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Residual Categories:
Silence, Absence and Being an Other[1]

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Introduction

Residual categories are common in everyday life, in the design and architecture of information and library systems, almost anywhere where one would use a choice between categories. For example in most surveys, such as opinion surveys, at least one space indicates a residual: none of the above, not applicable, n/a, and, not last but least, »etc.«. Things become residual for many different reasons, some of which will be discussed a bit more formally below. The purpose of this paper is to explore how different sorts of residuals appear and disappear, and the implications for some choices people now face about moral order in the design and use of large information systems. Residuals spaces are composed of complex recursive and linked relationships. They include important differences between the ones generated by those creating statistical or model-based information architectures from those looking for single instances of an important event. And neither of these sorts of residuals necessarily addresses the subtle problems of *inhabiting* such a space. Often, a lived experience may challenge all previous concepts stemming from either statistical or surveillance-based goals. If properly integrated, it may also provide a way to think beyond the current cruelty and surveillance modern systems are propagating.

A number of examples arise from the story of the spread of AIDS in its early days.[2] AIDS began with a small cluster of unusual diseases appearing in a demographically inappropriate population. Kaposi's sarcoma (a malignant cancer first appearing on the skin as a lesion) is a common symptom of the condition. This is

2 Randy Shilts: And the Band Played on: Politics, People, and the AIDS Epidemic, New York, NY 1987.

the type of cancer previously found primarily, and rarely, in elderly men of Jewish and/or Eastern European heritage. In San Francisco in the late 1970s it began appearing in a population of otherwise healthy, mostly younger men, some Jewish and some not. As more of these cases occurred, it began to appear that the disease was associated *primarily* with gay men. Thus, one of its early names was GRID (gay-related immune deficiency). However, due to the stigma associated with homosexuality, as well as to the fact that it was not exclusively gay men affected by the disorder, the part of public health or virology that could link cultural and experiential factors languished. Debates arose in the newly-free and politicized community of gay people about the modes of transmission of the disease, mirroring those puzzles faced by epidemiologists. An attempt to close the bathhouses, venues of frequent multiple sexual experiences, was seen on the one hand as homophobia and on the other as an attempt to save lives (if sexual transmission was the way the disease traveled). In 1985, a blood marker was found for the disease. By that point, the disease had become a terrible amalgam of lived experience, politics, epidemiology, public health, and health policy. It was impossible to distinguish the vocabularies of motive emerging from the world of gay freedom, from those widely held stigmas about homosexuality, and from often-murky senses on the part of many officials and public decision-makers about what exactly it means to be gay. Because of beliefs about sexuality and bisexuality, it took years for most public health officials to realize or recognize publically, for example, that bisexual men were passing the disease to their wives and girlfriends, as well as to or from their male lovers. Frequently the women had no knowledge of their partners' activities, and were uninformed about the early symptoms of the disease.[3]

It was some years before this amalgam became a working alliance for any sort of general AIDS health approach. In the meantime, people died. This experience and the challenges to both epidemiology and public were exacerbated by the counter-interests of the U.S. insurance companies. While they were not allowed to discriminate against *individuals* on the basis of sexual preference, they were able to profile demographically and geographically. Thus, if, in the 1980s, you were a »single« man between the ages of 18 and 40, living in a »known« gay area such as the Castro neighborhood in San Francisco, you may have been denied health insurance on a profiling basis. The insurance actuaries would bet that you were gay and therefore more vulnerable to AIDS. (Insurance companies base risks on a complex set of formulae, including demography, moral judgments about social value of the person, and health risk status based on group profiles.)[4]

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3 Abraham Verghese: My Own Country: A Doctor's Story of a Town and Its People in the Age of AIDS, New York 1994.
4 Cf. Martin Lengweiler: Double Standards: The History of Standardizing Humans in

During the 1980s, a radical response arose protesting the American federal government's failure, and President Ronald Reagan in particular, to even mention AIDS in public, let alone provide monies for research.[5] Protest activities included picketing, organizing sit-ins, and other forms of protest and boycotts aimed at pharmaceutical and medical research enterprises, including funding. Their goal was to invigorate the research that might lead to a cure, or a vaccine, or even significantly improved mortality figures for people with AIDS. This direct-to-researchers approach taken by groups such as ACTUp! provided and publicized an important patient activist model, later adapted by other groups, most prominently breast cancer patients, survivors and families.

