the recognition device used by the replicase in selecting molecules for replication. In addition, the progress and details of the replication mechanism can be examined with far greater certainty of obtaining precise interpretable information. Finally, and most important, are its implications for extracellular Darwinian experiments. The fact that we can now start such selection experiments with a molecule of completely known sequence means that we can finally exploit the information inherent in this experimental system. For the first time, we can now ask, and answer, the following question: "Precisely what base changes have occurred in mutating from one phenotype to another?"

We have already shown (*28*) that, small as it is, MDV-1 RNA yields mutants with a prespecified phenotype, and one of these has been sequenced. It would be surprising if the data gained from such studies do not lead to new and perhaps unforeseen insights into the evolutionary pathways available to replicating nucleic acids.

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The Nature and Sources of Irrationalism

Charles Frankel

Although the 20th century has been marked by an almost unbroken series of challenges to the authority of rational methods of thought, the current clamor against these methods probably has certain unique features. On the whole, established churches and governments have not encouraged it. It is not associated with any widespread popular movement of moral or religious revivalism, nor is it, in the minds of most of those identified with it, a conservative movement whose purpose is to restore authority and recover old values. On the contrary, they think of it as, among other things, an effort to relieve oppression and injustice and to break through to new heights of vision radically liberative for the human spirit. Indeed, this movement is mainly a creature of what is called, or miscalled, the "liberal Establishment." Both in the United States and abroad, its most sympathetic audience comes primarily from the more comfortable and better educated classes, and its central inspiration and emotional thrust have been sustained by people belonging to universities and other institutions whose traditional commitment, officially, has been to the practice and propagation of rational inquiry.

Nevertheless, despite the setting and auspices of the present revolt against reason, it is essentially not new in its content. I speak, of course, not of irrationalism in behavior or in the organization of society; in both of these, unhappily, a certain spirit of creative innovation still manifests itself. I speak of irrationalism as a studied and articulated attitude, proudly affirmed and elaborately defended, which pronounces science—and not only science, but, more broadly, logical analysis, controlled observation, the norms and civilities of disciplined argument, and the ideal of objectivity—to be systematically misleading as to the nature of the universe and the conditions necessary for human fulfillment. Despite the new language, half jargon and half slang, in which this irrationalism is expressed, the actual assertions on which it rests can be found in classic treatises on mysticism and in the utterances of many traditional philosophers and poets. The breathtaking departures from the thoughtways of industrial civilization, or of Western civilization, that are announced each month or each week are simply updated and, usually, bowdlerized versions of views that go back to the Greek mystery cults and the pre-Socratic philosophers Heraclitus and Parmenides.

What validity is there in the claims that this irrationalism puts forward to be accepted and believed?

The author is Old Dominion Professor of Philosophy and Public Affairs at Columbia University, New York 10027.

Five Propositions of Irrationalism

Although current irrationalists speak out of very different kinds of experience (*1*), the degree to which they rest their case on the same set of fundamental propositions is striking. These can be reduced, I believe, to five.

1) The universe man inhabits is divided into two realms—one of appearance, the other of reality. The former is marked by accident, doubt, uncertainty, coldness, alienation. In the second, doubt is dispelled, time and death have no sting, one is embraced by a world congruent with one's deepest desires, and discord and trouble are dissolved in an encompassing sense of harmony and coherence.

2) The reason that people mistake appearance for reality is that their definitions of reality rest on biased presuppositions which their culture, class, and practical concerns impose upon them. "There is no such 'condition' as 'schizophrenia,' but the label is a social fact and the social fact a *political event*," says R. D. Laing (*2*, p. 100). In the same vein, Theodore Roszak writes, "*Reality* marks out the boundaries of what might be called the collective mindscape, the limits of sane experience" (*3*, p. xxiv). Irrationalists differ as to the best way to break loose from this enslavement to collective prejudice, but they agree that truth and reality are achieved only when experience is approached in nakedness of mind. Thus, criticizing Freud, Roszak writes: "What Freud never wished to face squarely was the fact that the line we draw between the world Out There and the world In Here must be predicated on metaphysical assumptions that cannot themselves be subjected to scientific proof" (*3*, pp. 74–75).

