



TRAGEDY AND CHAOS

by

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The thesis this paper wishes to defend is that a culture that fails or refuses to acknowledge the tragic is liable to be brittle and vulnerable to internally or externally generated instabilities.

It would be impossible to offer an adequate survey here of the numerous extant definitions of the tragic. For the purposes of this paper, I will define the tragic as the conflict felt by creatures who, because of their complex nervous system, are capable of entertaining notions of infinity and yet who are in some way bounded by finite constraints. Simply, the tragic is the conflict between a longing for unboundedness and the awareness that of the necessity to adjust to a condition that is bounded.

According to J.T. Fraser, the engine for cosmic evolution is the tendency of the universe to get itself tangled up in unresolvable paradoxes. If that is indeed the case, then we might argue that the most universal of all structures is the conflict which cannot be resolved on its own grounds. Although it would be of immense interest to trace the history of such paradoxes from the most primitive stages of the universe

to the present, for the purposes of this presentation, I will focus on sexually reproducing life. As I will argue shortly, the immense benefits of sexual reproduction are paid for by death. Furthermore, when creatures attain a certain level of neural complexity, they become aware of their mortality. At the same time, they begin to imagine the world as it will be after their demise. From this realization, although I doubt simply in reaction to the knowledge of death, intricate brains begin to project themselves into all sorts of non-real realms: the afterlife, fictional worlds, transcendental dimensions, etc. Just as sexuality itself is the irresolvable paradox between life and death, awareness of this paradox by creatures whose nervous systems have evolved to such an extent that they are able to reproduce by non-physical means (the dissemination of information) is itself a highly evolved and considerably more complex version of the original paradox. I would argue that the deep cosmic and biological roots of the tragic lie in irresolvable paradox in general and the particular form it takes in the consciousness of self-reflexive, purposive, and mortal creatures such as us.

Having outlined the general contours of my argument concerning tragedy, I will now discuss at some greater length the specific biological underpinnings to our sense of the tragic. In general, I contend that the

tragic has its basis in the phenomenon of sexual reproduction insofar as it generates the unresolvable conflict between open-ended genetic innovation and death. As I suggested above, before the emergence of sexual reproduction, living organisms were in principle immortal. One attribute that distinguishes humans from most, if not all, other animals is that we know that we are going to die. But although knowledge of impending death is probably a uniquely human phenomenon, death itself is not. All living things can die. However, not all living things must die. Before nature invented sexual reproduction, death was a chance occurrence. There is no reason why, in principle, a single cell organism cannot live forever, and, in fact, by reproducing asexually through splitting, it literally does. It is only with the introduction of sexual reproduction, with its recombination of genetic material, that death is introduced as a necessary condition of life. It is because sexual reproduction carries the tremendous evolutionary advantage of rapid genetic variation that the death of the individual is important to the robustness of the species. Arguably, death kicked evolution into a higher gear, one that eventually resulted in creatures such as us who are condemned to awareness of our certain demise. Therefore, tragedy is associated with the paradox that many humans feel the need to sacrifice

themselves for a future or a transcendental cause that they know in all likelihood they will not be around to experience.

As Albert Camus argues, the tragic is a relation: on one side is the capacity of the human brain to imagine all kinds of transcendence; on the other side, is the awareness of or desire for a range of different kinds of finitude, chief among which is physical death. To reside in the tragic requires that one inhabit these contradictory vectors simultaneously. Following Camus, I believe that human beings are wont to avoid the unresolvable paradox of the tragic by imagining that either the need for transcendence or the awareness of finitude are an illusion. Therefore, this paper will first explore a number of ways in which a culture can refuse to confront the tragic. Then, it will suggest how the theory of dynamical systems might suggest a non-nihilistic concept of tragedy.

