of both of the former statements. This new statement is then followed by a new contradiction, and then by an escape to a new synthesis, and so on. History, as the working out of the logic of the World-Mind, can only be known through application of this same dialectic. Historical events move in the same way Socrates rationally constructed the ideal polis in the dialogue of The Republic, viz., by continually generating, from his discussants, statements which contradicted their previous statements yet were deduced from them, contradictions which the students would then attempt to reconcile with a new statement, whereupon Socrates would again point up new contradictory implications, until a point was finally reached where no new contradictions were forthcoming and the 'perfect state' had been described. According to Hegel the state is the worldly organization which most closely approaches absolute reality. History, as he interpreted it, moves from pure being (which he identified with contemporary China), through war and class conflict, to the absolute idea (interpreted
variously as either the Prussian State or some future stage in the
evolution of the Americas), i.e., the final idea which thinks it-
self.

Such an analysis, based simply on repeated contradictions of
no more than two elements at a time (rather than trillions of si-
multaneous equations) presented Marx with just the escape from em-
pirical-world complexity which he was seeking. Yet, the concept of
the World-Mind ran counter to the doctrine of materialism which was
supported by a powerful segment of the European intellectual com-

Mind Marx reinterpreted as a manifestation of physiochemical
changes in the nervous system, changes conditioned by the objective
conditions obtaining at a stage of history. In Marx's new under-
standing of history, the paramount importance given by Hegel to
class conflict in the development of society, and the progressive
resolution of such struggles through the dialectical process, is
retained.

Thus, Marx created a new analytical apparatus with easily dis-
criminated elements, e.g., social classes, which transform them-
selves according to an incredibly simple process of development,
i.e., negation and resolution. With this analytical tool he be-
lieved that he could sidestep the impossible task of accounting for
all of the relevant variables of the means of production (i.e. the material productive forces of history; the world changing independent contingencies) and all of the variables of the production relations and superstructure. The specific phenomena of geography, weather, ecology, and physical and cultural anthropology could now be sufficiently treated as one broad tendency, viz., the progress of the means of production. Successive bipolar class struggles come about as the means of production progress. The production relations and superstructure appropriate to a world of handmills contradict (aversively impede) the conditioning control of a new world of steam mills. The negation (overthrow) of the older production relations and superstructure then make easier further development of the means of production. The two classes of any stage of history (except the last, escatological communism) are identified with the production relations and superstructure respectively. To define these classes, i.e., to determine who was exploiting whom, Marx simply adopted two of the three categories of the classical theory of production, viz., labor and capital, and embellished them with concepts borrowed from the earlier French Utopian socialists, e.g., the decadent and philistine bourgeois and the noble proletarian.

Marx was no doubt sincere in his belief that dialectical materialism allowed those who understood it to readily discriminate the side of progress from the side of reaction simply by ascertaining who is exploiting whom. For Marx, the 'irrefutable' labor theory of value supplied the answer to that question. The revolutionary course of those who sought to alleviate the misery of the
downtrodden was therefore determined. All of the misery of society, e.g., poverty, class distinction, racism, sexual frustration, alienation exist simply because capitalism has not yet been negated. (The whole so-called contribution of "Marxist Psychology" is little more than a variation of this theme.) In fact, it is not an oversimplification to say that the communism which Marx expected was to be nothing more profound than the 'negation' of everything and everybody that ever bothered him or left him depressed.

The kind of logic which proves that there will be good simply because there now exists evil has its intrinsic appeal. Its success as measured by number of converts cannot be denied. Fewer and fewer people are still able to see that Marxism's revelation, viz., that an inherent 'logic' of the productive forces propels society 'forward' via class struggle, is no more than an improper generalization from a discredited metaphysical account of how the mind operates which has been applied, along with obsolete wage and value theories, to the problem of predicting and intelligently influencing the course of the catallaxy.

Max Eastman has interpreted the materialist conception of history to be simply bad psychology:

"Dialectical Materialism declares that the world is essentially material, and that mind evolved out of matter in connection with the complex organization of the nervous system in animals and men. But it does not, and dare not, go on to say that the motions of this mind are a continuation of the motion of matter in that central nervous system, adaptive motions, to be studied primarily from the standpoint of biology and physiology rather than logic. For, studied from this standpoint and in their actuality as concrete cases, these motions will be found to be not essentially logical—much less 'dialectic'—and the whole mystic-intellectual legend of Hegel will fall to the ground altogether. As Hegel himself said, "To see
that thought in its very nature is dialectical is a lesson of logic.1 And the moment logic is cast down from its position as a factual account of what thought in its 'inner essence' really is, and is recognized to be a set of rules which men have made for the better employment of their thoughts, that moment this 'lesson of logic' will lose its validity.

"It will lose its validity because it never had any. But it will lose the possibility of obscuring and confusing the boldest political minds of five generations of mankind with an unintelligible mixture of emotional mysticism and psychological half-truth. . . A dialectical philosophy of the universe, whether materialistic or idealistic, stands or falls with Hegel's fundamental science of the mind. It stands or falls with the belief that 'the principle and very unadulterated self of the mind' is to be found, not by examining its simple beginnings, but by winding oneself all up in its most complicated and hypercultivated manifestations, where it has become an end in itself, and where its end is 'to reach and get hold of itself and to liberate itself to itself,' whatever in honest fact that may mean. Marx's philosophy of Dialectical Materialism is inextricably bound up with this old-fashioned way of studying the mind."1

What then explains change in society?

In previous sections we saw that human behavior can control the independent contingencies of which it is a function. Canals can be built, clouds can be seeded, new machines employing new technology can be made, and atomic powerplants can be voted illegal and torn down. The history of the means of production is the story of natural and artificial reprogramming of the independent contingencies.

Perhaps the most important kind of independent-contingency reprogramming are the changes which used to, unequivocally, be called

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progress. Marx, never imagining the productivity-eroding effects of collectivism and etatism in the twentieth century, identified progress with inevitable historical development. The means of production, he supposed, develop according to a general law which "acts as the prevailing tendency only in a very complicated and approximate manner, as a never-ascertainable average of ceaseless fluctuations."¹

Interpreting the causes of advances in the 'level of progress' is easier than surveying them or measuring their impact during given periods. The means of production are reprogrammed when an individual operating in the catallaxy predicts the high would-be value of an as-yet nonexistent factor of production, and then under the control of his prediction proceeds to manipulate variables in ways that make the appearance of a successful design more probable. The entrepreneurs then select from the designs proffered those which each predicts (never with certainty) will work and will most economically control partial controllers in exchange episodes. The behavior of Bell, Edison, and Ford are florescent examples of such market-sponsored creativity. Without the relative exchange rates and money prices of the catallaxy, and with prices administered through centralized rational planning, it would have been impossible for such potential innovators to discriminate whether one productive factor or process would be more or less economical than

¹Karl Marx, Capital vol. 3 (Moscow: Foreign Language Publishing House, 1959) p. 159

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another. Knowing the existing quantity of a factor, its current allocation, and its uses tells the individual nothing of its true economic scarcity, i.e., its relative importance as reinforcement for any individual, its value to others, or its power as a partial-control variable.

Catallactic relations are not the only source of human reprogramming of the means of production. The operation of the coercive superstructure can also alter the independent-contingency environment either through 1) governmental aversive control, as when lawmakers set impact-resistance standards, gas mileage standards, and exhaust-emission standards for cars, standards which can only be achieved at the expense of other reinforcing automobile characteristics (e.g. price, power, capacity to hold a family, or run on cheaper gas, etc.), or 2) social aversive control, as when anti-capitalist environmentalists threaten to sabotage a nuclear power-plant which they oppose because such plants are 'too easily sabotaged.' In either case, the objectives of the coercive agents are achieved at the expense of production as it would have been shaped by the unhampered market's contingencies of cost, producer ability, and partial-controller selection.

Steward's non-dialectical theory of the irrigation cultures

It is not difficult to draw evidence from modern historical and archaeological research contradicting the Marxian thesis that, in their 'broadest tendencies,' independent (productive) contingencies, catallactic relations, and cultural superstructure follow dialectical patterns.
Modern cultural theorists trace many separate lines of cultural evolution from, for example, scattered kinship groups to multi-community states. Steward identifies the practicability of irrigation farming as the major independent-contingency feature controlling one such line which has been discovered to have been repeated many times over long intervals in the prehistory and early history of China, Mesopotamia, Egypt, the north coast of Peru, probably the Indus Valley, and possibly the Valley of Mexico.

According to Steward, the evolution of irrigation cultures is marked by three distinct stages. In the first, primitive groups gradually came under the control of agricultural contingencies maintained along damp riverbanks or in higher terrain where rainfall can sustain crops. These natural contingencies were not bountiful enough to permit much activity beyond the struggle for food. The complete division of labor could be encompassed within a single kinship group. Planting and gathering were the major occupations. Villages were small; large concentrations of people could not be sustained (and, without individual specialization, yielded no advantage.) The second stage began with 1) the discovery that river waters can be diverted by means of canals to irrigate large tracts of land, and 2) the learned capacity of some individuals to invest time and aversive effort for remote rewards. This new control by independent contingencies permitted the production of food


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in larger quantities, so much so in fact, that food deprivation and food contingencies ceased being the only important behavioral variables. "Irrigation farming made possible a large population and freed the farmers from the need to spend all of their time on basic food production." The independent contingencies had 'evolved.' The catallaxy accelerated its continual redivision of labor, i.e., the staking of new areas of specialization by partial controllers, thereby permitting even more varied and complex catallactic relations and further elaborations of the independent-contingency basis. In Steward's words: "This period brought the invention of the loom, weaving, metallurgy, the wheel, mathematics, the calendar, writing, monumental and religious architecture, and extremely fine art products."  

With specialization in the various phases of canal building and the expansion of water networks to serve many separate communities, "a coordinating and managerial control became necessary." Thus, was admitted the legitimate use of organized coercion, viz., eminent domain, taxation, and the conscription of labor for the support of public works. Transition to a third stage was underway. Now canal construction could be carried on with the labor and taxes of people from neighborhoods which did not directly benefit from a particular project. In general, the legitimacy of discretionary aversive control allowed that the partial control of an in-
individual could be sequestered by the state to promote the elaboration of independent contingencies which would in no way enhance that individual's partial control in return.

As use of these confiscated means began to be switched from public works to the power and glorification of the state, i.e., of the bureaucrats and soldiers, these cultures entered what Steward discriminates to be a third stage. The profits and means of the partial controllers evaporated. Production levels receded. The official coercive superstructure, in order to maintain their accustomed density of reinforcement, were forced to seek elsewhere.

". . . they began to raid and conquer their neighbors to exact tribute. The states grew into empires. The empire not only grew larger than the state but differed qualitatively in the ways it regimented and controlled its large and diversified population. Laws were codified; a bureaucracy was developed; a powerful military establishment, rather than the priesthood was made the basis of authority. The militaristic empires began with the Sumerian Dynasty in Mesopotamia, the pyramid-building Early Dynasty in Egypt, the Chou periods in China, the Toltec and Aztec periods in Mexico, and the Tiahuan period in the Andes.

Since the wealth of these empires was based on forced tribute rather than on increased production, they contained the seeds of their own undoing. Excessive taxation, regimentation of civil life, and imposition of the imperial religious cult over local ones led the subject peoples eventually to rebel. The great empires were destroyed; the irrigation works were neglected; production declined; the population decreased. A 'dark age' ensued. But in each center the process of empire building began anew, and the cycle was repeated. Cyclical conquests succeeded one another in Mesopotamia, Egypt, and China for nearly 2000 years. Peru had gone through at least two cycles and was at the peak of the Inca Empire when the Spaniards came. Mexico also probably had experienced two cycles prior to the Spanish Conquest."

1bid.
We see, then, an account of cultural histories which is neither dialectical, nor tending towards an escatological climax, nor based on the 'contradictions' between the means of production and the production relations. The cycles of the irrigation civilizations further suggest that progress is not inevitable, as Marx and others of his century believed. We have no more basis for predicting that our moon-shooting empire will end in eternal communism than we have for predicting that our descendents will experience cyclical declines and catallactic regenerations.

One may fondly hope, however, that the disciplines of psychology and economics may yet jointly yield to us powerful advantages which the vanished empires never had.

Varieties of cultural control

We discriminate only three methods of ordering human affairs: 1) the catallaxy with its division of labor, associated with 19-th century (non-interventionist) liberalism; 2) bureaucracy, the attempt to administer the division of labor without the catallaxy, associated with the Soviet Union, in particular, and with the 20th-century state in general; and 3) Maoism (also called 'small is beautiful' and 'negative-growth economics') which attempts to eliminate both (1), which Maoists call 'economism,' and (2) which they call 'officialism,' thereby causing a breakdown of specialization from the catallactic division of labor to a 'medium-technology' society comprised of 'jacks-of-all-trades and masters-of-none', associated with China's former Maoist regimes and present-day Cambodia under Pol Pot.
The West

This thesis is meant to introduce to reinforcement psychologists the long-forgotten first alternative, viz., the concept of the catallaxy as a behaviorally based process which unintentionally and impersonally distributes and coordinates planning among all partial controllers so that each individual's private budget-controlled plan is brought in line with everyone else's and with the protean independent contingencies of the non-behavioral environment. A coercion-arresting but otherwise noninterventionist government cannot be found in the world today; even the soi-disant liberal free-market countries (e.g. Switzerland, West Germany, the United States, and the Republic of China) are unstable mixtures wherein a much-restricted and regulated market ('the private sector') is charged with production, and an unlimited political-democratic coercive agency ('the public sector') is charged with fair, equal, and healthful distribution of that product. In short, these governments not only pursue the practice of creating the legal environment in which catallactic relations can take place, but they also engage in the incompatible practice of interfering with those relations by orders and prohibitions (backed by networks of armed agents and prisons) which divert economic production from those channels which reflect the knowledge and priority plans of the individual partial controllers.

Since no one knows all that the catallaxy 'knows', such systems are unstable. Each intervention has unforeseen consequences. Some of these consequences are aversive. Most will call forth ad-
justments by individual partial controllers, adjustments which the interventionists were unable to predict and which frustrate the original aims of their interventions. The unforeseen will invite further, compensatory, interventions which, themselves, create still newer problems. The interventionists, applying a consistent monopolistic approach, must expand the sphere of government to cover this multiplication of effects. This process can only end either in achievement of a total soviet-like state or, before that can happen, in some degree of economic collapse and popular retreat from activist economic policy.