In the case above, many forms of residuals occur. There is first a general »Other« accorded by many health agencies to gay men, arising from the stigmatization of their sexual choice. This in turns leads to a barrier between medical investigation and everyday lives of gay men – a barrier that first becomes a kind of invisible embedded residual, rather than a clear bias. The Other here is the working situation of those studying the epidemic. There was also the mysterious Other of those who were not gay or male, such as blood transfusion recipients or health care workers, during the early years of the epidemic. These puzzling cases remained as unknown, not elsewhere categorized for several years. As the AIDS epidemic grew into a global pandemic, statistical epidemiology became an increasingly important part of the picture. Still today, statistics, monitoring, and experience form three legs of analysis in the treatment of AIDS worldwide. In the case of pregnancy, for example, the willingness and ability of an HIV-positive mother to take AZT (the anti-retroviral drug that prevents transmission from mother to fetus) relies on personal and cultural circumstances, including how both sexual practices and medicine are interpreted. In parts of Africa some political leaders deny that AIDS is a retroviral condition, but contend that it rather is an issue of lifestyle or that it may be treated by herbal medicine. The same is true in the West in some groups, but not often as part of the state apparatus. And of course, there are complex issues of compliance anywhere, as with every medicine and every epidemic. Several years ago, I met a young man who was homeless and living in a park in San Diego who had been prescribed anti-retroviral drugs because he was HIV positive. However, being indigent, he sold those drugs to others who were also without medical care in exchange for money to feed himself. All of this was under the »radar« of the public health authorities, although of course, in the aggregate as well as in field-

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Modern Life Insurance, in: Martha Lampland and Susan Leigh Star (eds.): Standards and their Stories, Ithaca, NY 2009, pp. 95 – 118.

[5] Steven Epstein provides the canonical history of these events and their impact on medical research, cf. Steven Epstein: Impure Science: AIDS, activism, and the politics of knowledge, Berkeley, CA 1996.

work, it is a known problem for them. Yet statistically, my friend goes on the book as receiving treatment, while his falsifications about compliance are complexly residual to the analysis of the drugs' efficacy.

The residuals here begin to cascade, and urgently to demand that they be seen relative to a set of questions. For traditional African healers, it may be the Western medicine that is the visiting stranger, the Other. For my friend in the park, his statistics become part of an unknown kind of residual, perhaps considered in the rounding error of a model, but not necessarily linked to his experience of hunger.

This example is meant merely to demonstrate the value of reliance on a tripartite approach to understand the profound nature of residual categories: epidemiology/statistics, individual monitoring, and lived experience (including cultural awareness and sensitivities). Often the *ur*-category of Other is one that stretches across an entire system (health care or other institutions), including individual cases, groups and spreading dynamics, *and* lived experiences. I don't know exactly what a visualization of residuals would produce here, but I think of it as a shifting cloud of unknowns, partially knowns, and viewpoints. Surely such a thing would need to be modeled in several dimensions, that is, including time and relative motion. This article draws attention to this cloud-thing as a phenomenon, both methodological and substantive, for those analyzing the drift, flow, and infrastructural components of the not elsewhere categorized.

What Is a Residual Category?

Residual categories appear in a number of forms, ranging from ill-structured and informal to well-structured and formal. They may be managed by a systems administrator, information professional, or other person interested in preserving the integrity of a complex system, or they may be unmanaged.[6] Quite simply, they consist in the act of discarding information deemed by someone (including the designer of a survey or form) to be irrelevant, useless, or simply outside the purview of the system. Every time one fills out a form that has a space named something like »none of the above« or »not specified«, and checks that box, one is utilizing a residual category.

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6   On garbage can models of decision-making cf. James G. March and Herbert A. Simon: Organizations, New York, NY 1958; James G. March and Johan P. Olsen: Garbage can models of decision making in organizations, in: James G. March and Roger Weissinger-Baylon (eds.): Ambiguity and command: Organizational perspectives on military decision making, Marshfield, MA 1986, pp. 11−35.

In formal systems, then, residual categories consist in formal informational markings including:

Stand–alone Formal Residual Categories
- Response outside scope
- Refused to answer
- Not stated
- Response unidentifiable
- Repeated value
- Don't know
- None of the above
- Not elsewhere specified
- Incoherent
- Not further defined[7]

From this small, informal example, we can immediately derive different behavioral, social, and political dimensions to these sorts of answers. »None of the above« could include the unnamable, the unspeakable, the undiscovered, the shameful, the stigmatized, as we have seen above in the AIDS example. »Incoherent« could include any response, from one originating from Alzheimer's disease in the respondent, to one coming from a minority foreign language speaker, to one simply annoyed by too many surveys. One may refuse to answer because one is afraid, resistant to the group represented by the survey, to surveys in general, or because one doesn't understand the meaning or purpose of the questions, or whether they will be held anonymous and confidential as the survey states. Questions of construct validity and extensibility of these models cannot actually operate at a meta-level to sort residuals one from another, in the absence of deeper investigations into experience and empirical dimensions of becoming and being an Other.

As we move into the realm of complex social orders, ill–structured or informal category systems, designations of »the Other« of course become even more multifaceted.[8] »Them« is a simple way of dismissing groups, along with the range of equally dismissive pejoratives based on race, class, location, dress, ethnicity, gender, religion, age and physical ability, etc. »Oh, HER,« would carry the same emotional valence, but as one individual (or small group) speaking about another

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7   Some of these descriptors are from Statistics New Zealand, under: http://www2.stats. govt.nz/domino/external/omni/omni.nsf/ 23f076d733ded7e74c256570001d92b4/ 90b791 c7fdd37fd7cc256f39000f1c21?OpenDocument (26.02.2010).

