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The Street as Public Commons: A cross-cultural comparative framework for studying waste and traffic in India

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The street, lanes, and by-ways are a commons throughout much the world, a part of the environment not owned by any one individual, family, lineage, or corporation, but belonging to the community at large. While issues of the commons have come to loom large to preoccupy scholars, researchers, and planners in a world facing depletion of resources, climatic change, pollution, and massive threat to the biome of living species, little attention has been directed to the cross-culturalstudy of the commons that begins outside our homes. Yet the street as commons is the very place in which one often first experiences domains outside the domestic sphere, where one shares resources with ones neighbor and community, where conceptions and precepts about behavior in the public domain are socialized and communicated to a new generation. In this paper I argue that, indeed, it behooves us to study the street as commons, for herein in this arena so active and omnipresent in our lives we enact again and again attitudes and expectations that are fundamental to our relatings to others outside our kin. It is here on the streets that we move from among our kindred, affines, neighbors, and friends out into the world of strangers beyond our normal ken. In the metropolis, the townships, and villages growing vertically throughout the world, one increasingly enters a traffic of unrelated others. Among strangers how do we manage the street as a common resource among us? For the street provides space for the movement and meeting of people, for the transport, storing, and retrieval of materials and energy, and for the communicating and reaffirmation of information and meanings. As a potential public arena, the commons becomes a place in which one can communicate not only civic pride and loyalty, but civic anger, disloyalty, sabatage, and retribution. It provides access to sunlight, heat, warmth, and air. It is a venue for water transport and for sewage disposal.

In the developing world, as in India, the crises of the commons is acute because of the gross numbers of persons involved, the density of their settlements, the extensiveness of their dispersal to all corners of the subcontinent, and the limited funds available for conservation, rehabilitation, construction and maintenance of the commons. Furthermore the acceleration of development, in the utilization of fossil fuels, in increase in consumption and resultant accumulation of debris, in the elaboration of packaging and modern marketing, in the increase in urban concentration and in the traffic of tradehave resulted in monumental problems of air quality, sewage disposal, traffic coordination, clean water delivery and groundwater conservation and quality.

Clearly the problems of the commons have multiple and interlocking Dimensions from nation-state policy and action to municipal funds and actions, to local neighborhood groups, from questions of civic pride to house[a]hold and family centerness, from concerns of symbolic purity and cleanliness to modern conceptions of sanitation. But irrespective of the mix of actions

taken at various levels of social and political order, there is a primary level at which voluntaristic action at the local level plays a definitive role. For the issue is not only that of constructing major works to order the commons, but as a zone to which many have access, the quality of its continual use and maintenance.

Even though governments may plan, construct, and even maintain major public works, the manner in which their 100,000s of users respect and act upon these works will determine their long term history. For traffic control, stop lights may be set in place, but will drivers, cyclists, and pedestrians obey them? For flash flood control, as required in Jaipur City in India, a network of canals may be constructed, but will residents cease tossing debris and defecating in low lying places and ditches. Sidewalks may be constructed to separate foot traffic safely from animal and motorized traffic, but night time defecation on sidewalks may make all take to the cleaner streets. Sewers may be constructed to flush away liquid effluents and pollutants, but the dumping of trash, the breaking open of pipes to gain access for unclogging, soon leaves the whole system obstructed and stagnated. Clearly, the aggregate action of a public may either sustain or erode any major public works constructed on the commons.

At stake in all these issues are the nature of a people's conceptions of public order and the meanings ascribed to states or qualities of the public sector. What are the rules and conventions they respect, the foundation for their compliance, and the nature of their actual practice? What are a people's conceptions about natural, supernatural, and human forces operating in this sphere of human life? How do individual actions©© when guided by self interests, expections, and values, and when compounded by the thousands©ªactually aggregate in the context of the public domain, and with what effect?

It is in these areas that after a period of 30 years of intermittent research I come away from India with a sense of deepening distress. These concerns are crystallized through the assessment of the subcontinent's situation from the perspective of self©organizing dynamic systems, analyzable through the mathematics of complexity and the dynamics of social dilemmas. I wish to encourage the reader here to grasp that there is an intermediate level of order, greater than the individual, family, kindred, neighborhood, and possibly appropriator groups,,and smaller in scale than the institutions of the municipality, province, and national state. Furthermore, this level of organization is in itself not reducible to the institutions of market, or competitive polity. When we look for labels for this level of human organization, the words closest to relevance are those associated with civility, civic pride, and degree of trust, faith, and mutual reliability among citizens. I wish to show here that these are not merely value laden terms, but characteristics that may be defined in terms of alternate states of

demographically dense human social systems according to their level or state of self organization.