The soviet system

Bureaucratic government is an externally imposed 'nervous system' designed to substitute for the state-protected system of catallactic relations, i.e., the partial-controller market-price system. Bureaucracy is state economic planning. Its general method is to send all information to a single authority or planning agency for integration and use in a giant discriminative-stimuli complex which then controls cost-benefit analysis, planning, and administration. The bureaucratic system of the Soviet Union, seeking both the productivity growth associated with the West and monopolistic control of 'its citizens', has adopted a series of five-year plans, each a massive tangle of regulations backed in many cases by speedy use of the death penalty for 'economic crimes.' In theory, the task they have set for themselves involves all of the problems faced by the economic-model builder discussed in Part Two of this thesis. In practice, the consequences have followed the same pattern as in
all socialist countries, viz., inefficiency, a low density of production of effective reinforcers for the labor force, and the failure of even the harshest aversive measures to combat the inevitable flow of black-market activity and official corruption. The average soviet woman, for example, spends between two and three hours each day trying to find basic necessities like food and clothing and waiting in lines to purchase them. The scarcity and inferiority of consumers' goods is explained not only by the failure of retailing, but also by the inherent ineptitude in the supply of producer's goods:

"The problem of 'new technology'—of technical modernization and renovation of product capacity, technological progress, ability to produce technically up-to-date equipment, ability to operate it successfully, and related matters—goes back to the dawn of Soviet history. . . . despite all the economic and technical progress of the past half century, the problem does not seem to have waned in importance or urgency in the minds of the Soviet leaders. Lately, it has been linked with the so-called technology gap vis-à-vis the West, with national goals of military power and ideological prestige, with the stepped-up purchases of Western equipment and know-how, and with the overall objective of rapid economic progress at home. At the same time the depletion of internal reserves for the traditional 'extensive' form of economic growth since the beginning of the seventies has added urgency to technical progress. In terms of economic performance, the problem of 'new technology' is tied with the allegedly unsatisfactory payoff from the massive Soviet effort in research and development, the long standing and deeply ingrained resistance to product innovation at the factory level, and other difficulties of a systematic character.

"Crucial to the understanding of this complex problem is the appreciation of the role that the Soviet machine-building industry . . . plays in the process of innovation. The industry's objective—as with all Soviet industries—is to fulfill its plan, and the same is true of every

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1Lance Morrow, "The Russian Revolution Turns 60," Time, November 14, 1977, p. 49
firm or association in it. The firm (association) is virtually assured of takers for its products to the limits of its capacity. It does not have to search out markets, invent new types of equipment or new uses for old types, or engage in competitive struggle for markets. It is little concerned with the production and commercial problems of its customers, does not usually try to anticipate them, and has little interest in supplying follow-up services and technical advice. (These shortcomings have attended, for instance, the introduction of computers in the Soviet economy. . . Hence, the chronic difficulty of making MB (machine-building) firms adopt the production of new types of machinery and abandon the production of obsolete types.

"In contrast, the role that Western MB firms play in technical progress and innovation is a much more active one, thanks to competition, the search for markets, and consequent attention to customer's needs, and the direct involvement in research and development by many firms. In fact, in the West, individual MB firms are major generators and diffusers of technical progress and innovation."1

We will never be able to tell how much is lost by the inefficiency of Soviet planning, but we can observe that even those at its center have their own misgivings.

"Even Soviet economists have admitted that with the continued use of present methods (of planning) and with increased economic complexity, the Soviet Union would eventually need more than its total population just for management of the planning process. Many have argued that this problem could be solved by automated information-collecting and the use of computers. Yet, others argue that even these improvements will not suffice to maintain, much less raise, the level of efficiency in Soviet planning."2

The stubborn fact that Russia's communist government and command economy are still with us after six decades is no indication of either the efficacy or strength of their system. Whatever


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achievements are ascribed to this 'Great Experiment' are rendered suspect and unintelligible when it is acknowledged that any successes were obtained with the concurrent operation of the world's most pervasive black market; with large infusions of food, capital and technology on credit from the West; with large-scale confiscations of the productive capacity of its formerly market-system satellite countries; and, perhaps most important of all, with the otherwise-unavailable economic guidposts offered by genuine scarcity prices, i.e., catallactic exchange rates, generated in free-world markets.

Maoist China

Our interpretation of the historical application of Maoism in Red China is more involved. The Russian-trained Chinese revolutionaries rejected the market system on the basis of both communist theory and long identification with humiliating foreign domination. The Soviet road to economic and technical progress was tried. Yet, centuries before, China had brought bureaucracy to its natural, static and non-enterprising flowering. Confucianism had succeeded in elaborately ritualizing all interpersonal relationships, e.g., between subject and ruler, husband and wife, parent and child, scholar and student, soldier and farmer, etc. The ancient system came to be maintained by the subtlest control practices, i.e., those based on 'face' rather than fines or imprisonment, and its teachings formed the exclusive subject matter of ancient civil-service examinations.

The Chinese Communist leadership was not long in realizing that careful emulation of their Russian mentors' bureaucratically
administered collectivism was weaving a straight-jacket less elegant and more Western than the old one, but also just as incapable of keeping pace with, much less directing, the dynamic division of labor associated with the industrialized countries. Failure after failure convinced them that state 'officialism' cannot isolate control of each of the people without trading off the advantages of intelligent contact with productive resources and a freely adapting division of labor. The failure began with agriculture.

"...given the number and diversity of Chinese farms and the labor-intensive nature of cultivation, raising output is a task that, as (early-1950s) Chinese Communist policies have demonstrated, cannot readily be centralized, even in the hands of the head of a single village, let alone all the way up to Peking.

"Inability to centralize control over agriculture, and hence inability to control or even predict wide fluctuations in agricultural output, make centralization in nonagricultural sectors difficult as well. A drop in cotton output, for example, means that the textile industry operates well below capacity and that exports might have to be cut back. If exports are not cut back because of a desire to maintain imports of key producer's goods, the amount of cloth issued to Chinese consumers has to be reduced, with resulting increase in demand pressure on other commodities. If, on the other hand, cotton imports replace domestic production, imports or other producer's goods might have to be reduced for this reason as well. These difficulties are more serious the more general the fall in agricultural production. Flexibility at all levels is required, and central plans, enforced by centralized targets and rationed allocation of key inputs, tend to be inflexible."¹

Mao himself initiated the revolt against 'officialism.'

"In our work of socialist construction we are still to a very large extent acting blindly. For us, the

¹Dwight H. Perkins, Market Control and Planning in Communist China; (Massachusetts: Harvard University Press, 1966) pp. 204-205
socialist economy is still in many respects a realm of necessity not yet understood. Take me as an example: there are many problems in the work of economic construction which I still don't understand. I haven't got much understanding of industry and commerce. I understand a bit about agriculture, but this only relatively speaking—I still don't understand much."¹

"Judging by the present situation, I am afraid that it is necessary to expand the power of the regions... Our Constitution bestows no legislative power to the region... However, in conformity with the policies of the Center, and within the law, the region can make rules and regulations according to the requirements of its work and local conditions. The constitution does not forbid this."²

"The masses have boundless creative power. They can organize themselves and concentrate on places and branches of work where they give full play to their energy; they can concentrate on production in breadth and depth and create more and more welfare undertakings for themselves."³

"Now there are dozens of hands interfering with local administration, making things difficult for the region. Although neither the Center nor the State Control knows anything about it, the Departments issue orders to the offices of the provincial and municipal governments. All of these orders are said to have initiated from the Center, thus putting great pressure on the regions. Forms and reports are like floods. This situation must change and we must find a way to deal with it."⁴

"Both proletarian parties and the proletarian dictatorship will vanish in the future. But they are absolutely necessary today lest we become unable to suppress counter-revolution, to resist imperialism, or to construct socialism. For fulfilling these goals, the proletarian dictatorship has to be coercive to a great extent. And this


³Quotations From Chairman Mao Tse-Tung, ed. Stuart Schram, (New York: Frederick A. Praeger, 1967) p. 65

⁴Mao, loc. cit., p. 75

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makes it necessary to fight against bureaucratism, against structural obesity. I propose a cut of two thirds of our party and governmental organization.*

Chinese Marxist-Leninist economists fell in esteem, their power being replaced by Mao's doctrine of 'no theory divorced from practice.' The distinctive economic-psychological technique called 'Maoism' emerged as an escape response from both the catallaxy (the leadership was by now unalterably committed to using a straw-man capitalism as its competitor, scapegoat, and bogeyman) and bureaucratic state socialism. Quite unprofoundly, the new Maoist economy would be patterned after the organization Mao knew best, his militarily successful revolutionary army. It was Mao's belief that through decentralization, abolition of the chain of command, and the intensive grass-roots political training of local groups to shape selfless dedication to the aims of the collective, China would take its Great Leap Forward. No directed division of labor was thought necessary; integration of production, it was expected, would follow automatically from a people shaped with the attitudes appropriate to an advanced society, i.e., with the psychology of the future communist man. Only acceleration of socialization could bring about a transformation of production, socialization by means of political education that would transform the superstructure. Where Lenin believed social consciousness to be determined by production relations and not vice versa, Mao granted independent-variable status to consciousness. He would shape the superstructural

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^loc. cit., p. 77
ethic or consciousness appropriate to escatological communism (i.e., the productive, selfless, altruistic, and loving servants of mankind) and these new beings, without bureaucracy or self-serving economism, would bring China's production and productive forces into the future—a simple case of engineering the dialectic through socialist 'mind over matter.'

"The one situation where ideology was anything but a secondary factor in economic decision making was during the decentralization and rectification campaigns of the "great leap forward." The essence of this period was a transfer of decision-making authority to lower-level, ideologically orientated cadres. The rectification campaign (in this case in late 1957 and early 1958) was introduced to ensure the necessary ideological purity. Resulting from this were greater egalitarianism in agriculture and industry, abolition of free markets and private farm plots, and a distaste for all types of monetary control—all measures that could be justified primarily only on ideological grounds. Whether these lower-level cadres really believed in these steps or advocated them only to protect themselves from political oblivion is impossible to tell. There is evidence that some of the top leadership in this period felt that such extreme measures were not always desirable, but tolerated them rather than damping the enthusiasm and initiative of lower-level personnel. The reason for the "great leap" was to raise output quickly, not necessarily to move toward a true communist society, but the result was less output and more communism."  

The consequence of this course of action was total economic disorganization. Perhaps the abysmal failure of the back-yard steel mills is the best-remembered consequence of this pure-Maoist effort. The communists themselves admit to a fifty per cent drop in all production during this period.

After the Great Leap Forward, partial control was quietly re-

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1 Dwight H. Perkins, op. cit., p. 210-211
introduced. The communes were broken down and replaced in part by small private plots and the free market, which in the following years accounted for perhaps half of all agricultural produce. Income payments 'according to need' were de-emphasized and 'the level of communal services' reduced. Economic power, e.g., partial control, was transferred from commune and brigade levels to the family and team levels. Reinforcement of the individual crept back into the propagandistic literature, drama, and education.

From this point on, the leadership of China became divided between the radicals (or pure Maoists) and the pragmatists (or rightists). The recouping of losses from the Great Leap Forward meant sacrificing much control; the work of shaping the Chinese people to fit the ideals of the radicals had to be put aside. In 1959 Mao was taken from his position of chairman, yet he was permitted to retain his position as director of party ideology. This supplied him with the base from which he staged his return to power.

The radicals' comeback in the Great Proletarian Cultural Revolution followed six years after the Great Leap Forward. This time the Maoists did not care about production. Mao's supporters, viz., teenagers, led by demobilized soldiers, were sent against production managers, urban workers, popular authors and artists, and all of the followers of Liu Shau-ch'i, the man who had replaced Mao and overseen the recovery from the Great Leap Forward. These were 'the capitalist roaders,' 'the carriers of 'bourgeois ideas,'' the enemies of the Cultural Revolution.

"The theory of the Cultural Revolution is that an authoritarian bureaucracy, even using a system of wage and bonus incentives, leads to worker passivity; whereas . . ."
The capitalist readers, by increasing production, gave free reign to selfish motivations. This led people to think primarily of increasing their personal wealth.\textsuperscript{1}

Mao's own comments regarding his newly engineered upheaval show that he had learned no new lessons from the Great Leap Forward:

"The aim of the Great Proletarian Revolution is to revolutionize people's ideology and as a consequence to achieve greater, faster, better and more economical results in all fields of work. If the masses are fully aroused and proper arrangements are made, it is possible to carry on both the Cultural Revolution and production without one hampering the other, while guaranteeing high quality in our work. The Great Proletarian Cultural Revolution is a powerful motive force for the development of social productive forces in our country. Any idea of counterposing the Great Cultural Revolution to the development of production is incorrect."\textsuperscript{2}

American Maoist, John G. Gurley, of Stanford, concludes that:

"Mao saw the cultural revolution as largely a struggle within the superstructure—within the ideological realm. Yet, the danger to China was more than that the growing bourgeois ideas might in time restore capitalist relations of production. In fact, the bourgeoisie was being generated and regenerated, in hothouse style, by the capitalist relations of production after the Great Leap faltered in 1959. The Cultural Revolution attacked not only the resulting growth of bourgeois values but the social institutions and practices that bore capitalist imprints and spawned such values. Although Mao saw the bourgeoisie as a 'remnant,' it was in fact being continually recreated by social relations not yet fully transformed into socialist forms."\textsuperscript{3}

The Cultural Revolution returned Mao to power, yet without

\textsuperscript{1}Raymond L. Whitehead, \textit{Love and Struggle in Mao's Thought}, (Maryknoll, 1977)


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fully replacing the pragmatists. In 1973, Mao attempted to consolidate his gains by yet another mass-mobilization, this time aimed at Confucianism as well as against the newly-reborn bureaucracy.

This was an action

"which in fact led only to replacing one set of bureaucrats by another. Perhaps, indeed, despite the fragmentary directives which are all he has left us the last five years of his life, he did not launch these campaigns but, old and sick, was simply unable to prevent the ultra-leftest clique, seemingly well qualified to speak in his name, from doing so on his behalf."

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Be that as it may, it is evident that the radicals' hold survived only as long as Mao himself. Today (early 1978), Mao's widow and his radical following are vilified outcasts. The ruling pragmatists are avidly courting Tito, dictator of Yugoslavia, to sound out that country's so-called market-communism—a 'mixed economy' of only a slightly different mix than is found in the West. Apparently, the present Chinese leadership is seeking ways to embrace the catallaxy while saving their oriental communist 'face.'

Meanwhile, only in Cambodia are communist leaders following through with pure Maoism.

We have been forced to deal with the phenomenon of Maoism at great length, drawing passages from many sources. There must be no misunderstanding concerning Mao's 'accomplishment.' A large minority of radical behaviorists respond to the ideas presented in this thesis (when they respond at all) with statements of faith concerning Chinese communism. (Skinner himself, as we shall pres-
ently examin, has frequently voiced great hope for the future of Maoism in the world and for the future of its current Western analogue, small-is-beautiful economics.) These psychologists believe with John Gurely, and other Maoists, that economic development can best be promoted by breaking down specialization, by dismantling bureaucracies, and by undermining the other centralizing and divisive tendencies that give rise to experts, technicians, authorities, and bureaucrats remote from or manipulating the masses. . . Maoists will not accept economic development, however rapid, if it is based on the capitalist principles of sharp division of labor and sharp (meaning unsavory or selfish) practices."1

We have seen that this fairytale has no meaning outside the make-believe world of dialectical materialism, and we have seen the consequences of the Great Leap Forward and the Cultural Revolution. It is hoped that these two experiments have supplied refutation enough.