3) Human nature exhibits this ontological dualism between appearance and reality. A war goes on inside each person between the "cerebral" and the "emotional," the "conscious" and the "intuitive," the "empirical" and the "rhapsodic." And when the rational department attempts to extend its domain beyond its own rightful borders, it dehumanizes man and devalues nature. To quote Roszak again (*3*, p. 96):

> Our proud, presumptuous head speaks one language; our body another—a silent, arcane language. Our head experiences in the mode of number, logic, mechanical connection; our body in the mode of fluid process, intuitive adaptation; it sways to an inner purposive rhythm. . . . It may seem that to speak this way is to deal in a crude dichotomy of human nature. It is. The dichotomy that tears at our personality *is* crude; but I did not invent it. I have only inherited it, like you, from the antiorganic fanaticism of Western culture.

4) The unmistakable sign that we have gone astray is when we arrive at states of consciousness in which subject and object are distinguishable. Thus, science is to be distrusted on principle, for it rests on the distinction between the subjective and the objective. Describing the diverse influences playing on the "sensitivity training" movement, Kurt Back writes (*4*, pp. 207–208):

> Perhaps the common thread . . . is the rejection of the intellectual aspect of life or, in somatic language, the influence of the cortex. . . . It is a concerted effort to turn away from the emphasis on intellect, on tool-making abilities of the human animal, on classification, in short, on mediation of any experience through reflection, and to push the participants toward a direct experience that is not thought about and not analyzed.

Similarly, we know we have gone wrong morally and emotionally, according to irrationalism, when we feel separate from other human beings, or alienated from nature, or divided within ourselves. The possibility that, in the irreducible nature of things, there can be discordances between the human creature and its environment—that nature can be less than a perfect fit for man—is not contemplated. If there is discordance, human beings are responsible: we are doing or thinking something wrong. Specifically, when we are dissatisfied with our place in the scheme of things, it is because we have allowed the so-called "rational" mode of comprehension to dominate the others. Roszak writes, "The greatest truth mankind learned from its ancient intimacy with nature [is] the reality of spiritual being." And he argues that, if we forget this, we "will lack psychological completeness" (*3*, p. 8). Evidently, what does not make us psychologically complete cannot be true.

5) Accordingly, all human problems, cognitive, emotional, and social, are reducible to a loss of harmony—harmony between man and his environment, his head and his heart, his ideas and his instincts. Thus, beyond its assertions about the nature of man and the universe, irrationalism offers an image of the good life. It is a life free from unrest and unease—a life released, through passionate ecstasy or rapt contemplation, from the regretfulness of time, the vexations of decisions, and the risks of fallibility. Whether or not one agrees with irrationalism, it is easy to understand why it has been perennially attractive. It offers the vision of a kind of peace and unequivocal acceptance and commitment from which the normal perils, pains, and worries of human existence have been removed.

But what of the soundness of these five propositions?

First Proposition Examined

Irrationalism is not alone in distinguishing between "appearance" and "reality." The scientific process regularly does the same thing, in two ways. First, it resists or reinterprets the gross evidence of our senses (consider Copernicus and Galileo, for example) in response to the demands of over-arching laws and theories. Second, it pierces the curtain of established belief, replacing ideas supported by conventional opinion or official authority with other ideas, for which independent and impersonal evidence exists.

Indeed, it is passing difficult to understand why the myth persists among many educated people that rational inquiry thins out the world or deprives human experience of its extra dimensions of meaning. Thanks to science, the present world makes available to those who will do their homework subatomic particles, DNA, marginal utilities, relative deprivations, the Minoan culture, the story of evolution. This adds immeasurably to the import to be found in daily existence, to the connections to be drawn, to the implications to be read, to the "unseen things" to be adduced.