8   Charles C. Ragin and Howard Saul Becker (eds.): What Is a Case? Exploring the Foundations of Social Inquiry, Cambridge, UK 1992; the classic text on the topic of the Other in American sociology is Howard Saul Becker: Outsiders, New York, NY 1963.

individual, including similar pejoratives that may derive from the collective categories or from standalones, such as »weirdo« or »freak« or »crazy«. Every language and every group has its version of this – and »we« are no exception (we being the general academic audience to which this article is addressed, but could equally well apply to other communities of which I am a part). It is what Lieberson[9] would call an immutable social fact: there are always Others. How »they« are treated is the hallmark of the moral order of a society. Our relationship to our own residuals defines us, individually and collectively, as complex modern moral beings of one sort or another.

Considering Residual Categories as Objects, not Resources: People and Things

As implied above, the ubiquity and even necessity for some forms of residual categories seems to be a feature of any attempt to classify or categorize people, our material culture, and the ways we belong to the natural world around us. Most of us who live in houses with storage have something called a »junk drawer« – a drawer where a little number of small, not elsewhere classified things might dwell (e.g. a small scissors, a few postage stamps, a recipe not yet transcribed or pasted into a book, a seldom-used spice, a tool whose use has been forgotten, an old receipt blurred beyond recognition but which might become part of income tax figuring – someday). Or there may be an attic with leftover clothes and furniture, or a pile of unusable shards in an unspoken-for space, or a communal dump. Again, as with the »garbage can model«, all of these efforts may be useless and unstructured to those who created them, a place to put material forms of *not elsewhere classified*. At the same time, to another person, say someone looking for food or antiques or something to recycle, a dump can be a well-read space with different objects carrying different properties such as monetary value, survival value, ecological value or some mixture.[10] That is, in general, people treat residual categories as resources, not topics, using the language here of ethnomethodology.[11] That is, in whatever occupation or cultural location we occupy, as natives, we often simply use residual categories as convenient ways to focus on our own main problems, rather than to examine things outside that purview. Another way of saying this is that residual categories become unexamined, or in the anthropological sense,

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9 Stanley Lieberson: Making It Count: The Improvement of Social Research and Theory, Berkeley, CA, 1985.
10 Cf. Lars Eighner: Travels with Lizbeth, New York, NY 1994.
11 Cf. Harold Garfinkel: Studies in Ethnomethodology, Englewood Cliffs, NJ 1967.

naturalized. There are some important exceptions here, as when the residual category itself becomes an object of study or social change (see the AIDS example, above, and its categorical travels through the social structure of medicine and policy, or the excellent analysis by Kirk and Kutchins of the de-medicalization of homosexuality in the DSM, the US manual of categories used by mental health professionals[12]).

In the world of professional information architects and managers, as well as those designing complex large-scale surveys, there is an awareness of the residual as an object of work. They need to manage the distribution of residual categories if they are to have results in several areas.[13] (When the residual directly involves people and their lives, of course, the nature of closure becomes much more problematic, again as we have seen above.)

There are often formal rules for the management of these categories in large-scale systems. Take, for example, the rules for management of residual categories in the Australia/New Zealand Standard Classification of Occupations (ANZSCO):

»Codes reserved for residual categories
For each unit group of the classification structure, a six-digit code, consisting of the four digits of the unit group followed by the digits »99«, is reserved as a residual »not elsewhere classified« (nec) category. All occupations which are not separately identified in the classification structure are included in the »nec« category of the unit group to which they relate. Residual categories are only identified in the classification structure if they are needed. ANZSCO currently identifies 77 »nec« categories. The decision to include particular occupations in an »nec« category rather than as substantive categories is based on their lack of numerical significance in Australia or New Zealand.«[14]

Every large analytic enterprise, every large information system has rules of this sort (conduct a web search on the term »residual category« and it is apparent). It is an attempt, in classical Latourian fashion, to discipline the collection of information and maximize useful data.[15] Note, however, that every rule choice, such as numerical and statistical significance, has its consequences. Under the rule above,

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12 Stuart A. Kirk and Herb Kutchins: The Selling of DSM: The Rhetoric of Science in Psychiatry, New York, NY 1992.

13 If, in large-scale research, they clump in one area, all of the data in that area may become statistically useless, cf. Geoffrey C. Bowker and Susan Leigh Star: Sorting Things Out: Classification and Its Consequences, Cambridge, MA 1999.

14 Profile and Summary of ANZSCO Structure, Australian Bureau of Statistics, under: http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/8D5A0D315B5E6833CA2571 E200835600? opendocument (26.02.2010)

15 Cf. Bruno Latour: Science in Action, Cambridge, MA 1988.

»Prime Minister« becomes an insignificant residual category in the »nec« range; so would rare cases of bubonic plague under a similar numerically–based rule structure. Clearly, numbers alone will not work for a full analysis of the nature of occupations or other systems that include rare objects of great importance.

