AT YOUR OWN RISK: A SOCIOLOGICAL LOOK AT RISK ASSESSMENT AND WATER QUALITY STANDARDS

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ABSTRACT

Science allied with centralized bureaucratic organization when articulating and enforcing water quality standards creates a monster. Assigned risk does not enhance water quality for the public but merely standardizes it. Assumed risks by the public should set the parameters. Scientists should test for the consequences of such assumed risk. Hermeneutics allied with scientific testing establishes both a scientific basis for inquiry in the field of water quality as well as reduces the costs of enforcement and public education.

KEYWORDS

sociological perspective, measure of central tendency, professional orthodoxy, paradigms, dichotomized standards, hermeneutics, stratified random sample, open inquiry

INTRODUCTION

Sociologists look for patterns in human relationships and then, using what they perceive, attempt to generate and to verify alternative insights about the actual nature of behavior in a given setting. They can clarify the *status quo* . They can create new models which better relate the behavior to the activities and desired outcomes. The organizers of this conference invited me to attempt the latter.

Given the working title: "Godzilla Meets the Andromeda Strain:" Big Government confronts the Paradigms of Certain Science: How to Avoid the Conflict?, I set out to examine the problem fully

unaware of its basic dimensions. What can sociology contribute to this discussion? What social patterns dominate professional behavior in water quality? What is the social meaning of risk? What alternatives might make water projects and the lives of those who design and use them more effective and worthwhile?

In Search of Godzilla

Having no previous background in water quality , I do not pretend to know or to comprehend the full depth or breadth of the issues and variables which planners and engineers must confront. As an 'outsider' I took a look at the overall pattern of what was being done and came away with some insights which some, if not all, may find useful.

After being swamped by the minutiae of details, I decided that I needed to know how the standards which measure risk were established in the United States. I made an appointment to meet with the person designated to coordinate water quality standards at the US Environmental Protection Agency (EPA) in Washington, D.C. It took three weeks to make the contact. It could only be made through my Congressperson (The EPA works for Congress and the President, not for the private citizen.) After taking the wrong freeway exit; finding the massive EPA Building and then the 'correct' entrance (I was turned away from two others), and finally clearing security, I arrived late for my appointment at "Control Central." [Godzilla is Great indeed.]

Centralized Standards as Ideals

Equally difficult to locate was the determination of risk because it has two tiers and many complicating dimensions. After publishing the methodology and after inviting peer and public review, the determination of what constitutes water pollutants, I discovered, are set by the Research and Development staff at EPA . Although revised every five years, following their "scientific tests, the list of dangerous pollutants remains the standard for water quality; the fifty states monitor their water for pollutants on the list, at least, once every three years. Once the laboratory research determines that substance 'y' at 'x' concentration is unacceptable they publish the specific thresholds. With pride my host assured me that the list being scientifically derived "cannot, therefore, be altered." In less abstract terms, this means the list of pollutants are ideal, optimal and valid. Most interestingly, however, they are not the operational standard.

The Operationalized Standard Is a Local Problem

Operational standards for water quality are delegated to the fifty individual states. Nevertheless, the EPA criteria remain the optimal norms for water quality in the United States. "Norm" is the appropriate term here because the EPA sets bench mark standards for lists of pollutants--organic and inorganic--which, in turn, mandate regular monitoring by the states for each individual chemical variable. Unwilling or unable to police its criteria, EPA's delegation of accountability for these standards and their enforcement to the states gives the illusion of greater flexibility. In fact, it frees them of the political liability and relieves them of the huge enforcement costs.

The added explanation for this is politics: A large federalized government system demands diversity. The practical reason, I suspect, is that the criteria are too complicated and extensive to enforce thoroughly.

Uniform Standards Create a New Orthodoxy

In terms of an overview of the pattern of behavior, however, these criteria serve as immutable *truths*. All subsequent standards of risk remain accountable to these EPA standards. Risks thus become ordinal measures off a fixed absolute. You may not change the criteria; you may only change its ranked significance to conform with local or state circumstances.

This highly centralized pattern of identifying the essential criteria for pollutants has been duplicated by the World Health Organization. As the international agency which alerts all nations of the danger related to the consumption and use of water, WHO, with the weight of natural law, now seeks to establish its standards worldwide. Since the consumption of water is necessary for human survival, consuming any of their identified pollutants now becomes life-threatening in a direct, causal relationship.