What science and rational methods *have* done to "denude" nature is, first, to have introduced ideas for dealing with it that require specialized study and that are not easily available to the man on the run, and, second, to have deprived nature of her anthropomorphic and animistic qualities. This latter, above all, is responsible for most of the assaults upon science. It presents a nonhuman environment no longer perceived as subject to moral law or shaped to the size of human emotions. That this is the character of the natural universe is, admittedly, a harsh lesson to learn. For the sake of argument, agree that it may even be a false lesson. Still, it draws a sharper distinction

between "appearance" and "reality" than does anything in the scheme of philosophical irrationalism.

It is against this background that Roszak's preference for the deliverances of "the dark mind" are, I think, best understood. Why, he asks, should we prefer the deliverances of our minds when awake to the deliverances of our minds when they dream (*3*, pp. 84 and 87)?

> We in the contemporary West may wake each morning to cast out our sleep and dream experience like so much rubbish. But that is an almost freakish act of alienation. . . . It is the physicist's time we march to, time as time would be if there were no living thing to transform existence into experience; time such as machines can measure out in the lockstep of equal and abstract measures. The most threatening heresy of the dark mind lies precisely in this: it brings us to the still center of time's axis, where the turning wheel no longer turns. . . . It is just this lawless defiance of literalness and necessity that the intolerant waking mind rejects. . . .

But the "intolerant" waking mind, if one looks closely at the matter, merely rejects the idea that our dreams, shot through with moral and emotional import and constructed to the shape and dynamic of our fears and wishes, are as solid a basis for a veridical account of nature as the experiences of our more consciously critical and disciplined waking lives. Of course, logicians and scientists often forget or ignore their dreams and push them below the threshold of consciousness. But this implies no philosophical or intellectual commitment special to them. Mystics and rhapsodists do the same thing. I know of no scientifically informed individual, or partisan of reason in philosophy, who, as a matter of principle, dismisses dream experiences as "so much rubbish." Dreams are often a springboard to remarkable inspiration, in science as well as in poetry; and, at the very least, dreams tell a good deal, if analyzed, about the nature of the human self and human experience. But that necessary analysis is not performed while one is dreaming.

In fact, it is a caricature to suggest that we in the contemporary world ignore "the dark mind." Our interest in dreams is not less than that of our ancestors; like them, we try to tell our fortunes from our dreams. It is only in our method of inquiry into dreams, and in our theories about their causes, that we differ from them.

In sum, when one looks at the issues with some concern for facts and intellectual precision, irrationalism's distinctiveness lies, it seems to me, not in the fact that it asserts a difference between "appearance" and "reality," but in the fact that it applies a priori standards in determining what "reality" must be. It knows in advance that this "reality" must meet the human heart's desires, even the wildest desires welling up in our nighttime visions. In contrast, when scientific investigation distinguishes between what is "real" and what is only "apparent," the distinction is always specific, made in a particular context and as a consequence of a particular inquiry.

Is "Rational Inquiry" a Deception?

The irrationalist asserts that the methods of so-called "rational inquiry" are also compromised: they rest on presuppositions and therefore tailor the conception of reality to antecedent standards. Is this charge a just one? I think not. It involves a triple fallacy.

First, no inquiry of any kind is possible, nor is any commerce of the human creature with its environment, without assumptions or, at least, specialized and selective thrustings and responses of the organism. The irrationalist regularly suggests that he conducts his own explorations of reality without falling prey to this necessity of human existence: he floats on the Sea of Experience, absorbing all, imposing nothing. But such a mental performance would teach nothing, yield nothing; it would be an encounter with the unidentified, the indefinable, the unpicturable, the unrememberable. Moreover, from a psychological point of view, such a performance is impossible. Even in dreams, when something outside the dreamer's control seems most powerfully to take charge of him, his wishes, fears, and inveterate assumptions are patently present. That the irrationalist makes his own assumptions is illustrated by Laing's stunning statement that there is no such thing as schizophrenia and that the label "schizophrenic" is "a social fact and the social fact a political event." But what is a "social fact," and what is a "political event"? Do not these phrases also carry a load of assumptions with them?