SPATIAL AND TEMPORAL DIMENSIONS OF THE STREET

We conceive of the street not as a two dimensional lineality, lattice, or network, but as three dimensional, with length, breadth, and height. As the use of the street as a public commons intensifies, a depth below its surface (in subterreanean conduits) or in space above (as elevated on poles or posts) often become developed as a public domain.

Furthermore, the street has a surface. Over the prehistory and history of a community, a path way or street may have become covered with such materials as cobbles, crushed rock, asphalt, or cement. Yet, for the study of India, such a surface still is perceived as of the basic element of earth (²prithvii³), and the area above it as of ether. For India we will see how this culturally significant, for earth and ether are perceived as primary elements forming a container that is transformative.

But our study extends beyond the identification, nature, and significance of such defined spaces themselves, to the flows and interactions of matter, energy, people, and their messages and meanings in time through that space. Any unit in that space must be consider in terms of the temporality or duration of its occupancy. Furthermore, such units are linked, ever so ephemerally, by the trajectory of the objects that pass through them. Traffic flows through the street. We are interested in these flows and their immediate and long term consequences. Furthermore, we are interested in the evolution of this dynamic four-dimensional system, so defined and acted upon by its human occupants, and impacted by natural forces.

While the constituent units of observation are the actions, interactions, expectations, interpretations and values of the street's occupants, the focus of analysis is the aggregate consequences of their interactions. The proper units for analysis are patterns of flow, the traffic of persons, of materials, of domesticates, vehicles and machines; the in-flows of water, energy, and fuels and the outflow of effluvia; the circulation of air and exhaust; and the patterning in deposition and excavation of solid wastes. Furthermore, as a conduit through which a high density of mass and energy pass, the street is the major locus for interminglings, impacts and transformations.

These comparative reflections have a direct relevance to the particular configuration of meanings associated with waste and traffic in India. See "Traffic Churns Filth Purifying It into Dust," an accompanying paper by R. Thomas Rosin.

THE STREET AS COMMONS

The "street as commons" is used as a cover phrase, not as a label to define an ideal type, but as an umbrella phrase to gather together the issues of how various groups and sectors of people utilize a defined part of the environment as a shared resource. That part of the environment or landscape identified for common use has as it most valued characteristic its availability for temporary occupancy. The dynamic of its allocation pivots upon their capacity to occupy.

In considering the street as commons, we in particular are looking at the emergence of a bounded space, shared publicly by members from different kindred, lineages, and ethnicities, where the criteria for use and interaction increasingly becomes civil based upon universal standards transcending the particularities of locality and community, with access increasingly open to become inclusive rather than exclusive. The clarity physical boundaries, the inclusiveness or exclusiveness of access, the degree to which the street becomes a public space open to strangers, regulated by standards increasingly universalized--these are issues central to our study.

THE STUDY OF COMMON PROPERTY

By the word "commons" we are referring to a physical place in time, with or without clear boundaries, containing resources identified by the practices or conceptions of people, or any subgroup thereof, who share among themselves rights to use it. In this paper unlike other literature, we concentrate our focus on space and time as resources in and of themselves, for the street above all other considerations functions as a space available for temporary occupancy.

A signficant literature on the commons, however, focuses on the inorganic or biotic resources--as they are valued by any group utilizing the commons-- or on the intellectual or cultural properities transmitted and created by such groups. Yet, in considering access to such material, biotic or intellectual resources, the availability of space over time is a central issue, if the members of a group are, in fact, to enter the commons to capture and use it's resources. Hence our concerns have a direct relevance to the literature on common pool resources or common property resources (CPR).