If this were true, then most of the world's population would be dead. Instead, longevity has increased by 10-20 years world-wide in the last 40 years. With greater identification of pollutants and the "scientific" identification of the negative effect, we still progress to greater longevity, albeit despite the now "known" greater risks. Clearly the issue is more complex than the conceptually simple, bureaucratic assumptions rendered as criteria for determining what is wrong with our water.

What has been declared as "science" is, in fact, professional orthodoxy. Having narrowed and restricted the field of inquiry, professional orthodoxy has limited our ability to focus on the actual needs of water analysis. Water's symbiotic relationship with earth-bound organisms, most significantly, ourselves has been reduced to a regular triennial review of chemicals and crud. The question of epidemiology is not only ignored, it is surpassed by these higher standard of "purity."

Classical Notions of Truth Institutionalize Inquiry

By examining the operational logic, the flaws of the current system become clearer.

As with Plato and Aristotle in the Third Century, B.C., the operational logic assumes that we live in a rational universe, analogous to the human mind, and "discovery" is tautological confirmation of that fact. Therefore, what is bad in the microcosm is bad in the macrocosm.

Using Newtonian, Seventeenth Century thinking and invoking the Second Law of Thermal Dynamics, we may simply assume that any quantitatively isolated variable "causes" evil to infest water.

Finally by enshrining this logic in a hierarchy of power, government bureaucratic agencies, identification of pollutants and their consequences for human harm stand unquestioned. They are official "scientific fact." They are the footprints of Godzilla.

This is not to say, that pollutants are harmless, but it is to say that the method by which they are identified, the way they are enforced as criteria, and the negative consequences for more open inquiry into the issue make the current system resemble the counter Reformation Roman Catholic Church more than a scientific inquiry into the nature of human life relative to the complex suspensions and diverse solutions tainting our drinking water. The social consequences too are similar. Conformity to fixed standards--dogma--does not save lives anymore than it saved souls. It does, however, convince many that all is well in heaven **and** earth.

Having accused the US Environmental Protection Agency of being autocratic, politically astute, economically overbearing and unscientific--so what? Calling Godzilla a monster does not make it vanish.

Paradigmatic Criteria Restrict Inquiry

Although most do not perceive it, working even passively in this formal context shapes and to a great degree determines the outcomes of independent research in water quality analysis. To exceed them, would allow a scientist to conduct original scientific research. Realistically, does anyone regularly exceed them? Real social obstacles come into play.

Budgets Limit Choices

Given the lag in the budget which limits the new technology and the number of competent personnel available, an inverse relationship between what should be done and what can be done exists. As a result, the mandatory monitoring and testing of the EPA criteria do indeed set the limits of independent inquiries. Original inquiry can neither be justified nor funded. At best, what can be done and what should be done are collapsed into what EPA says must be done.

Information is Not Singular

Furthermore, the execution of these standards gets edited by institutionalized processes. We know sociologically that information does not pass directly to the viewer or reader. No matter how many times you watch EPA's video tapes on its criteria or reread the written regulations, only what your supervisor or superior identifies as important will be included in your understanding of your function in the water monitoring process. Policy becomes conventional behavior **after** it has been sanctioned by responsible leadership. Third World nations provide extremely vivid examples of this and why ideal criteria are never implemented.

Dichotomized Standards--Ideal to Local--Make Socio-Political Realities Determinant of Quality Outcomes

In developing countries the budget will not allow for full and effective field monitoring and management. Budgets must be massive to make all components link. Consequently breadth of coverage suffers. The Central Office with expertise--usually in the capital--becomes the repository of the criteria and the expertise. Lacking subordinate personnel to implement proper monitoring, many Third World nations, even where the standards have been articulated, cannot implement them. Consequently, the actual criteria go unenforced because the traditional local authorities--excluded from setting the criteria--find themselves without the means even to adapt the criteria to local circumstances. As a result, they either favor traditional patterns--"No problem. Nobody died this week."-- and leave the job undone or they simulate the procedures and lie to the central authority that scientific monitoring has been achieved. From this example we should see that the budgetary costs of maintaining centralized water quality programs relate to administrative overhead possibly more than they do to water quality outcomes. The following formula encapsulates the process: cost/project = scale/outcome. Increasing the budget increases the scale, but it may not affect the quality of the outcome. Under current norms epidemiology has been set aside in favor of compliance with a fixed set of criteria and procedures. Consequently, official "risk" measures deviance from the norms, not the actual human consequences to human beings. Allegiance to Godzilla, not water quality, has become the issue.