1John G. Gurley, op. cit., p. 6
PART FOUR

Skinner's Socialism and the Marketplace

**Skinner as both scientist and publicist**¹

By placing himself under the control of both the philosophical works of operationalism, behaviorism, and functional analysis on one hand, and the organisms and facilities of a succession of psychology laboratories on the other, Skinner has unquestionably become the greatest experimental psychologist of our time. There can be no accounting the extreme importance of his contribution to experimental method and to the theories of learning, verbal behavior, epistemology, and the philosophy of science.

In addition, Skinner has also exerted a tremendous, although not novel, influence on American thought as a social theorist and champion of a political program. To account for the shape of Skinner's socio-political theorizing, the speculative historian of political ideas, pointing to the necessarily monopolistic characteristics of an experimental analysis of behavior, may reach the con-

¹Much of the following analysis concerning Skinner's orientation with respect to the market culture draws, rather uncharitably, from scattered tangential treatments and assertions, rather than from the carefully considered elaboration of a major topic which we would hope for. I fear, however, that these tangents are all we shall have to work from. Skinner's current academic community apparently has not seen fit to interrogate him further in this field.
clusion that Skinner generated his social views from his method rather than from his accumulated scientific results. Another historian, adopting the sociological approach to intellectual history, may go on to consider the peculiar 'community contingencies' obtaining at Skinner's Harvard in those days of the New Deal and Fair Deal, that period when the young psychologist's advocacy of monopolistic design was first evident. During the then poorly understood monetary contraction and depression, businessmen and bankers were treated as scapegoats for bad money policies, and Harvard University emerged as the prestigious source of the federal government's 'Brain Trust,' that cream of the technocratic elite and their aids who filled the most powerful leadership and advisory positions in Washington, New York and elsewhere. One can wonder, especially after Skinner's unflattering characterization of Harvard's psychology faculty of the thirties and forties, whether his receiving the teaching position and the honor of delivering the William James Lectures (both in 1948) were not something more than recognition of his (even then) considerable scientific contributions; that they were instances of social selection recognizing Skinner's praise, epitomized in Walden Two,¹ for total government by benign and expert supervisors and science-governed social engin-

¹Although published in 1948, this book was actually written in Minnesota in the summer of 1945, partly on the basis of Skinner's regular conversations with "a group of philosophers and critics." It was privately circulated one year before publication. Among first readers was interventionist-economist, John Kenneth Galbraith, who, as a former farm boy, pointed out to Skinner that Hereford cows (a beef cattle) were miscast in the role of dairy animal.
eers. (It cannot be ignored that other men, many as great as Skinner in their respective fields, have often languished in backwater obscurity because the views of lesser men were less incompatible and less threatening to the political orientation of the established intellectual aristocracy.) Furthermore, it is reasonable to suspect that those students who were selected as "the best and the brightest" candidates for future leadership would reward greater attention to a psychology professor during conjectures about technologies of government control than they would during a presentation of, for example, the precise procedure for obtaining a stimulus-generalization gradient. Although Skinner may have been capable of discounting such social control, there does not appear to have been any good reason for him to have done so.

Non-scientific origins in no way disqualify a scholar's political prescriptions from meriting serious critical attention. I point them out here simply to establish that the system of Skinner's social doctrine is logically separable from the system of his science. A refutation of the former will have no impact upon the theory of operant reinforcement.

The socialism of Skinner is greatly at odds with the analysis of control presented in this thesis. Yet, both theories claim to be an elaboration of the scientifically derived, even Skinnerian, conception of man in relation to his environment. Hopefully, a dispassionate community of scientific scholars will see to it that the fittest theory survives.

"If we must have something to admire, let it be man's willingness to discard a flattering portrait of himself in
favor of a more accurate and hence more useful picture. Even here admiration is superfluous. The hard fact is that the culture which most readily acknowledges the validity of a scientific analysis is most likely to be successful in that competition between cultures which, whether we like it or not, will decide all such issues with finality."

Accident and design in human cultures

Skinner claims that since "the American way of life," i.e., our market culture, is not centrally planned, it must be the product of selection of the accidentally advantageous. This can be true only if one's definition of accident includes the unplanned automatic integration of the sometimes-detailed and sometimes-scientific plans of each partial controller. Skinner regards monopolistic, i.e., function-analytic, design of a culture as superior to the marketplace in promoting the continuation of a culture, i.e., the survival of a social environment's reinforcement practices. This may also be true, but the strength of the market is not that it promotes the continuation of current practices, but rather that it allows continuous cultural adjustment to new and changing conditions, i.e., the generation and selection of mutations in cultural practice.

The catallaxy is not a practice which is selected, but a behavior-environment field characterized by the absence of certain

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2 id., "Between Freedom and Despotism," Psychology Today, September, 1977, p. 91
aversive practices (including theft and fraud) and in which the optimum selection of practices takes place. Historically, this field is the by-product of coercive practices which, admittedly through monopolistic application, limit coercion—as in the imaginary monkey experiment outlined above.

The practices advocated by Skinner—e.g. "Programmed sequences of contingencies, in the hands of skillful teachers (leading) to the repertoire demanded by the social environment"—merely replace this field of selection with what masquerades as a monopolistic experiment, but is, in reality, the laboratory method of one-way functional analysis blindly applied to an ever-turbulently environment of billions of variables and no constants. Skinner does not appreciate the significance of the fact that any human control of the social environment must be shared with a mostly unaccountable physical environment, the environment which we must obey in order to control.

Administration of the dependent-variable culture

Proceeding from the pseudodoxy that a single coordinating agency can comprehend all economic and social contingencies and make them compliant, Skinner goes on to assert that in such a society human benefactors would finally be free to discover, through functional analysis, how people are "to be induced to use new forms of energy, to eat grain rather than meat, and to limit the size of their families." These and other presumably salutary objectives

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1ibid.
are found in several political essays which have followed the publication of Walden Two. What Skinner, the propagandist, does not face squarely is that the design of any strictly monopolistic commonwealth must answer not only a few dozen or a few hundred thousand, but all questions of how much, what kind, at what time, with what application, from whom, and to whom; as these questions apply to every means and every end which each member of the culture discriminates. Failure to do so would mean readmitting the mixed or black-market economy and relinquishing experimental control. But how are the answers to such questions to be generated? The dissatisfactions and criticisms of environmentalists, conservationists, consumer advocates, dietary purists, concerned scientists, professional educators, 'advocacy' journalists and knowledgeable officials have so far not suggested a consensus for the comprehensive ordering of society's economic priorities. Certainly it is ridiculous to adopt the demands of lobbyists as appropriate postulates for a science of society. Yet, Skinner repeatedly draws his illustrations and much of his justification for monopolistic control from such sources, and he does so without hinting by what analysis of contingencies, independent or otherwise, appropriate objectives are to be discovered and their relative importance, costs, and benefits weighed.

This is not to say that Skinner offers no guidelines for administration of the state. He has several and treats them as axioms. For example: "Simply by dividing the total amount of wages Americans receive each year by the number of people who want jobs, we arrive
at a perfectly reasonable annual wage for everyone."¹ We are not told what quantity and mix of products those equal shares of wages will be able to buy after such a contingently administered redistribution has taken place. Instead, we learn that "everyone suffers" when goods are unevenly distributed,² that the "law of supply and demand is misleading,"³ and that economic questions are trivial⁴ and need not be answered so long as a social environment can "positively reinforce the behavior of those who support it . . . and avoid creating negative reinforcers from which its members will escape through defection,"⁵ meaning that a cultural design needs only to outbid the net reinforcement of its nearest competitor.

The problem of outbidding the catallaxy

What is to be made of this? We have seen that the catallaxy makes precise use of the independent contingencies of the world as it continuously integrates and reinforces the behavior of its par-

¹loc. cit., p. xi; Skinner's logic is obviously faulty here. To the extent that the number of people who want jobs falls short of the number that comprises everyone, so far will that which each receives fall short of what he claims to be a reasonable wage, so if combined wages equals x dollars, but only half the people want jobs, then Skinner's perfectly reasonable wage fund for everyone will be twice what is, ceteris paribus, available.

²"Between Freedom and Despotism," op. cit., p. 82

³Walden Two, 2nd ed., op. cit., p. x

⁴loc. cit., p. xiv

⁵loc. cit., p. xiii
tial controllers. Skinner indirectly acknowledges this fact in another context, but fails to see its relevance to the earnest social engineer who endeavors to "make people consume less" through the arrangement of contingencies which nevertheless, must be reinforcing enough to wrest control from the catallaxy. The stupendous reinforcement power of the catallaxy is correctly appraised with the statement that under its control

"a vast technology has been developed to prevent, reduce or terminate exhausting labor and physical damage. It is now dedicated to the production of the most trivial conveniences and comfort. Not only do we not suffer extremes of cold and heat, but we also keep our buildings within a narrow range of temperatures. Not only do we not work to near exhaustion, but we also ride the escalator rather than climb stairs and push buttons to open the windows of cars."

We need not spend much time on criticisms—the sour grapes of frustrated socialist production—that capitalism reinforces too well. Remarks about the absolute disutility of so-called overreinforcement are all questionable. For example, the environment which yields optimal physiological conditions for the best quality scientific thinking—a commodity which Skinner doubtlessly values—may in fact be obtainable only within that narrow temperature range which the producers of air conditioners, heaters, and thermostats offer to partial controllers day or night, in every climate, and at all seasons. If this catallactic outcome causes scientists to become soft, we need only remember that the concept of specialization of labor allows that not all individuals need be lumberjack types.

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1 "Between Freedom and Despotism," op. cit., p. 82
And certainly the hurt, the aged, the arthritic, the tired, and the handicapped benefit from cheaply mass-produced electric windows, escalators, and the like. Meanwhile, depending upon widely disbursed controlling variables, others may buy barbells rather than car accessories, or patronize stores with lower prices and no escalators in order to save enough to buy running shoes or a book advertising aerobics.

Too much candy may be bad for children, but it is sometimes only contingencies involving the sweetest candy that can make a vegetable child first move his limbs, or establish the few coins which poor parents (who love noncontingently) can afford as effective reinforcement tokens with which to reward their children's helpfulness, or permit a doctor to quickly assure his young patient that 'this doctor is okay.' Finally, when considering the ill effects of many products, one must remember that it is entrepreneurs, controlled by partial-controller demand, who sustain the search and selection that leads to safer, cheaper, and ever-less discriminable substitutes for sugar, salt, cholesterol, meat, and so on. The entrepreneur is the market culture's fault-finder and its agent of revolutionary amelioration.

The catallaxy achieves many of Skinner's aims

Despite Skinner's offense at the kinds of things which reinforce some partial controllers, the fact remains that the catallaxy does supply a vast number of diversely conditioned people with a highly reinforcing life. In fact, there can be little argument that Skinner's description of the kind of monopolistic culture he
proposes serves even better as a description of the noninterven-
tionist market culture:

"...an environment in which people will treat each other
well, keep the size of the population within bounds, learn
to work and work productively, preserve and enhance the
reinforcing character of the world, explore and analyze
that world, limit the use of resources and keep the envi-
romment safe for future generations and do all of this be-
cause the results are positively reinforcing."¹

Catallactic relations involving a money medium attach prices and
costs to every resource. Child raising, apart from any subsidizing
welfare state, represents measurable costs to parents, while the
reinforcement a family derives from each new child has been known,
after a point, to diminish. Taken together these two facts have
generated the demands which have led entrepreneurs to discover and
market numerous means of birth control.

The partial controller sells his productivity often by hag-
gling with representatives of the investing entrepreneur over the
wages he will receive in return for the levels of output he con-
trols.

The world is explored by partial controllers who come upon new
sources of control with which to compete with existing sources in
attracting reinforcement. As a resource becomes scarce—and every-
thing is potentially a resource—it also, through the agency of the
market, rises in its relative cost, until eventually, and without
direction from Washington, the price system brings about 1) a great

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¹ibid.
exodus to substitutes, 2) a careful search for new sources, and 3) an outflow of new inventions which bypass the now-costly processes altogether.

Skinner sees no need for such market allocation. The government should do away with "usurping" entrepreneurs and is "most clearly a government of the people by the people when it does so." He is disturbed that in America "People claim the right to do as they please—to gamble away a fortune, risk unnecessary danger by not wearing a seatbelt, die an alcoholic, consume resources and pollute the environment without restrictions."^2

Skinner alleges three general defects of the market culture, viz., profligacy, inequality and coercion. Each of these allegations may now be examined.

Profligacy

That resources are consumed is unavoidable; that the market places no restrictions on their use is untrue. The entrepreneur is always seeking the cheapest and, therefore, most abundant means of supplying the market. The size of his profits is a function of his doing so. His capital accumulation, marketing techniques, product research and development, and organizational ability are all selected by profit and loss. Bankruptcy removes those who fail to employ the most economical means of supplying reinforcing goods and services to the members of the culture.

The problems of risk-taking and drinking, with which Skinner faults the market economy, deserve special treatment.

Gambling, owing to the potentially big reinforcement involved
and to the schedule by which small gains occur, is a highly reinforcing activity. Since money is a prerequisite for play, gambling may be said to enhance the value of money earned or held by those who gamble. To eliminate gambling without replacing it with something equally interesting for the same money is to render the lives of society's would-be gamblers so much less reinforcing.

Gambling does have its special functions. One group to whom gambling is especially attractive are those who have plenty of money, little regard for public opinion, and unusually negligible entrepreneurial ability. The fortunes of these less-fit market servants do not survive; the profligate heir of the sober businessman can extinguish in one day the capital built up over a lifetime of masterful partial control. In the casino undeserved wealth is relatively harmlessly transferred to more capable hands. Poorer persons, in contrast, generally increase their frequency of gambling as other means of getting money and realizing their lifetime plans become further circumscribed. Age, a defective repertoire or reputation, labor unions, taxes, government monopolies and regulations all restrict one's control over one's employment, advancement, and enterprise. Gambling permits one to escape the aversive certainty of a disappointing outcome by offering, at least, straws to grab. In the same way, alcoholism is an escape from the emotional concommitants of an aversive environment. For example, when coercive labor-union power, minimum-wage laws and child-labor laws restrict and distort the job market to the advantage of an elite, organized minority; marginal workers and those below margin (i.e. the young, the unskilled, and the independent) are forced to beg
competitively for employment. These workers can only interpret the
distorted market which turns them away as a valid indication of
their unhampered-market value, i.e., the terms of employment which
they could reach with employers were the employers free to bargain.
In other words, partial controllers whose labor commands a price
just a little less than the legal minimum wage may just as well
have skills that are worth nothing or, if they are supported by
the taxpayer in their unemployment, less than nothing. Out of
work, in an economy with higher prices, resulting in part from re­
stricted and overpaid labor production, life for the unemployed,
i.e., their self-evaluation, becomes cheap. Drug addiction, in­
difference to the loss of personal reputation through crime, parti­
cipation in dangerous recreations, mass-media overdose, and refuge
in radical politics—in short all of the anti-social behaviors of
the unemployed young, become commonplace. And the unnecessary
risks of driving without seatbelts, as Skinner points out, are in­
differently incurred.