Stimulated by the seminal work by Hardin in 1968, that challenged whether resources held in common could be extracted in a sustainable manner, the CRP literature provides an emerging theoretical (Ostrom1990, Bromley 1992), cross disciplinary (Ostrom 1990: 182©216; Oakerson 1992), and comparative (Campbell and Godoy 1992; Thomson, Feeny and Oakerson 1992) framework for both laboratory and field, ethnographic (Netting1981;

Coward 1979, 1985; Siy 1982; Berkes 1992 Wade 1988, 1992; Cordell 1989) and historical (McKean 1986, 1992; Maass and Anderson 1986) study of common property resources and institutions.

Central to this sustained critique of Hardin is distinguishing "open access resources"--"res nullius, which is Latin for 'no one's property'", with " no rules regulating individual use rights" (Runge 1992:18)-- from resources over which there are property rights, so that those so entitled may make "claim to a benefit stream." (Bromley 1992:4) Hardin's model proves to apply to open access resources, wherein an inability to exclude outsiders from their utilization sets the conditions for unregulated freeloading. Without the possibility to develop communication, reciprocity, and mutual trust as institutionalized patterns among cosharers (Ostrom 1992:297), extractors pursue simple strategies of self interest. In search of both theoretical and empirical grounds on which properties held in common might be managed in a sustainable fashion, such centers and associations as the National Academy of Sciences Panel on Common Property Resource Management, the International Association for the Study of Common Property, the Workshop in Political Theory and Policy Analysis at Indiana University, have encouraged scholarly meetings and publications.

In contrast to open access resources, with no effective exclusion rights or mechanisms to restrict access, there are a range of possible property regime wherein claims are recognized and sanctioned. Among these kinds of property regimes are governmental or state control, private or corporate ownership, and appropriator, self governing groups, the later of which are of preeminent interest. (Bromley 1992:4; Ostrom 1992) In this context, the nature of the street as commons become a part of the problematic. For in the history and evolution of the street, we may see the movement from localized control by proprietary groups of kindred or clan, shifting to residential enclaves, with increasing movement toward open access as outsiders are qualified for trade. With the establishment of towns and cities, governmental structure emerge, developing special institutions for public construction, maintenance, and operation. As populations become concentrated, and traffic on streets increase in volume, variety, and speed, however, governmental structures to maintain, control, or assure the safety of the flow may vary in their effectiveness. In our most recent times, communities may reclaim their streets by creating either locked gate communities or wars of turf, restricting access to their own members. Whether engineered by planners and developers for their wealthy clients willing to buy into a corporate community or club (Bromley 1992:14), or by gang members (as in South Central Los Angeles) or clans (as in Somalia) taking over the turf of their neighborhood, the exclusion of outsiders from some areas of our cities and suburbs returns the street to a common property resource group.

Hence, we find that the crucial discriminations about property, membership, and boundaries honed by this area of research apply well to grasping the nature of the street as an ever changing commons. However, associating an open access commons with, as Runge (1992:18) puts it, the absence of rules and conventions, is a position to which we take strong exception. The central focus of this paper is discovering in the streets, as they become open in access, those emergent conventions, institutions, and personal investments that may operate to regulate activities on such a commons.

THE STREET IN THE EMERGENCE OF CIVIL SOCIETY

Of focal interest are those junctures unfolding in the evolution and history of the street, wherein the street becomes a commons in civil society. In so doing, we are observing the shift from particularisitic relationships to generalized relationships, the emergence of new categories of persons, some sharply defined, and others residual, and the creation of a place for disintended actions, with corresponding changes in the interpretation of attitudes and expection of others and a redefinition of what are appropriate actions and responses to others so categorized and interpreted. We are viewing the threshholds and boundaries at which a civic landscape emerges. Where, when, and how do new categories of persons or strangers enter the flow? When, to the particularity of those normally encountered, are added those for whom new categories of a universal nature must be established?

Our tasks to study ethnographically and historically this transitional zone in space and time are several: 1.) To identify the zone as its emerges in its relationship to the expansion of civic society, 2.) To understand how prior traditions of action and interpretation are extended to this zone, 3.) To examine the emergence of new categories, attitudes, expections, rules and interactions, and 4.) To assess the level of self organization that emerges on the street-as-commons.

The streets informs its occupants about the larger social order of which one is increasingly becoming a part. Herein one may see strangers and gaze on persons who come from other social strata, ethnicities, races, and languages. Hence, the tendency to take to the streets to address the larger socio-political universe. At this juncture in history, the street has become a stage on which to address the people, the nation, or the polity as a whole.