Since the tragic is here being conceptualized as a relation between two opposing human pulls -- the pull of the infinite and the pull of the finite -- it follows that there are two ways to deny the tragic. On the one hand, one can seek to reside exclusively in the infinite. On the other hand, one can seek to reduce oneself to the bounded. In the first camp would be mystics, religious zealots, political ideologues, idealist philosophers, and psychotics. In the second camp one would find

behaviorists, scientific reductionists, analytic philosophers, alienated or displaced individuals, materialists, and psychotics. By radicalizing Cartesian dualism into two absolutely different sorts of substances -- unextended spirit and extended body -- and by deciding that ultimate reality resides in one side of the equation, one effectively camouflages the pathos of the irresolvable conflict that results from having a neocortex that can simultaneously envisage the infinite and its own limitations.

I wish to emphasize that the debilitating effects of refusing the tragic on a cultural level are not of equal magnitude when the finite is denied as when the infinite is denied. In general, a culture that sees itself as pure transcendence is likely to be more creative than one that reduces itself to the finite. Although neither is as healthy as an acceptance of the tragic, idealism is likely to result in greater cultural vigor than materialism. However, and again in general, idealism, especially in the form of political and ideological idealism, is potentially far more dangerous than materialism. Materialist cultures may atrophy, but they rarely engage in genocide.

I will now discuss eight ploys to finesse the tragic. They will be organized into two groups, according to whether the finite or the infinite

is emphasized.

Among the ruses that emphasize the finite are:

1. A reduction of time to the present.

Cultures that forget their past and ignore their future by reducing time to the present or to a limited horizon around the present are seldom able to understand, no less contemplate, the tragic. One of the classic forms taken by the tragic is the situation embodied in Oedipus the King in which a representative of the new humanism is unable to escape the clutches of the older heroic culture. To appreciate Oedipus's dilemma it is important to see him torn between two epistemologies: the traditional view that knowledge is gained through revelation and the emergent view that a human being alone, simply through the use of reason, can attain the truth. Without a broad historical sense, it would be impossible to appreciate the irresolvable paradox that fuels Oedipus the King.

Among the many examples of cultures that have rejected the tragic by ignoring the future and the past are extremely materialistic cultures, such as certain aspects of American society, and cultures that have been forcibly removed from their traditions and ways of life, such as Native Americans and African slaves.

future, it is very likely that a kind of nihilism will ensue. Traditionally, human beings imagine themselves as participating in a broad historical drama in which they are caretakers of the past and nurturers of the future. Frequently, the interests of the future are not identical with the present interests of the individual. Sacrifice is generally a decision to give up present advantages for either future or transcendental profits. We sacrifice for our children or for our gods because we have made a prior decision that their interests take precedence over our desires for immediate satisfaction. When we no longer believe in the importance of the future or of the transcendental realm, then we feel no compulsion to sacrifice. The very notions of sacrifice begin to be viewed cynically and a regime of nihilism is a likely consequence. A particularly poignant contemporary example is the plight of the inner city in the US, where a generation of young males lives a thoroughly deconstructed life because they are convinced that the future is a luxury that is denied them.

a. A subset of (3) is the devaluation of reproduction or of the significance of children. In the same communities that I mention above, reproduction all too frequently occurs in a mindless fashion and children are neither honored nor brought up in a caring and loving fashion.



b. A second subset of (3) is the devaluation of brain children, such as scientific, philosophical, or artistic ideas and artifacts. Whenever a culture becomes blind to the value of non-material products of the human mind, what Karl Popper calls World 3, and indifferent to their nurturing, it is in danger of losing its vitality. Many of the world's dictatorships have adopted policies that are inimical to the production of brain children for which humans are likely to sacrifice themselves. Interestingly, in contemporary American culture, it is a bromide of the now hegemonic conservative radio talk shows that government funding for the arts is a needless expenditure of money that could be better spent on more practical concerns.