REDEFINING RISK: A COMMUNITY BASED CONCEPT

Ideal Standards Good Only for Assigning Blame

Risk as operationalized by EPA and the World Health Organization is a measure of central tendency--a mathematical measure which averages an index of variable into a composite standard. Variance from these assigned standards measures risk. Participants may choose which variables they want to include in their monitoring index, however, they may choose only from the published list. Insubordination, the failure to use the full set of criteria, increases "risk." Such uniformity, however, does not equate with reduced danger or increased benefit to consuming citizens, it merely standardizes the procedures and sets the allowable solutions.

Real risk is the assumption of responsibility for and the acceptance of the consequences associated with the decision, project or policy. Risks must be assumed; not assigned. Under the current administrative assignment of criteria and local implementation of standards, risk can be administratively isolated. Indeed, when failure occurs, they assign blame to the unit or units which deviated from the proscribed standard.

Although this procedure does nothing to alleviate the consequences for those consumers who imbibed or used water; nor did it warn them of any danger until after they were exposed to the danger; it remains the primary sanction of centralized water quality standards. In short, this is not a measure of real risk but an assignment of legal liability. It should be abandoned.

He Who Accepts the Responsibility Defines the Risk

In its place, the responsibility for the assumption of risk must be negotiated with the people not with the authorities who currently define it.. After all, "Risk to whom?" should be the operational criteria. We must include the victims in the process and stop patronizing the "public" with presumptuous standards. Under the current system, sophisticated qualitative and quantitative chemical analysis conducted for organic and inorganic substances "protects" the public water supply. Detected organic pollutants are killed chemically; detected inorganic pollutants are filtered out or precipitated out before the thirsty are allowed to drink. As more and more variables--pollutants--are added to the testable list, whether they exist locally or not; whether they cause the epidemiologically verified harm or not, the costs increase. No wonder the public complains most about the cost of safe drinking water. Real risk, in contrast to morality--which is a deviation from a fixed social norm--has a more complex set of defining characteristics. Confusing the two makes Godzilla arrogant and unable to reconsider the purpose of risk assessment.

Ideal Standards are Costly to Maintain; Local Standards are Not

The opposite of risk is responsibility, not certainty, as it would be in morality. Who must ultimately assume the responsibility? The consumers--the ones who drink and use the water--of course. Currently they are patronized and treated like "hospital patients" by those who "know more". Consequently, unless someone else is going to pick up the bill, consumers will not willingly submit to the procedure. Government costs for water quality, thus, escalate as "those who know more" lobby to justify their jobs by relating to the criteria and procedures established by EPA rather than including consumers' expectations which must ultimately define risk.

In the not unrelated analogy to health care, the criteria for water quality must be made not by EPA, but by the consumers in concert with "those who know more." Otherwise, there will be no actual improvement in water quality but merely economically compromised alternatives substituting for a plan for safer and usable water. Similar to health care in America, the professional control over the criteria of health leaves the public victim to the process designed tautologically to justify the authority of the professional health care givers. Inside Godzilla are those who benefit from making it stomp.

Delegated to the fifty states--thence to smaller jurisdictions--can we expect full compliance with EPA water quality criteria in the United States to be an ideal or a reality? The experience of African nations mirror our own dilemma and often our own minimal responses. We seldom exceed the published criteria in our monitoring. We restrict our inquiry to the official variables. We enforce only what our bosses in the bureaucracy tell us must be enforced. We limit our efforts to fit a budget in which the operational first priority pays for the administrative overhead and expertise before processing the list of variables. We exclude the public from the definition of risk and thereby make them dependent on expertise.

In short, what good is a set of criteria which merely justifies the maintenance of a budget for a hierarchy of positions which preserve the illusion of the implementation of policy? None.

RETHINKING THE PROCESS. REDEFINING RISK

What then can we do about it? We need to re-structure how we define the problem and how we assume risk.

Water Use Quality, Not the Quality of Water Should Define Risk

The initial budgetary costs, therefore, must **not** go to establishing higher criteria and standards until we know how much responsibility the people want to assume. Dividing up water delivery into different use systems relative to risk assumed by the user could produce separate systems of bottled drinking water, bathing water, irrigation water and finally commercial water uses. Conversely, the liability for the waste run off from these systems would produce differential degrees of responsibility assigned to the specific user. This separates risk, liability and social responsibility into clear expectations, legal accountability, and economic responsibility.