THE SIGNIFICANCE OF THE STREET-AS- COMMONS

The street as commons increasingly is expanding into the existent paths, lanes, and streets of the world. 2.) This occurrence is accelerating through time, although in the modern world there are interesting efforts to redefine the street as private, particularistic, and exclusive. 3.) The emergence of the street as public commons is, in part, the story of the emergence of civic society. 4.) The kinds of rules, self concerns, assessments of others that emerges on the streets, in direct interaction with strangers, determines the level of self organization in traffic and suggests the level of civic organization acquired among those using the streets. 5.) The density, speed, and potential impact of the traffic on the streets emerges as a powerful force in and of itself, merging the intentionality of human action, with the momentum and velocity of physical objects.

COMMONS ENCLOSED AND REGULATED BY GOVERNMENTAL AGENCY

The regulation and codification of behavior on the street by municipality, provincial, or federal government, and the increased capacity of and necessity for authorities to survey, apprehend, judge and sanction violators under the enclosing legal norms--these processes limit the very characteristics of the street that have interested us as a commons. Even the use of the street as an arena for public protest against government now requires timely request, petition, and authorization, ironically, from the very government or authorities protested. Nevertheless, citizen non-compliance with regulations, bribery of officials, and contempuous violations could prove the rule for actual conduct on the street. Such incivility may emerge as local rejection of imposed laws. [Or in the case of Solidarity in Communist Poland, civility may emerge as a local rejection of communist imposed corruption and party member domination of the public disorder]. Enclosure of the commons may emerge in many forms, as may the resistance to enclosure. But rarely would the street as a commons become fully enclosed, for the acts of violation and of civility will continue to occur beyond the scope of authorities, the frequency and nature of which will contribute to the relative degree of quality (e.g. safety, efficiency, drama, etc.) achieved by its occupants.

We are viewing our materials according to two perspectives: 1.) A synchronic perspectives examines, at any particular time threshhold, the degrees of access to the home, temple, or shop, on the lanes and pathways of neighborhood and village, at one extreme, to the expanding circle of access whithin which even strangers may travel major streets and throughfares between or through villages at the other. 2). A diachronic developmental perspective would examine shifting boundaries, degrees of accessibility, looking for the emergence of universal standards transcending kinship, affinity, caste, class, and propinquity in a community expanding in population, density, and space over time.

AN EMIC AND ETIC PERSPECTIVE

We will combine an emic, ethnographic approach, taking the streets of India as our case example, and a cross-culturalcomparative etic approach.
The emic approach will focus on the significant action and interactions of humans from the boundary of home and ward onto the streets, wherein meanings associated with such space and its use are central to our concern,
recommending ethnographic methodologies of participant observation and ethnographic semantics et al., as well combined exegesis of oral and written texts. We are interested in the qualities or states local peoples ascribe to such public spaces. For these meanings constitute motivations for and interpretations of human action. Furthermore, such qualities provide a focus for assessing and comparing aggregate outcomes from the occupany and flow of traffic in the streets.

From a cross-culturalperpective, one may see variations in the perceptions and concerns associated with the streets. Cultures vary according to the various dimensions they perceive as significant: safety, efficiency, beauty, sanitation or health, heat, purity, sanctity, merit, honor, the drama of morality or self aggrandizement, and beauty. In an Arabic town, for example, inhabitants may be preoccupied with the challenges the streets pose to the seclusion, honor, and morality associated with women in the home. In a village of India, the elite inhabitants may be preeminently concerned with the defilement on the streets that challenges the high standards of purity associated with the home and caste ward, or they may be concerned with issues of auspiciousness in departures and arrivals.

Some of these qualities and meanings associated with the street permit ease of cross-culturalcomparison. Others may not. The efficiency and speed of the flow of traffic, a preeminent concern in the west, permits ready comparison. Efficiency, speed, sanitary quality of water and safety of sewage flows are qualities associated with global concerns for development. The purity, auspicious for entering the streets, aesthetic merit, or the dramatic opportunities of the street are values more readily associated with particular traditions, lending themselves less readily to comparative study. We propose, however, a framework that permits comparison in terms of the levels of complexity in interaction acquired in the maintaining of value on the streets as public commons.