The second ruse to paralyze the tragic is to focus exclusively on the infinite. Among the means to this end are:

1. A reduction of time to the past or future.

Cultures frequently see the present as insignificant in relation to the past or the future. For example, if the present is judged inferior to the past or to a projected future, then it is likely that it will be devalued. It is likely that a culture that denies the tragic by forsaking the present will see itself as either fallen from or as a propaedeutic to a golden age. In either case, cultural experimentation and creativity are

likely to suffer. In the case of art, cultures that drown out the present through an emphasis on past perfection, art will tend to be academic or stereotypical. Cultures that see themselves as vehicles for future glory will tend to create art that is stiffly otherworldly or mythic. Examples are many traditional cultures and Ottoman Greece.

2. A belief in an assured telos of history.

Whenever a culture sees the present as merely a step in a grand march whose conclusion has in some way already been determined, a kind of rigid linearity is likely to set in. Examples are Marxist societies and strict Calvinist determinism.

3. A belief in the literal immortality of the soul or of the resurrected body.

If a human society assumes that the future available to a human being is infinite, then there is no urgency to life. Of course, immortality also implies that bad decisions can haunt one forever, and it is probable that if immortality were to become a reality new higher order kinds of finitude would emerge, but I suspect that the typical reaction to the fantasy of immortality is a kind of lethargy. An example is Southern California before the riots.

To summarize, if the tragic is seen as a relation between two

opposing vectors, that pointing toward transcendence and that pointing toward finitude, then a disavowal of either direction is tantamount to a rejection of the tragic.

Having discussed these stratagems to deflect the pain of the tragic, I will now attempt to suggest that chaos, or the study of nonlinear dynamics, offers a way to reinfuse culture with a healthy sense of the tragic.

Dynamical systems in a far-from-equilibrium state can begin to display chaotic characteristics. Among the hallmarks of chaos is what is known as extreme sensitivity to initial conditions. Chaotic systems are nonlinear mainly because they are generated by positive and negative feedback. Whereas negative feedback tends to damp perturbations in a system, positive feedback has the opposite effect -- when the output of a nonlinear system is fed back into the system, a slight change in the input can very quickly result in massive changes in the system itself.

Amplified by a geometric feedback loop, the beating of a butterfly's wings in Seoul, Korea can, as the old saw of chaos would have it, change the weather in Dallas, Texas.

In practical terms, extreme sensitivity to initial conditions means that whereby in linear systems small inputs tend to produce small

systemic changes, in chaotic changes the most insignificant of perturbations are in a position to cascade through the system producing significant changes. In other words, in chaos the difference between the local and the global is not as clearly delineated as it is in non-chaotic situations. The local can quickly escalate to global proportions, and then, just as quickly, recede to insignificance. Furthermore, as opposed to linear systems, which allow calculations of future states, chaotic systems suffer no short cuts. In order to know the future state of a chaotic system, the researcher must set it in motion and then wait in real time to observe the evolution of the system. It is as if the price paid for the gain in agency granted by extreme sensitivity to initial conditions is a corresponding loss in long term predictability.

One of the bromides of contemporary culture is that the world has become so complex that the individual has lost his or her potential for effective agency. It is in fact true that the cultural and technological world the human species is in the process of creating is, by the standards of most of our ancestors, maddeningly labyrinthine. It is reasonable to assume that in such a world, the individual would become increasingly marginalized and cede his or her agency to larger social units such as corporations, institutions, and governments. However, this would be the

case only if the growth in complexity our world is undergoing were strictly linear. If, as it appears, the burgeoning complexity of the world is largely nonlinear, then in fact the agency of the individual might be rehabilitated. For if the individual functions in a nonlinear social environment as a minor perturbation does in a chaotic system, then there is every reason to believe that as culture and technology expand in nonlinear complexity the potential agency of the individual actually multiplies.