There is no obvious, simple corrective to this dilemma. If one *only* attempts to address a single lived experience, however, one can impoverish that very experience. Consider the case of a lone, isolated adolescent with Kaposi's sarcoma in 1979. Any number of sufferings derive from being the only one (or as far as one knows, the only one). If one is »Other« with 20 millions Others, that is another kind of experience, a shared suffering. The former concerns loneliness and isolated perceptions or acceptance; the latter has the potential to become a social movement.

The Many and the One

The brief example given above describes classic conflicts in the history of classification and of social science itself, that between statistical significance and event surveillance, and that between singular and collective experience. Different forms of infrastructure and maintenance attach to each. There are also logical and methodological challenges attached to each alone, but more especially to their collaboration and interaction. Another complexity emerges as the scientific form of this enterprise intersects everyday meaning.

1. The Questionnaire Society and Its Cloudy Residuals

Statistical significance is to be found through a system of sampling and surveying, whether that be the social science sort of census data collection or a more natural/physical science form of the same. Some of the kinds of organizations that sponsor this form of information infrastructure include bureaux of vital statistics, of survey research and of census; many forms of mapping including GIS systems that display quantitative aggregate information topologically; or collection of data from multiple agencies and their accumulation into larger data sets, such as those found in the US Biological Survey.

As well, during the twentieth century, a kind of culture of surveys has grown up to make this form of data collection seem unproblematic to many people. In contemporary society, one may be asked to fill out a »customer satisfaction survey« with every visit to the doctor or even any visit to a restaurant (especially franchised eateries). People taking surveys often make phone calls to customers, citizens, or randomly–generated lists of people (or send them over the internet) to collect in-

formation. So the very activity of being queried becomes woven into everyday activities. Unless this action becomes politically or financially dangerous, people mostly perceive it as benign or (perhaps) annoying. When one fills out a questionnaire at, for example, a franchise restaurant where one has just eaten, those analyzing the results can have no concrete idea of the participating population, what percentage of anything or anyone it is measuring, how to know whether the answers are true, or much of anything else. The same might be said of electronic reputational systems on the web such as those employed by Amazon.com or by Angie's List, a consumer-rating web-based list.[16] These sorts of systems have become a means of social control, workplace control, and contested spaces involving publicity and truth, and public trust. Many tangled residuals may arise in this fashion, including those entities *not* surveyed (which at present is most of them). What is the meaning of the silence for those intent on using the web to find products and services? What happens if a group of people with a certain political perspective decide to "e-bomb" the services of an organization with which they disagree? The organization comes to carry a low reputational grade or star rating; the reason for this remains residual, invisible.

Silent surveys are also routinely taken in industrial cultures by those using electronic services. For example, many credit-cards firms now routinely collect and analyze not just purchases, balances and payment histories for clients, but statistically analyze the *contents* of purchases as well. Using large amounts of aggregated data, with single categories of purchases as predictors, they build a profile of individual customers. Some of the funnier (or more sadly, ironic) instances I have heard discussed recently include the following:

a. The purchase of specialty birdseed (e.g. that directed at goldfinches or canaries) is overall positively correlated with a positive history of creditworthiness over a long period and across thousands of instances. So that, if one considers a category of purchase as worth x points, then the purchase of birdseed may be worth 25 points on a scale of 0-500. (As a thought experiment, the purchase of health food vitamins may be worth 15; of grocery store vitamins, 5.)
b. It is possible to purchase novelty shapes to replace the top of a gear shift, a part of the car steering that looks like a little round or ovoid shape. One of these items for sale is shaped in the form of a skeletal head. One replaces the usual black plastic knob with the silver or black death's head shape. Purchase of this

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[16] Although the form of these is slightly different, the argument holds. Amazon uses a cluster-based link system; Angie's list relies on the voluntary reviews of clients and customers, and contains comments as well as grades, ranging from A to F just as the American grading systems works in education, with A being high and F being a failure.

item is highly negatively associated with a creditworthy profile – stereotypically, perhaps one would think of a young male driving recklessly. (Again, for thought: other items in this category could be large amounts of tobacco, left-wing books, or liquor purchased.)

Although this sort of data collection is meant to be derived from a purely aggregated statistical correlation, of course, objects must be conceived of as entities before they may be counted as relevant. And the cultural valorization of activities such as home owning, pet owning, the accumulation of capital, and of what counts as a kind of sin are also always involved in the positive-negative valence of the purchases. Those who hold different values, or who may be too poor to participate in these activities, become residual to the data analysis, but at the same time, rated lower than others.