Our core interest is to assess and compare not locally valued states, relative success in their achievement, but the degree of civic order acquired.
To what extent has the street as commons acquired a degree of self organization and complexity. To guide us in applying such mathematical concepts to the social sciences, we turn to the works of Gregoire Nicolis and Ilya Prigogine. (1989) In their conceptualization and mathematical formulation of complexity, they specify its salient characteristics in the context of dynamic systems, in the hope of finding applications in the chemical, biological, and behavioral sciences. They include among their applications such interesting examples for analysis as the pathways and movements of ants and the human development of urban centers. (232-242)
Key Concepts in Defining Systems of Complexity ŒWe have reviewed Nicolis and Prigogone's" Exploring Complexity• so that we may delineate the salient characteristics of self organization and of the
systems in which self organization may occur. We selected as most salient for social scientific applications the characteristics of a system with: a.) fixed parameters but multiple states or systemic qualities; b.) a micro-level of units that monitor and act in relation to their immediate neighbors' actions, such that each iteration of local monitoring and action generate an on-going sequence of macroscopic outcomes; c.) positive feedback loops; d.)

amplification of signal; e.) switching devices; and f.) cascade effects tumbling the system into the different states possible for the same parameters. Previous Applications to the Social Sciences

"A dynamical model of a human society begins with the realization that in addition to its internal structure, the system is firmly embedded in an environment with which it exchanges matter, energy, and information." (Nicolis & Prigogine 1989:238) In this study of human behavior in the street as public commons, we are of course focusing on that aspect of the physical environment crucial to the exchanges of matter, energy, and information among human actors. Along the path ways of the streets occur the interchanges among domestic groups and the transactions that bring matter, energy, and information into their homes and businesses.

Nicolis and Prigogine go further to analyze the "interplay between the behavior of ...actors and impinging constraints from the environment," selecting as focus the actors with their "individual projects and desires." They choose however to conceptualize, and later formalize as the core constraint in their construction of a dynamic system "the difference between desired and actual behavior." In their formula for behavior, they formulize individual "choice making" and the variable of "attractiveness." They then construct an equation that reviews the dynamics of choice-switching in a finite population of interactants, wherein the number selecting one choice will direct impact the number of persons selecting the other.

Our tack is difference: we would affirm their earlier intuition, that the core phenomena affecting interactions in the system are "anticipations about the future" and " guesses concerning the desires of the other actors." For our analysis of the dynamics of a system of human interactions occurring in the street as commons, linking actors to one another and to resources for use in their domestic lives and businesses, the crucial constraint is the ability to anticipate and make predictable the actions of others. Such predictions are contingent upon inferring the expectations, desires, strategies for action of others, and, in communicating to them ones own expectations, desires, and strategies. Furthermore, participants may or may not assess the level of others' personal investments into the issues that determine quality in the commons. As the behaviors of others become more predictable, and hence reliable, so that one may increasingly base action on anticipations of what ones neighbors are doing and will do, the system of interactions reaches a new level of order. But within these parameters of quantity of persons, materials, energy, and messages posed to move in the commons, there remains several possible solutions. Assuming high degrees of unreliability or low degree of investments among fellow actors in the communal sphere results in diminished expectation for order in the commons. The system in turn shifts towards entropy, low efficiencies, high redundancies, increased agitation but dimished macro-movement in materials, energy, or information. Assuming

reliability and increased investments in energy, concentration, and time among fellow actors in the commons results in heightened expectations and demands for order. The system in turn shifts toward decreased entropy, decreased redundancies, diminished local agitation, but improved efficiencies in the movement of materials, energy, and information throughout the system.Here we see the same parameters, in terms of actors and their activities, but differences in the depositions, flows, castastrophies, and disruptions involved in the movement of materials, energy, and information throughout the system. The different states are determined by altitudes, expectations, and interpretations, amplified at the level of meaning to become switching devices for the quality of the system as a whole. (For example, reciprocity and reliability in the actions of others encourage trust in their projected actions, which in turn encourages ones own reciprocally reliable action. With increasingly reciprocal fulfillment of one another's projections and expectations, there is a growing intolerance for the unreliable and untrustworthy.)