Inequality

Skinner is certainly correct in claiming that

"people differ in their ability to acquire property and
hence in the quantities they possess, and since posses­
sion usually makes acquisition easier, differences have be­
come very great."\(^1\)

However, his conclusion that such a state of affairs is avoidable,

\(^1\)"Between Freedom and Despotism," op. cit., p. 82
that it is undesirable, and (implied through his silence) that it has no outstanding advantages must be regarded as completely without foundation. It has been said that communism, socialism, and all egalitarian movements are prompted as much by envy, jealousy, and the desire for effortless omnipotence, as by ignorance of basic economics, and we observe that both unproductive college students and politically unpowerful yet highly intelligent professors have traditionally been most susceptible to these doctrines. (This socio-political explanation is not intended to apply to Skinner. One may read his autobiography and judge for oneself the place of these motives there.)

Of course, the mentalisms (viz. envy, jealousy, desire for power) of this 'chamber-of-commerce' analysis can be recast or translated into statements about environmentally controlled behaviors, and such behaviors, if, indeed, they are less effective for the 'subject,' can be modified. The ethical education of children can include learning that the opposite of selfish behavior is envious behavior, rather than altruistic behavior which—as a type of exchange that is often highly reinforcing to oneself—is selfishness misunderstood. Competitive sportsmanship, the adoption of absolute self-standards (rather than comparative interpersonal standards), a selling repertoire and a differentiated productive repertoire to be sold, as well as a knowledge of elementary economics that includes the role of the entrepreneur and the importance of the specialized partial controller in the marketplace (i.e. individualism) all can be taught, while at the same time the inevitable consequences of attempts at the destructive leveling of par—
tial control to achieve a 'fair,' 'equal,' or socially just' dis-
tribution of wealth can be pointed out. Yet, a careful examination
of his work reveals that Skinner nowhere entertains this possibil-
ity. He accepts as imperishable truth his dictum that "everyone
suffers" when goods are unevenly distributed, and accepting it,
proceeds to base his entire social prescription upon it, until
finally he is led to conclude, along with many other of our great-
est thinkers as they have reached the twilight of their careers,
that a communist dictatorship like Mao's "China(,) may be closer to
the solution I am talking about."¹

Coercion

Skinner claims that government should renounce its liberal (in
the original sense of the term) role as custodian (in the sense of
watching and protecting rather than seeking to cure) of the partial
controllers, i.e., the polity that serves as adjudicator of disput-
ed inter-partial-controller contracts, and acts to defend, through
aversive control, everyone's person and property from person-in-
flicted infringement, viz., from murder, rape, physical damage,
slander, theft, pollution of the air that envelopes one's home,
poisoning of one's river, etc., but which never acts to shield any-
one from the selecting competition of someone else's superior or
cheaper goods and services. Like Marx, Skinner maintains that such
a state is part of a terrible phase of history to be overcome only

¹Walden Two, 2nd ed., op. cit., p. xv
through the evolution of science and technology, and, especially for Skinner, through the application of a science of behavior.  

"A state defined by repressive, formal, legal, social controls based on physical force has certainly figured in our own development, we may be ready to move on to another state."  

His alternative is, by now, no surprise.  

"But why should governments confine themselves to aversive control? Why not use positive reinforcement—or, to speak less precisely, rewards? Many governments have the means of doing so; they have the power to provide as well as punish."  

It has not dawned upon Skinner that no government punishes anyone without someone else being reinforced thereby or that governments provide nothing which they do not first confiscate from others. If someone is reinforced by government action someone else must be punished or else the transaction would already have taken place catallactically.  

The university psychologist whose attention is intensely narrowed to his experiments has little reason to stop and consider that the supply of food pellets and equipment with which he and his assistants arrange laboratory contingencies, i.e., his seemingly unlimited means of shaping and reinforcing the behavior of a few

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1"Emphasis on a science of behavior has not freed Skinner from his own "materialist conception of history." In fact, Skinner's subliminal Marxism is clearly evidenced by a long list of statements such as: "Wars may be inevitable so long as wealth is unevenly distributed, but those who are lucky enough to have an undue share naturally defend it." Reflections on Behaviorism and Society, (Englewood Cliffs: Prentice-Hall, Inc., 1978) p. 17

2Walden Two, 2nd ed., op. cit., p. xv

3"Between Freedom and Despotism," op. cit., p. 80
laboratory animals, is largely paid for by taxes and by the donations and endowments used by businessmen as vehicles for avoiding yet-higher tax brackets and confiscatory penalties. The scientist holding government grants, for example, in the fields of aggression and aversive control, is not likely to inquire after the nature of the contingencies which have made these large sums of money available and which, consequently, have exalted his research, enhanced the power and respect accorded him within his department, and elevated his standard of living. Yet, the aversive character of such money transfers cannot be denied. Any producer failing to surrender a share of his produced value to the Internal Revenue Service will have that share plus a penalty forcefully removed from him. Physical resistance to this negative punishment will be met with further fines and a warrant for his arrest. Unremitting resistance to the arresting federal marshals will result in his being either overwhelmed, incapacitated, or killed. As far-fetched as this sounds to our aculturated ears, the fact is that this set of contingencies is currently in maintenance for every producing American and is the real source of the unlimited "power to provide" which Skinner discerns in government and which he unthinkingly recommends as a substitute for coercion.

Coercion is inevitable

A government does not produce more than the catallaxy, it merely redistributes catallactically generated production in ways more reinforcing to those who control the aversive network. At the extreme, where the agents of government do not understand the func-
tion of the market, the catallactic division of labor is eventually superceded by the completely bureaucratic police state in which in which every worker is left with just one unpunished course of action and where the analytical methods of operations management attempt to cope with an ocean of variables. Such a state, unless propped up from the outside, does not in the long-run survive. The bureaucratically administered economy soon cannot support its own army of bureaucrats. Political disintegration follows disintegration of the catallaxy.

In places where the market is better understood—as in post-Maoist Red China—the market is allowed to operate only to the point where the balance of catallactic productivity and coercive confiscation leave the ruling group with what they deem to be their maximum long-run take.

Skinner maintains that the partitioning of the market culture into monopolistically controlled Walden Twos, i.e., the "small is beautiful" approach to cultural administration, would enable controllers to "more easily solve the problems facing the world today" and "would make it possible to arrange more effective 'contingencies of reinforcement' according to the principles of applied behavior analysis." We have already seen that the elimination of both the catallaxy and the bureaucracy requires isolating individuals from all occasions in which independent contingencies may generate catallactic relations. This entails separating people from

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1Walden Two, 2nd ed., op. cit., p. x
2ibid.
accustomed ways of living, traumatic destruction of all products of mercantile life deemed meretricious from the standpoint of the state; the abolition of privacy, and massive killing to end the aggression and to stem the tide of escape which such necessarily punitive measures would—and, in every historical instance did—bring about. If successful—the Cambodian Maoists under Pol Pot are driving to be the first—there would be no bureaucracy and no catallaxy, but also no higher order production, no sophisticated products, and no relief from hardship, simply because the division of labor would be suppressed along with the 'capitalist mode of production.' The land would support only a fraction of the former population, and with each in a state of existence which Glaucon, in Plato's Republic, upon hearing it described, termed a "city of swine" because of all the reinforcing human handiwork such a community would exclude.

It is inevitable that many will dismiss this thesis with the objection that it is a tragic misunderstanding of Skinner, who, everywhere, has spoken explicitly and emphatically against extensive use of aversive control in scientific cultural design. To this, I can only answer that, notwithstanding his strong opposition to such practice, aversive control is the only way individuals can be held to a rational and comprehensive societal plan when, as must unavoidably happen from time to time, the catallaxy gains adventitious control over members of the culture, control which the state must always recapture from the regenerated partial controllers if it wants to stay in the driver's seat.

This idea is certainly not original. The way in which the
undoing of the rationally planned society comes about was first predicted in 1902 by Dutch economist, N. G. Pierson:

"To receive less of a thing than was expected is a disappointment for everyone—but not for everyone in the same degree. If, for example, meat is scarce, this will hardly disturb those for whom a vegetarian diet serves almost as well; but those who are unwilling to restrict their consumption of meat will look for means which will enable them to continue as usual. There exists no greater difference than in the extent to which men value the enjoyment of particular things. As long as the communist state can supply each person with what he wants, no trading will arise as a result of such differences; but when this is no longer the case, trading is inevitable. Then price lists will be circulated which will tell us for how many cigar, tea, or coffee certificates we can buy other certificates. Thus the commercial principle, which such a society sought in vain to abolish, comes once more into the foreground. Profits which the State should have been able to claim for itself fall to individual persons. The phenomenon of value can no more be suppressed than the force of gravity. What is scarce and useful has value. It may well be possible, in a communist society, to make value a source of profit to individuals, but to annihilate value is beyond the power of man. Value is not the effect but the cause of exchange. Things do not have value because they are exchanged; they are exchanged because they have value—more value for some people than for others."  


forcers, so selected that they strengthen the kinds of behavior which makes a future possible.\textsuperscript{1}

The only problem with this world is Skinner's proffered means of obtaining it. The selection process which he expects to yield the less-troublesome, future-promising, immediate-reinforcement contingencies is not, for Skinner, the catallaxy. From his social writings, it is clear that he does not understand how, through entrepreneurial activity in catallactic relations among partial controllers, the catallaxy adjusts to changing circumstances and prospects; how market pricing takes the future—future demands for goods and services and future supplies—into account in its solution of the social-environment-contingency problem. When he attacks the practices of the "usurping" entrepreneur and the "selfish" rich, who are "lucky" enough to obtain wealth, as dangerous to the future of civilization, he reveals no comprehension of partial controllers as individuals with unique sets of learned and inherited characteristics, who pursue happiness\textsuperscript{2} (i.e. behave) and, in so doing, come to generate a spontaneous system which integrates human valuations of time and resources scattered throughout the

\textsuperscript{1}loc. cit., p. 30

\textsuperscript{2}Skinner acknowledges happiness as behavior that can be part operant and part respondent (i.e. conditioned reflex), and also part public (i.e. observable by second persons; e.g. smiling or tearing) and part 'private event' (i.e. receptors inside the skin responding to stimuli inside the skin). As a radical behaviorist, Skinner grants the private experience of happiness status as a dependent variable but never as an independent, i.e., controlling or causing, variable. From this, perhaps not unreasonable, assumption, he then, as a positivist, leaps to the conclusion that happi-
planet, a system in which the pursuit of happiness (now become partial control) provides the contingency selection promoting a future of ever-increasing satisfaction for the world's population. Instead, following Galbraith and, later, Schumacher, he excoriates the high density of reinforcement obtainable in the market culture as a fatal temptation:

"Happiness is a dangerous value, and the pursuit of happiness has clearly been too successful. Like other affluent nations, we must, to coin a horrid word, 'deaffluentize.'"  

Skinner's pipe dream, viz., cultural selection of a positive-reinforcement way of life by scientific-principle-and-data-controlled monopolistic design, is an illusion shielded by a fundamental ignorance of the market order—an ignorance not to be illuminated by the four 'lights' of economic theory with whom his writings have shown some familiarity (viz., Marx, Veblen, Galbraith, and Schumacher) or by his reading of recent history which leads him to entertain the possibility that

"if Mao-Tse-tung created a social environment rich in positive reinforcers, then they (the Red Chinese) may be doing what they want to do, and it is quite possible that they may feel freer than Americans. Moreover, it is possible that the reinforcers affecting their behavior have been chosen precisely because of their bearing on the


ness, in itself, is unimportant, even though it is the general concomitant of positive reinforcement and the removal of aversive stimulation. Reinforcement may elicit happiness, but its true importance is that it controls operant behavior. Skinner, therefore, views the human condition as all means and no ends—except for cultural survival, an end which, he says, "chooses us" (with the mediation, of course, of the behavior scientists). The primary reinforcement psychologist opposes, then, both hedonism and eudaemonism.

1*loc. cit.*, p. 32
future of the Chinese way of life.¹

In the field of cultural control, design does not remove and replace the naturally evolved system of human interaction. If monopolistic social engineering is to work it must constantly displace (by continually outbidding or hampering) the operation of the catallaxy and if the engineering is to operate on the principle of positive reinforcement (metaphor: leading a mule along a trail by dangling a carrot a few inches in front of its nose or by planting carrots along the center of the trail at psychologically effective intervals) it will not, at the same time, be able to "make people consume less" in places where the market can still provide plenty. (Metaphor: The carrots will not be able to keep the mule from orienting toward tastier, more-plentiful, or closer vegetation growing—and leading—away from the trail that is of interest to the rider.) Partial controllers cannot be induced to become the state's experimental subjects by offering them "deaffluentization," and the government establishment that attempts to promote such a transition through deception (i.e. by creating shortages or prohibitive prices through its own interventions and then, in a mass-education campaign, attributing these problems to irresponsible and obscene corporate profiteering, the depletion of resources, or 'market externalities') is a government that will eventually be seen-through and ignored. Official and 'professional' admonitions will no long-

¹Ibid.
er be heeded by resource owners, producers, entrepreneurs, or consumers. The open market will continue undeterred by the dire predictions of the state's 'indicative planners.' Ultimately, the governing authority resolved to realize its designs will have only one recourse: coercion (metaphor: the whip and blinders). However, human beings (more so than mules) have recourse to the black market or emigration, as when people escape from iron-curtain and bamboo-curtain countries to the West, or from socialist Britain to the United States, or from New York City and 'Taxachusetts' to New Hampshire or the sunbelt states.

Rigging the game of the pursuit of happiness is not so easy as Skinner supposes.

Monopolistic Control and the Natural Selection of Cultural Practices

Evolving practices

In addition to alleging its would-be non-averseness, Skinner further develops apologetics for the monopolistically designed and controlled culture by linking its quasi-laboratory characteristics to the concept of cultural survival.