At some point, this sort of profiling goes far beyond the idea of the income-cost-payment history of similarly weighted figures. Rather, it works just as does a criminal profile in working backwards from an aggregate profile to an individual one. Expectations and stereotypes travel from a group to an individual, something that has made the term »racial profiling«, for example, anathema in progressive circles, an exercise in pure racism. Rather than condemn any specific form of activity here (and that is not my intent), it is important to examine the sorts of activities (including monitoring and valuing) involved in the aggregate-to-individual direction of analytic traffic. The work that is done here requires a particular cultural fluency in addition to a network of constant electronic monitoring. At the same time, this research is also vulnerable to what is commonly thought of as an error in scientific logic. That is, correlation does not prove causation in the absence of a prior hypothesis, a population, and subtler tests. But the logic here used is not about proving a hypothesis; rather, it concerns shifting the burden of proof from a category of behavior onto an individual's responsibility. This may have a conservative influence, or a tendency toward a lowest common denominator, in any population. The notion of »cultural fluency« is flexible and may include biases and stereotypes, as well as monocultures.

Why should this concern us as citizens, humanists, or social scientists? One result specific to this paper is that such profiling activities discourage aggregators from examining categories of »the Other« in great detail. This is irrespective of the particular positive or negative valence put on any given purchasing action by data collecting agencies. Profiling is a brute force approach to moral order. Perhaps the person purchasing a death's head gearshift knob is a Buddhist contemplating the nature of human mortality in her or his morning drive to work. Perhaps the person buying fancy birdseeds has several cats and is a sadist who loves to see them eat particular birds. What if the birdseed purchased by a poor family is cheap, but

represents a commitment to the natural world and enjoyment of it, rather than a stereotyped careless or transient situation? Because the hidden structure of the residual remains unknown, in turn the analysts do not know the answer to these sorts of question.

Perhaps these cases only explain 2% of the variance, not enough to be significant to the credit card companies. But it is enough, like all such profiles, to condemn or valorize everyone within it, regardless of motive, means, or intent. When used to measure something like creditworthiness, such profiles begin to participate in the sort of vicious circle of the form: you are poor because you are unworthy, and being unworthy, you will not be given enough credit to change that circumstance (from us). And such reasoning is enough to hide within these interesting forms of residual categories mentioned above.

2. Single, Important Events

Single (or rare, individual) but important events present a different kind of challenge for working infrastructure, residuals and moral order. Such events might include a single but contagious instance of a deadly disease, an earthquake, or a nuclear explosion. Rather than taking a statistical surveillance approach, those who wish to be alerted to such events require a system of monitoring, not modeling per se. They rely on indicators that are embedded within increasingly complex systems of indicators. Groups such as scientists or the military conducting biological, weapons or safety-critical monitoring now use increasing quantities of such networks to monitor a widening range of such events. This may be spatial or temporal. In the latter case, groups may monitor spaces for such long-term events as ecological degradation or the presence of deadly chemicals. Data and sensor quality, maintenance, collection and curation strategies come to the fore in these circumstances. Commonly, combining indicators with network forms of censoring means employing a craft skill difficult to analyze or replicate. These groups use various surrogates as indicators with which to alert officials, or others concerned, about an event, however rare. So a squiggle on a seismometer becomes an indicator of an earthquake, a nuclear explosion or an artifact generated somewhere in the systems. Such artifacts are often classified as a sort of residual, something that didn't really happen. Checks, balances and maintenance of these networks are an expensive proposition. It is not unless and until the artifacts begin to accumulate and someone notices them in a systematic way that they may move from residual categories to actual phenomena of notice.

In the world of public health, multiple monitoring systems are mobilized through schools, workplaces, public education, and public health. For example,

the requirement to have a syphilis test before marriage in the United States builds in a surveillance structure linked to the state-sanctioned marriage system. The marriages are not prevented by the state, but a person carrying the disease will have their application identified in the public health records and will become a target for public health intervention. The United States Immigration and Naturalization Services (now known as Homeland Security) has for many years instituted similar checks. For example, one must now take an HIV test before immigrating to the United States. The actual form for a permanent residency card or for citizenship also depends on self-report. The questions include stating occupation and showing means of support, relatives in the U.S., etc. They also include some rather ironic ones, in a way, e.g. »are you mentally retarded?,« »have you ever sold your body for profit?,«[17] and even »are you an alcoholic?«

The purpose of this analysis is in no way to make any overall judgment about specific networks and systems of surveillance. Clearly, it can be important to know when a tornado is approaching, when a deadly disease is spreading, or when a single event such as a nuclear test is performed anywhere in the world. The point here is to examine the architecture, from the point of view of moral order, of the creation of residual categories as a result of using and deploying these systems.