In summary, in applying the mathematics of complexity to the study of social scientific materials, we observe as the hard datathe demographic elements of space, settlement, occupancy, and the quantities of persons, materials energy, and bits of information. From such data we may specify the parameters of the system,The soft data consists of expressions about attitudes, expectations, and projections--data about phenomena that is ever fluctuating. When studied by the social scientists, inferences about attitudes may shimmer as relevant only for the moment of the survey just completed. The very publication of results are likely to alter the very outcome of the next survey. Such soft data is a part of the switching device that explains shifts in the all over behavioral system. It is this interpretive information, encoded, symbolized and communicated, that is readily amplified.

Actions in the human realm are often, in themselves, also communications of intentions, commitment, and likelihood to persevere. Others respond not only to the action, but to what they express. The reading of intentions into the actions of others and knowing that others are so reading intentions into ones own actions encourage attention to posture, kinesthetics, and trajectory as media to communicate intent. In this manner, actions become signals, readily applied, as humans attentively impute to them significance. Hence, we may readily see how behavior is amplified, once the participants themselves become active in communicating and reading intention into the behaviors of others.

Such actions, irrespective of their scale or intensity, must be taken most seriously, because of their supposedly communicative content. On the other hand, if actions can be assumed as careless, accidental, or

non©intentional, a behavioral fact that one must take account of, but need not interpret as a significant communication about selves, the moral order, or values and beliefs, then one may relate to the behavioral fact alone, without its amplication as a significant action. (For example: In a modern suburb in India, one ignores a neighbor's tossed trash. It is not "a trashing" of ones own front gate or neighborhood. Spitting in the street is just that, rather than an expression also of contempt for those who are witnesses. Someone defecating before another's front fence at night may not be see an effort to defile those living behind that fence, but an unfortunate act of nature.)

When one reads the behavior of another as non-intentional and nonrelational, one need not take personal offense for their behavior. One need not feel moral indignation about a violation of a shared moral order. One need not suffer feelings about the desecration of shared communal symbols and values. Such are the possibilites on the street, as it emerges as an open access public commons-a venue for strangers to be joined in mutual interaction.

In contrast, consider streets in which others are monitored, intentions communicated, expectations inferred, where appropriate actions and behaviors are institutionalized, and participants internalize norms and values as aspects of self. The latter kind of street achieves a high level of self organization.The Symbolic and Physical Interpretation of the Street as a Dynamic System Accepting this set of salient characteristics as delineated by Nicolis and Prigogine, we have identified our system parameters quantitatively in terms of materials, energy, and messages; our micro-level of processes in terms of embodied selves interacting both symbolically and physically; systemic states in terms of efficiencies and qualities in flows and depositions; amplified signals in terms of behavior interpretated symbolically as the attitudes, expectations, and strategies of others; switching devices as altered expectations about the reliability and trustworthiness of others; and positive feedback loopings and circuitry in terms of reciprocities, institutionalization and legitimacy, and symbolic internalizations about self and society.

Having selecting a symbolic interactionist perspective, honed to making comparative sense out of the interactions on the streets of India, what significant elements and processes at the micro-level would we include? What factors, personal, interactional, and institutional, would detemine quality in the commons? Let us imagine the fullest possible array of factors.

Assume first a public of participants who value the same aggregate condition for the commons. [The Dimension of Consensual Valuation] Then, add that these individuals in the commons act with the intention that such values ought to be realized through appropriate action. [Goal Intentionality] Furthermore, for social interaction to sustain and reinforce action in the

commons, the individuals must monitor one another. [Attentiveness/Mutual Monitoring] They are interested in the intentions, expectations, and strategies of others, and they base their own actions upon their anticipation about how others will act. [Expectations] They communicate such to one another. [Communication] Furthermore, participants share a common conception that disciplined individual action within the commons directly contribute to its overall quality. [Micro-macro cognitive associations] They observe evidence that the appropriate local action in the aggregate does have beneficial impact on the shared commons. [Evidential Confirmation]

As a matter of fact, there is a causal relationship between such local appropriate and disciplined actions and the aggregate good. [Causality] Participants are used to acting, not in terms of immediate gain or value, but in terms of future anticipated benefits. [Immediate verses anticipatory benefit] They are used to acting, not in terms of immediate self interest, but in terms of the common good. [Altruistic] They see their own actions as a model of appropriate behavior that may influence the actions of others. [Kantian] They believe that others are also limiting their own self interest in the name of the common good. [Trust in Communal Self Restraint]