The second fallacy is the notion that all presuppositions, merely because they are presuppositions, are equally impositions on the nature of things. But the fact that a process of thought called "scientific" rests on presuppositions does not put it on the same level with every other process of thought. Everything depends on the specific content and character of the presuppositions in question and on the controls that exist for checking, correcting, or rejecting them. Thus, we may agree or not with the soundness, say, of Freud's basic ideas, but, Roszak to the contrary notwithstanding, drawing a line at a certain point between "the world Out There" and "the world In Here" does not involve an unargued metaphysical assumption that is ever after free from correction. The line as we draw it is an invitation to conduct investigations in certain ways. If the investigations come up with nothing, or with monstrous findings incompatible with the stock of our well-tested beliefs, we have reason to draw the line differently.

Rational methods, whether in the law, physics, child-rearing, or personal hygiene, begin with presuppositions that are supported by successful experience in the past. They are sustained only as long as they meet successive challenges and serve as elements in explanatory frameworks that guide inquiry to reliable new results more effectively than do alternative frameworks. Such presuppositions, meeting, as they do, carefully elaborated standards of intersubjectivity, reflect the coordinated, but uncommanded, assent of a community of disciplined observers. "Reason" is often described in ethereal language. From a sociological point of view, however, it is simply the name for forms of behavior by which individual beliefs are concerted without recourse to force or authority. It codifies the elementary principles of courtesy without which the maintenance of a liberal civilization is impossible.

Nor does this mean that the scientific community is like a closed club that maintains its insular view of the world by establishing special conventions which prevent any alien point of view from breaking through. The intellectual history of science is a series of revolutions. In contrast, irrationalist thought turns and returns upon itself.

The third error in the irrationalist position derives from its own controlling preconception. The irrationalist holds that any presupposition is necessarily misguided because it is inevitably

partial and selective and therefore distorts reality. This is the Wholistic Assumption—the view that all things are internally related in such a way that they are parts of one single organic entity, so constituted that if it changes in any one respect it must change in every other respect. The assumption persists from Parmenides to F. H. Bradley; it is recurrent among mystics. Jonathan Edwards stated it simply and lucidly when, as a very young man, he resolved to conduct his scientific studies so as to show "how the Motion, Rest, and Direction of the *Least Atom* has an influence on the motion, rest and direction of every body in the Universe; and to show how, by that means, every thing which happens, with respect to mote, or straws and such little things, may be for some great uses in the whole course of things, throughout Eternity . . ." (*5*).

But this assumption, although it expresses a hope that many men of great poetic and religious feeling have fervently entertained, is not one on the basis of which anybody can consistently think or act. It would involve his wrenching into unrecognizable shape common notions on which he inevitably relies.

For example, in everyday life, as well as in science, the law, and other specialized activities, we often speak of the "nature" of a thing or a person, or the "character" of an event. When we do so, we do not mean to include all of that thing's or event's relations and traits, possible as well as actual, accidental as well as essential. This is because intelligible discourse requires us to define and limit the subject matter of the discourse and to indicate those features of it from which, in terms of some explanatory framework, others of its salient features can be deduced and explained. The "nature" of a thing, in short, is only a selected subset of interrelated properties of that thing. To discard this notion is to say that there is never anything such as accident or irrelevance; it is to say, indeed, that there is no distinction to be drawn between a consecutive argument and a nonconsecutive one.

It is this Wholistic Assumption that lies behind the statements of writers like Laing that the distinction between sanity and insanity is a purely conventional or political one. But do such propositions as that fire burns and knives pierce rest for their confirmation entirely on conventions and political fiat? And must an individual be at one with all Reality in order to escape the charge, when he asserts such propositions, that he is a victim of sectarian prejudices?

Dualistic Psychology of Irrationalism

The irrationalist's theory of human nature is steeped in the tradition of the dualistic psychology it condemns. It talks about "reason" as though it were a department of human nature in conflict with "emotion." But "reason," considered as a psychological process, is not a special faculty, and it is not separate from the emotions; it is simply the process of reorganizing the emotions, of setting up a plan for satisfying them, a scheme of relative priorities constructed in relation to the resources and constraints of surrounding circumstance. As Hume said, reason is, and of necessity must be, the slave of the passions.