In addition to seeming futile or quaint, these historically significant questions noted above may remain unquestioned for many years. They illustrate an important feature of the consequences of installing these systems into infrastructure. The above queries are a result of the eugenic science influence on the establishment of the U.S. immigration service in the early part of the twentieth century. The questions were meant to exclude »undesirables« from the population, and thus improve the overall eugenic profile of the country. Although straightforward eugenics[18] has been scientifically unfashionable since the Nazi era, the questions, infrastructures and viewpoints remain, with their combination of innocence and discrimination. They become embedded in a larger infrastructure, and unless they become the target of a specific social movement, they are unlikely to change. They identify a pool of residual Others, often with no specific structure for accessibility, or accountability. I do not know what happens to a potential immigrant who answers the question, »Have you ever sold your body for profit?« in the affirmative, but to my knowledge such cases would be ajudicated behind closed doors. The built environment also richly includes such values. For example in the State of Massachusetts, despite the U.S. principle of separation of church and state, and despite the absence of practicing Puritans for some centuries, a blunt instrument of built

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17   My partner, being an academic and an immigrant to the U.S., of course immediately answered an ironic »yes« to this question.
18   But cf. Troy Duster: Backdoor to Eugenics, New York, NY 1990.

morality provides a similar solution. In that state, supermarkets may sell liquor on every day except from midnight Saturday to noon on Sunday. At midnight on Saturday a heavy iron cage descends in front of the shelves holding wine, beer, and other alcoholic beverages, barring people from the purchase of liquor. (These were called »blue laws« in the past, blue being a traditional Anglophone color of sin and sexuality, as in »blue movies« being a euphemism for pornography.) Presumably, citizens of Massachusetts and visitors to that state then cannot drink until *after* church. Muslims, Jews, atheists, Buddhists, Wiccans, and a panoply of Others who observe or don't observe religious events according to that timeline are forced to inherit an older set of someone else's moral values. They become de facto residuals, including, ironically, some of the sects of Protestants descended from the Puritans who have relaxed the attitude towards drinking.

Surveillance networks, too, are thus of course implicated in scientific fashions and biases, and often targeted toward specific populations. The 19th and early 20th century history of the U.S. Public Health Service and its surveillance of leprosy among the ethnic Chinese and native Hawaiian populations of the then-territory of Hawai'i is laced with moral panic about the disease, and held an uneven focus on certain subpopulations. After World War II, public health officials came to believe that Hansen's disease (leprosy) is treatable with antibiotics, and may be seen as a chronic illness rather than a bellwether of Biblical devastation. Before this time, public health services practiced surveillance through the schools, work-places, and homes of especially vulnerable populations in Hawai'i. A network of informers was established, and if a person were found to have evidence (and the quality of that evidence and its basis in medical findings is highly suspicious) of leprosy, they were sent to a leper colony at Kalaupapa on the island of Moloka'i. Suspected lepers were arrested, sometimes put in chains, and forced, without fur-ther ado, to undertake a dangerous one-way trip to the extremely isolated site. Retrospective accounts tell us that some of the younger people, presumably those who were not disabled, would in fact find extraordinary means to climb the steep hills surrounding the colony and mingle with townspeople, passing as visitors. No data exist about contamination effects from these visits.[19] Occasionally a dedicated partner or parent would accompany the ill person into exile, often but not always acquiring the disease themselves. Their stories are often narrated, but as residuals, not always captured by public health, either.

Isolation and sequestration are one family of techniques for containment of these sorts of residuals. Others include those early warning systems that may lead

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[19] Cf. Ted Gugelyk and Milton Bloombaum: The Separating Sickness, Ma'i Ho'oka'awale, Honolulu, Hawaii 1979; for a rich fictionalized historical account, cf. Alan Brennert: Moloka'I, New York, NY 2003.

to evacuation or other forms of physical containment, as in a nuclear accident. A system of informing and reporting often accompanies these sorts of networks, and the fate of these networks, once established, is historically varied. Some become surveillance networks utilized by totalitarian regimes; some become everyday benign forms of reporting such as the examination of schoolchildren's heads for lice. Of course the social, cultural and psychological effects of something such as a search for lice are not included in the use of the adjective »benign«. This entirely depends on the culture of the local implementation; in some cases the identification of an individual so afflicted may create an Other or a lifetime of remembered shame. They then become another kind of Other.

Logics of Residuality

The examples above are themselves oversimplifications of enormously complex social logics, technical systems, and political and cultural implications. My purpose in analyzing the generation of residual categories in these broadly different circumstances is to draw attention to the kind of methodological deadlock that sometimes exists in the analysis of infrastructure and its development. The type of residuals created by aggregate analysis of the sort performed by the credit card companies noted above are visible in the first instance as insignificant numbers without history or moral recourse. As information systems provide more and deeper opportunities for this sort of surveillance, numerical residuals proliferate. At the same time, when a move is made from the larger aggregates to individuals (as for example, someone who really *is* a bad insurance risk and who buys a death's head car gear decoration), the correlation becomes hypostatized. A second order invisibility is created in this case. That is, there are in the first case those numerical residual minorities discussed above, and who are unexamined. These are the equivalent of the »garbage can category residents«. Their motives and predictions about them remain unknown at the level of the aggregate.

An even subtler invisibility attaches to those for whom the correlation *seems* predictive. That is, what is residual there is not numerical, exactly, but is taken as behavioral and predictive of future. It is a *shadow residual* until the reasons for the placement of the individual in the category are elaborated. So someone may be in that aggregate category, but may be a very careful driver. Bowker notes that this is structurally isomorphic with the processes of forgetting that he has modeled.[20] There is not just one kind of forgetting, just as there is not just one kind of residual.