Properly phrased, risk becomes first a political consensus issue, then a public health problem, then an engineering and/or chemistry problem. Currently, it is the reverse. Rather than "educate" the public about the needs for water quality, we need to work with the public to help them determine the level of responsibility they will assume. The high cost and high failure rate of the current approach results because it strives to cajole, entice and/or coerce people to conform to optimal criteria and standards made independently of the assumption of risk: People, who actually assume the responsibility and suffer the consequences of failure.

The constitutional function of the Federal Government to oversee the "health and general welfare" of all citizens does not grant it a monopoly to do it in an excessively costly and arrogant manner. On the contrary, it has an obligation to do it the most responsible and effective way.

HERMENEUTICS: THE MORE EFFECTIVE WAY AND ITS RADICAL CONSEQUENCES FOR THE CURRENT RISK AND CONTROL SYSTEM

Hermeneutics developed as a means of analysis within theology and ethical systems where the goal was to reach an optimal community-based insight. It makes no pretext about objectivity, and instead works through inter-subjectivity until the issue at hand contains all the concerns of the community expressed as a rational set of insights. In both theology and as a community decision-making process, the derived consensus is the goal. No further testing is sought or needed. It ends here.

Mobilize the People to Define and to Accept Risk

In social science, the decision-making model has been adapted to first follow what is called a "hermeneutic circle," in which all participants express their subjective opinion on the topic until an

agreement is reached on what common assumptions need to be verified or explored. Community-based hypothesis formation results. The "circle" includes a representative stratified random sample of all those who must assume the risk. The criteria and standards which evolve to cope with the shared needs of all now become comprehensible to all. When disaster strikes victims know how to act without further expertise because the means of achieving their goals are understood if a prior hermeneutic consensus had been achieved. Bring a representative sample of the people, not just the experts and the vested interests, into the "loop". Without a mammoth, coercive budget to enforce compliance, this expanded circle constitutes the only way to make the "loop" effective. More significantly, however, this process should not be seen as a return to representative and responsible government, which it also accomplishes, but a means to re-establish real scientific inquiry, as well.

Test The Hypotheses Which Define the Assumed Standard for Local Water Use Made by the Community

Every local jurisdiction which so establishes a circle based on the determination of common responsibility and risk, thus sets up a series of testable hypothesis of the feasibility of their consensus needs. This should be designed and conducted by the scientists in the community. Those which prove fruitful and feasible become local policy. To verify the usefulness of the local criteria and standards in terms of public health and safety one initial test would be to review the list of toxic inorganic wastes and organic pollutants, but they no longer define the risk. They help to clarify it.

Consequently, chemists, engineers, biologists need to be a part of the circle--but not as now--the sole definers of the circle. The assigning of risk must be replaced by the assumption of risk by those who will drink the water and use it.

Costs are reduced initially because expertise must be persuasive, not pre-emptive in this format. Tests will be limited to determine the actual dangers associated with the local community's assumption of risk. Formula solutions need not apply. Real inquiry and innovation can be brought to bear to meet the stated risk parameters. Outcomes will be measured and epidemiology now becomes essential--not optional. The aggregate findings for a nation of hermeneutic circles--like common law precedents--can guide and tame Godzilla to walk in concert with the local population.

Decentralizing now makes reporting of outcomes and approaches a common law function, not a review and approval function for EPA. Over time the best solutions and immediate benefits of local options will become national policy compiled by the EPA.

IN SUM:

To deal honestly with the issue of risk, we must invert the authority structure and return to common law precedents to tame statutory laws so that they reflect the assumed risk of the people.

To allow science to play an innovative and constructive role in the community, it must first relate to

a community and then be able to freely experiment in meeting the hermeneutically defined needs of actual clusters of citizens.

To persist in supporting the current system without challenge reduces scientific inquiry to a homily and the scientist to an *apparatichik*. Godzilla can only be tamed if you feed him on local needs.

Ironically, it is not in the developed world where this leadership and initiative is taking place. Indeed in the developed world, these options are now pre-emptively excluded. Unless leadership decides to overturn the *status quo*, which is unlikely, the most clever innovators must look elsewhere. To reduce professional risk, form an alliance with a developing community outside the United States and learn what can be done; then bring your expertise home.

Fundamentally, inquiry does not have to await permission or a budget when as research it can be undertaken to satisfy real community need anywhere. Look for the need and you will be rewarded with opportunity. Play the game as it is currently defined and you will spend your life wondering why no one ever really appreciated you. By not seizing the opportunity, life becomes a moral certainty and you can take comfort in the fact that you were allied with Godzilla--**at your own risk**.

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