To be sure, reasoning is a process with a certain emotional tone and conative thrust of its own: it involves the feeling of controlling one's feelings, of delaying final judgment, of actively entertaining alternative ideas, and of judging all ideas, one's own as well as other people's, by the same tests. The strength of the rational emotion, accordingly, is not usually equal to that of our first-order emotions. It is only under comparatively rare circumstances, and normally under fairly artificial conditions, that the second-order emotion, which is the emotion of reason, can become intense and self-sustaining, and can yield an excitement equivalent to that caused by emotions such as love, hate, and awe. This is why the mores and institutions of the scientific community and the civilities of liberal society are so important. They nourish and reward rational emotion and provide social procedures that make up, in part, for the weakness of reason as an aboriginal component of human psychology.

As a pragmatic matter, what irrationalism asks is that society invest less—or nothing at all—in maintaining the institutions, and the codes of ethics and etiquette, which have proved necessary to support the emotion of reason. Only an extraordinarily sanguine attitude about the inherent reasonableness of man's instinctual life, only a confident faith, belied by all experience, in the unforced, providential symmetry between the needs of human nature and the structure of the universe, can explain the willingness to take such a one-sided chance on human impulse and spontaneity. Far from introducing a note of disharmony, reason is a harmonizer; for it is our first-order emotions, our spontaneous impulses, which are disharmonious one with another.

The Irrationalist and Original Sin

The belief in the universe's total and perfect integration with human needs also underlies the irrationalist notion that, when reality is genuinely understood, all forms of separateness and division—within the self, between individuals, between the "subjective" and the "objective"—will disappear. The assumption is that problems of choice between competing desires will not arise; that no activities such as planning or the conservation of scarce resources will be needed; that no conflicts will arise over the distribution of these resources. (Or is it the assumption that these difficulties, which characterize the world of appearance, will be left to a class of Helots, practicing the arts of reason, to solve, while the emancipated enjoy Reality in its higher kindness?)

In brief, for the irrationalist, the universe is good; it is man, rational man, who has willfully made it evil, all by himself. Irrationalism, behind its long arguments and often impenetrable rhetoric, is an attempt to solve the ancient problem of Evil and to restate the ancient myth of the Fall.

Prometheus and the Lotos-Eater

It is in this context that the irrationalist's notion of the good life may be evaluated. Although the spokesmen of irrationalism make much of words like "ecstasy" and "rhapsody," the vision they offer of how men should live is essentially passive and wistful. It is not the image of Prometheus or Odysseus that they offer, it is that of the Lotos-Eater. The dream is of a scheme of things in which human beings face no difficult dilemmas and all good things are equally possible. What, after all, is the imperative for rationality in action? It is simply that, in human life, appearances are deceptive, impulses and desires at cross-

purposes, and time, energy, and resources limited. Irrationalism asks us to believe that these constraints do not exist in the world, not when it is rightly understood; irrationalism asks us further to believe that rational methods, which emerge to mitigate these constraints, are their cause.

Why Irrationalism?

The above consideration of the assertions on which contemporary irrationalist doctrine rests also tells us something, I believe, about its sources.

Undoubtedly, there are special features of the current scene that help to explain the particular audiences, the popularity, and the language and style of this irrationalism. Among these features are the marketing needs and habits of a competitive economy, the peculiarities of the position of youth, the drug culture, and the anti-intellectual implications of much that passes these days for "advanced" educational, psychological, and philosophical theory. The eagerness of liberal clergymen to be identified with what is, or seems, new must also be taken into account.

There are other factors. One is the damage done by uncontrolled technological change; another is the discredit done to scientists' reputation for common sense and common humanity by individuals—some of them scientists, some of them charlatans—who present, in relation to complex and grievous human problems, simplistic notions that parody scientific method. Considerable damage has also been done by scientists, among whom social scientists are perhaps the most notable, who exaggerate the amount of sound and applicable knowledge they have and who offer confident solutions to social problems—solutions that, when tried, turn out to be only a mixture of pious hope and insular moral judgments.