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[20]	Cf. Geoffrey C. Bowker: Memory Practices in the Sciences, Cambridge, MA 2005.

Ecological Fallacies

The nature of the »ecological fallacy« has been a well-known problem in social analysis for over half a century.[21] That is, data collected at one level of analysis and then non-analytically directed to another contains a necessary logical flaw, of the sort noted above. This flaw is that without a knowledge of the exact mechanics through which causality travels across levels of scale, the analyst, in the end, performs what can only be a semi-random assignment of cases to classes. Stanley Lieberson, in his brilliant book *Making it Count*, notes that this unmeasured selectivity assumes the mild character of an apparent test effect, while itself remaining invisible to analysis. Thus, it is possible to achieve all sorts of validity in standardized tests including very large numbers of test subjects, while ignoring cultural variants in selecting individuals or in analyzing the statistical tails. One of the important consequences of moving between an aggregate and individuals, when ignoring specificity, is another locus for the creation of unexamined residual categories and their attendant variables. That is, what Lieberson calls the assumption of an irreversible actually becomes an impenetrable.[22] This is not to say that careful analysis of multiple factors including history cannot create useful and important social research. However it is the blind search for aggregates that creates as well as bad social science, an unknown sort of moral order, as he argues so urgently. This is especially true in modern very large-scale infrastructure development.

In addition to the ecological fallacy involved in moving from aggregates to individuals, there is as well a distancing of moral responsibility from those inhabiting the residual space. For example, new forms of work are appearing on the Internet such as Amazon's Mechanical Turk. This is a system where piecework has been brought to a new level of sophistication. Like the old factory systems where pieces of work were farmed out to laborers with the flow of supply and demand, Mechanical Turk offers an electronic form of this division of labor. Various labor contractors advertise for workers to perform labor of all sorts, at least of all sorts that can be contracted through the world of information technology. For example someone who needs a piece of computer programming work done may advertise for a large number of workers to perform small pieces of the task. These people are paid a very low rate to perform fantastically fungible work. They are paid only upon satisfaction of the contractor. As with the old piecework system, one of the effects of a highly piecemeal and distributed form of production is a lack of concern for the time of the worker, their social benefits or, to say the least, their career

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21 W. S. Robinson: Ecological Correlations and the Behavior of Individuals, in: American Sociological Review 15/3 (1950), pp. 351–357.

22 Lieberson: Making it count (as note 9), Chapter 6, pp. 120–151.

trajectories. When the system turns sets of contracting relationships between the rich and the poor, it comes as no surprise that it is the poor who suffer the consequences. This is true internationally as well as locally. Scale becomes indifferent here in the traditional sense. Even children's games may be harnessed for programming and other tasks, without consent of child or parent – this invisible work folds in lack of controls, others, work not compensated or tracked, and thus, more residuals come to inhabit this sort of system.[23]

In networked systems designed to catch a single instance, be they human networks, technical networks, or a mixture of the two, the residuals generated become, as we have seen above, the bearers of a set of indicators, such as a flaming red patch of skin for the potential leper.

The interpretation of those indicators, as well as their construction, is a highly socially subtle accomplishment. As Ellen Balka and colleagues have shown in their path-breaking work on their generation along a chain of handovers, indicators and their relationship to underlying phenomena change locally, spatially, and temporally.[24]

For instance, in studying health indicators in an accident, Balka notes that each local link in a chain of situations may work according to different set of indicators. This means that those maintaining the safety and health of an individual traversing the path of an accident to a hospital, for example, are at the mercy of the local skill of those interpreting the indicators generated by the previous locale. Consider the following example. Someone, following a fall, may be rescued on a ski slope by a ski patrol with basic emergency medical technician skills. The indicators generated by the person's accident are recorded by the patrol according to their local schema and training. Medics then interpret, and act on, the situations for which they are specifically trained, using the prior information in a way that becomes invisible and residual. In a serious accident, private helicopter medics who scoop up the patients assess them in a particular way, according to a different logic, training regime, treatment, and paperwork/computer work infrastructure of forms and notes. And so on, in a continuing chain with each set of providers interpreting the previous set of indicators and re-representing them.

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23 For a powerful analysis of this sort of internet social structures see Jonathan Zittrain: Minds for Sale, under: http://www.sis.pitt.edu/~fineinst/projects/zittrain.html (26. 02. 2010).

24 Cf. Ellen Balka, Eileen Green and Flis Henwood: Gender, Health and Information Technology in Context, Basingstoke, Hampshire/New York NY 2009; Ellen Balka, Karen Messing and Patricia Armstrong: Indicators for all: Including occupational health in indicators for a sustainable health care system, in: Policy and Practice in Health and Safety May (2006), pp. 45 – 61; Ellen Balka et. al.: Ghost charts, shadow records and patient handovers: Issues and challenges in creating and managing cross jurisdictional socio-technical infrastructures in health, in: Journal of Computer Supported Cooperative Work (Special Issue: Health care infrastructures), submitted 2010.