Furthermore, there is an institutionalization of appropriate behavior in the commons, for the participants communicate their shared values and approval of conventions to one another. [Public communication of values and conventions] Accordingly, they are attentive to rules and conventions regulating the use of the commons. [Normative] They affirm the golden rule principle that one ought to behave in the commons as you would want others to behave. [Affirmed Kantian Rule] Participants have mechanisms of self governance to decide policy, rules, and procedures for use of the commons. [Self Governance] They believe that one ought to sanctions violations of the explicit rules and customs that regulate the commons [Sanctions], and are ready to act themselve or encourage others when they so act to enforce customary conventions and rules. [Affirmed Enforcement] Furthermore, they perceive as legitimate those authorized to enforce and sanction, acting in the interest of the community at large. [Legitimacy] They believe there is a consensus in values and a uniformity in moral action to realize common good in their community. [Consensus & Uniformity in Moral Action, Believe there is]

Furthermore, there is a personal dimension, in that they perceive the violation of the commons by another directly as a personal affront to their own dignity and integrity. They take offense. [Personal engagement]. They perceive violations as a moral outrage, against the social order of which they are a part. [Moral engagement] They perceive them as a blasphomy against shared values. [Ideational engagement] Hence we have discriminated these various factors that might structure or determine the quality in outcomes from aggregate human interactions in

the commons. We argue that many of these features cluster and interrelate, reinforcing one another. toward the emergence of different levels of social causality, feed-back circuitry, and self organization-determining systemic quality in outcomes and level of self organization in the aggregate human interactions in a commons. We are looking for positive feed back loops, amplifications, and cascades, that determine the shift from one qualitative state to another of the system.

Among these factors, which cluster and mutually influence one another, we posit these junctures and circuits at which effects cascade to rise or lower levels of systemic order. We may posit three: the circuitry reenforcing the reciprocity of dyadic interactions; the circuitry of third party witnessing the interactions of others, leading to institutionalization; and the circuitry of internalization, making the public behavior of others a matter of personal identity, concern and reinforcement

EVEL ONE: A COMMONS REGULATED BY SHARED CONVENTIONS:

The sharing of manners, street etiquette, and conventions for occupancy and movement introduces order into waste and traffic flows on the street, with the degree of order limited by the degree of compliance with such conventions.

LEVEL TWO: A COMMONS OF RECIPROCAL RESPECT: Reciprocating for courtesies received, or discourtesies flaunted, introduce the imputation of intention to the actions of others. As streets become an open access public commons, in which one increasingly is interacting among strangers, with whom one is unlikely to have future identificable encounters, the challenges to reciprocate in prestations and exchanges are considerable. But it is the willingness to attribute intentions, read expectations, and reciprocate, not only with particularized and known others, but with generalized categories of others that will determine the relative level of order and quality achievable.

LEVEL THREE: THIRD PARTY WITNESSING AND INSTITUTIONALIZATION OF CIVIL BEHAVIOR ON THE COMMONS: When participants become interested not only in their own dyadic, reciprocal relations, but monitor and stand as witness to the interactions of others, a higher level of civil order emerges. In this "triadization of relationships" (Nadel 1957:86), "the dyadic relationship of persons in correlative roles comes to involve the interests and actions of 'third parties'." In this manner a public of a kind emerges, acting as monitors, witness, or potential critics. From such activities may flow the full institutionalization of behavioral modes, for the private actions among a dyad become the moral concerns of a public, that may move from criticism and evaluation to sanctioning of publically witnessed behavior.

LEVEL FOUR: THE COMMONS AS EXTENTION OF SELF: The internalization of the public norms and values as a significant aspect of self may have a powerful effect upon maintenance of quality within the commons. The commons is perceived as a shared and valued heritage, such that one may take personal offense to violations as an affrontery to self. One may express indignation for such violations of the social or moral order. One may express outrage at the subversion of share values. The street as public commons becomes an arena significant to self.