"A group adopts a given practice—a custom, a manner, a controlling device—either by design or through some event which, so far as its effect upon the group is concerned, may be wholly accidental. As a characteristic of the social environment this practice modifies the behavior of members of the group. The resulting behavior may effect the success of the group in competition with other groups or with the nonsocial environment. Cultural practices which are advantageous will tend to be characteristic of the groups which survive and which therefore perpetuate those practices. Some cultural practices may therefore be said to have survival value, while others are lethal in
the genetic sense."¹

As soon as we recognize that the concept of survival of the "advantageous," like Spencer's concept of the survival of the fittest," tells us no more that that what can survive survives, we are led to inquire further after the nature of the field of variables in which Skinner's design for cultural survival takes place. According to Skinner,

"...cultural practices ...largely responsible for the use which is made of the genetic material born into the group, since they determine whether the individual will be able to develop his talents fully, whether educational institutions will be open to him regardless of class or other distinction, whether educational policies are progressive or reactionary, whether he will be subject to political or economic favoritism in the selection of a profession, and so on. The culture also determines the extent to which the members of the group are preoccupied with food or sex or with escape from minor aversive stimulation in the search for 'comfort' or from such major aversive stimulation as hard labor or combat, as well as the extent to which they are subject to exploitation by powerful agencies. In turn, therefore, it determines the extent to which they are able to engage in productive activities in science ... The experimental test of a given culture is provided by competition between groups under the conditions characteristic of a particular epoch."²

It is a crucial acknowledgement that:

"Since survival always presupposes competition, if only with the inanimate environment, it does not appear to define a 'good' culture in the absence of competition. There appears to be no way in which we can test the survival value of a culture in vacuo to determine its absolute goodness."³

¹ B. F. Skinner, Science and Human Behavior, op. cit., p. 430
² loc. cit., p. 431
³ loc. cit., p. 432

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The fact that survival is environment-specific relates the problem of designing a lasting set of cultural practices to the economic problems of 1) selecting new adaptations to changing independent contingencies, and 2) predicting where, when, and at what ratios of exchange catallactic relations will occur. Such information is essential even to the cultural engineer of the monopolistic community whose only interest is in finding out where, when, and how to short-circuit the market process. We shall return to Skinner's appreciation of this matter shortly.

One point on which Skinner is not to be questioned is the claim that certain consequences will necessarily follow the adoption of cultural survival as a criterion for cultural design.

"There are circumstances under which a group is more likely to survive if it is not happy, or under which it will survive only if large numbers of its members submit to slavery. . . In order to accept survival as a criterion it thus appears to be necessary to abandon such principles as happiness, freedom, and virtue.

". . . Human behavior does not depend upon the prior choice of any value. When a man jumps out of the way of an approaching car we say that 'he chooses life rather than death.' But he does not jump because he has chosen; he jumps because jumping is evoked by certain stimulating circumstances. This fact is explained in turn by many earlier contingencies of reinforcement in which quick movement has reduced the threat of impending aversive stimulation. . . It is obvious after the fact that the behavior has worked to his advantage. But this particular advantage could not have operated before he jumped. Only past advantage could have had an effect upon his behavior. He was likely to jump or to learn to jump because his ancestors were selected from a large population just because they jumped or learned to jump quickly from the paths of moving objects. Those who did not jump or could not learn to jump are probably not represented by contemporary descendants. . . An individual does not choose to live or die; he behaves in ways which work towards his survival or death. Behavior usually leads to survival because the behaving individual has been selected.
by survival in the process of evolution."  

No fault can be found with this account of the selection of individual behavior within the environmental fields of species-survival contingencies and ontogenetic-learning contingencies. It is only in his subsequent leap to link this phenomenon of individual survival-learning to the behavior of the cultural designer with respect to the survival of his whole super-individual culture that Skinner commits his most serious error.

The monopolistic controller as a cultural mutation

With respect to "the behavior of making a constructive suggestion about a cultural practice," Skinner states that:

"...A long biological and cultural history has produced an individual who acts in a particular way with respect to cultural conditions. Our problem is...to examin the complex conditions under which design occurs. Some changes in culture may be made because of consequences which are roughly described as happiness, freedom, knowledge, and so on. Eventually, the survival of the group acquires a similar function."  

Skinner's collectivist fallacy thus comes about in his examination of the cultural conditions which bring about movement toward adopting cultural design over other success criteria, i.e., his interpretation of the contingencies controlling advocation of the scientist-monopolized culture. Skinner, with Marx, is claiming that individual self-interest (the quest for happiness, freedom,

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1 loc. cit., p. 433

2 loc. cit., p. 432
knowledge, and, presumably, personal power, status, and dignity) controls cultural mutation only temporarily and that it will be replaced (or 'negated') in this province with the advent of new control by scientist-formulated predictions of the specific practices best fit to promote the survival of the culture.

Skinner's notion of cultural survival, like its Marxist analogue, viz., 'the Good of the People,' is an abstraction totally removed from the welfare and survival of any single individual and from any present loss, hardship, or suffering collectively incurred in 'building the future'—a fact clearly demonstrated by Skinner's strong opposition to consumer sovereignty over entrepreneur-mediated production and distribution. It exemplifies a way of thinking closely related to those ideas which have led to communism's mass murders, terror, and systematic enslavement of millions.

People who work for the survival of the culture arrive late on the scene, Skinner maintains,

"because the effect of a culture upon human behavior, and in turn upon the perpetuation of the culture itself, can be demonstrated only when a science of human behavior has been well developed. The 'practice of changing practice' is accelerated by science just because science provides an abundance of instances in which the consequences of practices are show. The individual who is familiar with the results of science is most likely to set up comparable conditions in cultural design, and we may say . . . that he is using survival as a criterion in evaluating a practice."\(^1\)

This is only-slightly-revisionist Marxism. First a special science is proposed which, it is claimed, enables its

\(^1\)loc. cit., pp. 433-4

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adepts to predict the lineament of that which will survive, i.e., to see the shape of things to come in a future that will take its course precisely because that science has been realized. Skinner speaks of behavioral scientists generating cultural mutations which will "speed up the evolutionary process," as though, beating the communist at his own game, the radical behaviorist could be the midwife of a foreordained human destiny. Next, it is declared that this science is a means of changing societal relationships to serve mankind's long-run interests wholly apart from the individual of those now living—except as these latter must be molded and used in the overall design of cultural contingencies.

"A scientific analysis leads us to resist the more immediate blandishments of freedom, justice, knowledge, or happiness in considering the long-run consequences of survival."¹

The claim that the existence of a science of behavior that can point up the consequences of controller-arranged contingencies will automatically place the cultural designer under the control of the survival of his culture is an unsupported assertion found throughout Skinner's social writings.

In light of the present analysis, we may only interpret this position as a species of wishful thinking, as a Skinnerian 'mand' rather than a Skinnerian 'tack.' We cannot ignore our own daily witness of how the demagogue's feigned concern for the general welfare returns the same powerful reinforcement from the electorate as would the genuine article. We have all come to question the degree to which science controls the official pronouncements of the 'fiscalist' economists on the government payroll. It is almost
proverbial that the more general the objective of a group the more general will be the corruption of those who guide its collective attainment. Perhaps the 'practice of changing practices' will be accelerated, but this by itself does not establish that the scientist-controller will not engage in practices which change practices in ways reinforcing to himself, in ways that make him feel free, just, and knowledgeable, but also comfortable, important, powerful, and regal.

In considering how self-interest prevails over apparently culture-serving measures, even after these latter have been accredited by scientific analysis, it is instructive—especially to the Skinnerian behaviorist—to turn to economist Ludwig von Mises' description of how the scientific contributions of market economics have been received throughout the last one hundred and fifty years of cultural evolution:

"...It would be a grievous error to assume that the hostility felt toward entrepreneurs and capitalists, toward wealth and quite especially toward newly acquired wealth, toward money-making and in particular toward business and speculation, which today dominates our entire public life, politics, and literature stems from the sentiments of the masses. It springs directly from the views held in the circles of the educated classes who were in public service and enjoyed a fixed salary and a politically recognized status..."

"...A system of ethics whose authors are found in the circles of priests, bureaucrats, professors, and officers of the army expresses only disgust and contempt for entrepreneurs, capitalists, and speculators.

"And now these educated classes filled with envy and hatred, are presented with a theory that explains the phenomena of the market in a manner deliberately neutral with regard to all value judgements. Price rises, increases in the rate of interest, and wage reductions, which were formerly attributed to the greed and heart-
lessness of the rich, are now traced back by this theory to quite natural reactions of the market to changes in supply and demand. Moreover, it shows that the division of labor in the social order based on private property would be utterly impossible without these adjustments by the market. What was condemned as a moral injustice—indeed, as a punishable offense—is here looked upon as, so to speak, a natural occurrence. Capitalists, entrepreneurs, and speculators no longer appear as parasites and exploiters, but as members of the system of social organization whose function is absolutely indispensable. The application of pseudo-moral standards to market phenomena loses every semblance of justification. The concepts of usury, profiteering, and exploitation are stripped of their ethical import and thus become absolutely meaningless. And finally, the science of economics proves with cold, irrefutable logic that the ideals of those who condemn making a living on the market are quite vain, that the socialist organization of society is unrealizable, that the interventionist social order is nonsensical and contrary to the ends at which it aims, and that therefore the market economy is the only feasible system of social cooperation. It is not surprising that in the circles whose ethics culminate in the condemnation of all market activity these teachings encounter vehement opposition. 

"Economics refuted the belief that prosperity is to be expected from the abolition of private property and the market economy. It proved that the omnipotence of the authorities, from whom wonders had to be hoped for, is a delusion and that the man who undertakes to organize social cooperation, . . . who directs organic and inorganic nature in the process of production, cannot go beyond certain limits. This had to appear to the servitors of the apparatus of violence, both those in the imperium and those in the magisterium, as a lowering of their personal prestige. They considered themselves as demigods who make history, or at least as assistants of these demigods. Now they were nothing but the executors of an unalterable necessity. Just as the deterministic theories, entirely apart from the condemnation they receive from the ecclesiastical authorities on dogmatic grounds, encountered the inner opposition of those who believed themselves to be possessed of free will, so these theories too met with resistance on the part of rulers and their retinue, who felt free in the exercise of their political power."1

But what of the theory which states that one will arrange contingencies well who will live under the control of them oneself, i.e., the theory of democratic government? Why have the masses of the great democracies not seen to it that the findings of science are utilized in the formulation of governing policy? The same economist again supplies an answer:

"Capitalism and its political counterpart brought the masses civil liberties and unprecedented will-being. It gave practically everybody the opportunity to acquire knowledge and to cultivate his talents. But it could not remove the intellectual inertness and lethargy of the crowds of commonplace people. In offices and factories they are committed to routine jobs without any comprehension of what makes the wheels turn and what magic rewards the unvarying performance of some simple manipulations with products of the most refined accomplishments of scientific technology. Their ignorance, coupled with their resentment against all those who eclipse them in any regard, makes them easy prey to the inflammatory propaganda of the prophets of an earthly paradise to be achieved by the establishment of the total state."  

The historical emanation of a science of behavior and a technology of monopolistic control does not automatically ensure that cultural engineers will design a social environment that generates their own genuine self-subordinating—as opposed to hypocritical or self-righteously rationalized—altruistic control.

The original propounding of the gospel of Christian love was an event which doubtless increased the frequency or probability of saintliness in the remainder of mankind's earthly pilgrimage, yet not all subsequent priests, popes, and Christian innovators have been saintly. Similarly, exclusive control of controllers by sci-

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Scientific methodology and 'objective' data is 1) hard to get, 2) hard to identify as gotten (or lost), 3) hard to make permanent within a culture subject to exogenous environmental transformations and unpredictable variations in the 'scientific' repertoires of future controllers, and 4) hard to identify as having been made permanent or not, i.e., as surviving or not.

Monopolistic guessing about survival value and entrepreneurial guessing about profitability

Allowing, for the sake of argument, that a culture can exist in which monopolistic planner-controllers are under the control of science and have subordinated their personal interests, both conscious and unconscious, to the goal of cultural survival, there is left an equally weighty problem, a problem which Skinner has not entirely glosses over.

"Survival will not have a useful effect upon the cultural designer unless he can actually calculate survival value. . . . We may change the pattern of family life and of educational institutions so that children will grow up to be happier people, but are we sure that happy people are most likely to survive in the world today? . . . Similarly, in governmental design, it may be possible to give everyone a considerable measure of security, but will the government which does so then be supported by an energetic, productive, and inventive people?"¹

For the calculation of survival value, Skinner relies in part, but only in part, on science:

". . . It is in the spirit of science to insist upon careful observation, the collection of adequate information, and the formulation of conclusions which contain a mini-

¹E. F. Skinner, Science and Human Behavior, loc. cit., p. 434
"A demonstration of basic behavioral processes under simplified conditions enables us to see these processes at work in complex cases, even though they cannot be treated rigorously there. If these processes are recognized, the complex case may be more intelligently handled. This is the kind of contribution which a pure science is most likely to make to technology. For example, a behavioral process frequently occupies a considerable period of time and often cannot be observed at all through casual observation... We are not likely to use the process effectively until the scientific study of simpler instances has assured us that a given end-state will indeed be reached. It is the business of science to make clear the consequences of various operations performed upon a system. Only when we have seen these consequences clearly set forth are we likely to be influenced by their counterparts in complex practical situations."

Most significantly, the rest is left to guessing.

"Although no one course of action may be exclusively dictated by scientific experience, the existence of any scientific parallel, no matter how sketchy, will make it somewhat more likely that the more profitable of two courses will be taken. To those who are accustomed to evaluating a culture in terms of absolute principles, this may seem inadequate. But it appears to be the best we can do. The formalized experience of science, added to the practical experience of the individual in a complex set of circumstances, offers the best basis for effective action. What is left is not the realm of the value judgement; it is the realm of guessing. When we do not know, we guess. Science does not eliminate guessing, but by narrowing the field of alternative courses of action it helps to guess more effectively."

Intelligent guessing about relations within the social environment is, in a catallaxy, done by partial-controlling entrepreneurs. The relative probabilities of the different courses, at which the entrepreneurs intelligently guess, can never be known in

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1loc. cit., p. 435
2loc. cit., p. 436
full. In fact, the sources themselves are as numerous and varied for each entrepreneur as are the ways in which his partial control (i.e., money, capital, land, skill, inventory) can be employed in an economy. Not only can science not answer all of the questions about profitability, it is also incapable of identifying all of the questions. Much indeed rides on what Skinner calls "the practical experience of the individual."

In light of his penetration into the problem of man's inevitable ignorance of the totality of the relationships of the social environment, it is disappointing that Skinner ignores the one 'design' which allows for the environmental selection of superior guessing, i.e., the market system of behavior organization. It does not occur to Skinner—although he has made the analysis possible—that the different guesses of different individuals may be controlled by different hidden and unanalyzed sets of controlling conditions, some of which control more advantageously than others, so that one man's intelligent guessing may, for reasons unknown, lead to greater advantage for greater numbers of people than another's. In the catallaxy, when this happens, the man who guessed best gets more to guess about and venture next time and the man who's guessing resulted in waste gets less. This is the function of profit and loss.

How ironic, that this system of market selection, so consistent with Skinner's ultimate aims, is the very same market order which seeks to abolish and replace with a non-competitive ('single-species') central-planning (and guessing) agency, i.e., a state...
which operates as a single entrepreneur who owns all productive resources and commands a monopoly of aversive control to thwart all competition.