The results of this highly skilled yet invisible work[25] is both a visible set of traces concerning the individual involved in the accident, and what Balka calls a »shadow chart« possibly known and shared with others along the chain, but not represented in any formal sense. As this shadow work accumulates, different residuals are formed. These include residual experiences of the staff that may be very important to patient welfare, yet transmissible in highly local ways and perhaps not otherwise. There is also the residual experience of the patient who may be unable to trace the nature of their care, prognosis, or status.

Examined logically, this sort of residuality itself may recurse in the sense that instances of these events may accumulate and replicate. They in turn may clog the distribution of knowledge and action along infrastructural lines.

Lived Experience and Residual Categories: Social and Cultural Aspects of Residuality

Several times in the course of this article, I have implied that a further exploration of »lived experience« may be helpful for changing the unstructured, invisible, and frequently deadlocked residuals created by statistical models or surveillance networks, as in those named above. What does that really mean in practice?

To delve into the discarded information, in whatever form it takes (of large scale or small scale infrastructures of surveillance or identification), means a profound methodological shift in where social theory about information systems begins and ends. One important tactic that has been well-elucidated in recent studies of information systems[26] is that of stretching the traditional ethnographic study, historical case, or place-based enterprise, in order to describe aspects of infrastructures. This provides details about the subtleties of creation of residual categories and how they are managed in certain situations. A suggestion made and repeated many times by Star, Bowker and other theorists from this tradition is to begin with the experiences of those who inhabit the residuals.

As a methodological question as well as a question of social justice, it is easy to demand everything of this form of ethnography, or everything of large-scale analysis, or of monitoring. Often, a last resort is simply for an analyst to graft perspectives together higgledy-piggledy. This kind of activity is common in sci-

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25 Cf. Susan Leigh Star and Anselm Strauss: Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work, in: Computer Supported Cooperative Work 8 1/2 (1999), p. 9–30.

26 E.g. Bowker and Star: Sorting things out (as note 13); Bowker: Memory practices (as note 20); Martha Lampland and Susan Leigh Star (eds.): Standards and Their Stories: How Quantifying, Classifying, and Formalizing Practices Shape Everyday Life, Ithaca 2009.

entific research – not because of bad science, but because this is a kind of unknown phenomenon yet to be integrated in most scientific work practices.

A residual (person, thing, event, animal) is always residual relative to some set of analytic questions. Often, residuals are Other because they are less valuable than a dominant or naturalized perspective from a given point of view. The stratification of perspectives, to use the delectable phrase of George Herbert Mead, is collectively in some sense what creates social and moral order.[27] So in the absence of an absolute residual rule, we are thrown together as anthropologists/sociologists, and information, computer, medical and natural scientists of all sorts.

The investigation of lived experience begins with this set of caveats, then. Experiences are created relative to a set of questions and perspectives; thus, the experiences of residuals are also relative to them. The prevailing social justice questions are not served by exemplifying »the Other« in an arbitrary way. Movement »up and down« levels of scale is extremely difficult until and unless scale itself has been interrogated. Analysis of this movement, documentation of it, even visualization of it is a major challenge to large-scale knowledge systems.

This line of inquiry is neither a politics of pity, nor a politics of highly individualized locales, to paraphrase the work of Luc Boltanski.[28] Boltanski, following the work of Hannah Arendt, argues that in the modern situation, we are faced with a dilemma. This dilemma is that we are moved to help the suffering of others at an emotional level through viewing of particular exemplars, such as the wide-eyed children often seen in philanthropic exhortations. On the other hand, this representation is what he calls »hyper-singularized«.[29] So one would, if seeking a universal sort of amelioration of suffering (including that of designated Others), choose to find a more general basis for charity:

»The particular problem that a politics of pity must confront thus concerns this paradoxical treatment of *distance*. To avoid the local such a politics must bring together particular situations and thereby convey them, that is to say cross a distance, while retaining as far as possible the qualities conferred on them by a face to face encounter. This is not a new problem [...T]he spectacle of suffering, incongruous when viewed at a *distance* by people who do not suffer, and the unease that this spectacle infallibly provokes – so evident today when eating our evening meal we see famished or massacred bodies paraded before our eyes in our home – is not a technical consequence of modern means of communication...«[30]

I agree that the apparition of the ultimate social »Other« of uncertain purview

27   George Herbert Mead: Selected Writings, ed. Andrew J. Reck, Chicago, IL 1981
28   Luc Boltanski: Distant Suffering: Morality, Media, and Politics, Cambridge, UK 1999.
29   Ibid, p. 12.
30   Ibid.

is not only technical, and not only modern. It is old and new, here and there. This paper is a modest suggestion to argue for a methodology of residuality, emphasizing the inclusion of experience in the investigation of the not elsewhere classified. Some of the domains we have yet to learn much about in this respect include the generation and effect of standards and their residuals on people's lives; the ecologies that pertain at different sizes, depths and ages of infrastructures and their normative images; shadow, ghost, and silent knowledges, and how those may be best investigated.