While these levels co©occur in traditional behavioral systems, the extent to which they emerge on streets as they become open access commons is the central concern of our investigation.A Brief Preliminary Applications to the Understanding of Traffic and Waste Disposal in India In a parallel paper, we have analyzed waste disposal and traffic in theù__ public sector of the streets of India. We have found that purity and pollution are the qualities of the street upmost in the minds of those using the street. The street has a structure: Along the edges of the street, pollutive substances and waste are deposited. At the center of the street, where traffic flows, the area is considered relatively pure. The street acts as a venue, and traffic as process in the transformation of filth into dust. In that paper, titled "Traffic Churns Filth Purifying It into Dust," we argue three processes at work: 1.) the tropic cycle consisting of humans, other species, as well perhaps of spirits, selecting from among the cast-aways for their own needs, 2.) the churning, messing and marking by traffic that breaks down, refines, or consumes the dendritus of life, so that, in the final prcoess, 3.) the refined residues of dust approach decoding, to become unified with the elemental constituents.

This process of returning quality to the street, in the refining of dust which may be used as a cleanser to purify, we argue, occurs without active human agency, without actors wilfully striving to achieve the systemic quality desired. In the processing of filth and in the flowing of traffic (subject of another study) through the streets, we would argue, humans and other occupants conduct themselves in terms of immediate interest and convenience. They are participants in a system of action, perceived as nonªrelational, the interpretation of intentions confused by inertial momentum.
Each moves according to his nature, adhering to a limited number of conventions, without expectations of reciprocal return. There is minimal elaboration of reciprocity in the exchange of courtesies, for one is interacting with strangers. Furthermore, few act as witness, monitoring to evaluate the actions of others. There is a suspension of moral justment, aroused only by the most outlandish of actions. The occasions of moral outrage and displays of personal engagement over the affairs of other, when they do occur, occur after the near or complete catastrophe--too late to effectively modulate the behavior of traffic that caused the catastrophe.

Let us briefly contrast this dynamic with a Euro-American model of waste disposal and

traffic on the street. The western metropolis affirms the achievement of hygiene and public safety on the street, by structuring its space according to function. Lineal space is differentiated according to function. The street is ordered into lanes, channels, and conduits that are discrete, continuous, uninterrupted, with special care for their crossings. Pedestrians are restricted to side walks, vehicles to laned divisions, with the fastest granted the center , the slower, to the side, with parked vehicles, close and parallel to the curb side. Pipings, conduits, and wires, devoted to water, sewage, electricity, or message delivery, extend this separation of space and materials for functions to above and below the street. Clean water is in conduits running ,parallel but separate from those bearing sewage. Special provisions are made for the crossings, for these are the points of endangerment. Confusion of space and function impedes traffic, pollutes clean water, endangers commerce and the safety of passage. Crossings are often tiered vertically so that different networks are isolated from one another. The maintenance of such a system, however, requires extreme vigiliance. Any break at any point in the line, or any confusion of function, disrupts the flow. The system by its very nature requires a lineal and continous ordering. To sustain such a system along its expanded networks requires a public responsive to monitoring and reporting any breakage or obstruction, to prevent endangerment to safety, health, or disruption to efficiency of flow. In practice, participants are so involved with the public facilities passing their business or homes, that untreated breaks and obstructions are treated as personal affronts to the neighborhood. Such a vigiligance depends upon self organization of a high order.

The street, in turn, may be claimed and regulated by municipal and state authorities. The entrance of their agents to enforce laws on the streets is perceived as but an addition of another set of self-interested actors into its dynamic field. They too act according to their own nature and self-interests. They may be bribed or thwarted. Hence they are perceived as any othera actions within the field, rather than supported as legitimate agents enforcing laws accepted as necessary to enforce order in the commons.

The conventional level of self organization, we would argue, that characterizes the state of the commons in modern India, places severe constaints on the achievement of quality in the public sector. With the parameters of the system carrying greater loads of people, materials, and messages, and at accelerating velocities, the street as commons becomes increasingly the venue for high risk and catastrophe.

According to this analysis in regard to traffic, the emergence of outrage on the streets to vehicle injuries to pedestrians, the challenges of bus drivers careening around corners, the curses thrown to truck drivers who parked in traffic lanes, the harassment of the drunken trucker prepared to return to the wheel--all these acts would be evidence of a shifting set of expectations and values that might launch an emergent level of self organization. According to this analysis in regard to sewage flows, the sorting of papers and rages placed for the rage-pickers, or challenges to the neighbor's servant who breaks into a covered sewer line or to the person tossing

household trash in a flood-control canal--these acts are evidence of a shifting set of expectations and values that might launch an a more complex level of self organization.

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