Ecology and the catallaxy contrasted with constructed landscapes and the dependent-variable culture

The relationship between the scientific analysis of human behavior and the improvement of cultural practices is clearly misunderstood by Skinner when he states that those

"who act to make the physical world more beautiful—the ecologists concerned with natural beauty and the artists, musicians, architects, and others who create beautiful things—all increase the chances that living in the world will be positively reinforced. Those who use behavior modification, properly defined, could be said to be concerned with preserving and furthering the natural beauty of the social environment—or, to borrow a phrase from a vanishing culture, to create more beautiful people."¹

First, let us clear up another misunderstanding. Ecology, i.e., the science which studies the patterns of relations among organisms and their environment, does not concern itself with natural beauty as Skinner claims. Aesthetic behavior with respect to nature is, however, the self-appointed jurisdiction of the soi-disant environmentalists, a political lobby which couches its arguments in the language of ecology. The two are not the same. For example, an aluminum soft-drink can or even several thousand such cans and an equal number of non-biodegradable plastic cups lying in a forest do not affect the ecology in any significant way; no lower

¹Id., Reflections on Behaviorism and Society, op. cit., p. 11
life forms are imperiled by them; animals do not "see the ugliness" or "the alienation of nature by private interests and the capital-

ist means of production" and fall over dead. (In fact, a mess of cans might be the best way to keep large numbers of campers away, thus averting real ecological damage.) Appeals to the aesthetic enjoyment of a self-righteous elite who treat themselves to frequent "back-packing" expeditions with their nature clubs must not be mistaken for a mandate by science. The unknown consequences of bottle-deposit legislation which obtain in the aluminum, steel, glass, trucking and other industries (and the effects on poor inner-city children during a summer heatwave who 1) bring home less cold pop from the market, 2) climb into or tip over garbage cans in neighborhoods or parks looking for deposit bottles, and 3) learn that working for an allowance does not yield much in return are much closer to true ecological problems.

The ecologist knows, as the environmentalist apparently does not, that the environment is not in equilibrium and never has been. He knows that there is no balance of nature, just as the economist knows that there is no evenly rotating steady-state economy. The ecologist-economist knows 1) that a lumbering company will, if permitted, cut down every tree on public land to which they have only been awarded temporary 'lumbering rights,' but that where land is privately owned the owner will see to it that the long-run value of all of the resources on his property is effectively husbanded, 2) that the private competitive campground is always cleaner, dollar for dollar, than its public counterpart, and 3) that no one would let an industrialist dump factory wastes into his private
river without charging a stiff (monopoly) price, a price high
even to ensure that pollution will not reach a point that will
take profits from the owner's recreation business. And so on.

Now it is clear that Skinner has taken the environmentalist
platform rather than the ecologist's analysis as his special view-
point. It is this orientation that permits Skinner the above com-
parison between the actions of those concerned with generating
beauty and the actions of the social engineer. However, the "art-
ists, musicians, architects, and others who create beautiful
things" are concerned with the manipulation of a closed set of con-
trolling variables already secured and already known (e.g. paint
and canvas, music paper and piano, bricks and tables of engineering
specifications). Each set represents a comprehensible small (or
closed) system that can be shaped, organized, and made beautiful
(reinforcing). However, the beauty of all such homo-faber art lies
in its simplicity, completeness, relative permanence, and pleasing
discriminable form—in its whole effect upon the beholders. Con-
sequently, this "furthering-the-beauty" orientation is inadequate
as an interpretation of the consequences of social-control manipu-
lations within the incalculably complex open set of relevant vari-
ables which comprise the field of human-environment interaction.

Instead of following the aesthetically indifferent science of
ecology or market economics, Skinner has taken and shaped the ap-
proach of the landscape architect. Understandably, he prefers
planned beauty to unplanned ugliness. However, he fails to ac-
knowledge that the regularity, symmetry, and fashioned beauty of a
landscaped garden require tremendous doses of outside energy (viz.
irrigation, mowing, pruning, dusting, pulling, fertilizing, and planting) to be maintained—i.e., to survive. Without this external intervention the biotic movement that has been held in check (i.e. unplanned growth—including what hortensial aesthetes describe as 'weeds' and 'pests'—and true endogenous natural selection, i.e., nature's own free market) will transform the habitat into something very different and, perhaps, depending upon who you are, ugly. Therefore, it cannot be said, in Skinner's sense, that a more beautiful natural environment has been "created"—rather, a condition regarded as beautiful has been held for a while at a continual cost. Logical extension from landscaped gardens to monopolistically controlled social environments is obvious. Yet, nowhere does Skinner ask if we are willing to pay this kind of cost (i.e. the cost of gaining and maintaining prepotency over the catallaxy) and nowhere has he shown any taste for that "trivial" science which makes the costs of "beautifying" the social environment known.

Economics and reinforcement psychology

Economics seeks to point up the nonobvious (or remote) consequences of human actions in a world of scarce resources and humans for whom those resources form a substantial part of the sets of conditions generating human behavior. Reinforcement psychology seeks to point up the nonobvious effects of the consequences of individual action upon the subsequent action of that same individual, i.e., the ways in which an individual's behavior is selected according to past encounters with consequences. Both are different from the natural sciences which seek to establish principles con-
cerning the effects of one class of non-behavioral event, under known conditions, upon another class of non-behavioral event. The principles of reinforcement psychology (the science of consequence-controlled behavior) are relevant to economics (the science of behavior-controlled and behavior-controlling consequences) insofar as the consequences of human action include all ramifications of the contributions which the action of partial controllers or monopolistic controllers make to the control of others within the social environment.

Only in the autistic economy of Robinson Crusoe (without Friday) do economics and reinforcement psychology become the same in their relation to the natural environment and natural sciences. There, independent contingencies and monopolistic contingencies are the same. Crusoe, as a partial controller alone, is also an unrivaled monopolistic controller of one. With complete knowledge of the relevant natural-science principles and of the changing particulars of the island, (horrendously complex) monopolistic analysis of Crusoe's behavior becomes theoretically possible, an analysis which (again theoretically) could be conducted by Crusoe himself. With the arrival of Friday, however, Walden One becomes Walden Two, and the problem of community control becomes an question.

Examining Skinner's social prescription on a comprehensible scale

The device of Robinson Crusoe's island has a long and venerable history in social and economic theory. The clarity which it affords to the evaluation of utopian proposals is still available
The insinuation of Friday as a partial-controlling newcomer to the island imparts to both individuals benefits from the exchange of specialized productive services made possible under a two-part division of labor. However, Friday also brings with him an end to Crusoe's monopoly of human intelligence and power on the island, and the loss of any tight experimental predictability of human events which Crusoe may have enjoyed.

Crusoe may be interested in recovering that greater proportion

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1The method which step-by-step builds a (necessarily theoretical) causal or genetic account of economic development from Crusoe to the real world belongs largely to the 'Austrian' school of economics. See Murray Rothbard's *Man, Economy, and State* (Los Angeles: Nash Publishing, 1970) for the best recent example. This school of 'subjective use value' (i.e subjective in the sense of being based on the inherited and learned behavior of the single individual) takes as its theme the consequences of a world of imperfectly adapted individuals each aiming at more satiated and less aversive states within a changing environment that includes the market. It is interesting to further note that early members of this school (e.g. Carl Menger, an originator of marginal-utility analysis) strove to link their theory of value to the organic psychology of their time, but soon found that neither the biology nor the physiology of the nineteenth century could supply an interpretive compliment to what its critics were calling the school of hedonistic psychologism. By the time E. L. Thorndike's "Law of Effect" was enunciated the effort had already extinguished. The laws of economics had by then come to seek sanction from 1) Economic Man, i.e., a set of arbitrary postulates, deductions from which are inductively tested against the conduct of actual business firms, 2) introspective or a priori knowledge of the intentional application of the general category of means and ends, from which a completely deductive or rationalistic economics was elaborated, and 3) statistical inference, including, especially, regression analysis, which tests the predictions and contents of econometric models of systems of aggregate variables, models which make no appeal to either causation or the properties of individual behavior. For an account of the Austrian economists' historical flirtation with psychology, see Lawrence H. White, *The Methodology of the Austrian School* (New York: The Center for Libertarian Studies, 1977).
of predictability and environmental control which were in so many ways reinforcing in his solitary (and poorer) days before Friday. After all, he now finds himself doing work—which is as unpleasant as ever—to produce commodities which he himself will not consume, but which now are important only in a mediate way, as goods for which Friday will exchange the products of his own labor. Since there is no absolute scale which measures how much fish equals a given amount of clothing or how much time spent fishing equals the time spent skinning animals and sewing garments, the determination of rates of exchange falls, therefore, naturally to the process of catallactic relations.

Partly because of the increased distance between labor and its fruits and partly because of the open-endedness of the exchange relations, Crusoe begins to find his trading partner an especially lazy companion who asks unreasonable amounts of aversive activity in exchange for his own handiwork. As the weaker and less productive of the two, Crusoe is bound to formulate some variant of the dictum: from each according to his ability and to each according to his needs. Yet, no matter how dissatisfied he is with his loss of prediction and control and with Friday's apparently cutthroat dealing, the European is not willing to give up the considerable advantages of Friday's specialized contributions only to return to the autistic economy of a hermit.

One night, let us imagine, Crusoe opens his water-damaged volume of Skinner's works and reads there:

"A social environment functions most effectively for the individual, the group, and the species, if so far as possible, people directly control people. The design of a
social environment in which they do so is one of our most pressing needs. It is quite clearly a special challenge to psychology as a science of behavior."¹

This appears reasonable to Crusoe. He considers: Certainly Friday consumes too much of our scarce energy resources; he eats too much; he demands too many things from our joint production, things which he really does not need; he does not do enough hunting, gathering, fishing, building, and storing; he does not do enough to keep the hut hygienically clean; in fact, the private aims which Friday pursues contribute absolutely nothing to what I know is in our best long-run interest.

He reads on:

"Those who act to improve government of the people, by the people, for the people have been selected by special, possibly accidental circumstances. Since they have been selected, they are an elite . . . Their task is . . . to bring people under the control of more effective physical and social environments."¹

At this point Crusoe remembers his flintlock. Here is the "accidental circumstance" that entitles him to restore the monopolistic prediction and control of his former autistic economy without his foregoing the benefits he has been deriving from cooperative exchange.

He quickly reads the essays on social control. He learns that constant direct aversive control would be bad design, that extensive use of punishment to achieve practical ends would lead to es-

¹B. F. Skinner, "Between Freedom and Despotism," op. cit., p. 91
²Ibid.
cape in ever-more refined ways, or possibly result in violent counterattack or stubborn resistance. Rather than risk this, he adopts Skinner's implied and specified solutions: he will confiscate all of Friday's reinforcers (implied) and then dispense them contingently (specified). This will make Friday see him as the beneficient provider he is. Of course, this means that Crusoe will have to forego much of the time normally spent hunting and trapping in order to supervise Friday, making sure that he does not override social control by snitching from production (which is always at hand) and secretly stockpiling his own self-reinforcement capability, i.e., acting in stealth as Crusoe had acted freely before Friday arrived.

After the first day of implementing the new system, Crusoe stays up late by the fire collating new data in his plan for the beautification of the island and for the continued survival of his cultural control practices. Suddenly, and doubtless owing to his early ethical training in a continental-liberal culture, Crusoe feels a familiar twinge in his stomache: Was it necessary to blow Friday's left hand off when he exhibited predictable aggression and attempted to resist confiscation by coming at me with that rock? For reassurance, Crusoe again turns to his edition of Skinner:

"A program of contingency management which begins by taking something away from people suggests a lack of compassion... But although a state in which all needs are satisfied may appeal to those who have struggled to satisfy needs, it is in a curious sense a state of deprivation, a state in which people are deprived of reinforcements..."
which induce them to behave."

After reading this, Crusoe picks up his pencil and writes the following on the back of one of Friday's performance charts: If I am to continue to induce Friday to behave, he must forever be kept from obtaining all of the ends which are important to him. Without my continuous and consistent control over him, this scientific design for beauty and survival on our island may never be realized. Therefore, Skinner is right, insofar as I cannot ethically permit Friday to be deprived of the deprivation which will induce him to work for our culture. As for Friday himself, his frivolous designs when left to the exchange environment are incompatible with my scientific designs for survival. Besides, as Skinner has the founder of Walden Two say, "The majority of people . . . want to be free of responsibility and planning. What they ask for is that they be decently provided for." Obviously, (he concludes) my plan accomplishes that. Q. E. D.

Confiscating something reinforcing in order to return it contingently may, as Skinner avers, suggests lack of compassion, but it is unquestionably aversive insofar as the 'taking away' functions as punishment and evokes all of the behavioral by-products of punishment which Skinner has taught about (viz. escape, aggression, avoidance, unpleasant counter-productive emotional behavior). To

\[1\text{id., Cumulative Record, op. cit., p. 290}\]
\[2\text{id., Walden Two, op. cit., p. 253}\]
the extent that the sequestering of reinforcers and means of reinforcement is aversive, to that extent Skinner, with Marx (that other 'exappropriator') is advocating violent revolution; and the fact that he nowhere makes the connection or, perhaps, as a socialist, is convinced that the concept of ownership is prescientific, does not make the fact any less factual.

Skinner's justification for confiscation, i.e., the doctrine of deprivation of the deprivation which induced people to work for their culture is entirely spurious. With the possible exception of the ascetic saint, perfect satiety has never been achieved in the laboratory or elsewhere. Only relative satiety, relative deprivation, and relative states of aversive stimulation have been studied. It is not inconsistent with the current findings of the science of behavior to say that the ordering of deprivations for any organism continues indefinitely, that as prepotent responses bring an organism to a certain level of deprivation relative to all other dimensions of deprivation, the formerly next most powerful deprivation assumes control, and so on indefinitely. The point at which the inside of the skin is in perfect homeostatic equilibrium with the universe outside the skin may be asymptotically approached through continuously effective operant behavior, but has never been known to have been reached. (Of course, we are here merely stating the law of marginal utility behavioristically.)

Skinner's reference to a curious state of deprivation in which people, because of satiety, are "deprived of reinforcements which induce them to behave productively" can only be viewed as a disin-
genuine defence of the right of Crusoe, the controller, to keep
Friday, the ordinary member of the culture, deprived so that Cru­
soe may continue to use Friday as an instrument for operating upon
the environment in ways that satiate Crusoe and remove what is
aversive to Crusoe. The fact that Crusoe is a trained scientist
who has data and methods to see remote consequences that others do
not and that he is reinforced by cultural survival and finds a poor
and sick society aversive; lends no power whatsoever to Skinner's
argument, since there remains the probability that such a wise
Philosopher King would conclude that the best design would be that
he abdicate monopolistic control in favor of the much-wiser market­
place.

Could the Crusoe in our story reach any other conclusion?

Walden Two

Frazier's community, Walden Two, as it is described in Skin­
ner's novel, Walden Two, cannot be evaluated. The community is
supposed to be an empirical-experimentation-based monopolistic 'in­
tentional culture.' Yet, the book that portrays it is, itself,
wholly a rationalistic construction. An assumption of its logic
is that there are no reasons why the community could not work.