It appears, therefore, that contrary to expectations, a complex cultural environment might increase the potential agency of individuals. However, this gain in agency does not come without a price. To extend the economic metaphor, let us consider the fate of an investment in a linear and a nonlinear environment. In a largely linear investment vehicle, such as Certificates of Deposit, an investor sacrifices upside potential for predictability. In general, unless the entire economy were to fold, an investment in a CD will yield a fixed amount of interest. However, in a highly nonlinear environment, such as the futures or options market, although a small investment could yield enormous profits, there is little assurance that the entire investment will not be lost. In general, the more secure the investment, the less the potential gain, the more

uncertain the investment, the higher the possibility for profit. In the language of chaos, we could translate this bit of financial wisdom as follows: linear systems sacrifice volatility for predictability while nonlinear systems sacrifice predictability for volatility. An agent in a nonlinear system could change the entire world through his or her intervention, however this potency must be paid for by the absence of any assurance that the intervention will have any effect whatsoever, or, in the worst of circumstances, that it won't have effects that are detrimental to the robustness of the system.

The notion of extreme sensitivity to initial conditions has important consequences for the theory of tragedy that I have been outlining. It will be recalled that I am defining the tragic as the irresolvable conflict between transcendence and finitude. It is possible to translate, mutatis mutandis, these terms onto the vocabulary of chaos. An agent functioning in a chaotic environment is potentially able to alter the entire system through a limited intervention. In other words, although chaos doesn't offer certain traditional forms of transcendence -- those associated with otherworldliness, for example -- it does lend itself to transcendence in the sense of the possibility of bringing about global social change.

However, there is a price paid for the potentially unearned efficacy

of a single agent in a nonlinear chaotic environment. Much as in the options market, where a small investment can reap inordinate rewards for the fortunate investor but only at the cost of potentially disastrous losses, the expense of chaotic agency is an essential insecurity concerning the results of one's efforts. In other words, although the beating of a butterfly's wings could, in principle, affect weather patterns a continent away, it most probably won't. One of the sacrifices that an agent in a chaotic environment must make is that, as opposed to a nonlinear context, in which pushing two bodies twice as far apart as they were initially guarantees that the gravitational forces between them will be reduced by a fourth, his or her results are never predictable except in a statistical way. Furthermore, in most contexts, the odds can be extremely poor. Although it is possible that some of my ideas expressed in a class in Dallas could explode nonlinearly and result in legislation that will change the political texture of life in the U.S., I wouldn't bet the farm on it. However, the loss of certainty is not the only cost for the possibility of windfalls in chaotic systems. By locking into a complex pattern of feedback loops that he or she did not foresee, it is possible that our benevolent meteorologist here in South Korea could unleash the power of a butterfly breeze only to learn that it has parlayed itself into a tornado

that devastated large segments of North Texas. A second cost of chaotic agency is that the generative power of nonlinearity coupled with the extreme complexity of real world systems creates a context in which the causal relation between intentions and effects is rendered highly problematic. Of course, such is the case in most systems. Except in highly rudimentary linear systems, it is often difficult to correlate input to output. However, when systems approach the maddening nonlinearity of human social structures, it becomes highly likely that, even if we assume that it is possible to know what the good is, efforts to realize it are diverted from the agent's original intentions and end up having evil effects. The folk wisdom that imagined the composition of the road to hell had, perhaps, a sophisticated intuition of extreme sensitivity to initial conditions.

In conclusion, I would like to summarize the discussion so far and then suggest some possible implications for the theory of tragedy I have been developing. First, let us return to the theme of this committee, the biological foundations of aesthetics. In general, I take foundation to mean something like epigenetic predisposition in the sociobiological sense. The question, then, is whether it is possible to locate in the biological realm a kind of epigenetic rule for the tragic. If we define the tragic as the



unresolvable conflict between transcendence and finitude, as the tendency of the human mind to project itself beyond temporal or physical constraint while periodically falling into awareness of its rootedness in the plodding rhythms of organic and inorganic matter, then the tragic can be said to be founded on the fundamental conflict that defines sexual reproduction: the conflict between the fever of creativity brought about by genetic variation and the dull thud or welcome port of death. Of course, until biological entities develop a nervous system complex enough to become aware of their own condition, the conflict inherent in sexual reproduction is not understood as such, although it is probably felt in some species specific way. But with the advent of the human brain, the conflict that defines sexuality has assumed a new form that is both more potent and more pernicious. Humans know that they are going to die at the same time that they are visited by visions of permanence, eternity, and transcendence. The tragic, then, is simply the complexification of a fundamental biological conflict into tension so unbearable that most people and most societies develop elaborate ruses to disguise it.