But when the nature and the antiquity of the arguments for irrationalism are considered, we become aware, I think, that the quarrel between supporters and opponents of rational methods represents an ancient division in the Western soul. In the disagreements between the Sophists and the Pythagoreans, Aristotelian and Augustinian Christians, Dominicans and Franciscans, Coleridge and the Utilitarians, Henri Bergson and Bertrand Russell, we have successive reprises of this drama. It rises to fever pitch when scientific discovery accelerates and when the discoveries that science makes seem more and more subversive of inherited beliefs, social creeds, habits of action, laws, or the soundness of old and cherished hopes and hates. Under these circumstances, irrationalism offers a promise of relief and immunity. There can be no doubt that, although it points only clumsily at an evil, that evil is there. The careful rational methods by which knowledge and technique have been advanced have only rarely been used to examine the purposes to which this knowledge and intelligence are harnessed. It is natural that science, in such a setting, should seem to be a Frankenstein to those who are threatened by it.

Nevertheless, to use words George Santayana wrote 70 years ago in a letter to William James, it is "intolerable that we should still be condemned to give the parsons and the 'idealists' a monopoly of indignation . . ." (*6*). Those who look beyond reason have no monopoly, either in fact or in logic, on recognizing the frivolity, inanity, ugliness, and cruelty that are abroad in the world. Without reason, furthermore, indignation can be undiscriminating; and appeals to "conscience" and "morality" become only the demand that others acclaim one's prejudices.

I would add one final point. It often seems to me that disagreements over "rationalism" and "irrationalism," at least in their milder phases, stem from a misunderstanding. A matter of taste and style is mistaken for a matter of ultimate moral and cognitive significance, leading to the kind of sweeping assertions that I have considered. But once the issues I have discussed are set aside, there still remains, of course, a difference. It is the difference between Haydn and Wagner or between Voltaire and Rousseau.

Thus Roszak, describing what he calls "the hard-edged cerebral elegance of the Enlightenment," says that "it wanted no more and would tolerate no more of life than sound logic, good prose, and exact numbers might accommodate" (*3*, p. 280). But the music of Mozart, a major product of the Enlightenment, can hardly be described simply as "cerebral." *Don Giovanni* offers a view of life in which values other than sound logic, good prose, and exact numbers are given, as I recall, serious attention. It is possible to enjoy both the poetry of Pope and that of Blake; it certainly ought to be possible, if one can't abide one or the other, to follow a policy of live and let live. Must we really demand the resolution of radical metaphysical disagreements or suggest that we occupy different levels in the hierarchy of salvation because our preferences differ in such matters?

The policy of mutual toleration was also a product of the Enlightenment, and it expressed that age's conception of rational dealings between human beings. I presume that when irrationalists attack the ideal of rationality, few of them mean to attack this practical proposal for coexistence. To that extent, they, too, make obeisance to reason.

References

1. A sample of recent books speaking for irrationalism in the sense here described includes: R. D. Laing, *The Politics of Experience* (*2*); G. Leonard, *The Transformation* (Delacorte, New York, 1972); T. Roszak, *Where the Wasteland Ends* (*3*). Lionel Trilling has described Roszak's earlier *The Making of a Counter-Culture* (Doubleday, New York, 1969) as "perhaps the best-known and also the best-tempered defense of the ideologized antagonism to mind" [*Times Literary Supplement* (17 November 1972), p. 1384]. Other irrationalist writers who have obtained a considerable following include Norman O. Brown and Carlos Castañeda. Tom Wolfe [*The Electric Kool-Aid Acid Test* (Farrar, Straus & Giroux, New York, 1968)] presents an account, in the mode of the new journalism, of irrationalism in the context of the drug culture. Kurt W. Back (*4*) offers an outsider's analysis and evaluation of the nature, setting, social origins, and incidence of "sensitivity training" and "the encounter movement."
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6. *The Letters of George Santayana*, D. Cory, Ed. (Scribner, New York, 1955), p. 81.