Jules Verne, a man influenced by the same 'scientific' Comte­
ian tradition as Skinner, wrote a novel featuring a cannon designed
to shoot people around the moon. Verne described the cannon's ar­
chitecture, dimensions, materials, casting, and motive force. Yet,
a modern physicist has calculated that Verne's projectile and its
occupants would have been vaporized halfway up the barrel had the
device really been fired. Still, this contradiction of scientific law did not keep Verne from successfully firing his fictional cannon, sending his voyagers around the moon, and, most reinforcingly, back to earth. What is more, the real-life readers of this best-seller felt vicariously rewarded by the accomplishment. Verne had succeeded in going beyond his reader's trained scientific ken, in creating the illusion of a genuine record of empirical events, in writing good science fiction. In a work of fiction we can describe perpetual motion machines, the defying of gravity, and travel back through time. Those familiar with the laws of thermodynamics and relativity will not be fooled. We can also describe, impressionistically, a positive-reinforcement community run by a monopolistic planning agency that remains effectively on top of things without a market and without a popular scuffle. Although not yet obvious to the layman, this too is science fiction.

Walden Two is a rationalistic construction rather than an empirical record. Yet, it is not rational enough to permit a rational analysis. The construction is not rigorous. The workings of the various institutions have not been drawn with all interrelationships fit together. Frazier's topical monologues and rambling dialogues with the visitors, often interrupted at crucial points, although direct and compelling, do not add up to a description of Walden Two that is translatable into a system-analytic diagram or econometric model. Economic questions go unanswered.

According to his own estimate, sixty per cent of Skinner's writings have been about society and not about the science of behavior. One can only wish that Skinner would have used that time...
to formulate a comprehensive and unified view of all behavioral and social science, as earlier behaviorist, E. L. Thorndike did in his monumental *Human Nature and the Social Order.* Walden Two and the various collections of Skinner's monographs do not fit the bill.

As it is written, Walden Two enables Skinner to fudge, retreat, and retrench with respect to seemingly essential features of his utopia (e.g. "The labor-credit system was pure Marx. A more effective system could be designed today." while, at the same time, keeping the alleged 'greater truth' of its message intact. It is, in this sense, a book that can be used much like the Holy Bible, viz., a source of control that is beyond testing. When attempts, e.g., the Twin Oaks community (described below), have been made to emulate Frazier's work, the ensuing failure (e.g. all original members of Twin Oaks have defected, their emptied ranks being filled by a rapid turnover of fresh Walden Two converts) is invariably attributed to not following Skinner's system, or its spirit (of experimentation), closely enough. This is reminiscent of the faithful of the perfectionist communities who blamed the termination of their communities upon a common failure to adhere strictly to the teachings of scripture.

For these reasons, we shall here ignore the workings of Frazier's Walden Two and turn our attention, instead, to the real-

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world consequences of the efforts of the book's real-world following. Although such communities do not receive Skinner's unqualified blessing, we shall, in examining them, at least have the surety that we are not studying the machinery of a dream.

Twin Oaks

An experimental community has been operating in Virginia since 1967. It was founded by a woman named Kathleen Kinkade and others who were moved, at least in part, by Skinner's Walden Two. The farm and first new building were the gifts of a wealthy sympathizer. From the first, its members have been selected (or filtered) by their attraction to the Walden Two ideology. Skinner's book was literally the promotional vehicle that created the market for this enterprise.

"Because we have Walden Two, we do not need a leader or teacher. Cooperation is possible because we have all, before we even joined, agreed upon the general principles of the community described in that book. Enormous ground is covered in that general agreement—including such items as a scientific, experimental approach to problem solving, the community of property, the dissolution of the nuclear family, and the willingness to deliberate about the moulding of character and personality."¹

The community has clearly derived its governmental procedure, its labor credit system, and its code of conduct from the novel. The code is easily summarized: people must act and be treated as

though they are equal, no one must look more capable than anyone else, trade secrets must be revealed, experience must have no privileges, no one may complain, no one may discuss his political views when local outsiders are present, everyone must be considerate, everyone must clean up after himself, and everyone must be allowed one place to be alone.\(^1\) Three rotated planners are given absolute power to set priorities, change the structure of government, and shape all policy as long as they remain within the code and can avoid popular rebellion. Administration of the plan is the job of several bureaucrats, called managers. The managers are responsible to the planners, but are generally granted considerable leeway in choice of methods. Each manager is in charge of a different work category, e.g., food, farming, crafts, hammock assembly, construction, child control, etc.

Control of the members is ultimately based upon their relative aversion to the world outside. All are apparently repelled by the competition to produce for the market, by buying and selling, by the quest for individual success, and by the demands and sacrifices of family life. The strong egalitarian and anti-private-property bent as well as the frequent Marxist cant and hippy appearance of most of the members is indicative of a failure of socialization into the role of productive partial controller. At any rate, a certain amount of labor credits must be accumulated to avoid being asked to leave.


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"'What would you do if a member didn't do his work?' asked Burris of Frazier, in Walden Two. 'I can't imagin it,' said Frazier. 'We'd think of something.' We are often asked that same question, but our answer is a little more definite. . . 'We would ask him to leave,' was the reply."

Labor credits are made contingent upon plan-serving activity. The plan is divided into discrete tasks and a list of these is given to each member. The member ranks forty of the tasks in the order of his preference. The managers then delegate members to each task more or less by preference ranking. High-preference tasks receive fewer points and lower preference tasks receive more points. There has been a recurring tendency to inflate the point requirements.

In the community; food, shelter, and whatever else is available is given non-contingently and 'equally.' In practice envy-behavior controls the distribution process. Having decided that giving one person a musical instrument does not mean that everyone should have one, or that everyone should have something of equal market value, or that everyone should receive something equally in proportion to his capacity for enjoyment, the community finally settled upon the criterion of distributing commodities only insofar as no member "feels that somebody else has unfairly usurped his share." Thus the envyocracy.

"Equality in a community is a relationship so structured that no member envys another. Simple."

". . . We do not intend, if we can help it, to permit inequalities of the type where one member has something that

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\[1\] ibid., p. 74

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the other member would wish to have but is denied for no fault of his own.¹

Despite claims that it is the 'small-is-beautiful' vanguard of the successor to the capitalistic corporate state, we may view this communal establishment as an entrepreneurial venture within the catallaxy. It offers to a certain subset of people a special environment which is (to them) more reinforcing that that which the competition is making known. In this respect it is little different from Disneyland, Holiday Inns, retirement communities, or the combined city and Chamber of Commerce of San Francisco—although in other respects, e.g., profitability and financing, it more closely resembles a donation-supported monastic retreat. It has been packaged for a particular minority within American society—a group which includes its founders—and, being such, is representative of the exotic specialized markets which characteristically are catered to only in free-market societies. The Asian communist countries, which many of the community members fervently admire, would never spare either the resources or the manpower for experimenting with a possibly successful alternative to the authoritative dogma for which they have sacrificed millions of lives. It is, perhaps, for such reasons that nonrevolutionary utopian communists have traditionally sought the most laissez-faire countries for the conduct of their social experiments. Ms. Kinkade's community is a registered legal partnership of Virginia. Its members, Marxists included, and their joint property, remain under the protec-

¹ibid.
tion of the federal, state, and local laws of this vestigial liberal society.

What is of special interest to us in the present thesis is the assertion by Ms. Kinkade that her group has created an experimental society which is somehow opposed to the catallaxy and which can suggest the means of its replacement. This belief is accepted almost universally by the members of the community, by radical political behaviorists, by the devotees of Ms. Kinkade, and by most Skinnerians. They hold that the community has proven that partial control may be harmlessly traded off for nonaversive experimental control, and that smallness eliminates bureaucratic inefficiency, involves little sacrifice, and solves the Hayekian problem of economic knowledge and coordination.

"What keeps our system from turning into a tiresome bureaucracy is its simplicity—that decisions can be made swiftly by at most three people, and usually by a single manager using his or her judgement."¹

One must be completely blinded to the achievement of the marketplace not to realize that the organization and planning of Ms. Kinkade's community represent only the final and penultimate stages of a vast catallactic process. The decisions of her planners and managers are almost an insignificant fraction of the prior decisions made within the catallaxy which are directly responsible for the clothing, shelter, food, transportation, comfort, and entertainment of the community. We have already referred to Leonard

¹Kinkade, op. cit., p. 55
Read's discovery that no one knows how to make a pencil. Yet pencils abound in Ms. Kinkade's community. All are 'imported.' These handy writing implements would be indispensible were there no pens to substitute for them. The pens are imported too. And so are the books, shoes, shirts, tractors, bananas, medications, cars, radios, telephones, flour, phonographs, steel products, plastic products, eyeglasses, paper, cotton, scissors, light bulbs, clay pipe, fiberboard, matches, and clocks, as well as the cord, chain, and rings, out of which the members 'make' the hammocks they sell. The community has materials and appliances from all over the free world, brought to Virginia by profit-seeking importers. One looks in vain for any complaint that the things they need have not been made available to buy. At almost every point of its existence the community has been sustained by the catallaxy which surrounds it.

Having begun to penetrate both its propaganda and its mystique, we see that this soi-disant intentional community, hailed as the most successful in the country, is a collection of people with common interests who are ensconced on a piece of southern real estate where they enjoy the fruit of capitalist production mixed with their own cooperative housekeeping. (One notes that the products of this community are no more varied or impressive than those of any well-organized American family farm.) Still, there can be no gainsaying the fact that the members are receiving what they appear to value, i.e., an atmosphere of communist fellowship in which each verbally reinforces the others' belief that they are the first to achieve in practice the leftist intellectuals' dream.
of eradicating dependence upon partial-controller relations.

It is not the purpose of this thesis to find fault with those who seek such an atmosphere. In the purchasing of an enjoyable lifestyle, 'the customer is always right.' Still, while recognizing the principle of consumer sovereignty within the 'lifestyle market,' we may nevertheless ponder whether this particular wishful-thinking mode of living can be sustained in more than just a few exceptional showcase communities.

Of extreme relevance to this last question is the fact that Ms. Kinkade's community continues to take from the catallaxy more than it gives back. Without the extensive charity of what must be a finite number of wealthy sympathizers, the community would have operated at a loss every year of its existence. In this respect it is not unlike the philanthropy-supported indigent workfarms of nineteenth-century England. Subscriptions, donations, book royalties, and the outside work of a few members pay for the lion's share of the community's market purchases. The internal production of the community—which includes hammock assembly, contract typing, dairy farming, vegetable produce, crafts, printing, lecturing, and fold-dance instruction—contribute less than half of the community's revenues. Credit is extended to the community every month by the local (profit-seeking) merchants. And there is almsgenerating:

"If your coming this way and have room in your station wagon anyway, Twin Oaks could use: kitchen chairs, bedding

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1. *Journal of a Walden Two Commune, op. cit.*, pp. 38, 96

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of all kinds, rugs, tools, building materials, hymn books or other three- or four-part choral music, art materials, yarn..."

The lifegiving donations by exogenous friends and those middle-class visionaries who buy a hammock to support the Skinnerian cause, are instances of the community's reliance upon the catal- laxy. Two other forms of catallactic dependence, viz., the taking of outside work by some members and the surrender of the disposition of the financial and real-property holdings of new members, demonstrate within the community itself an undeniably parasitic relationship between man and man.

The clearest exposition of the collective exploitation of the community's small but necessary group of partial controllers, i.e., the outside workers, is found in the community's own official journal:

"There are issues on which there is no possible agreement, and on which a decision is badly needed. Take for example, the fourth item on the agenda, a discussion of the current financial situation and a suggestion that we send some of our members to find jobs in the nearby cities in order to make ends meet. Status quo will not answer here, for the current practices (we will say) mean ruin to the Community. Loud voice has opinions and expresses them, but there is no greatful acceptance of his ideas this time, for every member is threatened by the suggestion. There is intense argument. Several members, especially those who know they can easily find work, argue in favor of the Outside Job Plan and say (rather contemptuously) that they will volunteer to be the first to go, but that in good time every member should take his turn. Some other members, especially those who have not held regular jobs for many years and are not sure they could get and hold a job, argue that community is meaningless if members have to hold outside jobs. Someone suggests borrowing

\[1\text{loc. cit., p. 93}\]
money and starting an industry. Another throws in cutting back the standard of living and eating brown rice and honey, having the phone taken out, and letting automobiles ground themselves as they gradually run out of gas.  

"As to the outside job question, the board will know whether it is necessary, and if it is, they will set up a system and ask the members to cooperate with it."\(^2\)

"Originally we needed only two outside workers to bring in enough cash. Our current expenditures require eight workers."\(^3\)

"After we started depending primarily upon outside jobs as a means of support, the planning job seemed a little easier."\(^4\)

"Outside work has always been our least popular job, and there are good reasons why this is so. Getting up at 5:30 in the morning is one of them. Sack lunches is another. For the least skilled, the jobs themselves can be very bad... It is easy to become estranged and feel left out. It is hard to fight the feeling that you are being exploited, particularly if you come home to find that some inside worker did not iron your blouse, or the lunch packer has forgotten that you cannot stand pickles in your tuna salad. Inside workers tend to forget what outside work is like, and adjust very quickly to the leisurely pace of normal community activities.

"Suppose for example that you're the garden manager and are trying to manage the garden in the evening and weekends in spite of your outside job. You make plans, requisition the labor, explain the work to those signed up for it, and then come home to find it undone because 'it was too hot to work, and a bunch of us went swimming.'... Occasionally a member will leave the community because outside work is so hateful that he cannot face another twenty days of it."\(^5\)

1\textit{loc. cit.}, p. 77-78
2\textit{loc. cit.}, p. 80
3\textit{loc. cit.}, p. 91
4\textit{loc. cit.}, p. 96
5\textit{loc. cit.}, p. 91
"It has been repeatedly suggested that we allow certain people to be entirely free from obligation to do outside work—those people for whom it is truly hideous, who 'freak out' in a factory or office. There is some justice to the suggestion. Are we not dedicated to the principle 'From each according to his ability, to each according to his needs'? But the drawbacks of basing a policy on that principle are obvious. If we made exceptions of that kind, we would find our group of outside workers once again consisting largely of volunteers who have salable skills, spending most of their time outside the Community supporting an ever-growing group of those who intensely dislike outside work."¹

Hardly anyone in the everyday world of business engages in work for its intrinsic value. There is both a supply of labor and a demand for labor between employer and employee. The higher the wage that is offered, the more willing one is to transfer from a more pleasant job to a less pleasant job. Ms. Kinkade's community sends its outside workers to be employed in unpleasant work by city businessmen. On payday these workers surrender their paychecks to the appropriate community manager. Later they each receive from the community the same less-than-a-dollar allowance that all other members receive. In one sense the outside workers resemble the American 'family breadwinner' with many children to support, but the community's proportion of outside workers to dependents is considerably smaller than the nuclear family's average proportion of breadwinners to children, making the outside worker's share of the 'bread' he earns correspondingly less than that of Dad or Mom.

The second form of group dependence upon the individual member's partial control involves the wealth which new members bring

¹ibid.
to the community.