It is pretty much of a commonplace that in our postmodern era we don't have much of a taste for the tragic. According to J.T. Fraser,

By its very nature, tragedy depicts a world in which final victory over evil is impossible. This is an unpopular view for a civilization that dogmatically maintains that all problems can be solved.

It is of course true that a legacy of our ebullience over technological and scientific progress is that as a culture we prefer not to consider failure. And yet, the signs of certain kinds of failure are all around us. Furthermore, those of us who grew up in the manic world of Dr. Strangelove know that lunatics with their fingers on the trigger can achieve transcendence and finitude simultaneously and nearly instantly. It is certainly true that excessive optimism and excessive pessimism can coexist in a kind of societal cognitive dissonance. And it is also true that either of these two moods can be fetishized into a world view that forecloses the possibility of encountering or experiencing the tragic. Nevertheless, I would like to suggest another diagnosis of the present historical moment. I suspect that our aversion to the tragic stems not simply from a Pollyannish refusal to confront evil nor simply from fear of what madmen with a bomb can do, but also from a growing, although still fairly unconscious, awareness that our world is becoming so complex that

traditional forms of causality no longer describe it accurately. If, as I have been suggesting, linear forms of causality need to be replaced by nonlinear ones, and if on some level we have been aware of this shift from some time, then our resistance to the tragic might stem not from a kind of lethargy occasioned by a loss of agency per se but from a growing awareness that one kind of tragic agency -- the belief that it is possible to bring about global change -- being nonlinear, can no longer be trusted. In our contemporary world, agency is more like a bet than an investment, or more like an investment than a prediction. Of course, to some degree, social agency has always been to a large degree nonlinear. Today, however, it is felt to be so by more and more people. That in itself should not be reason enough to disavow the tragic. After all, nonlinear agency is democratic, giving one a fighting chance to effect significant changes without a retinue of men and elephants. However, it is also more maddeningly random than most individuals are willing to countenance. We therefore retreat into fantasies of bucolic nineteenth century American villages in our attempt to finesse the truly tragic implications of the world we have created, a world in which transcendence suffuses our lives but seems to be out of our control.

As I argued at the beginning of this presentation, I believe that an

index of cultural health is the capacity of a people to acknowledge and live in the paradox of the tragic. I fear that our culture has little sense of its own finitude, a degraded sense of transcendence, and no confidence in the potency of the individual. I would suggest that one of the reasons for this state of affairs is that the tragic has itself evolved from that faced by Oedipus, for whom, although there was no good decision, the decisions available were clear, to a hazy tragic environment appropriate to a highly complex social and technological world. Today's tragic hero must live in the unresolvable conflict between transcendence and finitude without a sure sense of what transcendence or finitude mean or how his or her actions can succeed or fail.

It is my hope that chaos offers a way to reinfuse culture with a healthy sense of the tragic. The idea of sensitivity to initial conditions is a double-edged sword. On the one hand, it is capable of rehabilitating the notion that an individual has agency even in a world as complex as the one the human species is in the process of creating. On the other hand, it also suggests that there is no real way of knowing whether an individual's actions will be inconsequential or even detrimental to the robustness of the system. The tragic uncertainty of a finite individual agent in a chaotic system requires a peculiar kind of courage. As the Existentialists

argued, an individual must confront with lucidity the fact that although he or she is responsible for the future there is no guarantee that his or her actions will in fact be in the service of the right future. Such a person must be willing to work for a future they cannot with certainty identify as the most desirable one. Furthermore, he or she must be capable of devoting him or herself with passion and commitment to projects that are likely in the end to turn out to be either counterproductive or trivial even if they are executed flawlessly. Finitude, which in the old dispensation was usually seen as something like death, destiny, weakness, or the will of the gods, must now be understood as all that plus the uncertainty swirling in the heart of chaos.