"Our financial and property policies reflect our determination to avoid a privileged class. Members get no cash income except a very small allowance which has ranged between twenty-five cents and a dollar a week. Any money which they might have owned before joining simply stays in the bank for the first three years unless they want to donate it to the community. In any case, Twin Oaks receives the interest on it, as well as the dividends on any stocks and bonds, rents from any property, or any continuing income of any kind."

As has been demonstrated by the Soviet state, Red China and other collectivist efforts throughout history, whenever the fruits of any increase in one man's exertions in aversive labor must be distributed equally among a large group rather than placed at the disposal of the man himself, the result is invariably a wholesale failure of production. This is why modern socialist countries, Red China included, regularly jettison their theories and resort to market production or Western imports to pull their chestnuts out of the fire. Ms. Kinkade's "radical alternative to the kind of life we have left," is no different than the larger historical variants, despite the fact that her group is earnestly committed to "make our little society conform to our ideals."

"Many a hopeful member would take a managership with the intention of seeing the department thrive under his care, only to find that the other members working in his department just don't care enough to do a good job, and good projects were continually being sabotaged by indifference."

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1Kathleen Kinkade, op. cit., p. 49
2Journal of a Walden Two Commune, op. cit., p. 85
3loc. cit., p. 90
No manipulation of the labor-credit system has been able to alleviate this problem beyond the first few optimisitic weeks. Members dedicated to the principle of collectivism and contingency management are puzzled by their own "procrastination." It is discovered that "there are always people who claim more credits than they reasonably should." The rule of no public grumbling or griping is violated to declare, "What I can't stand is that nobody here will take a project and see it through to the end."

To combat this problem the community adopted the political indoctrination technique of public criticism and self-examination developed by Mao Tse-Tung when confronted with exactly the same problem. As on girl publically confessed:

"Basically, I can get away with doing whatever I want. But at Twin Oaks I am beginning to believe that in the long run I don't really want to try to get away with everything, because I've seen other people here act like that, and I've seen how it affects the whole group; and I think people who act completely selfishly are shits. I don't want to think of myself that way."

The socialist-self-criticism experiment accomplished two things in the community. It changed verbal behavior and it eliminated the practice of socialist self-criticism.

"The main thing I got out of the session was that everybody criticised the same thing—my public bitching, even when it was justified. I had really thought that some people were mature enough to appreciate public criticism.

1 loc. cit., p. 62
2 loc. cit., p. 60
3 loc. cit., p. 51
4 loc. cit., p. 63

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when it was needed, and I didn't realize that dislike for it was so universal."

In the end, the community returned to reliance upon officially circulated exhortations and admonitions aimed at everyone and at no one in particular, e.g.:

"If I don't do my work someone else will have to do it for me; if I do this very often I just won't be doing my share; and everyone who doesn't do his share is a schmuck."2

Faced with the fact (evident in the increasing reliance of the community upon the catallaxy) that the community is living beyond its means, the response has not been a careful examination and re-evaluation of the problem of collectivist production, but rather a rehash of modern communism's defensive inversion of that problem, viz., how to shape human acceptance of the ever-smaller economic pie, and how to teach the 'virtue' of zero-growth, negative-growth, and sacrifice to the collective.

"In order to make even an adequate supply of anything go around, it is necessary for everyone to have simple and modest tastes and desires. That means creation of an entirely new culture—non-competitive, non-consumerist . . . First there is the problem of making a decent supply of desirable things available. That's economics. Then there's the necessity of keeping people's desires within bounds, so that the economic problem doesn't keep multiplying. That's cultural planning."3

Let us first consider the community's applied "economics." In an early article on "Twin Oaks Leadership" by Ms. Kinkade, we find

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1loc. cit., p. 69

2loc. cit., p. 60

3Kathleen Kinkade, op. cit., p. 58
the following passage:

"Somebody has to make decision (sic). Shall we raise corn next year? How much labor can we afford to spare for building an experimental dome? How many automobiles shall we license? To what extent should a biological mother care for the newborn? Can we put money into recreational activities this year? Is it desirable to raise individual cash allowances? How fast can we effectively absorb new members? Should visitors be encouraged? Shall we openly solicit funds?... These decisions are made by the board of planners, unless it's clearly a managerial decision."

Clearly the community has adopted the centralized-economy approach to the problems of production and distribution. They have accepted at face value the assurance of Skinner, Schumacher, and the pure Maoists that small-scale production can replace market coordination and obviate the problems of bureaucracy. The question now is: with their small scale and with the vast simplifications made possible by an exogenous and gratuitous supply of a great many necessities, how are the remaining economic decisions made? How do the planners come to utilize the independent contingencies of the environment for this or that end? How do they gauge the relative value of this or that alteration of the community habitat? How is the superstructure designed which they impose upon all members? How do they measure efficiency or their chosen standard of distribution, i.e., envy. How do they scientifically (and not just mathematically) integrate the facts of their simple and externally assisted community to devise a plan which realizes their self-description as an intentional community? In short, how do they re-

1. Journal of a Walden Two Commune, op. cit., p. 61

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place the partial-controlling entrepreneurs?

The answer to all of these questions is unequivocally supplied in a much-later article:

"... could we buy some cows and some trees and a smaller freezer? Or should we put off some of these projects until next year? And how do you budget things like that?

"Money isn't the only thing that has to be budgeted, either. How much labor will the garden and food processing demand? How much will be left for construction? Considering the number of simple facts that we just do not know, the planning problem is staggering. For instance, we don't know how well any of the vegetable crops will do, and therefore how much food there will be to process; how many members and visitors will be on hand each week for the work; what skilled people may have joined by then or will be visiting; whether or not unexpected sources of cash may appear. Planning is really just careful guessing."¹ (italics supplied)

For those who are capable of critically examining what Ms. Kinkade has accomplished and who can judge without favoritism and without regard to their established reputation, we see here exploded the myth that small communities are manageable (and therefore beautiful); that communism suddenly works when the system of the catallactic division of labor is partially dismantled. The economic problem of Ms. Kinkade's community is not solved—it is merely covered up by 'foreign aid' from the well-off American left. The supposedly scientific and rational planner is revealed as no more than a single risk-taking entrepreneur, an entrepreneur with the usual limited information, but one who has been given monopolistic domination of the entrepreneurial function, thereby removing

¹loc. cit., p. 97
himself from the field of competitive selection on the basis of superior allocative judgments, the comparative measure which is the only measure of entrepreneurial performance and 'survivability.' The monopolist planner does not scientifically refute the suggestions of the other members, he merely passes over their judgment to make his own educated guesses. The overridden suggestions of the others, the would-be entrepreneurial competitors, are never tried.

The regular pool of planners, appealing to the resulting economic blindness of the community have developed a rationalization for keeping control in their hands and away from rivals.

"The job (of planner) requires agility of mind, reasonableness of judgment, commitment to the goals of the community, and sharp self-awareness... The charge of incompetence (has always fallen) wide of the mark, because it imputes to the job what the job was never intended to have. Furthermore, the accuser invariably marks himself, by his accusation, as not understanding the purpose of plannership. This in turn makes us fearful that such a person would abuse the position if he had it, so he never gets it..."

"At the bottom of the anger on this subject is the assumption that the person who can do intellectual work like decision-making is somehow better than one who has difficulty thinking straight, and that the appointment to a job that requires thinking therefore merits and gets prestige based on that evaluation... Recognizing this as a prejudice which is detrimental to an egalitarian society, we are determined to do away with it, if possible in one generation."

One can only pity the intelligent and innovative young Skinnerians who have been taken in by this ruse.

Having established that the community has no rational means of making the supply of goods and services meet the demand, we finally

1Kathleen Kinkade, op. cit., p. 244
turn to the system which Ms. Kinkade and the other planners have adopted to make the demand fit the supply.

Their rule is that "no member shall enjoy financial privileges that are denied the rest of us..." The poor and non-productive derelicts are to be made into successfully ascetic saints. Each member receives according to his needs and everyone's needs are equal (except when an individual has managed to win a concession from group envy.) All receive the same food, all get the same allowance. Furthermore, conscious exchanges of prestige, status, and even recognition of achievement are denied to everyone. Even invention and innovation are accorded little attention for fear of raising the specter of human inequality and marshaling social punishment.

"If some people are more useful than others, let them serve more. We want a society that rejoices in the usefulness and enjoyable talents of its members, without according anyone prestige or honor on account of them."1

We recognize here, not the acknowledgement of Skinner's contingency-controlled man, but a call for Mao's perfectly altruistic communist man, the man imagined to emerge from the final dialectical negation of the capitalist superstructure and from the Great Cultural Revolution. Ms. Kinkade, the most frequent planner of the community, seeks the engineer, inventor, creative artist, and laborer who will work harder and harder even as everything they create is taken from them and distributed to meet the needs of the

1 ibid.
community. Ultimately, she seeks individuals who will operate without approval, without attention, without freedom or dignity, but only with needs (everyone's constant demand for the fruits of productivity), and envy, and power (which resides in the planners who lay claim, as allocators, to everyone's productive and creative capacity.) Although a few members appear to be convincing first approximations, we are, nevertheless, safe concluding that the cultural engineering that would shape such miraculous persons is nowhere in evidence at Twin Oaks.

The gap which these intentional communalists perceive between their and their practice is the falsehood they live. Practice cannot contradict theory unless that theory is wrong or misapplied, and only careful reasoning which draws from both psychology and economics may determine which is the case.
We have seen that the problem of predicting behavior when two organisms share control of relevant determining variables. In such a case the two sets of contingencies which obtain in the mutual shaping of shaping cannot be identified. The several reasons for this are perhaps all condensable to one. There are more unknown behavior variables than there are known behavior-variable determining functional relations.

We have considered an alternative analysis, borrowed from Weingarten and Mechner, which treats the exchange relationships between partial controllers as its dependent variable, and takes the cross-controlling contingencies between organisms (i.e. those in which the manipulandum operated by one organism produces behavior-controlling consequences for another organism and vice versa) as its independent variable. The sum of all such behavior-relevant contingencies in a social environment comprise what we call the independent contingencies of a catallaxy. We call such independent-contingency analysis the study of catallactic relations or the science of the catallaxy. We have discussed its limitations as an inductive science, turning to the experimental work of Boren and of Fouraker and Siegal and to our own imaginary experimental settings with monkeys and with men. It lacks the resolving power of the monopolistic analysis of behavior.

We have seen how in human society partial control is established and maintained when coercion, i.e., the arranging of aver-
sive contingencies, is restricted and we have learned how partial control implies a fluid but orderly division of the independent contingencies of the environment into distinctive provinces of control—roughly covered by the concept of private property, the ownership of the means of producing and distributing. This is the germ of the important phenomenon of the division of labor which is essential to any industrial and scientific civilization.

Our analysis has led us to discriminate cultural control as operating along three interlocking avenues, viz., independent contingencies, catallactic relations, and the less-clearly understood superstructure of coercive practices, i.e., the province of law, government, and other institutions and groups which control through punishment or the promise of punishment—a concept for which we are indebted to Karl Marx. We have also made general observations concerning predictable consequences of the dispensation obtaining under four different superstructural arrangements, 1) the classical-liberal market economy, 2) the many variants of the mixed or interventionist economy, 3) the planned socialist economy, and 4) the 'pure Maoist' or 'small-is-beautiful' economy. We have examined the problem of the evolution of cultures and the eternal problems of a science-and-engineering technology of society. We have seen from Hayek and other members of the individual-based 'Austrian School' of economics, how fundamental barriers to social analysis and control stem from the inevitably turbulent and variegated earth environment (including its human fibers); an environment in which the particulars may all singly conform to known scientific laws, but in which the present concatenated state of things, i.e., the
interrelated set of particulars currently obtaining, is never known. We have seen how Marx attempted to solve this (insoluble) problem through the mysticism of dialectical materialism, i.e., the Mumbo Jumbo which teaches that since mind is an aspect of matter that proceeds by actively contrasting opposites, then reality must develop in the same way, and that therefore a future good society which the mind longs for can be scientifically speeded along simply by destroying ('negating'), through revolutionary action, all that offends one about present society. We noted the appeal which Marxian analysis holds for Skinnerians seeking a broader cultural analysis. We have also seen how in the West, government-sponsored econometricians and macro-economists attempt to solve the problem of specific prediction within the tripartite catallaxy through functional analysis. Yet, we have seen, appealing to the contributions of Hayek and Herrnstein, and to our own discursive reasoning about the catallaxy in relation to scientific analysis, that sets of simultaneous equations built upon government and business statistics or laboratory simulations are wholly inadequate for obtaining the predictability required to plan the economy of even a small community. We have attempted to separate Skinner, the Harvard socialist, i.e., the function-analytic (rather than historical-materialist) Marxist, who is isolated most clearly by the characterization of Fraizer in Walden Two, from B. F. Skinner, the great psychologist and exacting scientist-philosopher. And finally we have looked at an actual attempt to realize Walden Two, an attempt that has received Skinner's (qualified) endorsement. From the members' own account of its conduct, we see that their experi-
supports the general conclusions of this thesis, despite the fact that they have contrary interpretations and would object violently to all that is presented here.

This thesis has been written in full knowledge of the charges of negativism and subservience to capitalist reaction or anti-progressive forces that it will encounter. It will be interpreted as a throwback to Herbert Spencer and William Graham Sumner and as a musty and old-fashioned way of looking at human affairs. Most damming of all, it will be called an apology for plutocracy. The individual's who will pronounce these judgments, whatever their individual status, will be representative of the dominant 'progressive' viewpoint in both the groves of academe and the seats of government.

In elaborating the present thesis, I have drawn much support from the example of a liberal economist whose books were burned by Hitler's National Socialists, banned in all of the communist states, and deliberately sabotaged (in typesetting, printing, proofreading, binding, and pricing) by a well-coordinated conspiracy among a nameless group of "liberal" intellectuals at the Yale University Press\(^1\)—in all three instances the interventions were conducted by men who sought (and seek) to improve their respective cultures by eliminating 'harmful teachings' and 'incorrect thought.' Completion of the present work would never have appeared worthwhile to me had I not read the following words of that econo-

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"We need not consider the hostility that the sciences of human action encounter from without. There is, to be sure, enough of such external opposition, but it is scarcely capable of arresting the progress of scientific thought. One must be very strongly prepossessed by an etatist bias to believe that proscription of a doctrine by the coercive apparatus of the state and the refusal to place its supporters in positions in the church or in government service should ever do injury to its development in the long run. Even burning heretics at the stake was unable to block the progress of modern science. It is a matter of indifference for the fate of the sciences of human action whether or not they are taught at the tax-supported universities of Europe or to American college students in the hours not occupied by sports and amusements. But it has been possible in most schools to dare to substitute for praxeology and economics subjects that intentionally avoid reference to praxeological and economic thought only because internal opposition is present to justify this practice. Whoever wants to examine the external difficulties that beset our science must first of all concern himself with those which arise from within."¹

This thesis, it is hoped, has done just that.

¹Ludwig von Mises, Epistemological Problems of Economics, op. cit., pp. 185-6


________. "What is America?" *The Saturday Evening Post,* October, 1978, pp. 16-104.


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